

**START**



Title: OFFICIAL GAZETTE OF THE UNITED STATES PATENT AND TRADEMARK  
OFFICE. PATENTS.

Volume: 1174

Issues: 1 - 2  
PATENTS: 5,410,755-5,414,866

Date: MAY 2 - MAY 9, 1995

UMI Number: 10426.00

Note:

REEL: 6

**UMI**

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Ann Arbor, MI 48103

UMI Number: 10426.00

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Trademark  
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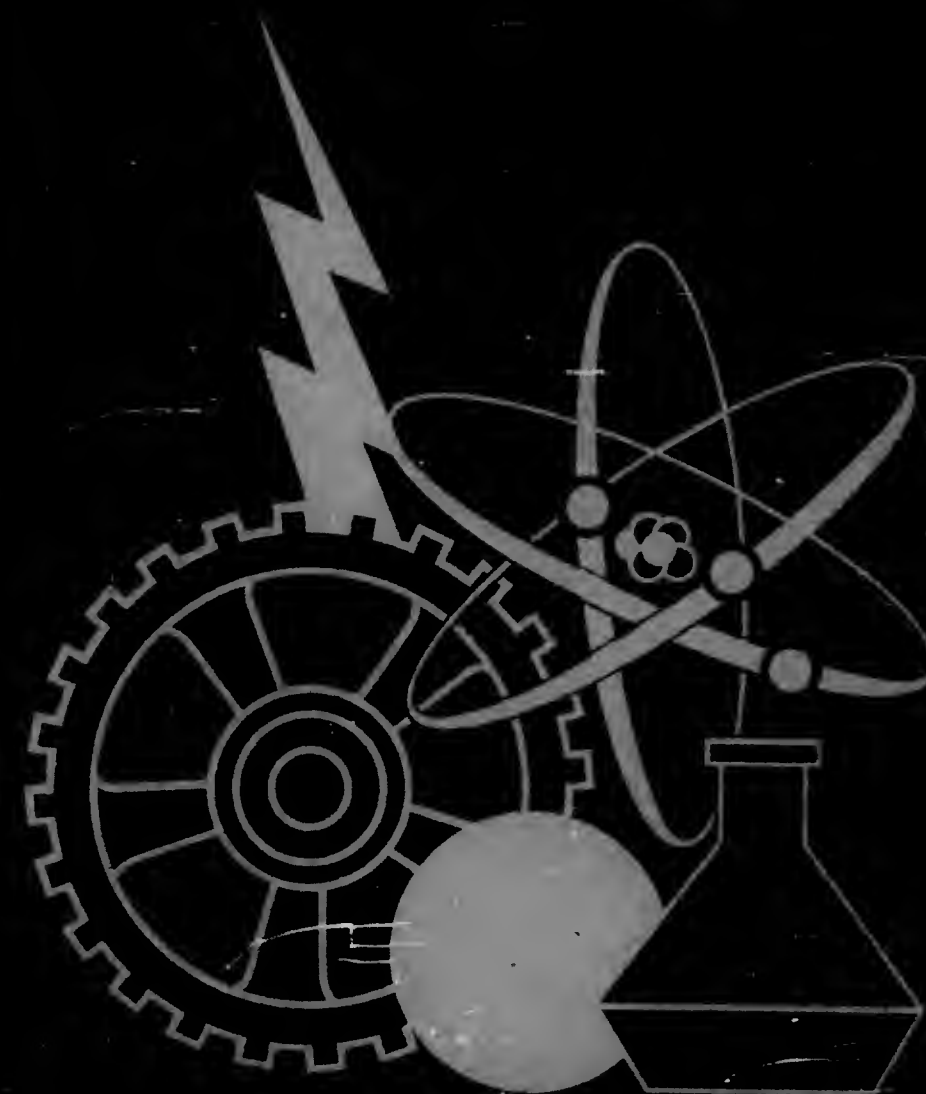
Vol. 1174 Number 1

# OFFICIAL GAZETTE

of the  
UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

May 2, 1995



PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

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## PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning PCT member countries, see the notice appearing in the *Official Gazette* at 1168 O.G. 100, on Nov. 29, 1994.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52, on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2, on July 7, 1987, and at 1091 O.G. 2, on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed, effective Oct. 1, 1994, due to a change in the exchange rate of the U.S. dollar with regard to the German mark, and was announced in the *Official Gazette* at 1165 O.G. 81, on Aug. 23, 1994.

International fees were changed, effective on January 1, 1995, due to a change in the exchange rate of the U. S. dollar with regard to the Swiss franc, and were announced in the *Official Gazette* at 1168 O.G. 99, on Nov. 29, 1994.

Certain domestic PCT fees and charges for International Search and Preliminary Examination were changed, effective Oct. 1, 1994, and were announced in the *Official Gazette* at 1165 O.G. 132, on Aug. 30, 1994.

The schedule of PCT fees (in U.S. dollars), effective Jan. 1, 1995, is as follows:

#### International Application (PCT Chapter I) fees:

Transmittal fee.....	210.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed.....	640.00
—Corresponding prior U.S. national application filed.....	420.00
—Supplemental search fee, per additional invention (payable only upon invitation).....	180.00
European Patent Office as ISA.....	1537.00

#### International fees

Basic fee.....	604.00
Basic Supplemental fee (for each page over 30).....	12.00
Designation fee per country or region	
—For the first 10 national or regional offices designated.....	147.00
—For each designation in excess of 10 offices.....	No Charge

#### Precautionary designation fee and confirmation fee for each precautionary designation confirmed (PCT Rule 15.5)

—Designation fee.....	147.00
—Confirmation fee.....	73.50

#### International Application (PCT Chapter II) fees associated with filing a Demand for Preliminary Examination:

Handling fee.....	185.00
Preliminary examination fee	

#### USPTO as International Preliminary Examining Authority (IPEA)

—USPTO was ISA in PCT Chapter I.....	460.00
—Additional examination fee, per additional invention (payable only upon invitation).....	140.00
—USPTO was not ISA in PCT Chapter I.....	690.00
—Additional examination fee, per additional invention (payable only upon invitation).....	240.00

U.S. National Stage Fees	Small Entity	Regular
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#### Basic National fee

##### USPTO was IPEA

—All claims presented satisfied provisions of PCT Article 33(2) to (4).....	46.00	92.00
—All claims presented did not satisfy provisions of PCT Article 33(2) to (4).....	330.00	660.00
USPTO was ISA but not IPEA.....	365.00	730.00

##### USPTO was neither ISA nor IPEA

—Filed without a search report from the European Patent Office or the Japanese Patent Office.....	490.00	980.00
—Filed with a search report from the European Patent Office or the Japanese Patent Office.....	425.00	850.00

#### Other National fees

—For each independent claim in excess of 3.....	38.00	76.00
—For each claim in excess of 20 ..	11.00	22.00
—For each application containing a multiple dependent claim.....	120.00	240.00
—Surcharge for filing oath or declaration after the time limit applicable under PCT Article 22 or 39(1).....	65.00	130.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1).....	130.00	130.00

Dec. 12, 1994

BRUCE A. LEHMAN  
Assistant Secretary of Commerce and  
Commissioner of Patents and Trademarks

#### Notice of Maintenance Fees Payable

Title 37 Code of Federal Regulations (CFR), Section 1.362(d) provides that maintenance fees may be paid without surcharge for the six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(h), as amended effective Dec. 16, 1991. If the maintenance fee is not paid in the patent requiring such payment the patent will expire on the 4th, 8th, or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on April 28, 1992 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:



Utility Patents 5,107,542 through 5,109,545  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on April 26, 1988 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,739,522 through 4,741,049  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on April 24, 1984 for which maintenance fees due at 11 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,443,891 through 4,445,230  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

For patents based on applications filed on or after Dec. 12, 1980, but before Aug. 27, 1982, patent owners must establish small entity status according to 37 CFR 1.27 if they have not done so and if they wish to pay the small entity amount.

The current amounts of the maintenance fees due at 3 years and six months, 7 years and six months, and 11 years and six months are set forth in 37 CFR 1.20(e)-(g), as amended Oct. 1, 1994, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§ 1.9(f)) .....\$480.00  
By other than a small entity .....\$960.00

(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§ 1.9(f)) .....\$965.00  
By other than a small entity .....\$1,930.00

(g) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 12 years; the fee is due by eleven years and six months after the original grant:

By a small entity (§ 1.9(f)) .....\$1,450.00  
By other than a small entity .....\$2,900.00

The amount of the surcharge for paying the maintenance fee during the grace period or after expiration of the patent are set forth in 37 CFR 1.20(h), and (i) which are reproduced below:

(h) Surcharge for paying a maintenance fee during the 6 month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980:

By a small entity (§ 1.9(f)) .....\$65.00  
By other than a small entity .....\$130.00

(i) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been:

(1) unavoidable .....\$640.00  
(2) unintentional .....\$1,500.00

### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fee

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

### PATENTS WHICH EXPIRED February 22, 1995 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 31,954 (4,374,822)	06/593,070 (06/327,668)	07/23/85 (02/22/83)
Re. 32,759 (4,643,936)	07/023,586 (06/829,638)	10/04/88 (02/17/87)
4,374,439	06/222,655	02/22/83
4,374,442	06/287,347	02/22/83
4,374,444	06/241,592	02/22/83
4,374,445	06/237,581	02/22/83
4,374,458	06/222,941	02/22/83
4,374,463	06/344,910	02/22/83
4,374,468	06/242,193	02/22/83
4,374,496	06/221,709	02/22/83
4,374,510	06/249,458	02/22/83
4,374,511	06/219,108	02/22/83
4,374,514	06/360,076	02/22/83
4,374,516	06/236,849	02/22/83
4,374,528	06/282,332	02/22/83
4,374,569	06/288,109	02/22/83
4,374,571	06/236,311	02/22/83
4,374,576	06/230,634	02/22/83
4,374,579	06/217,165	02/22/83
4,374,609	06/265,938	02/22/83
4,374,613	06/270,238	02/22/83
4,374,616	06/276,627	02/22/83
4,374,621	06/315,970	02/22/83
4,374,643	06/284,532	02/22/83
4,374,648	06/291,691	02/22/83
4,374,654	06/289,172	02/22/83
4,374,658	06/323,085	02/22/83
4,374,660	06/293,913	02/22/83
4,374,663	06/224,882	02/22/83
4,374,666	06/244,379	02/22/83
4,374,667	06/311,339	02/22/83
4,374,678	06/269,292	02/22/83
4,374,680	06/246,260	02/22/83
4,374,684	06/226,291	02/22/83
4,374,688	06/244,635	02/22/83
4,374,692	06/240,454	02/22/83
4,374,696	06/246,111	02/22/83
4,374,697	06/217,217	02/22/83
4,374,699	06/281,759	02/22/83
4,374,705	06/232,307	02/21/83
4,374,716	06/290,460	02/22/83
4,374,720	06/295,161	02/22/83
4,374,729	06/228,543	02/22/83
4,374,730	06/215,758	02/22/83
4,374,733	06/249,774	02/22/83
4,374,737	06/285,431	02/22/83
4,374,745	06/292,752	02/22/83
4,374,752	06/279,158	02/22/83
4,374,766	06/383,404	02/22/83
4,374,768	06/254,705	02/22/83
4,374,769	06/274,599	02/22/83
4,374,773	06/225,747	02/22/83
4,374,789	06/300,224	02/22/83
4,374,802	06/302,550	02/22/83
4,374,819	06/218,845	02/22/83
4,374,824	06/228,791	02/22/83
4,374,826	06/282,109	02/22/83

Patent Number	Serial Number	Issue Date	4,642,868	06/713,958	02/17/87
4,374,831	06/334,939	02/22/83	4,642,871	06/738,790	02/17/87
4,374,832	06/334,940	02/22/83	4,642,873	06/547,532	02/17/87
4,374,833	06/286,508	02/22/83	4,642,882	06/767,905	02/17/87
4,374,834	06/247,743	02/22/83	4,642,885	06/758,627	02/17/87
4,374,835	06/224,710	02/22/83	4,642,887	06/768,592	02/17/87
4,374,837	06/288,847	02/22/83	4,642,891	06/722,702	02/17/87
4,374,842	06/250,299	02/22/83	4,642,892	06/678,438	02/17/87
4,374,843	06/293,574	02/22/83	4,642,895	06/794,826	02/17/87
4,374,844	06/316,627	02/22/83	4,642,901	06/753,521	02/17/87
4,374,845	06/313,847	02/22/83	4,642,902	06/738,475	02/17/87
4,374,858	06/239,937	02/22/83	4,642,906	06/765,209	02/17/87
4,374,871	06/268,549	02/22/83	4,642,908	06/727,886	02/17/87
4,374,874	06/271,437	02/22/83	4,642,918	06/783,449	02/17/87
4,374,881	06/247,027	02/22/83	4,642,919	06/707,146	02/17/87
4,374,882	06/332,276	02/22/83	4,642,921	06/706,882	02/17/87
4,374,891	06/239,755	02/22/83	4,642,923	06/743,285	02/17/87
4,374,895	06/277,210	02/22/83	4,642,931	06/857,994	02/17/87
4,374,897	06/240,436	02/22/83	4,642,932	06/788,480	02/17/87
4,374,901	06/333,197	02/22/83	4,642,934	06/722,469	02/17/87
4,374,902	06/233,569	02/22/83	4,642,936	06/731,726	02/17/87
4,374,906	06/306,835	02/22/83	4,642,937	06/651,563	02/17/87
4,374,918	06/302,504	02/22/83	4,642,938	06/765,448	02/17/87
4,374,920	06/287,465	02/22/83	4,642,945	06/752,259	02/17/87
4,374,924	06/351,812	02/22/83	4,642,950	06/247,287	02/17/87
4,374,928	06/269,150	02/22/83	4,642,952	06/700,266	02/17/87
4,374,929	06/317,372	02/22/83	4,642,953	06/827,818	02/17/87
4,374,930	06/312,474	02/22/83	4,642,954	06/751,002	02/17/87
4,374,936	06/263,724	02/22/83	4,642,955	06/845,846	02/17/87
4,374,937	06/279,319	02/22/83	4,642,957	06/839,868	02/17/87
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4,374,948	06/266,778	02/22/83	4,642,971	06/712,548	02/17/87
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4,374,981	06/323,705	02/22/83	4,642,989	06/613,604	02/17/87
4,374,983	06/240,104	02/22/83	4,642,992	06/826,670	02/17/87
4,374,986	06/289,667	02/22/83	4,643,000	06/797,797	02/17/87
4,374,988	06/318,611	02/22/83	4,643,003	06/775,559	02/17/87
4,374,991	06/221,091	02/22/83	4,643,004	06/839,591	02/17/87
4,374,992	06/286,830	02/22/83	4,643,005	06/699,847	02/17/87
4,374,993	06/271,323	02/22/83	4,643,014	06/786,684	02/17/87
4,374,999	06/222,184	02/22/83	4,643,015	06/778,802	02/17/87
4,375,007	06/320,590	02/22/83	4,643,018	06/677,566	02/17/87
4,375,010	06/215,691	02/22/83	4,643,021	06/790,186	02/17/87
4,375,011	06/241,371	02/22/83	4,643,022	06/617,803	02/17/87
4,375,020	06/273,456	02/22/83	4,643,027	06/748,771	02/17/87
4,375,030	06/259,708	02/22/83	4,643,035	06/732,591	02/17/87
4,375,041	06/347,270	02/22/83	4,643,036	06/734,196	02/17/87
4,375,046	06/244,369	02/22/83	4,643,040	06/763,351	02/17/87
4,375,047	06/286,298	02/22/83	4,643,044	06/721,449	02/17/87
4,375,053	06/220,227	02/22/83	4,643,051	06/806,253	02/17/87
4,375,055	06/245,173	02/22/83	4,643,056	06/817,218	02/17/87
4,375,078	06/247,962	02/22/83	4,643,059	06/759,048	02/17/87
4,642,814	06/793,777	02/17/87	4,643,060	06/825,447	02/17/87
4,642,815	06/824,792	02/17/87	4,643,063	06/761,752	02/17/87
4,642,820	06/777,932	02/17/87	4,643,069	06/761,448	02/17/87
4,642,822	06/654,947	02/17/87	4,643,071	06/749,002	02/17/87
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4,642,848	06/771,399	02/17/87	4,643,098	06/662,023	02/17/87
4,642,850	06/681,667	02/17/87	4,643,103	06/715,673	02/17/87
4,642,851	06/867,457	02/17/87	4,643,104	06/786,041	02/17/87
4,642,852	06/744,271	02/17/87	4,643,106	06/660,148	02/17/87
4,642,853	06/846,279	02/17/87	4,643,110	06/882,762	02/17/87
4,642,854	06/714,843	02/17/87	4,643,113	06/702,038	02/17/87
4,642,856	06/361,521	02/17/87	4,643,114	06/742,119	02/17/87
4,642,858	06/787,141	02/17/87	4,643,115	06/847,160	02/17/87
4,642,861	06/785,603	02/17/87	4,643,117	06/797,818	02/17/87
4,642,864	06/811,258	02/17/87	4,643,120	06/788,304	02/17/87
4,642,866	06/737,107	02/17/87	4,643,121	06/731,837	02/17/87
			4,643,122	06/633,554	02/17/87



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Patent Number	Serial Number	Issue Date	4,643,340	06/800,047	02/17/87
4,643,124	06/733,387	02/17/87	4,643,341	06/872,265	02/17/87
4,643,127	06/657,228	02/17/87	4,643,353	06/702,667	02/17/87
4,643,128	06/739,568	02/17/87	4,643,357	06/800,781	02/17/87
4,643,130	06/576,508	02/17/87	4,643,359	06/713,369	02/17/87
4,643,133	06/711,673	02/17/87	4,643,367	06/733,671	02/17/87
4,643,134	06/743,133	02/17/87	4,643,373	06/686,047	02/17/87
4,643,135	06/785,951	02/17/87	4,643,375	06/748,925	02/17/87
4,643,142	06/824,194	02/17/87	4,643,376	06/695,759	02/17/87
4,643,145	06/679,308	02/17/87	4,643,379	06/791,809	02/17/87
4,643,148	06/776,691	02/17/87	4,643,380	06/822,483	02/17/87
4,643,151	06/813,720	02/17/87	4,643,384	06/815,938	02/17/87
4,643,154	06/769,467	02/17/87	4,643,386	06/672,071	02/17/87
4,643,155	06/658,264	02/17/87	4,643,387	06/630,070	02/17/87
4,643,163	06/809,426	02/17/87	4,643,388	06/354,123	02/17/87
4,643,166	06/681,160	02/17/87	4,643,390	06/738,921	02/17/87
4,643,168	06/718,059	02/17/87	4,643,391	06/723,068	02/17/87
4,643,170	06/802,377	02/17/87	4,643,392	06/691,064	02/17/87
4,643,172	06/789,417	02/17/87	4,643,396	06/803,057	02/17/87
4,643,173	06/696,256	02/17/87	4,643,399	06/733,717	02/17/87
4,643,177	06/620,024	02/17/87	4,643,401	06/770,074	02/17/87
4,643,178	06/603,228	02/17/87	4,643,403	06/697,905	02/17/87
4,643,183	06/716,482	02/17/87	4,643,405	06/783,323	02/17/87
4,643,186	06/792,852	02/17/87	4,643,410	06/724,181	02/17/87
4,643,195	06/648,480	02/17/87	4,643,418	06/708,004	02/17/87
4,643,198	06/578,701	02/17/87	4,643,419	06/695,546	02/17/87
4,643,199	06/834,573	02/17/87	4,643,420	06/689,131	02/17/87
4,643,200	06/844,889	02/17/87	4,643,423	06/666,689	02/17/87
4,643,204	06/542,265	02/17/87	4,643,425	06/665,062	02/17/87
4,643,205	06/576,305	02/17/87	4,643,430	06/719,059	02/17/87
4,643,210	06/764,634	02/17/87	4,643,441	06/789,555	02/17/87
4,643,212	06/594,324	02/17/87	4,643,445	06/662,340	02/17/87
4,643,214	06/700,447	02/17/87	4,643,447	06/819,732	02/17/87
4,643,217	06/737,521	02/17/87	4,643,451	06/729,478	02/17/87
4,643,219	06/513,987	02/17/87	4,643,456	06/777,914	02/17/87
4,643,222	06/724,347	02/17/87	4,643,458	06/597,640	02/17/87
4,643,223	06/829,255	02/17/87	4,643,460	06/698,635	02/17/87
4,643,227	06/788,723	02/17/87	4,643,467	06/401,300	02/17/87
4,643,230	06/724,770	02/17/87	4,643,472	06/686,114	02/17/87
4,643,232	06/808,649	02/17/81	4,643,474	06/701,462	02/17/87
4,643,234	06/775,806	02/17/87	4,643,476	06/781,873	02/17/87
4,643,235	06/802,861	02/17/87	4,643,480	06/761,524	02/17/87
4,643,236	06/805,718	02/17/87	4,643,485	06/673,830	02/17/87
4,643,241	06/757,876	02/17/87	4,643,488	06/744,499	02/17/87
4,643,242	06/802,837	02/17/87	4,643,490	06/747,120	02/17/87
4,643,243	06/762,540	02/17/87	4,643,496	06/794,138	02/17/87
4,643,246	06/753,585	02/17/87	4,643,504	06/722,225	02/17/87
4,643,248	06/829,706	02/17/87	4,643,507	06/726,873	02/17/87
4,643,250	06/882,417	02/17/87	4,643,509	06/728,924	02/17/87
4,643,251	06/695,798	02/17/87	4,643,511	06/810,723	02/17/87
4,643,258	06/732,850	02/17/87	4,643,513	06/807,966	02/17/87
4,643,259	06/657,623	02/17/87	4,643,514	06/518,440	02/17/87
4,643,260	06/781,919	02/17/87	4,643,517	06/724,984	02/17/87
4,643,263	06/651,620	02/17/87	4,643,524	06/579,840	02/17/87
4,643,264	06/668,920	02/17/87	4,643,525	06/686,066	02/17/87
4,643,265	06/707,895	02/17/87	4,643,533	06/721,977	02/17/87
4,643,266	06/764,477	02/17/87	4,643,534	06/642,331	02/17/87
4,643,268	06/640,319	02/17/87	4,643,537	06/617,424	02/17/87
4,643,275	06/819,391	02/17/87	4,643,539	06/666,638	02/17/87
4,643,279	06/730,733	02/17/87	4,643,544	06/800,275	02/17/87
4,643,281	06/830,341	02/17/87	4,643,545	06/873,041	02/17/87
4,643,287	06/749,910	02/17/87	4,643,548	06/751,596	02/17/87
4,643,290	06/804,388	02/17/87	4,643,565	06/622,553	02/17/87
4,643,291	06/820,855	02/17/87	4,643,569	06/746,177	02/17/87
4,643,292	06/730,466	02/17/87	4,643,577	06/628,238	02/17/87
4,643,294	06/712,168	02/17/87	4,643,581	06/655,556	02/17/87
4,643,302	06/669,844	02/17/87	4,643,583	06/687,229	02/17/87
4,643,304	06/713,314	02/17/87	4,643,590	06/712,273	02/17/87
4,643,311	06/727,401	02/17/87	4,643,592	06/669,805	02/17/87
4,643,312	06/866,801	02/17/87	4,643,593	06/845,175	02/17/87
4,643,314	06/679,396	02/17/87	4,643,594	06/808,931	02/17/87
4,643,316	06/678,718	02/17/87	4,643,598	06/764,464	02/17/87
4,643,322	06/771,497	02/17/87	4,643,600	06/834,962	02/17/87
4,643,328	06/799,867	02/17/87	4,643,601	06/655,496	02/17/87
4,643,333	06/850,698	02/17/87	4,643,603	06/719,245	02/17/87
4,643,334	06/689,376	02/17/87	4,643,604	06/734,727	02/17/87
4,643,337	06/665,038	02/17/81	4,643,611	06/721,077	02/17/87
			4,643,612	06/682,725	02/17/87
			4,643,615	06/773,108	02/17/87

Patent Number	Serial Number	Issue Date	4,643,889	06/846,254	02/17/87
4,643,616	06/672,944	02/17/87	4,643,891	06/542,171	02/17/87
4,643,621	06/477,564	02/17/87	4,643,896	06/618,380	02/17/87
4,643,624	06/743,565	02/17/87	4,643,901	06/503,323	02/17/87
4,643,627	06/782,849	02/17/87	4,643,905	06/608,887	02/17/87
4,643,634	06/522,657	02/17/87	4,643,914	06/763,124	02/17/87
4,643,639	06/685,472	02/17/87	4,643,918	06/729,850	02/17/87
4,643,651	06/771,843	02/17/87	4,643,920	06/836,911	02/17/87
4,643,653	06/782,285	02/17/87	4,643,921	06/759,429	02/17/87
4,643,659	06/713,773	02/17/87	4,643,922	06/763,834	02/17/87
4,643,661	06/668,901	02/17/87	4,643,933	06/739,323	02/17/87
4,643,663	06/797,686	02/17/87	4,643,942	06/689,758	02/17/87
4,643,666	06/659,123	02/17/87	4,643,945	06/771,702	02/17/87
4,643,669	06/769,455	02/17/87	4,643,946	06/797,100	02/17/87
4,643,674	06/769,008	02/17/87	4,643,948	06/714,770	02/17/87
4,643,675	06/757,090	02/17/87	4,643,952	06/781,500	02/17/87
4,643,678	06/696,509	02/17/87	4,643,953	06/846,400	02/17/87
4,643,687	06/702,262	02/17/87	4,643,954	06/812,575	02/17/87
4,643,689	06/636,544	02/17/87	4,643,955	06/751,391	02/17/87
4,643,694	06/773,880	02/17/87	4,643,956	06/686,063	02/17/87
4,643,695	06/764,735	02/17/87	4,643,962	06/789,953	02/17/87
4,643,703	06/745,666	02/17/87	4,643,963	06/666,906	02/17/87
4,643,706	06/660,910	02/17/87	4,643,967	06/626,903	02/17/87
4,643,707	06/831,436	02/17/87	4,643,969	06/494,040	02/17/87
4,643,709	06/729,241	02/17/87	4,643,970	06/469,004	02/17/87
4,643,712	06/789,144	02/17/87	4,643,972	06/762,686	02/17/87
4,643,714	06/762,562	02/17/87	4,643,974	06/575,334	02/17/87
4,643,721	06/798,439	02/17/87	4,643,977	06/710,217	02/17/87
4,643,727	06/689,481	02/17/87	4,643,981	06/550,170	02/17/87
4,643,732	06/789,587	02/17/87	4,643,982	06/804,517	02/17/87
4,643,740	06/787,377	02/17/87	4,643,988	06/610,444	02/17/87
4,643,742	06/717,311	02/17/87	4,643,989	06/642,131	02/17/87
4,643,743	06/465,434	02/17/87	4,643,990	06/452,827	02/17/87
4,643,744	06/700,977	02/17/87	4,643,995	06/682,773	02/17/87
4,643,755	06/303,794	02/17/87	4,643,997	06/694,643	02/17/87
4,643,756	06/715,229	02/17/87	4,643,998	06/545,623	02/17/87
4,643,758	06/669,396	02/17/87	4,643,999	06/681,948	02/17/87
4,643,759	06/743,303	02/17/87	4,644,000	06/715,564	02/17/87
4,643,761	06/695,605	02/17/87	4,644,002	06/774,653	02/17/87
4,643,763	06/774,527	02/17/87	4,644,006	06/623,588	02/17/87
4,643,766	06/840,746	02/17/87	4,644,007	06/755,373	02/17/87
4,643,768	06/774,323	02/17/87	4,644,010	06/827,482	02/17/87
4,643,773	06/588,479	02/17/87	4,644,015	06/860,952	02/17/87
4,643,775	06/626,072	02/17/87	4,644,016	06/761,278	02/17/87
4,643,776	06/723,443	02/17/87	4,644,023	06/732,183	02/17/87
4,643,779	06/661,818	02/17/87	4,644,024	06/443,721	02/17/87
4,643,781	06/732,739	02/17/87	4,644,029	06/773,483	02/17/87
4,643,786	06/731,584	02/17/87	4,644,033	06/737,573	02/17/87
4,643,791	06/813,970	02/17/87	4,644,035	06/677,655	02/17/87
4,643,795	06/734,164	02/17/87	4,644,037	06/635,986	02/17/87
4,643,798	06/721,460	02/17/87	4,644,038	06/781,841	02/17/87
4,643,805	06/836,952	02/17/87	4,644,040	06/847,810	02/17/87
4,643,807	06/808,777	02/17/87	4,644,041	06/752,568	02/17/87
4,643,814	06/722,968	02/17/87	4,644,042	06/770,297	02/17/87
4,643,815	06/676,882	02/17/87	4,644,050	06/775,768	02/17/87
4,643,817	06/742,476	02/17/87	4,644,051	06/686,411	02/17/87
4,643,820	06/832,196	02/17/87	4,644,053	06/704,122	02/17/87
4,643,822	06/706,487	02/17/87	4,644,061	06/705,780	02/17/87
4,643,827	06/752,375	02/17/87	4,644,065	06/610,456	02/17/87
4,643,830	06/621,740	02/17/87	4,644,069	06/762,755	02/17/87
4,643,832	06/660,942	02/17/87	4,644,070	06/683,018	02/17/87
4,643,839	06/600,933	02/17/87	4,644,072	06/722,932	02/17/87
4,643,847	06/797,081	02/17/87	4,644,074	06/721,746	02/17/87
4,643,850	06/682,777	02/17/87	4,644,075	06/807,096	02/17/87
4,643,852	06/814,657	02/17/87	4,644,076	06/722,276	02/17/87
4,643,854	06/640,928	02/17/87	4,644,079	06/633,240	02/17/87
4,643,860	06/865,656	02/17/87	4,644,087	06/742,575	02/17/87
4,643,861	06/751,201	02/17/87	4,644,089	06/884,327	02/17/87
4,643,862	06/755,691	02/17/87	4,644,090	06/836,892	02/17/87
4,643,863	06/695,831	02/17/87	4,644,094	06/714,272	02/17/87
4,643,864	06/695,830	02/17/87	4,644,109	06/785,346	02/17/87
4,643,866	06/526,172	02/17/87	4,644,113	06/785,697	02/17/87
4,643,870	06/800,566	02/17/87	4,644,118	06/718,524	02/17/87
4,643,872	06/591,569	02/17/87	4,644,119	06/590,666	02/17/87
4,643,878	06/662,639	02/17/87	4,644,125	06/778,824	02/17/87
4,643,881	06/680,626	02/17/87	4,644,129	06/801,421	02/17/87
4,643,882	06/586,288	02/17/87	4,644,130	06/735,276	02/17/87
4,643,885	06/713,461	02/17/87	4,644,136	06/702,791	02/17/87
		02/17/87	4,644,138	06/488,371	02/17/87

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Patent Number	Serial Number	Issue Date	4,644,494	06/577,215	02/17/87
4,644,139	06/807,673	02/17/87	4,644,496	06/457,197	02/17/87
4,644,147	06/883,863	02/17/87	4,644,497	06/559,559	02/17/87
4,644,152	06/677,353	02/17/87	4,644,498	06/780,539	02/17/87
4,644,158	06/661,971	02/17/87	4,644,501	06/680,125	02/17/87
4,644,161	06/800,640	02/17/87	4,644,503	06/567,215	02/17/87
4,644,165	06/468,279	02/17/87	4,644,505	06/619,436	02/17/87
4,644,167	06/706,285	02/17/87	4,644,506	06/593,262	02/17/87
4,644,169	06/752,805	02/17/87	4,644,509	06/821,824	02/17/87
4,644,171	06/720,498	02/17/87	4,644,522	06/638,290	02/17/87
4,644,174	06/775,973	02/17/87	4,644,524	06/693,287	02/17/87
4,644,182	06/796,452	02/17/87	4,644,534	06/751,241	02/17/87
4,644,188	06/657,807	02/17/87	4,644,538	06/432,894	02/17/87
4,644,193	06/596,863	02/17/87	4,644,548	06/573,751	02/17/87
4,644,202	06/722,915	02/17/87	4,644,553	06/671,390	02/17/87
4,644,207	06/722,914	02/17/87	4,644,555	06/857,226	02/17/87
4,644,210	06/808,195	02/17/87	4,644,556	06/782,064	02/17/87
4,644,212	06/730,580	02/17/87	4,644,557	06/573,752	02/17/87
4,644,213	06/823,478	02/17/87	4,644,563	06/751,078	02/17/87
4,644,216	06/725,980	02/17/87	4,644,567	06/389,073	02/17/87
4,644,217	06/731,553	02/17/87	4,644,569	06/767,478	02/17/87
4,644,221	06/260,959	02/17/87	4,644,573	06/637,872	02/17/87
4,644,226	06/863,824	02/17/87	4,644,574	06/226,203	02/17/87
4,644,229	06/610,254	02/17/87	4,644,576	06/753,486	02/17/87
4,644,234	06/775,548	02/17/87	4,644,580	06/727,470	02/17/87
4,644,237	06/788,262	02/17/87	4,644,584	06/754,817	02/17/87
4,644,238	06/657,404	02/17/87	4,993,078	06/495,128	02/17/87
4,644,241	06/742,202	02/17/87	4,993,086	07/442,506	02/19/91
4,644,242	06/635,344	02/17/87	4,993,088	07/568,786	02/19/91
4,644,244	06/771,415	02/17/87	4,993,089	07/439,163	02/19/91
4,644,249	06/758,956	02/17/87	4,993,090	07/496,784	02/19/91
4,644,252	06/809,033	02/17/87	4,993,093	07/518,039	02/19/91
4,644,254	06/757,443	02/17/87	4,993,095	07/437,123	02/19/91
4,644,258	06/725,669	02/17/87	4,993,098	07/434,948	02/19/91
4,644,259	06/666,804	02/17/87	4,993,099	07/427,112	02/19/91
4,644,261	06/706,878	02/17/87	4,993,100	07/457,240	02/19/91
4,644,263	06/681,178	02/17/87	4,993,102	07/410,080	02/19/91
4,644,268	06/721,101	02/17/87	4,993,107	07/239,746	02/19/91
4,644,273	06/750,970	02/17/87	4,993,110	07/351,520	02/19/91
4,644,274	06/481,138	02/17/87	4,993,117	07/427,640	02/19/91
4,644,277	06/689,543	02/17/87	4,993,118	07/472,994	02/19/91
4,644,289	06/677,228	02/17/87	4,993,124	07/471,515	02/19/91
4,644,296	06/726,091	02/17/87	4,993,126	07/468,604	02/19/91
4,644,297	06/835,682	02/17/87	4,993,129	07/522,919	02/19/91
4,644,306	06/754,707	02/17/87	4,993,135	07/373,516	02/19/91
4,644,310	06/592,199	02/17/87	4,993,145	07/378,903	02/19/91
4,644,314	06/868,384	02/17/87	4,993,147	06/944,485	02/19/91
4,644,320	06/651,223	02/17/87	4,993,152	07/402,891	02/19/91
4,644,328	06/437,846	02/17/87	4,993,156	07/462,683	02/19/91
4,644,330	06/658,492	02/17/87	4,993,157	07/399,157	02/19/91
4,644,332	06/788,904	02/17/87	4,993,159	07/519,808	02/19/91
4,644,343	06/781,943	02/17/87	4,993,166	07/569,862	02/19/91
4,644,344	06/681,351	02/17/87	4,993,167	07/335,853	02/19/91
4,644,345	06/518,417	02/17/87	4,993,169	07/332,153	02/19/91
4,644,355	06/668,749	02/17/87	4,993,171	07/537,021	02/19/91
4,644,356	06/666,841	02/17/87	4,993,175	07/440,919	02/19/91
4,644,357	06/772,581	02/17/87	4,993,177	07/231,367	02/19/91
4,644,363	06/733,836	02/17/87	4,993,186	07/418,518	02/19/91
4,644,365	06/699,577	02/17/87	4,993,187	07/481,699	02/19/91
4,644,366	06/655,046	02/17/87	4,993,189	07/421,344	02/19/91
4,644,367	06/675,654	02/17/87	4,993,192	07/401,757	02/19/91
4,644,379	06/677,952	02/17/87	4,993,195	07/440,802	02/19/91
4,644,380	06/288,378	02/17/87	4,993,201	07/496,547	02/19/91
4,644,382	06/820,895	02/17/87	4,993,202	07/343,431	02/19/91
4,644,393	06/840,465	02/17/87	4,993,208	07/327,913	02/19/91
4,644,394	06/815,376	02/17/87	4,993,210	07/249,313	02/19/91
4,644,395	06/783,809	02/17/87	4,993,211	07/490,441	02/19/91
4,644,416	06/772,936	02/17/87	4,993,214	07/435,143	02/19/91
4,644,421	06/744,153	02/17/87	4,993,224	07/419,932	02/19/91
4,644,422	06/506,658	02/17/87	4,993,225	07/465,866	02/19/91
4,644,429	06/498,178	02/17/87	4,993,229	07/404,580	02/19/91
4,644,437	06/794,166	02/17/87	4,993,233	07/369,594	02/19/91
4,644,441	06/637,139	02/17/87	4,993,235	07/531,102	02/19/91
4,644,448	06/836,484	02/17/87	4,993,237	07/385,103	02/19/91
4,644,460	06/682,008	02/17/87	4,993,239	07/359,798	02/19/91
4,644,462	06/529,335	02/17/87	4,993,240	07/410,690	02/19/91
4,644,484	06/612,687	02/17/87	4,993,241	07/526,240	02/19/91
4,644,488	06/541,124	02/17/87		07/414,196	02/19/91
				06/609,623	02/19/91

Patent Number	Serial Number	Issue Date	4,993,515	07/328,290	02/19/91
4,993,244	07/520,764	02/19/91	4,993,516	07/513,935	02/19/91
4,993,245	07/341,127	02/19/91	4,993,519	07/422,855	02/19/91
4,993,248	07/435,451	02/19/91	4,993,520	07/343,213	02/19/91
4,993,250	07/437,606	02/19/91	4,993,536	07/448,975	02/19/91
4,993,254	07/372,319	02/19/91	4,993,937	07/524,535	02/19/91
4,993,258	07/511,623	02/19/91	4,993,538	07/481,598	02/19/91
4,993,261	07/396,405	02/19/91	4,993,539	07/389,229	02/19/91
4,993,262	07/187,526	02/19/91	4,993,541	07/352,255	02/19/91
4,993,270	07/160,447	02/19/91	4,943,545	07/413,092	02/19/91
4,993,272	07/433,562	02/19/91	4,993,546	07/500,536	02/19/91
4,993,276	07/025,399	02/19/91	4,995,548	07/535,748	02/19/91
4,993,277	07/514,177	02/19/91	4,993,549	07/276,459	02/19/91
4,993,278	07/509,448	02/19/91	4,993,552	07/507,984	02/19/91
4,993,281	07/347,992	02/19/91	4,993,553	07/303,318	02/19/91
4,993,286	07/528,911	02/19/91	4,993,555	07/392,025	02/19/91
4,993,292	07/422,688	02/19/91	4,993,560	07/371,627	02/19/91
4,993,297	07/563,795	02/19/91	4,993,561	07/290,303	02/19/91
4,993,298	07/417,035	02/19/91	4,993,562	07/450,451	02/19/91
4,993,299	07/308,163	02/19/91	4,993,566	07/452,638	02/19/91
4,993,308	07/330,803	02/19/91	4,993,567	07/492,073	02/19/91
4,993,310	06/532,509	02/19/91	4,993,571	07/407,398	02/19/91
4,993,311	07/017,303	02/19/91	4,993,573	07/393,576	02/19/91
4,993,313	07/519,216	02/19/91	4,993,580	07/509,714	02/19/91
4,993,317	07/348,415	02/19/91	4,993,583	07/338,982	02/19/91
4,993,318	07/352,045	02/19/91	4,993,584	07/349,426	02/19/91
4,993,322	07/234,021	02/19/91	4,993,586	07/369,457	02/19/91
4,993,323	07/345,824	02/19/91	4,993,588	07/365,761	02/19/91
4,993,324	07/407,385	02/19/91	4,993,589	07/365,835	02/19/91
4,993,327	07/370,278	02/19/91	4,993,591	07/443,574	02/19/91
4,993,329	07/362,045	02/19/91	4,993,592	07/443,928	02/19/91
4,993,334	07/358,267	02/19/91	4,993,594	07/413,234	02/19/91
4,993,339	07/474,341	02/19/91	4,993,595	07/353,566	02/19/91
4,993,341	07/469,211	02/19/91	4,993,598	07/351,420	02/19/91
4,993,345	06/237,546	02/19/91	4,993,601	07/434,784	02/19/91
4,993,347	07/463,797	02/19/91	4,993,603	07/464,516	02/19/91
4,993,361	07/411,226	02/19/91	4,993,611	07/264,473	02/19/91
4,993,365	07/251,368	02/19/91	4,993,612	07/420,924	02/19/91
4,993,367	07/391,458	02/19/91	4,993,620	07/518,441	02/19/91
4,993,368	07/536,836	02/19/91	4,993,628	07/516,164	02/19/91
4,993,372	07/421,662	02/19/91	4,993,631	07/372,345	02/19/91
4,993,373	07/480,176	02/19/91	4,993,634	07/426,055	02/19/91
4,993,383	07/216,940	02/19/91	4,993,656	07/414,512	02/19/91
4,993,384	07/505,083	02/19/91	4,993,658	07/435,338	02/19/91
4,993,395	07/557,207	02/19/91	4,993,664	07/342,164	02/19/91
4,993,397	07/398,913	02/19/91	4,993,665	07/312,051	02/19/91
4,993,398	07/427,773	02/19/91	4,993,666	07/214,722	02/19/91
4,993,399	07/363,343	02/19/91	4,993,667	06/831,010	02/19/91
4,993,400	07/392,546	02/19/91	4,993,675	07/438,613	02/19/91
4,993,406	07/407,822	02/19/91	4,993,676	07/465,918	02/19/91
4,993,427	07/434,136	02/19/91	4,993,677	07/537,436	02/19/91
4,993,431	07/571,323	02/19/91	4,993,679	07/340,632	02/19/91
4,993,432	07/329,937	02/19/91	4,993,680	07/462,710	02/19/91
4,993,433	07/343,497	02/19/91	4,993,684	07/384,776	02/19/91
4,993,436	07/454,275	02/19/91	4,993,685	07/529,531	02/19/91
4,993,437	07/496,152	02/19/91	4,993,687	07/075,198	02/19/91
4,993,446	07/421,804	02/19/91	4,993,688	07/419,505	02/19/91
4,993,455	06/835,247	02/19/91	4,993,694	07/417,610	02/19/91
4,993,456	07/381,043	02/19/91	4,993,702	07/374,629	02/19/



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Patent Number	Serial Number	Issue Date	4,994,124	07/523,563	02/19/91
4,993,767	07/478,285	02/19/91	4,994,129	07/336,902	02/19/91
4,993,772	07/482,271	02/19/91	4,994,138	07/304,163	02/19/91
4,993,776	07/452,484	02/19/91	4,994,150	07/397,935	02/19/91
4,993,781	07/410,317	02/19/91	4,994,151	07/380,018	02/19/91
4,993,789	07/244,923	02/19/91	4,994,158	07/196,548	02/19/91
4,993,793	07/351,802	02/19/91	4,994,160	06/677,040	02/19/91
4,993,795	07/432,161	02/19/91	4,994,168	07/260,637	02/19/91
4,993,804	07/434,311	02/19/91	4,994,172	07/375,068	02/19/91
4,993,810	07/338,261	02/19/91	4,994,175	07/284,181	02/19/91
4,993,825	07/442,137	02/19/91	4,994,176	07/340,896	02/19/91
4,993,830	07/453,402	02/19/91	4,994,177	07/379,620	02/19/91
4,993,833	07/252,325	02/19/91	4,994,179	07/425,761	02/19/91
4,993,843	07/162,314	02/19/91	4,994,186	07/230,841	02/19/91
4,993,849	07/467,041	02/19/91	4,994,199	07/509,912	02/19/91
4,993,856	07/430,003	02/19/91	4,994,201	07/412,080	02/19/91
4,993,866	07/430,813	02/19/91	4,994,225	07/212,550	02/19/91
4,993,867	07/393,663	02/19/91	4,994,232	07/525,421	02/19/91
4,993,873	07/346,993	02/19/91	4,994,238	07/205,230	02/19/91
4,993,880	07/518,700	02/19/91	4,994,239	06/576,821	02/19/91
4,993,882	07/207,042	02/19/91	4,994,247	07/404,726	02/19/91
4,993,887	07/376,397	02/19/91	4,994,253	07/240,406	02/19/91
4,993,895	07/462,148	02/19/91	4,994,257	07/041,868	02/19/91
4,993,897	07/438,191	02/19/91	4,994,263	07/517,520	02/19/91
4,993,898	07/284,144	02/19/91	4,994,264	07/451,204	02/19/91
4,993,906	07/396,724	02/19/91	4,994,265	07/040,431	02/19/91
4,993,909	07/335,273	02/19/91	4,994,266	07/376,825	02/19/91
4,993,912	07/453,315	02/19/91	4,994,268	07/269,426	02/19/91
4,993,923	07/143,353	02/19/91	4,994,271	07/155,778	02/19/91
4,993,935	07/396,080	02/19/91	4,994,274	07/385,645	02/19/91
4,993,937	07/355,904	02/19/91	4,994,280	07/372,659	02/19/91
4,993,946	07/454,444	02/19/91	4,994,296	07/353,679	02/19/91
4,993,947	07/210,400	02/19/91	4,994,330	07/492,211	02/19/91
4,993,949	07/467,644	02/19/91	4,994,336	07/353,063	02/19/91
4,993,952	07/429,070	02/19/91	4,994,348	07/315,119	02/19/91
4,993,953	07/425,680	02/19/91	4,994,351	07/366,217	02/19/91
4,993,964	07/339,693	02/19/91	4,994,352	07/471,583	02/19/91
4,993,978	07/491,737	02/19/91	4,994,360	07/563,810	02/19/91
4,993,980	07/317,415	02/19/91	4,994,366	07/432,483	02/19/91
4,993,985	07/471,438	02/19/91	4,994,369	07/132,926	02/19/91
4,993,988	07/498,667	02/19/91	4,994,382	07/357,668	02/19/91
4,993,989	07/427,645	02/19/91	4,994,383	07/400,306	02/19/91
4,993,991	07/348,005	02/19/91	4,994,389	07/024,291	02/19/91
4,993,995	07/418,634	02/19/91	4,994,391	07/372,674	02/19/91
4,993,996	07/483,888	02/19/91	4,994,394	07/239,664	02/19/91
4,993,997	07/490,347	02/19/91	4,994,397	07/357,790	02/19/91
4,994,000	07/432,689	02/19/91	4,994,418	07/453,158	02/19/91
4,994,019	07/474,680	02/19/91	4,994,421	07/278,994	02/19/91
4,994,023	07/391,282	02/19/91	4,994,422	07/482,170	02/19/91
4,994,025	07/400,212	02/19/91	4,994,424	07/431,949	02/19/91
4,994,027	07/424,174	02/19/91	4,994,429	07/265,242	02/19/91
4,994,036	07/390,608	02/19/91	4,994,430	07/457,816	02/19/91
4,994,039	07/013,220	02/19/91	4,994,439	07/299,881	02/19/91
4,994,042	07/415,876	02/19/91	4,994,448	07/251,445	02/19/91
4,994,044	07/420,319	02/19/91	4,994,453	07/407,747	02/19/91
4,994,046	07/455,938	02/19/91	4,994,457	07/066,352	02/19/91
4,994,049	07/436,709	02/19/91	4,994,462	07/253,806	02/19/91
4,994,051	07/454,933	02/19/91	4,994,464	07/417,535	02/19/91
4,994,052	07/371,993	02/19/91	4,994,465	07/474,426	02/19/91
4,994,056	07/434,010	02/19/91	4,994,470	07/465,448	02/19/91
4,994,059	07/239,602	02/19/91	4,994,471	07/351,360	02/19/91
4,994,060	07/325,955	02/19/91	4,994,473	07/263,604	02/19/91
4,994,063	07/365,217	02/19/91	4,994,476	06/779,188	02/19/91
4,994,064	07/454,432	02/19/91	4,994,477	07/173,382	02/19/91
4,994,070	07/336,040	02/19/91	4,994,479	06/899,218	02/19/91
4,994,075	07/385,210	02/19/91	4,994,481	07/022,671	02/19/91
4,994,080	07/220,012	02/19/91	4,994,498	07/487,504	02/19/91
4,994,082	07/242,962	02/19/91	4,994,507	07/481,542	02/19/91
4,994,084	07/370,453	02/19/91	4,994,509	07/263,230	02/19/91
4,994,085	07/320,436	02/19/91	4,994,511	07/428,479	02/19/91
4,994,087	07/280,109	02/19/91	4,994,513	07/452,486	02/19/91
4,994,088	07/361,335	02/19/91	4,994,515	07/371,863	02/19/91
4,994,091	07/461,303	02/19/91	4,994,517	07/363,211	02/19/91
4,994,103	07/420,248	02/19/91	4,994,518	07/379,371	02/19/91
4,994,104	07/286,434	02/19/91	4,994,524	07/225,111	02/19/91
4,994,109	07/347,660	02/19/91	4,994,529	07/446,757	02/19/91
4,994,113	07/480,488	02/19/91	4,994,536	07/210,508	02/19/91
4,994,116	06/738,439	02/19/91	4,994,543	07/377,053	02/19/91
			4,994,551	07/454,818	02/19/91

Patent Number	Serial Number	Issue Date	4,994,916	07/236,457	02/19/91
4,994,553	07/208,954	02/19/91	4,994,921	07/195,712	02/19/91
4,994,554	07/287,462	02/19/91	4,994,922	07/339,061	02/19/91
4,994,557	07/150,132	02/19/91	4,994,923	07/305,622	02/19/91
4,994,563	07/372,402	02/19/91	4,994,924	07/363,013	02/19/91
4,994,564	07/269,646	02/19/91	4,994,940	07/412,331	02/19/91
4,994,569	07/430,127	02/19/91	4,994,941	07/292,994	02/19/91
4,994,570	07/530,152	02/19/91	4,994,948	07/509,132	02/19/91
4,994,575	07/429,232	02/19/91	4,994,951	07/340,988	02/19/91
4,994,577	07/402,413	02/19/91	4,994,952	07/410,142	02/19/91
4,994,578	07/344,738	02/19/91	4,994,953	07/393,717	02/19/91
4,994,586	07/357,201	02/19/91	4,994,956	07/514,666	02/19/91
4,994,601	07/247,817	02/19/91	4,994,974	07/270,082	02/19/91
4,994,606	07/532,764	02/19/91	4,994,978	07/296,056	02/19/91
4,994,616	07/180,576	02/19/91	4,994,980	07/335,538	02/19/91
4,994,624	07/464,848	02/19/91	4,994,984	07/174,941	02/19/91
4,994,627	07/494,353	02/19/91	4,994,997	07/245,887	02/19/91
4,994,637	07/429,688	02/19/91	4,995,009	07/562,668	02/19/91
4,994,642	07/425,919	02/19/91	4,995,030	07/431,713	02/19/91
4,994,644	07/460,955	02/19/91	4,995,046	07/397,410	02/19/91
4,994,645	07/460,927	02/19/91	4,995,053	07/514,181	02/19/91
4,994,648	07/390,275	02/19/91	4,995,066	07/400,188	02/19/91
4,994,656	07/270,079	02/19/91	4,995,072	07/373,759	02/19/91
4,994,658	07/454,241	02/19/91	4,995,086	07/244,586	02/19/91
4,994,661	07/289,990	02/19/91	4,995,102	07/192,179	02/19/91
4,994,665	07/461,109	02/19/91	4,995,106	07/398,191	02/19/91
4,994,668	07/402,174	02/19/91			
4,994,670	07/447,912	02/19/91			
4,994,672	07/410,182	02/19/91			
4,994,678	07/328,050	02/19/91			
4,994,679	07/316,733	02/19/91			
4,994,680	07/518,659	02/19/91			
4,994,681	07/417,762	02/19/91			
4,994,682	07/354,112	02/19/91			
4,994,694	07/397,213	02/19/91			
4,994,710	07/321,607	02/19/91			
4,994,712	07/358,928	02/19/91			
4,994,717	07/457,718	02/19/91			
4,994,720	07/468,623	02/19/91			
4,994,725	07/488,717	02/19/91			
4,994,731	07/441,687	02/19/91			
4,994,744	07/499,235	02/19/91			
4,994,749	07/285,698	02/19/91			
4,994,751	07/393,223	02/19/91			
4,994,760	07/364,559	02/19/91			
4,994,767	07/460,885	02/19/91			
4,994,785	07/444,989	02/19/91			
4,994,790	07/400,625	02/19/91			
4,994,798	07/399,133	02/19/91			
4,994,808	07/450,662	02/19/91			
4,994,813	07/421,427	02/19/91			
4,994,831	07/448,702	02/19/91			
4,994,838	07/392,666	02/19/91			
4,994,839	07/358,825	02/19/91			
4,994,842	07/424,655	02/19/91			
4,994,854	07/222,167	02/19/91			
4,994,877	07/154,199	02/19/91			
4,994,913	07/431,079	02/19/91			

## Errata

In the list of patents which expired on November 23, 1994, due to failure to pay maintenance fees, in the O.G. of January 31, 1995, the following patent should not have appeared:

Patent No.	Serial No.	Issue Date	Filing Date
Re. 32,080 (4,360,255)	06/640,865 (06/286,332)	02/11/86 (11/23/82)	08/15/84 (07/23/81)

In the list of patents which expired on December 26, 1993, due to failure to pay maintenance fees, in the O.G. of March 15, 1994, the following patent should not have appeared:

Patent No.	Serial No.	Issue Date	Filing Date
Re. 34,561 (4,890,573)	07/816,028 (07/223,630)	03/15/94 (01/02/90)	12/30/91 (07/25/88)

In the list of patents which expired on December 04, 1994, due to failure to pay maintenance fees, in the O.G. of February 14, 1995, the following patent should not have appeared:

Patent No.	Serial No.	Issue Date	Filing Date
4,362,173	06/247,561	12/07/82	08/01/80

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE  
(35 U.S.C. 41(C); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment
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Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,620,744	06/677,384	11/04/86	12/03/84	03/06/95
4,749,324	07/031,907	06/07/88	03/30/87	02/28/95
4,750,550	06/882,885	06/14/88	06/24/86	08/31/94
4,834,648	07/097,742	05/30/89	09/17/87	11/28/94
4,838,911	07/237,695	06/13/89	08/26/88	02/28/95
4,843,122	07/043,568	06/27/89	06/28/87	02/15/95
4,863,849	06/756,129	09/05/89	07/18/85	01/18/95
4,868,103	06/831,250	09/19/89	02/19/86	03/09/95
4,872,084	07/240,740	10/03/89	09/06/88	11/28/94
4,920,537	07/215,394	04/24/90	07/05/88	03/09/95
4,922,822	07/283,501	05/08/90	12/12/88	02/28/95
4,923,165	07/399,328	05/08/90	08/28/89	03/06/95
4,945,902	07/284,668	08/07/90	12/15/88	01/17/95
4,952,685	07/043,668	08/28/90	04/28/87	03/06/95
4,962,285	07/267,487	10/09/90	11/04/88	03/06/95
4,969,893	07/367,423	11/13/90	06/16/89	01/20/95
4,972,807	07/357,473	11/27/90	05/26/89	03/09/95

## Reissue Applications Filed

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.12(b)).

**4,865,024**, Re. S.N. 08/406,772, Mar. 16, 1995, Cl. 604, EXTENSION DECELERATION ORTHOSIS, David E. Hensley, et. al., Owner of Record: *Inventor*, Attorney or Agent: Richard D. Multer, Ex. Gp.: 3304

**4,910,271**, Re. S.N. 08/403,383, Mar. 14, 1995, Cl. 526/106, PROCESS FOR THE POLYMERISATION OF ETHYLENE OR THE COPOLYMERISATION OF ETHYLENE AND ALPHA-OLEFINS IN A FLUIDISED BED IN THE PRESENCE OF A CHROMIUM BASED CATALYST, Jean-Claude A. Bailly, et. al., Owner of Record: *BP Chemicals Limited*, London, England, Attorney or Agent: Harold Haidt, Ex. Gp.: 1505

**4,937,040**, Re. S.N. 08/402,321, Mar. 10, 1995, Cl. 383, SECURITY DEPOSIT BAG, Bruce A. Holcomb, et. al., Owner of Record: *Minnesota Mining and Manufacturing Co.*, Minneapolis, Minn., Attorney or Agent: Mark W. Binder, Ex. Gp.: 2401

**4,956,273**, Re. S.N. 08/335,185, Nov. 7, 1995, Cl. 435/5, SYNTHETIC PEPTIDES AND METHOD OF USE FOR DIAGNOSIS AND VACCINATION FOR AIDS AND ARC, Ronald C. Kennedy, et. al., Owner of Record: *Inventor*, Attorney or Agent: Paul T. Clark, Ex. Gp.: 1813

**5,060,378**, Re. S.N. 08/401,366, Mar. 9, 1995, Cl. 30/134, DEMOLITION TOOL FOR A HYDRAULIC EXCAVATOR, Roy E. Labounty, et. al., Owner of Record: *Labounty Manufacturing, Inc.*, Two Harbors, Minn., Attorney or Agent: Peter L. Costas, Ex. Gp.: 3204

**5,155,593**, Re. S.N. 08/321,415, Oct. 12, 1994, Cl. 348/413, VIDEO SIGNAL CODING METHOD, Jun Yonemitsu, et. al., Owner of Record: *Sony Corporation*, Tokyo, Japan, Attorney or Agent: William S. Fromer, Ex. Gp.: 2615

**5,162,130**, Re. S.N. 08/337,554, Nov. 10, 1994, Cl. 427/2, LIGHT ACTIVATED COLORATION OF DENTAL RESTORATIONS, Gerald G. McLaughlin, Owner of Record: *Inventor*, Attorney or Agent: Thomas M. Galgano, Ex. Gp.: 1307

**5,180,328**, Re. S.N. 08/391,491, Jan. 19, 1995, Cl. 452/128, METHOD AND APPARATUS FOR REMOVING A HIDE FROM A BACK PORTION OF A TAIL OF CARCASS, Albert Davis, Owner of Record: *Monfort Inc. Corp.*, Greeley, Colo., Attorney or Agent: Joseph E. Kovarik, Ex. Gp.: 3203

**5,193,598**, Re. S.N. 08/404,358, Mar. 15, 1995, Cl. 144/287, PORTABLE SUPPORT STAND ATTACHABLE TO A SAWHORSE, Jim J. Estrem, Owner of Record: *George Estrem, Slayton, Minn.*, Attorney or Agent: Karl G. Schwappach, Ex. Gp.: 3201

**5,309,324**, Re. S.N. 08/353,500, Dec. 9, 1994, Cl. 351/734, DEVICE FOR INTERCONNECTING INTEGRATED CIRCUIT PACKAGES TO CIRCUIT BOARDS, Jorge M. Hernandez, et. al., Owner of Record: *Circuit Components, Inc.*, Tempe, Ariz., Attorney or Agent: Michael A. Cantor, Esq., Ex. Gp.: 2103

## Requests for Reexaminations Filed

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**D. 327,841**, Reexam. No. 90/003,762, Mar. 20, 1995, Cl. D9/348, APPLE TRAY, Richard V. Letourneau, Owner of Record: *The Chinot Company*, Waterville, Me., Attorney or Agent: Robert G. McMorrow, Jr., Connolly & Hutz, Wilmington, Del., Ex. Gp.: 2902, Requester: Owner

**4,220,815**, Reexam. No. 90/003,757, Mar. 16, 1995, Cl. 178/018, NONPLANAR TRANSPARENT ELECTROGRAPHIC SENSOR, William A. Gibson, et. al., Owner of Record: *Elographics, Inc.*, Oak Ridge, Tenn., Attorney or Agent: Martin J. Skinner, Kingston, Tenn., Ex. Gp.: 2614, Requester: Steven R. Borgman, Vinson & Elkins, Houston, Tex.

**4,655,771**, Reexam. No. 90/003,752, Mar. 20, 1995, Cl. 623/001, PROSTHESIS COMPRISING AN EXPANSIBLE OR CONTRACTILE TUBULAR BODY, Hans I. Wallenstein, Owner of Record: *AMS Medinvent S.A.*, Crissier, Switzerland, Attorney or Agent: Burns Doane Swecker & Mathis, Alexandria Va., Ex. Gp.: 3308, Requester: C. David Emhardt, Woodard, Emhardt Naughton Moriarty & McNett, Indianapolis, Ind.

**4,954,126**, Reexam. No. 90/003,753, Mar. 20, 1995, Cl. 600/036, PROSTHESIS COMPRISING AN EXPANSIBLE OR CONTRACTILE TUBULAR BODY, Hans I. Wallenstein, Owner of Record: *AMS Medinvent S.A.*, Crissier, Switzerland, Attorney or Agent: Burns Doane Swecker & Mathis, Alexandria Va., Ex. Gp.: 3305, Requester: C. David Emhardt, Woodard, Emhardt Naughton Moriarty & McNett, Indianapolis, Ind.

**5,136,894**, Reexam. No. 90/003,750, Mar. 15, 1995, Cl. 074/493, TILTABLE MARINE STEERING HELM, Thomas G. Carter, et. al., Owner of Record: *IMO Industries, Inc.*, Hudson, Ohio, Attorney or Agent: Thomas J. Perkowski, Hopgood Calimafde Kalil & Judlowe, New York, N.Y., Ex. Gp.: 3502, Requester: Teleflex, Inc., Limerick, Pa.

**5,191,396**, Reexam. No. 90/003,760, Mar. 22, 1995, Cl. 257/339, HIGH POWER MOSFET WITH LOW ON-RESISTANCE AND HIGH BREAKAGE VOLTAGE, Alexander Lidow, et. al., Owner of Record: *International Rectifier Corp.*, El Segundo, Calif., Attorney or Agent: Ostrolenk Faber Gerb & Soffen, New York, N.Y., Ex. Gp.: 2503, Requester: SGS-Thomson Microelectronics, Inc., c/o Peter J. Thoma, Thompson & Knight, Dallas, Tex.

**5,232,268**, Reexam. No. 90/003,756, Mar. 21, 1995, Cl. 299/013, METHOD OF BREAKING A FULL FACE OF ROCK FOR CONSTRUCTING SHAFTS AND TUNNELS, William R. Dengler, Owner of Record: *Dynatec International Ltd.*, Richmond Hill, Canada, Attorney or Agent: Bereskin & Parr, Toronto, Canada, Ex. Gp.: 3506, Requester: Richard P. Bauer, Washington, D.C.

**5,263,794**, Reexam. No. 90/003,761, Mar. 22, 1995, Cl. 405/052, ENVIRONMENTALLY SAFE UNDERGROUND PIPING SYSTEM, Michael C. Webb, Owner of Record: *Environ Prod.*, Lionville, Pa., Attorney or Agent: Eugene E. Renz, Jr., Media, Pa., Ex. Gp.: 3501, Requester: Total Containment, Inc., c/o Merek & Voorhees, Alexandria, Va.

**5,305,244**, Reexam. No. 90/003,751, Mar. 15, 1995, Cl. 364/708.1, HANDS-FREE, USER-SUPPORTED PORTABLE COMPUTER, Edward G. Newman, et. al., Owner of Record: *Computer Products & Services, Inc.*, Fairfax, Va., Attorney or Agent: George A. Loud, Lorusso & Loud, Arlington, Va. Ex. Gp.: 2306, Requester: Dan P. Glaser, InterVision Systems, Inc, Raleigh, N.C.

## Notice of Expiration of Trademark Registrations Due To Failure to Renew

15 U.S.C. 1059 provides that each trademark registration may be renewed for periods of ten years from the end of the expiring period upon payment of the prescribed fee and the filing of an acceptable application for renewal. This may be done at any time within six months before the expiration of the period for which the registration was issued or renewed, or it may be done within three months after such expiration on payment of an additional fee.

According to the records of the Office, the trademark registrations listed below are expired due to failure to renew in accordance with 15 U.S.C. 1059.

## TRADEMARK REGISTRATIONS WHICH EXPIRED MARCH 06, 1995 DUE TO FAILURE TO RENEW

Reg. Number	Serial Number	Reg. Date
97,324	71/075,523	06/02/1914
97,331	71/075,679	06/02/1914
97,369	71/074,316	06/02/1914
97,384	71/068,673	06/02/1914
97,390	71/075,189	06/02/1914
97,419	71/073,008	06/02/1914
313,425	71/347,648	05/29/1934
313,442	71/347,703	05/29/1934
313,469	71/345,157	05/29/1934
313,476	71/345,636	05/29/1934
313,478	71/345,570	05/29/1934
313,490	71/346,613	05/29/1934
313,496	71/346,714	05/29/1934
583,453	71/643,252	12/08/1953
590,338	71/578,442	06/01/1954
590,357	71/618,481	06/01/1954

590,358	71/619,922	06/01/1954
590,359	71/620,332	06/01/1954
590,360	71/620,850	06/01/1954
590,364	71/621,751	06/01/1954
590,371	71/626,336	06/01/1954
590,372	71/626,687	06/01/1954
590,378	71/629,491	06/01/1954
590,407	71/636,476	06/01/1954
590,412	71/637,791	06/01/1954
590,413	71/637,795	06/01/1954
590,417	71/638,253	06/01/1954
590,424	71/638,773	06/01/1954
590,438	71/640,691	06/01/1954
590,439	71/640,739	06/01/1954
590,447	71/642,282	06/01/1954
590,456	71/642,755	06/01/1954
590,458	71/643,206	06/01/1954
590,467	71/644,339	06/01/1954
590,469	71/644,522	06/01/1954
590,470	71/644,563	06/01/1954
590,476	71/644,736	06/01/1954
590,478	71/644,878	06/01/1954
590,485	71/646,834	06/01/1954
590,486	71/646,926	06/01/1954
590,487	71/646,939	06/01/1954
590,488	71/646,955	06/01/1954
590,489	71/646,956	06/01/1954
590,490	71/646,957	06/01/1954
590,491	71/647,119	06/01/1954
590,492	71/647,450	06/01/1954
590,506	71/648,850	06/01/1954
590,507	71/648,870	06/01/1954
590,508	71/648,929	06/01/1954
590,510	71/649,045	06/01/1954
590,514	71/650,160	06/01/1954
590,523	71/650,768	06/01/1954
590,547	71/651,745	06/01/1954
590,557	71/652,296	06/01/1954
590,563	71/652,484	06/01/1954
590,565	71/652,514	06/01/1954
590,567	71/652,822	06/01/1954
590,568	71/652,908	06/01/1954
590,582	71/654,428	06/01/1954
590,596	71/620,312	06/01/1954
590,600	71/646,442	06/01/1954
590,606	71/605,533	06/01/1954
590,607	71/605,534	06/01/1954
590,613	71/622,864	06/01/1954
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590,620	71/641,152	06/01/1954
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984,772	72/412,799	05/28/1974
984,775	72/433,630	05/28/1974
984,778	72/457,641	05/28/1974
984,782	72/438,199	05/28/1974
984,783	72/443,654	05/28/1974
984,784	72/435,586	05/28/1974
984,792	72/441,801	05/28/1974
984,793	72/441,995	05/28/1974
984,795	72/447,084	05/28/1974
984,796	72/454,333	05/28/1974
984,797	72/457,890	05/28/1974
984,799	72/458,236	05/28/1974
984,800	72/458,700	05/28/1974
984,803	72/459,182	05/28/1974
984,807	72/464,826	05/28/1974
984,814	72/414,057	05/28/1974
984,816	72/416,058	05/28/1974
984,818	72/423,321	05/28/1974
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984,838	72/392,538	05/28/1974	985,058	72/448,746	05/28/1974
984,839	72/451,476	05/28/1974	985,059	72/449,231	05/28/1974
984,840	72/451,477	05/28/1974	985,062	72/452,414	05/28/1974
984,843	72/462,440	05/28/1974	985,066	72/454,439	05/28/1974
984,847	72/449,134	05/28/1974	985,067	72/455,867	05/28/1974
984,848	72/450,171	05/28/1974	985,069	72/456,092	05/28/1974
984,849	72/460,021	05/28/1974	985,071	72/456,881	05/28/1974
984,852	72/425,235	05/28/1974	985,074	72/411,809	05/28/1974
984,854	72/427,028	05/28/1974	985,075	72/418,107	05/28/1974
984,856	72/441,110	05/28/1974	985,076	72/433,031	05/28/1974
984,857	72/443,286	05/28/1974	985,079	72/449,063	05/28/1974
984,859	72/452,400	05/28/1974	985,082	72/450,516	05/28/1974
984,862	72/463,532	05/28/1974	985,083	72/450,552	05/28/1974
984,864	72/373,564	05/28/1974	985,086	72/453,067	05/28/1974
984,866	72/410,720	05/28/1974	985,089	72/455,169	05/28/1974
984,868	72/418,563	05/28/1974	985,092	72/459,365	05/28/1974
984,869	72/422,919	05/28/1974	985,094	72/426,547	05/28/1974
984,870	72/423,836	05/28/1974	985,096	72/448,327	05/28/1974
984,874	72/436,953	05/28/1974	985,097	72/448,734	05/28/1974
984,877	72/440,553	05/28/1974	985,099	72/453,103	05/28/1974
984,878	72/442,976	05/28/1974	985,101	72/454,820	05/28/1974
984,882	72/446,361	05/28/1974	985,104	72/417,356	05/28/1974
984,884	72/447,310	05/28/1974	985,106	72/420,727	05/28/1974
984,889	72/450,421	05/28/1974	985,107	72/424,488	05/28/1974
984,894	72/423,100	05/28/1974	985,110	72/427,625	05/28/1974
984,895	72/432,778	05/28/1974	985,111	72/437,778	05/28/1974
984,900	72/418,237	05/28/1974	985,112	72/439,327	05/28/1974
984,901	72/421,373	05/28/1974	985,113	72/439,328	05/28/1974
984,903	72/425,918	05/28/1974	985,115	72/445,643	05/28/1974
984,906	72/434,324	05/28/1974	985,122	72/446,927	05/28/1974
984,910	72/438,653	05/28/1974	985,127	72/464,662	05/28/1974
984,924	72/454,174	05/28/1974	985,128	72/393,909	05/28/1974
984,926	72/463,776	05/28/1974	985,129	72/413,576	05/28/1974
984,927	72/464,195	05/28/1974	985,133	72/442,492	05/28/1974
984,930	72/416,783	05/28/1974	985,134	72/443,493	05/28/1974
984,935	72/444,092	05/28/1974	985,135	72/443,894	05/28/1974
984,937	72/445,842	05/28/1974	985,136	72/444,942	05/28/1974
984,938	72/446,067	05/28/1974	985,139	72/458,385	05/28/1974
984,946	72/448,288	05/28/1974	985,140	72/459,018	05/28/1974
984,947	72/448,532	05/28/1974	985,141	72/459,371	05/28/1974
984,951	72/450,684	05/28/1974	985,143	72/460,750	05/28/1974
984,952	72/455,409	05/28/1974	985,146	72/402,585	05/28/1974
984,957	72/449,144	05/28/1974	985,147	72/433,593	05/28/1974
984,958	72/436,152	05/28/1974	985,152	72/454,205	05/28/1974
984,960	72/443,114	05/28/1974	985,156	72/434,077	05/28/1974
984,961	72/447,875	05/28/1974	985,157	72/434,347	05/28/1974
984,962	72/450,154	05/28/1974	985,160	72/443,874	05/28/1974
984,967	72/440,672	05/28/1974	985,164	72/457,215	05/28/1974
984,969	72/457,939	05/28/1974	985,165	72/459,229	05/28/1974
984,978	72/435,336	05/28/1974	985,166	72/459,971	05/28/1974
984,983	72/431,782	05/28/1974	985,168	72/425,782	05/28/1974
984,984	72/446,283	05/28/1974	985,170	72/430,327	05/28/1974
984,986	72/423,085	05/28/1974	985,174	72/445,066	05/28/1974
984,989	72/438,386	05/28/1974	985,176	72/450,772	05/28/1974
984,990	72/438,389	05/28/1974	985,177	72/450,773	05/28/1974
984,993	72/447,173	05/28/1974	985,186	72/434,862	05/28/1974
984,995	72/365,281	05/28/1974	985,195	72/429,051	05/28/1974
985,000	72/404,949	05/28/1974	985,196	72/433,921	05/28/1974
985,011	72/429,321	05/28/1974	985,198	72/442,728	05/28/1974
985,012	72/429,975	05/28/1974	985,199	72/449,265	05/28/1974
985,014	72/433,130	05/28/1974	985,200	72/449,437	05/28/1974
985,017	72/438,211	05/28/1974	985,203	72/417,308	05/28/1974
985,022	72/442,546	05/28/1974	985,207	72/409,404	05/28/1974
985,026	72/445,871	05/28/1974	985,208	72/419,477	05/28/1974
985,029	72/447,899	05/28/1974	985,209	72/425,520	05/28/1974
985,030	72/448,680	05/28/1974	985,213	72/443,051	05/28/1974
985,036	72/391,897	05/28/1974	985,223	72/372,128	05/28/1974
985,038	72/417,531	05/28/1974	985,226	72/458,809	05/28/1974
985,039	72/421,767	05/28/1974	985,227	72/467,228	05/28/1974
985,040	72/430,853	05/28/1974	985,228	72/435,753	05/28/1974
985,041	72/430,905	05/28/1974	985,229	72/395,563	05/28/1974
985,042	72/431,646	05/28/1974	985,230	72/421,945	05/28/1974
985,043	72/432,402	05/28/1974	985,231	72/443,403	05/28/1974
985,047	72/435,192	05/28/1974	985,236	72/384,762	05/28/1974
985,048	72/435,788	05/28/1974	985,243	72/405,056	05/28/1974
985,054	72/440,461	05/28/1974	985,244	72/427,631	05/28/1974
985,055	72/447,021	05/28/1974			

**Patent Term Extended Under 35 U.S.C. 156**

An interim extension of the term of U.S. Patent No. 4,085,225 has been granted under 35 U.S.C. 156(e)(2) for a period of one year from the original expiration date of the patent. An application for patent term extension was filed by the patent owner of record Duphar International Research B.V. based on approval of the product "LUVOX" by the Food and Drug Administration.

**Registration To Practice**

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished to the Director, Office of Enrollment and Discipline on or before June 16, 1995.

D'Iorio, Helene, 1829 Hunter's Run Dr., Gloucester, Ont., K1C 6X6, Canada  
Granchelli, John A., 13 Speers Crescent, Kanata, Ont., K2M 1W1, Canada  
Ham, Seungsook, P.O. Box 26121, Arlington, Va. 22215-6121  
Swann, Julian B., 801 Walkley Rd., Ottawa, Ont., K1V 6R6, Canada

April 6, 1995

KAREN L. BOVARD, Director  
Office of Enrollment and Discipline**Registration To Practice**

The following person successfully passed the registration examination that was held October 13, 1993. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of the following applicant on moral, ethical, or other grounds should be furnished to the Director, Office of Enrollment and Discipline on or before June 16, 1995.

Baskin, Jonathan D., 6363 Beryl Rd., #204, Alexandria, VA 22312

April 6, 1995

KAREN L. BOVARD, Director  
Office of Enrollment and Discipline**Service by Publication**

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days of this publication, the cancellation will proceed as in the case of default.

Verification Systems, Inc., Lubbock, Tex., Reg. No. 1,311,422, for the mark "INSTA-" and design, Canc. No. 23,225.

Capri Sun, Inc., San Mateo, Calif., Reg. No. 1,519,063, for the mark "COOL UPS", Canc. No. 23,480.

Elizabeth & Margaret, Inc. dba L.A. Life Styles, Fairport, N.Y., Reg. No. 1,613,324, for the mark "L.A. Life Styles and Design", Canc. No. 23,489.

D. Seidmann's Sons, Inc., Philadelphia, Pa., Reg. No. 358,906, for the mark "Philly", Canc. No. 23,493.

JEAN BROWN  
Administrator,  
Trademark Trial and  
Appeal Board,  
for Robert M. Anderson  
Deputy Assistant  
Commissioner for Trademarks

**Department of Commerce  
Patent and Trademark Office  
37 CFR Parts 1 and 3**

[Docket No. 9504087-5087-01]  
RIN: 0651-AA76

**Changes to Implement 20-Year Patent  
Term and Provisional Applications**

Agency: Patent and Trademark Office, Commerce.

Action: Final rule.

**Summary:** The Patent and Trademark Office (PTO) is amending the rules of practice in patent cases, Parts 1 and 3 of title 37, Code of Federal Regulations, to establish procedures for: (1) filing and processing provisional application papers; (2) calculating the length of any patent term extension to which an applicant is entitled where the issuance of a patent on an application filed on or after June 8, 1995 (the implementation date of the 20-year patent term provisions of the Uruguay Round Agreements Act), other than for designs, was delayed due to interference proceedings, the imposition of a secrecy order and/or appellate review; and (3) implementing certain transitional provisions contained in the Uruguay Round Agreements Act.

Effective Date: June 8, 1995.

**For Further Information Contact:** Magdalen Y. Greenlief or John F. Gonzales, Senior Legal Advisors, Office of the Deputy Assistant Commissioner for Patent Policy and Projects, by telephone at (703) 305-9285, by fax at (703) 308-6916 or by mail marked to their attention and addressed to the Commissioner of Patents and Trademarks, Box DAC, Washington, D.C. 20231.

**Supplementary Information:** The Uruguay Round Agreements Act (Public Law 103-465) was enacted on December 8, 1994. Public Law 103-465 amends 35 U.S.C. 154 to provide that the term of patent protection begins on the date of grant and ends 20 years from the filing date of the application. The amendment applies to all utility and plant patents issued on applications having an actual United States application filing date on or after June 8, 1995. Specifically, 35 U.S.C. 154(a)(2), as contained in Public Law 103-465, provides that the patent term will begin on the date on which the patent issues and will end twenty years from the date on which the application was filed in the United States. If the application contains a specific reference to an earlier application under 35 U.S.C. 120, 121 or 365(c), the patent term will end twenty years from the date on which the earliest application referred to was filed. As amended by Public Law 103-465, 35 U.S.C. 154 does not take into account for determination of the patent term any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).

Under 35 U.S.C. 154(b)(1), as contained in Public Law 103-465, if the issuance of an original patent is delayed due to interference proceedings under 35 U.S.C. 135(a) or because the application is placed under a secrecy order under 35 U.S.C. 181, the term of the patent shall be extended for the period of delay, but in no case more than five (5) years.

Under 35 U.S.C. 154(b)(2), as contained in Public Law 103-465, if the issuance of a patent is delayed due to appellate review by the Board of Patent Appeals and Interferences or by a Federal court and the patent is issued pursuant to a decision in the review reversing an adverse determination of patent-



ability, the term of the patent shall be extended for a period of time but in no case more than five (5) years. However, a patent shall not be eligible for extension under 35 U.S.C. 154(b)(2) if the patent is subject to a terminal disclaimer due to the issuance of another patent claiming subject matter that is not patentably distinct from that under appellate review.

Under 35 U.S.C. 154(b)(3)(B) and 154(b)(3)(C), as contained in Public Law 103-465, the period of extension under 35 U.S.C. 154(b)(2) shall be reduced by any time attributable to appellate review before the expiration of three (3) years from the filing date of the application and for any period of time during which the applicant for patent did not act with due diligence, as determined by the Commissioner.

Under 35 U.S.C. 154(b)(4), as contained in Public Law 103-465, the total duration of all extensions of a patent under 35 U.S.C. 154(b) shall not exceed five (5) years.

The provisions for patent term extension under 35 U.S.C. 154(b) are separate from and in addition to the patent term extension provisions of 35 U.S.C. 156. The patent term extension provisions of 35 U.S.C. 154(b) are designed to compensate the patent owner for delays in issuing a patent, whereas the patent term extension provisions of 35 U.S.C. 156 are designed to restore term lost to premarket regulatory review after the grant of a patent. In order to prevent a term extension under 35 U.S.C. 154(b) from precluding a term extension under 35 U.S.C. 156, Public Law 103-465 amends 35 U.S.C. 156(a)(2) to specify that the term has never been extended under 35 U.S.C. 156(e)(1).

The 20-year patent term provision is contained in 35 U.S.C. 154, as amended by Public Law 103-465. Section 154 of title 35, United States Code, applies to utility and plant patents, but not to design patents. The term of a design patent is defined in 35 U.S.C. 173 as fourteen (14) years from the date of grant. Therefore, the patent term and patent term extension provisions set forth in 35 U.S.C. 154, as amended by Public Law 103-465, do not apply to patents for designs.

In addition, Public Law 103-465 establishes a domestic priority system. In accordance with the provisions of the Paris Convention for the Protection of Industrial Property, the term of a patent cannot include the Paris Convention priority period. Public Law 103-465 provides a mechanism to enable applicants to quickly and inexpensively file provisional applications. Applicants will be entitled to claim the benefit of priority in a given application based upon a previously filed provisional application in the United States. The domestic priority period will not count in the measurement of the term.

Section 111 of title 35, United States Code, was amended by Public Law 103-465 to provide for the filing of a provisional application on or after June 8, 1995. Section 41(a)(1) of title 35, United States Code, was amended by Public Law 103-465 to provide a \$150.00 filing fee for each provisional application, subject to a fifty (50) percent reduction for a small entity. The requirements for obtaining a filing date for a provisional application are the same as those which previously existed for an application filed under 35 U.S.C. 111, except that no claim or claims as set forth in 35 U.S.C. 112, second paragraph, is required. Moreover, no oath/declaration as set forth in 35 U.S.C. 115 is required. The provisional application is also not subject to the provisions of 35 U.S.C. 131, 135 and 157, i.e., a provisional application will not be examined for patentability, placed in interference or made the subject of a statutory invention registration. Further, the provisional application will automatically be abandoned no later than twelve (12) months after its filing date and will not be subject to revival to restore it to pending status beyond a date which is after twelve (12) months from its filing date. A provisional application will not be entitled to claim priority benefits based on any other application under 35 U.S.C. 119, 120, 121 or 365.

Also, Public Law 103-465 amended 35 U.S.C. 119 to allow an applicant to claim the benefit of the filing date of one or more copending provisional applications in a later filed application for patent under 35 U.S.C. 111(a) or 363. The later filed application for patent under 35 U.S.C. 111(a) or 363 must be filed by an inventor or inventors named in the copending provisional application not later than 12 months after the date on which the provisional application was filed and must contain or be amended to contain a specific reference to the provisional application. The provisional application must disclose an invention which is claimed in the application for patent under 35

U.S.C. 111(a) or 363 in the manner provided by the first paragraph of 35 U.S.C. 112. In addition, the provisional application must be pending on the filing date of the application for patent under 35 U.S.C. 111(a) or 363 and the filing fee set forth in subparagraph (A) or (C) of 35 U.S.C. 41(a)(1) must be paid.

Since 35 U.S.C. 154(a)(3), as contained in Public Law 103-465, excludes from the determination of the patent term any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b), the filing date of a provisional application is not considered in determining the term of any patent.

Section 119(e)(1) of title 35, United States Code, provides that if all of the conditions of 35 U.S.C. 119(e)(1) and (e)(2) are met, an application for patent filed under 35 U.S.C. 111(a) or 363 shall have the same effect as though filed on the date of the provisional application. Thus, the effective United States filing date of an application for patent filed under 35 U.S.C. 111(a), and entitled to benefits under 35 U.S.C. 119(e), is the filing date of the provisional application. Any patent granted on such an application, is prior art under 35 U.S.C. 102(e) as of the filing date of the provisional application.

Likewise, the effective United States filing date of a patent issued on an international application filed under 35 U.S.C. 363, and entitled to benefits under 35 U.S.C. 119(e), is the filing date of the provisional application, except for the purpose of applying that patent as prior art under 35 U.S.C. 102(e). For that purpose only, 35 U.S.C. 102(e) defines the filing date of the international application as the date the requirements of 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) were fulfilled.

Public Law 103-465 further includes transitional provisions for limited reexamination in certain applications pending for two (2) years or longer as of June 8, 1995, taking into account any reference to any earlier application under 35 U.S.C. 120, 121 or 365(c). The transitional provisions also permit examination of more than one independent and distinct invention in certain applications pending for three (3) years or longer as of June 8, 1995, taking into account any reference to any earlier application under 35 U.S.C. 120, 121 or 365(c). These transitional provisions are not applicable to any application which is filed after June 8, 1995, regardless of whether the application is a continuing application.

The amendments to title 35 relating to 20-year patent term, patent term extension, provisional applications and the transitional provisions are effective on the date which is six (6) months after the date of enactment, i.e., on June 8, 1995.

A Notice of Proposed Rulemaking was published in the Federal Register at 59 FR 63951 (December 12, 1994) and in the Patent and Trademark Office Official Gazette at 1170 Off. Gaz. Pat. Office 377-390 (January 3, 1995).

Forty-nine written comments were received in response to the Notice of Proposed Rulemaking. A public hearing was held at 9:30 a.m. on February 16, 1995. Fourteen individuals offered oral comments at the hearing. The forty-nine written comments and a transcript of the hearing are available for public inspection in the Special Program Law Office, Office of the Deputy Assistant Commissioner for Patent Policy and Projects, Room 520, Crystal Park I, 2011 Crystal Drive, Arlington, Virginia, and are available on the Internet through anonymous file transfer protocol (ftp), address: ftp.uspto.gov.

The following includes a discussion of the rules being added or amended, the reasons for those additions and amendments and an analysis of the comments received in response to the Notice of Proposed Rulemaking.

**Changes in text:** The final rules contain numerous changes to the text of the rules as proposed for comment. Those changes are discussed below. Familiarity with the Notice of Proposed Rulemaking is assumed.

Section 1.9(a)(1) is being changed for clarity to define a national application as a U.S. application for patent which was either filed in the Office under 35 U.S.C. 111, or which entered the national stage from an international application after compliance with 35 U.S.C. 371. Also, a new paragraph (a)(3) is being added to define the term "nonprovisional application" as a U.S. national application for patent which was either filed in the Office under 35 U.S.C. 111(a), or which entered the national stage from an international application after compliance with 35 U.S.C. 371.

The proposed deletion of § 1.60 is being withdrawn. Therefore, § 1.17(i) is being changed to retain the reference to § 1.60.

Section 1.17(q) is being changed to delete the fifty (50) percent reduction for small entities in the \$50.00 fee established for filing a petition under § 1.48 in a provisional application and a petition to accord a provisional application a filing date or to convert an application filed under § 1.53(b)(1) to a provisional application.

Sections 1.17(r) and (s) are being changed to include a fifty (50) percent reduction for small entities in the fees established for entry of a submission after final rejection under § 1.129(a) and for each additional invention requested to be examined under § 1.129(b). In the final rule, the fee required by §§ 1.17(r) and 1.17(s) from a small entity is \$365.00. The fee required from other than a small entity is \$730.00.

The elimination of the small entity reduction in § 1.17(q) and the addition of the small entity reduction in §§ 1.17(r) and (s) are the result of additional review, which resulted in the conclusion that the fees established for the transitional procedures in §§ 1.129(a) and (b) may be reduced by fifty (50) percent for small entities. However, the petition fees required by § 1.17(q) are not subject to the fifty (50) percent reduction for small entities.

The proposed deletion of the retention fee practice set forth in former § 1.53(d), now redesignated § 1.53(d)(1), is being withdrawn. Therefore, § 1.21(l) is being retained and amended to refer to § 1.53(d)(1). Also, the proposed change in the text to § 1.17(n) is being withdrawn, since § 1.60 is being retained.

Section 1.28(a) is being changed to clarify the procedure for establishing status as a small entity in a nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application. In such cases, applicants may file a new verified statement or they may rely on a verified statement filed in the prior application, if status as a small entity is still proper and desired. If applicants intend to rely on a verified statement filed in the prior application, applicants must include in the nonprovisional application either a reference to the verified statement filed in the prior application or a copy of the verified statement filed in the prior application. A verified statement in compliance with existing § 1.27 is required to be filed in each provisional application in which it is desired to pay reduced fees.

Section 1.45(c), first sentence, is being changed for clarity to refer to a "nonprovisional" application.

Section 1.48 is being changed to include a new paragraph (e) setting forth the procedure for deleting the name of a person who was erroneously named as an inventor in a provisional application. The procedure requires an amendment deleting the name of the person who was erroneously named accompanied by: a petition including a statement of facts verified by the person whose name is being deleted establishing that the error occurred without deceptive intention; the fee set forth in § 1.17(q); and the written consent of any assignee. The first sentences of §§ 1.48(a)-(c) are also being changed for clarity to refer to a "nonprovisional" application.

Section 1.51(a)(2)(i) is being changed to require that the provisional application cover sheet include the residence of each named inventor and, if the invention was made by an agency of the U.S. Government or under a contract with an agency of the U.S. Government, the name of the U.S. Government agency and Government contract number. The residence of each named inventor is information which is necessary to identify those provisional applications which must be reviewed by the PTO for foreign filing licenses. If the invention disclosed in the provisional application was made by an agency of the U.S. Government or under a contract with an agency of the U.S. Government, the security review for that application should already have been done by that agency of the U.S. Government. Therefore, identification of those particular provisional applications on the cover sheet will reduce the number of applications which the PTO must forward to other agencies of the U.S. Government for security review.

Section 1.53(b)(1) is being changed to retain the reference to § 1.60.

Section 1.53(b)(2)(ii) is being changed to require that any petition and petition fee to convert a § 1.53(b)(1) application to a provisional application be filed in the § 1.53(b)(1) application prior to the earlier of the abandonment of the § 1.53(b)(1) application, the payment of the issue fee, the expiration of twelve (12) months after the filing date of the § 1.53(b)(1) application, or the filing of a request for a statutory invention

registration under § 1.293. Where the § 1.53(b)(1) application was abandoned before the expiration of twelve (12) months after the filing date of the application, a petition to convert the application to a provisional application may be filed in the § 1.53(b)(1) application if the petition to convert is filed prior to the expiration of twelve (12) months after the filing date of the § 1.53(b)(1) application and is accompanied by an appropriate petition to revive an abandoned application under § 1.137.

Section 1.53(b)(2)(iii) is being changed to indicate that the requirements of §§ 1.821-1.825 regarding application disclosures containing nucleotide and/or amino acid sequences are not mandatory for provisional applications.

Section 1.53(d)(1) is being changed to retain the retention fee practice. The proposal to delete the retention fee practice set forth in § 1.53(d) is being withdrawn.

The first sentences of §§ 1.55(a) and (b) are being changed for clarity to refer to a "nonprovisional" application. Also, §§ 1.55(a) and (b) are being changed to clarify that the nonprovisional application may claim the benefit of one or more prior foreign applications or one or more applications for inventor's certificate.

Section 1.59 is being changed to retain the reference to the retention fee set forth in § 1.21(l) and to clarify that the retention fee practice applies only to applications filed under § 1.53(b)(1).

The proposal to delete § 1.60 is being withdrawn. Therefore, § 1.60 is being retained and amended to clarify in the title of the section and in paragraph (b)(1) that the procedure set forth in the section is only available for filing a continuation or divisional application if the prior application was a nonprovisional application and complete as set forth in § 1.51(a)(1). Also, paragraph (b)(4) is being amended to delete the requirement that the statement which must accompany the copy of the prior application include the language that "no amendments referred to in the oath or declaration filed to complete the prior application introduced new matter therein." The requirement is unnecessary because any amendment filed to complete the prior application would be considered a part of the original disclosure of the prior application and, by definition, could not contain new matter. Also, paragraph (b)(4) is being amended to refer to § 1.17(i).

Section 1.62(a) is being changed to refer to a prior complete "nonprovisional" application and to clarify that a continuing application may be filed under § 1.62 after payment of the issue fee if a petition under § 1.313(b)(5) is granted in the prior application. Section 1.62(a) is also being changed to clarify the existing practice that the request for a § 1.62 application must include identification of the inventors named in the prior application.

Section 1.63(a) is being changed for clarity to refer to an oath or declaration filed as a part of a "nonprovisional" application.

Section 1.67(b) is being changed for clarity to refer to a "nonprovisional" application.

Sections 1.78(a)(1) and (a)(2) are being changed to refer to a "nonprovisional" application and to clarify that the nonprovisional application may claim the benefit of one or more prior copending nonprovisional applications or international applications designating the United States of America. Section 1.78(a)(1)(ii) is being changed to retain the reference to § 1.60. Section 1.78(a)(1)(iii) is being retained and amended to refer to §§ 1.53(b)(1) and 1.53(d)(1).

Sections 1.78(a)(3) and (a)(4) are being changed to refer to a "nonprovisional" application and to clarify that the nonprovisional application may claim the benefit of one or more prior copending provisional applications.

Section 1.78(a)(3) is also being changed to remind applicants and practitioners that when the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. Section 111(b)(5) of title 35, United States Code, states that a provisional application is abandoned twelve months after its filing date. Sections 119(e)(1) and (e)(2) of title 35, United States Code, require that a nonprovisional application claiming benefit of a prior provisional application be filed not later than twelve months after the date on which the provisional application was filed and that the provisional application be pending on the filing date of the nonprovisional application. Under §§ 1.6 and 1.10, no filing dates are accorded



to applications on a Saturday, Sunday, or Federal holiday within the District of Columbia. Thus, if a provisional application is abandoned by operation of 35 U.S.C. 111(b)(5) on a Saturday, Sunday, or Federal holiday within the District of Columbia, a nonprovisional application claiming benefit of the provisional application under 35 U.S.C. 119(e) must be filed no later than the preceding day which is not a Saturday, Sunday, or Federal holiday within the District of Columbia.

Section 1.78(a)(4) is also being changed to delete the requirement that the reference in the nonprovisional application to the provisional application indicate the relationship of the applications. As a result of the change, § 1.78(a)(4) provides that a nonprovisional application claiming benefit of one or more provisional applications must contain a reference to each provisional application, identifying it as a provisional application and including the provisional application number (consisting of series code and serial number). However, the section does not require the nonprovisional application to identify the nonprovisional application as a continuation, divisional or continuation-in-part application of the provisional application.

Section 1.83(a) is being changed to delete the proposed redesignation of paragraph (a) and to delete proposed paragraph (a)(2). Also, §§ 1.83(a) and (c) are being changed for clarity to refer to a "nonprovisional" application. Further, § 1.83(c) is being changed to remove the reference to paragraph (a)(1).

Section 1.101 is being changed for clarity to refer to a "nonprovisional" application.

Sections 1.129(a) and (b) are being changed to identify the effective date of 35 U.S.C. 154(a)(2) as June 8, 1995.

Further, § 1.129(a) is being changed to provide that the first and second submissions and fees set forth in § 1.17(r) must be filed prior to the filing of an Appeal Brief, rather than prior to the filing of the Notice of Appeal, and prior to abandonment of the application. The requirement that the fee set forth in § 1.17(r) be filed within one month of the notice refusing entry is being deleted. Section 1.129(a) is also being changed to provide that the finality of the final rejection is automatically withdrawn upon the timely filing of the submission and payment of the fee set forth in § 1.17(r). The language indicating that the submission would be entered and considered after timely payment of the fee set forth in § 1.17(r) "to the extent that it would have been entered and considered if made prior to final rejection" is being deleted. In view of the magnitude of the fee set forth in § 1.17(r), the next PTO action following timely payment of the fee set forth in § 1.17(r) will be equivalent to a first action in a continuing application. Under existing PTO practice, it would not be proper to make final a first Office action in a continuing application where the continuing application contains material which was presented in the earlier application after final rejection or closing of prosecution but was denied entry because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised. The identical procedure will apply to examination of a submission considered as a result of the procedure under § 1.129(a). Thus, under § 1.129(a), if the first submission after final rejection was initially denied entry in the application because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised, then the next action in the application will not be made final. Likewise, if the second submission after final rejection was initially denied entry in the application because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised, then the next action in the application will not be made final. In view of 35 U.S.C. 132, no amendment considered as a result of the payment of the fee set forth in § 1.17(r) may introduce new matter into the disclosure of the application.

Section 1.129(b)(1) is being changed to identify the date which is two months prior to the effective date of 35 U.S.C. 154(a)(2) as April 8, 1995. Section 1.129(b)(1) is also being changed to clarify in subsection (ii) that the examiner has not made a requirement for restriction in the present or parent application prior to April 8, 1995, due to actions by the applicant.

Section 1.129(b)(2) is being changed to delete the identification of the period provided for applicants to respond to a notification under § 1.129(b) as one month. The time period for response will be identified in any written notification under § 1.129(b) and will usually be one month, but in no case will it

be less than thirty days. The period may be extended under § 1.136(a). The language is also being changed to provide that applicant may respond to the notification by (i) electing the invention or inventions to be searched and examined, if no election has been made prior to the notice, and paying the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in excess of one which applicant elects, (ii) confirming an election made prior to the notice and paying the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in addition to the one invention which applicant previously elected, or (iii) filing a petition under § 1.129(b)(2) traversing the requirement without regard to whether the requirement has been made final. No petition fee is required. The section is also being changed to provide that if the petition under § 1.129(b)(2) is filed in a timely manner, the original time period for electing and paying the fee set forth in § 1.17(s) will be deferred and any decision on the petition affirming or modifying the requirement will set a new time period to elect the invention or inventions to be searched and examined and to pay the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in excess of one which applicant elects.

Section 1.129(c) is being changed to clarify that the provisions of §§ 1.129(a) and (b) are not applicable to any application filed after June 8, 1995. However, any application filed on June 8, 1995 would be subject to a 20-year patent term.

Section 1.137 is being amended by revising paragraph (c) to eliminate, in all applications filed on or after June 8, 1995, except design applications, the requirement that a terminal disclaimer accompany any petition under § 1.137(a) not filed within six (6) months of the date of the abandonment of the application. The language "filed before June 8, 1995" and "filed on or after June 8, 1995" as used in the amended rule, refer to the actual United States filing date, without reference to any claim for benefit under 35 U.S.C. 120, 121 or 365. No change to § 1.137 was proposed in the Notice of Proposed Rulemaking. However, in all applications filed on or after June 8, 1995, except design applications, any delay in filing a petition under § 1.137(a) will automatically result in the loss of patent term. The loss of patent term will be the incentive for applicants to promptly file any petition to revive. Therefore, no need is seen for requiring a terminal disclaimer in such applications. It would amount to a penalty if a terminal disclaimer was required.

Section 1.316 is being amended by revising paragraph (d) to eliminate, in all applications filed on or after June 8, 1995, except design applications, the requirement that a terminal disclaimer accompany any petition under § 1.316(b) not filed within six (6) months of the date of the abandonment of the application. Acceptance of a late payment of an issue fee in a design application is specifically provided for in § 1.155. Therefore, § 1.316 does not apply to design applications. The language "filed before June 8, 1995" as used in the amended rule, refers to the actual United States filing date, without reference to any claim for benefit under 35 U.S.C. 120, 121 or 365. No change to § 1.316 was proposed in the Notice of Proposed Rulemaking. However, in all applications filed on or after June 8, 1995, except design applications, any delay in filing a petition under § 1.316(b) will automatically result in the loss of patent term. The loss of patent term will be the incentive for applicants to promptly file any petition under § 1.316(b). Therefore, no need is seen for requiring a terminal disclaimer in such applications. It would amount to a penalty if a terminal disclaimer was required.

Section 1.317 is being amended by removing and reserving paragraph (d) to eliminate the requirement that a terminal disclaimer accompany any petition under § 1.317(b) not filed within six (6) months of the date of lapse of the patent. No change to § 1.317 was proposed in the Notice of Proposed Rulemaking. However, the delay in filing a petition under § 1.317(b) does not result in any gain of patent term. Therefore, no reason is seen for requiring a terminal disclaimer in such cases.

Section 1.701(a) is being changed to identify the implementation date as June 8, 1995, and to clarify that a proceeding under 35 U.S.C. 135(a) is an interference proceeding.

Section 1.701(b) is being changed to provide that the term of a patent entitled to an extension under § 1.701 shall be extended for the sum of the periods of delay calculated under paragraphs (c)(1), (c)(2), (c)(3) and (d) of § 1.701 and the

extension will run from the expiration date of the patent. The reference to a terminal disclaimer is being deleted to be consistent with § 1.701(a)(3) and to avoid any confusion.

Section 1.701(c)(1)(i) is being changed for clarity by deleting the phrase "if any" after the first occurrence of "interference" and by inserting the same phrase after the phrase "the number of days."

Section 1.701(c)(1)(ii) is being changed to clarify that the period referred to ends on the "date of the termination of the suspension" rather than on the date of the next PTO communication reopening prosecution.

Section 1.701(d)(1) is being amended to clarify that the "time" referred to is time "during the period of appellate review."

Section 1.701(d)(2) is being amended to clarify that the Commissioner, under the broad discretion granted by 35 U.S.C. 154(b)(3)(C), has decided to limit consideration of applicant's due diligence only to acts occurring during the period of appellate review. The supplementary information published in the Notice of Proposed Rulemaking contained examples of what might be considered a lack of due diligence for purposes of § 1.701(d)(2) as proposed. Specifically, the supplementary information identified requests for extensions of time to respond to Office communications, submission of a response which is not fully responsive to an Office communication, and filing of informal applications as examples. In view of the comments received and the language adopted in the final rules, those examples are withdrawn. Acts which the Commissioner considers to constitute prima facie evidence of lack of due diligence under § 1.701(d)(2) are suspensions at applicant's request under § 1.103(a) during the period of appellate review and abandonments during the period of appellate review.

#### Discussion of Specific Rules

Title 37 of the Code of Federal Regulations, Parts 1 and 3, are being amended as indicated below:

Section 1.1 is being amended to add a paragraph (i) to provide a special "Box Provisional Patent Application" address to assist the Mail Room in separating and processing provisional applications and mail relating thereto.

Section 1.9 is being amended to redesignate paragraph (a) as paragraph (a)(1) and to define a national application as a U.S. application for patent which was either filed in the Office under 35 U.S.C. 111, or which entered the national stage from an international application after compliance with 35 U.S.C. 371. A new paragraph (a)(2) is being added to define the term "provisional application" as a U.S. national application filed under 35 U.S.C. 111(b). Also, a new paragraph (a)(3) is being added to define the term "nonprovisional application" as a U.S. national application for patent which was either filed in the Office under 35 U.S.C. 111(a), or which entered the national stage from an international application after compliance with 35 U.S.C. 371.

Sections 1.12 and 1.14 are being amended to replace the references to § 1.17(i)(1) with references to § 1.17(i).

Sections 1.16(a)-(e) and (g) are being amended to clarify that those sections do not apply to provisional applications. A complete provisional application does not require claims. However, provisional applications may be filed with one or more claims as part of the application. Nevertheless, no additional claim fee or multiple dependent claim fee will be required in a provisional application. Section 1.16(f) is being amended to insert the words "basic fee". Section 1.16(e) refers to "the basic filing fee". Current Office practice allows a design application to be filed without the design filing fee or the oath/declaration as set forth in § 1.53(d)(1). The change to § 1.16(f) is merely for clarification. In addition, § 1.16(a) is being amended to replace the word "cases" with the word "applications", since the word "applications" is used elsewhere in the rule.

Section 1.16 is also being amended to add a new paragraph (k) which lists the basic filing fee for a provisional application as \$75.00 for a small entity (see §§ 1.9(c)-(f)) or \$150.00 for other than a small entity as contained in Public Law 103-465. Since the filing fee for a provisional application is established by Public Law 103-465 as a 35 U.S.C. 41(a) fee, the filing fee

for a provisional application will be subject to the fifty (50) percent reduction provided for in 35 U.S.C. 41(h).

Further, § 1.16 is being amended to add a new paragraph (l) which establishes the surcharge required by new § 1.53(d)(2) for filing the basic filing fee or the cover sheet required by new § 1.51(a)(2) for a provisional application at a time later than the provisional application filing date as \$25.00 for a small entity or \$50.00 for other than a small entity.

Section 1.17(h) is being amended to clarify that the \$130.00 petition fee for filing a petition for correction of inventorship under § 1.48 applies to all patent applications, except provisional applications. Paragraph (i)(1) is being redesignated as paragraph (i) and paragraph (i)(2) is being removed. The fee for a petition under § 1.102 to make an application special has been placed in paragraph (i). The words "of this part", in § 1.17, paragraphs (h) and (i), are being deleted, since the paragraphs currently refer to sections in parts other than Part 1. Section 1.17(i) is also being amended to clarify that the fee set forth in paragraph (i) for filing a petition to accord a filing date under § 1.53 applies to all patent applications, except provisional applications.

A new § 1.17(q) is being added to establish a petition fee of \$50.00 for filing a petition for correction of inventorship under § 1.48 in a provisional application and for filing a petition to accord a provisional application a filing date or to convert an application filed under § 1.53(b)(1) to a provisional application. The petition fee set forth in § 1.17(q) is not reduced for a small entity.

New §§ 1.17(r) and (s) are being added to establish the fees for entry of a submission after final rejection under § 1.129(a) and for each additional invention requested to be examined under § 1.129(b), respectively. These fees have been set at \$365.00 for a small entity and \$730.00 for other than a small entity.

Section 1.21(l) is being amended to refer to § 1.53(d)(1).

Section 1.28(a) is being amended to clarify the procedure for establishing status as a small entity in a nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application. In such cases, applicants may file a new verified statement or rely on a verified statement filed in the prior application, if status as a small entity is still proper and desired. If applicants intend to rely on a verified statement filed in the prior application, applicants must include in the nonprovisional application either a reference to the verified statement filed in the prior application or a copy of the verified statement filed in the prior application. Status as a small entity may be established in a provisional application by complying with existing § 1.27.

Section 1.45(c) is being amended to clarify that the first sentence applies to a "nonprovisional" application. Section 1.45(c) is also being amended to add a second sentence relating to joint inventors named in a provisional application. The second sentence states that each inventor named in a provisional application must have made a contribution to the subject matter disclosed in the provisional application. All that § 1.45(c), second sentence, requires is that if a person is named as an inventor in a provisional application, that person must have made a contribution to the subject matter disclosed in the provisional application.

Sections 1.48(a)-(c) are being amended to specify that the procedures for correcting an error in inventorship set forth in those sections apply to nonprovisional applications. New paragraph (d) is being added to establish a procedure for adding the name of an inventor in a provisional application, where the name was originally omitted without deceptive intent. Paragraph (d) does not require the verified statement of facts by the original inventor or inventors, the oath or declaration by each actual inventor in compliance with § 1.63 or the consent of any assignee as required in paragraph (a). Instead, the procedure requires the filing of a petition identifying the name or names of the inventors to be added and including a statement that the name or names of the inventors were omitted through error without deceptive intention on the part of the actual inventor(s). The statement would be required to be verified if made by a person not registered to practice before the PTO. The statement could be signed by a registered practitioner of record in the application or acting in a representative capacity under § 1.34(a). The \$50.00 petition fee set forth in § 1.17(q) would also be required. New paragraph (e) is also being added setting



forth the procedure for deleting the name of a person who was erroneously named as an inventor in a provisional application. The procedure requires an amendment deleting the name of the person who was erroneously named accompanied by: a petition including a statement of facts verified by the person whose name is being deleted establishing that the error occurred without deceptive intention; the fee set forth in § 1.17(q); and the written consent of any assignee.

Section 1.51 is being amended to redesignate § 1.51(a) as § 1.51(a)(1) and to include a new paragraph (a)(2) identifying the required parts of a complete provisional application. As set forth in § 1.51(a)(2), a complete provisional application includes a cover sheet, a specification as prescribed in 35 U.S.C. 112, first paragraph, any necessary drawings and the provisional application filing fee. A suggested cover sheet format for a provisional application is included as an Appendix A to this Notice of Final Rulemaking and is available from the PTO free of charge to the public. However, the rule does not require the applicant to use the PTO suggested cover sheet. Any paper containing the information required in § 1.51(a)(2)(i) will be acceptable. The cover sheet is required to identify the paper as a provisional application and to provide the information which is necessary for the PTO to prepare the provisional application filing receipt. Also, the residence of each named inventor and, if the invention disclosed in the provisional application was made by an agency of the U.S. Government or under a contract with an agency of the U.S. Government, the name of the U.S. Government agency and Government contract number must be identified on the cover sheet.

Section 1.51(b) is being amended to indicate that an information disclosure statement is not required and may not be filed in a provisional application. Any information disclosure statements filed in a provisional application will either be returned or disposed of at the convenience of the Office. An information disclosure statement filed in a § 1.53(b)(1) application which has been converted to a provisional application will be retained in the application after the conversion, if the information disclosure statement was filed before the petition required by § 1.53(b)(2)(ii) was filed.

The title of § 1.53 and paragraph (a) are being amended to refer to application number, rather than application serial number. The term "application number" is found in current § 1.5(a).

Section 1.53(b) is being redesignated as § 1.53(b)(1) and is being amended to refer to § 1.17(i) rather than § 1.17(i)(1) to conform to the change therein.

A new § 1.53(b)(2) is being added to set forth the requirements for obtaining a filing date for a provisional application. Section 1.53(b)(2) states that a filing date will be accorded to a provisional application as of the date the specification as prescribed by 35 U.S.C. 112, first paragraph, any necessary drawings, and the name of each inventor of the subject matter disclosed are filed in the PTO. The filing date requirements for a provisional application set forth in new paragraph (b)(2) parallel the existing requirements set forth in former paragraph (b), now redesignated paragraph (b)(1), except that no claim is required. In order to minimize the cost of processing provisional applications and to reduce the handling of provisional applications, amendments, other than those required to make the provisional application comply with applicable regulations, are not permitted after the filing date of the provisional application.

Section 1.53(b)(2)(i) is being added requiring all provisional applications to be filed with a cover sheet identifying the application as a provisional application. The section also indicates that the PTO will treat an application as having been filed under § 1.53(b)(1), unless the application is identified as a provisional application on filing. A provisional application, which is identified as such on filing, but which does not include all of the information required by § 1.51(a)(2)(i) would still be treated as a provisional application. However, the omitted information and a surcharge would be required to be submitted at a later date under new § 1.53(d)(2).

Section 1.53(b)(2)(ii) is being added to establish a procedure for converting an application filed under § 1.53(b)(1) to a provisional application. The section requires that a petition requesting the conversion and a petition fee be filed in the § 1.53(b)(1) application prior to the earlier of the abandonment of the § 1.53(b)(1) application, the payment of the issue fee, the expiration of twelve (12) months after the filing date of

the § 1.53(b)(1) application, or the filing of a request for a statutory invention registration under § 1.293. The grant of any such petition would not entitle applicant to a refund of the fees properly paid in the application filed under § 1.53(b)(1).

Section 1.53(b)(2)(iii) is being added to call attention to the provisions of Public Law 103-465 which prohibit any provisional application from claiming a right of priority under 35 U.S.C. 119 or 365(a) or the benefit of an earlier filing date under 35 U.S.C. 120, 121 or 365(c) of any other application. The section also calls attention to the provisions of Public Law 103-465 which provide that no claim for benefit of an earlier filing date may be made in a design application based on a provisional application and that no request for a statutory invention registration may be filed in a provisional application. Section 1.53(b)(2)(iii) further specifies that the requirements of §§ 1.821-1.825 are not mandatory for provisional applications. However, applicants are reminded that an invention being claimed in an application filed under 35 U.S.C. 111(a) or 365 which claims benefit under 35 U.S.C. 119(e) of a provisional application must be disclosed in the provisional application in the manner provided by the first paragraph of 35 U.S.C. 112. Voluntary compliance with the requirements of §§ 1.821-1.825 in the provisional application is recommended, in order to ensure that support for the invention claimed in the 35 U.S.C. 111(a) application can be readily ascertained in the provisional application.

Section 1.53(c) is being amended to require that any request for review of a refusal to accord an application a filing date be made by way of a petition accompanied by the fee set forth in § 1.17(i), if the application was filed under § 1.53(b)(1), or by the fee set forth in § 1.17(q), if the application was filed under § 1.53(b)(2). This reflects the current practice set forth in the Manual of Patent Examining Procedure (MPEP), section 506.02 (Sixth Edition, Jan. 1995) with regard to any request for review of a refusal to accord a filing date for an application. The PTO will continue its current practice of refunding the petition fee, if the refusal to accord the requested filing date is found to have been a PTO error.

Section 1.53(d) is being redesignated as § 1.53(d)(1).

Section 1.53(d)(2) is being added to provide that a provisional application may be filed without the basic filing fee and without the complete cover sheet required by § 1.51(a)(2). In such a case, the applicant will be notified and given a period of time in which to file the missing fee, and/or cover sheet and to pay the surcharge set forth in § 1.16(l).

Section 1.53(e) is being redesignated as § 1.53(e)(1) and amended to refer to § 1.53(b)(1). Also, a new § 1.53(e)(2) is being added to indicate that a provisional application will not be given a substantive examination and will be abandoned no later than twelve (12) months after its filing date.

Sections 1.55(a) and (b) are being amended to clarify that the sections apply to nonprovisional applications and to clarify that a nonprovisional application may claim the benefit of one or more prior foreign applications or one or more applications for inventor's certificate. Also, § 1.55(a) is being amended to replace the reference to 35 U.S.C. 119 with a reference to 35 U.S.C. 119(a)-(d). In addition, the reference to § 1.17(i)(1) in § 1.55(a) is being replaced by a reference to § 1.17(i) to be consistent with the change to § 1.17. Section 1.55(b) is also being amended to refer to 35 U.S.C. 119(d) to conform to the paragraph designations contained in Public Law 103-465.

Section 1.59 is being amended to clarify that the retention fee practice set forth in § 1.53(d)(1) applies only to applications filed under § 1.53(b)(1).

Section 1.60 is being amended to clarify in the title of the section and in paragraph (b)(1) that the procedure set forth in the section is only available for filing a continuation or divisional application if the prior application was a nonprovisional application and complete as set forth in § 1.51(a)(1). Paragraph (b)(4) is being amended to delete the requirement that the statement which must accompany the copy of the prior application include the language that "no amendments referred to in the oath or declaration filed to complete the prior application introduced new matter therein." The requirement is unnecessary because any amendment filed to complete the prior application would be considered a part of the original disclosure of the prior application and, by definition, could not contain new matter. Also, paragraph (b)(4) is being amended to refer to § 1.17(i).

Section 1.62(a) is being amended to clarify that the procedure set forth in the section is only available for filing a continuation, continuation-in-part, or divisional application of a prior nonprovisional application which is complete as defined in § 1.51(a)(1). Section 1.62(a) is also being amended to clarify that a continuing application may be filed under § 1.62 after payment of the issue fee if a petition under § 1.313(b)(5) is granted in the prior application and that the request for a § 1.62 application must include identification of the inventors named in the prior application. The phrase "Serial number, filing date" in § 1.62(a) is being changed to "application number."

Section 1.62(c) is being amended to replace the reference to § 1.17(i)(1) with a reference to § 1.17(i) to be consistent with the change to § 1.17. Also, the term "application serial number" in § 1.62(c) is being changed to "application number."

Section 1.63(a) is being amended to replace the reference to § 1.51(a)(2) with a reference to § 1.51(a)(1)(ii) in order to conform with the changes in § 1.51 and to refer to an oath or declaration filed as a part of a nonprovisional application.

Section 1.67(b) is being amended to replace the reference to § 1.53(d) with a reference to § 1.53(d)(1) in order to conform with the changes in § 1.53. Furthermore, the references to §§ 1.53(b) and 1.118 are being deleted to make clear that the new matter exclusion applies to all applications including those filed under §§ 1.60 and 1.62. Also, the section is being amended to refer to a nonprovisional application.

Sections 1.78(a)(1) and (a)(2) are being amended to clarify that the sections apply to nonprovisional applications claiming the benefit of one or more copending nonprovisional applications or international applications designating the United States of America. Section 1.78(a)(1)(iii) is being amended to refer to §§ 1.53(b)(1) and 1.53(d)(1). Section 1.78(a)(2) is also being amended to eliminate the use of serial number and filing date as an identifier for a prior application. The section will require that the prior application be identified by application number (consisting of the series code and serial number) or international application number and international filing date.

Sections 1.78(a)(3) and (a)(4) are being added to set forth the conditions under which a nonprovisional application may claim the benefit of one or more prior copending provisional applications. The later filed nonprovisional application must be an application other than for a design patent and must be copending with each provisional application. There must be a common inventor named in the prior provisional application and the later filed nonprovisional application. Each prior provisional application must be complete as set forth in § 1.51(a)(2), or entitled to a filing date as set forth in § 1.53(b)(2) and include the basic filing fee. Section 1.78(a)(3) also includes the warning that when the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. A provisional application may be abandoned by operation of 35 U.S.C. 111(b)(5) on a Saturday, Sunday, or Federal holiday within the District of Columbia, in which case, a nonprovisional application claiming benefit of the provisional application under 35 U.S.C. 119(e) must be filed no later than the preceding day which is not a Saturday, Sunday, or Federal holiday within the District of Columbia.

Section 1.78(a)(4) is also being added to provide that a nonprovisional application claiming benefit of one or more provisional applications must contain a reference to each provisional application, identifying it as a provisional application and including the provisional application number (consisting of series code and serial number). The section does not require the nonprovisional application to identify the nonprovisional application as a continuation, divisional or continuation-in-part application of the provisional application.

Sections 1.83(a) and (c) are being amended to clarify that the sections apply to nonprovisional applications.

Section 1.97(d) is being amended to replace the reference to § 1.17(i)(1) with a reference to § 1.17(i) to be consistent with the change to § 1.17.

Section 1.101(a) is being amended to indicate that the section applies to nonprovisional applications.

Section 1.102(d) is being amended to replace the reference to § 1.17(i)(2) with a reference to § 1.17(i) to be consistent with the change to § 1.17.

Section 1.103(a) is being amended to replace the reference to § 1.17(i)(1) with a reference to § 1.17(i) to be consistent with the change to § 1.17.

Section 1.129 is being added to set forth the procedure for implementing certain transitional provisions contained in Public Law 103-465. Section 1.129(a) provides for limited reexamination of applications pending for 2 years or longer as of June 8, 1995, taking into account any reference to any earlier application under 35 U.S.C. 120, 121 or 365(c). An applicant will be entitled to have a first submission entered and considered on the merits after final rejection if the submission and the fee set forth in § 1.17(r) are filed prior to the filing of an Appeal Brief and prior to abandonment of the application. Section 1.129(a) also provides that the finality of the final rejection is automatically withdrawn upon the timely filing of the submission and payment of the fee set forth in § 1.17(r). After submission and payment of the fee set forth in § 1.17(r), the next PTO action on the merits may be made final only under the conditions currently followed by the PTO for making a first action in a continuing application final. If a subsequent final rejection is made in the application, applicant would be entitled to have a second submission entered and considered on the merits under the same conditions set forth for consideration of the first submission. Section 1.129(a) defines the term "submission" as including, but not limited to, an information disclosure statement, an amendment to the written description, claims or drawings, and a new substantive argument or new evidence in support of patentability. For example, the submission may include an amendment, a new substantive argument and an information disclosure statement. In view of the fee set forth in § 1.17(r), any information disclosure statement previously refused consideration in the application because of applicant's failure to comply with § 1.97(c) or (d) or which is filed as part of either the first or second submission will be treated as though it had been filed within one of the time periods set forth in § 1.97(b) and will be considered without the petition and petition fee required in § 1.97(d), if it complies with the requirements of § 1.98. In view of 35 U.S.C. 132, no amendment considered as a result of the payment of the fee set forth in § 1.17(r) may introduce new matter into the disclosure of the application.

Section 1.129(b)(1) is being added to provide for examination of more than one independent and distinct invention in certain applications pending for 3 years or longer as of June 8, 1995, taking into account any reference to any earlier application under 35 U.S.C. 120, 121 or 365(c). Under § 1.129(b)(1), a requirement for restriction or for the filing of divisional applications would only be made or maintained in the application after June 8, 1995, if: (1) the requirement was made in the application or in an earlier application relied on under 35 U.S.C. 120, 121 or 365(c) prior to April 8, 1995; (2) the examiner has not made a requirement for restriction in the present or parent application prior to April 8, 1995, due to actions by the applicant; or (3) the required fee for examination of each additional invention was not paid. Under § 1.129(b)(2), if the application contains claims to more than one independent and distinct invention, and no requirement for restriction or for the filing of divisional applications can be made or maintained, applicant will be notified and given a time period to (i) elect the invention or inventions to be searched and examined, if no election has been made prior to the notice, and pay the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in excess of one which applicant elects, (ii) in situations where an election was made in response to a requirement for restriction that cannot be maintained, confirm the election made prior to the notice and pay the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in addition to the one invention which applicant previously elected, or (iii) file a petition under § 1.129(b)(2) traversing the requirement without regard to whether the requirement has been made final. No petition fee is required. Section 1.129(b)(2) also provides that if the petition is filed in a timely manner, the original time period for electing and paying the fee set forth in § 1.17(s) will be deferred and any decision on the petition affirming or modifying the requirement will set a new time period to elect the invention or inventions to be searched and examined and to pay the fee set forth



in § 1.17(s) for each independent and distinct invention claimed in the application in excess of one which applicant elects. Under § 1.129(b)(3), each additional invention for which the required fee set forth in § 1.17(s) has not been paid will be withdrawn from consideration under § 1.142(b). An applicant who desires examination of an invention so withdrawn from consideration can file a divisional application under 35 U.S.C. 121.

Section 1.129(c) is being added to clarify that the provisions of §§ 1.129(a) and (b) are not applicable to any application filed after June 8, 1995. However, any application filed on June 8, 1995, would be subject to a 20-year patent term.

Section 1.137 is being amended by revising paragraph (c) to eliminate, in all applications filed on or after June 8, 1995, except design applications, the requirement that a terminal disclaimer accompany any petition under § 1.137(a) not filed within six (6) months of the date of the abandonment of the application. The language "filed before June 8, 1995" and "filed on or after June 8, 1995" as used in the amended rule, refer to the actual United States filing date, without reference to any claim for benefit under 35 U.S.C. 120, 121 or 365.

Section 1.139 is being added to set forth the procedure for reviving a provisional application where the delay was unavoidable or unintentional. Section 1.139(a) addresses the revival of a provisional application where the delay was unavoidable and § 1.139(b) addresses the revival of a provisional application where the delay was unintentional. Applicant may petition to have an abandoned provisional application revived as a pending provisional application for a period of no longer than twelve months from the filing date of the provisional application where the delay was unavoidable or unintentional. It would be permissible to file a petition for revival later than twelve months from the filing date of the provisional application but only to revive the application for the twelve-month period following the filing of the provisional application. Thus, even if the petition were granted to reestablish the pendency up to the end of the twelve-month period, the provisional application would not be considered pending after twelve months from its filing date. The requirements for reviving an abandoned provisional application set forth in § 1.139 parallel the existing requirements set forth in § 1.137.

Sections 1.177, 1.312(b), 1.313(a), and 1.314 are being amended to replace the references to § 1.17(i)(1) with references to § 1.17(i) to be consistent with the change to § 1.17.

Section 1.316(d) is being amended to eliminate, in all applications filed on or after June 8, 1995, except design applications, the requirement that a terminal disclaimer accompany any petition under § 1.316(b) not filed within six (6) months of the date of the abandonment of the application. Acceptance of a late payment of an issue fee in a design application is specifically provided for in § 1.155. Therefore, § 1.316 does not apply to design applications. The language "filed before June 8, 1995" as used in the amended rule, refers to the actual United States filing date, without reference to any claim for benefit under 35 U.S.C. 120, 121 or 365.

Section 1.317(d) is being removed and reserved to eliminate the requirement that a terminal disclaimer accompany any petition under § 1.317(b) not filed within six (6) months of the date of lapse of the patent.

Section 1.666 is being amended to replace the reference to § 1.17(i)(1) with a reference to § 1.17(i) to be consistent with the change to § 1.17.

Section 1.701 is being added to set forth the procedure the PTO will follow in calculating the length of any extension of patent term to which an applicant is entitled under 35 U.S.C. 154(b) where the issuance of a patent on an application, other than for designs, filed on or after June 8, 1995, was delayed due to certain causes of prosecution delay. Applicants need not file a request for the extension of patent term under § 1.701. The extension of patent term is automatic by operation of law. It is currently anticipated that applicant will be advised as to the length of any patent term extension at the time of receiving the Notice of Allowance and Issue Fee Due. Review of the length of a patent term extension calculated by the PTO under § 1.701 prior to the issuance of the patent would be by way of petition under § 1.181. If an error is noted after the patent issues, patentee and any third party may seek correction of the period of patent term granted by filing a request for Certificate of Correction pursuant to § 1.322. The PTO intends to identify

the length of any patent term extension calculated under § 1.701 on the printed patent.

Section 1.701(a) is being added to identify those patents which are entitled to an extension of patent term under 35 U.S.C. 154(b).

Section 1.701(b) is being added to provide that the term of a patent entitled to extension under § 1.701(a) shall be extended for the sum of the periods of delay calculated under §§ 1.701(c)(1), (c)(2), (c)(3) and (d), to the extent that those periods are not overlapping, up to a maximum of five years. The section also provides that the extension will run from the expiration date of the patent.

Section 1.701(c)(1) is being added to set forth the method for calculating the period of delay where the delay was a result of an interference proceeding under 35 U.S.C. 135(a). The period of delay with respect to each interference in which the application was involved is calculated under § 1.701(c)(1)(i) to include the number of days in the period beginning on the date the interference was declared or redeclared to involve the application in the interference and ending on the date that the interference was terminated with respect to the application. An interference is considered terminated as of the date the time for filing an appeal under 35 U.S.C. 141 or civil action under 35 U.S.C. 146 expired. If an appeal under 35 U.S.C. 141 is taken to the Court of Appeals for the Federal Circuit, the interference terminates on the date of receipt of the court's mandate by the PTO. If a civil action is filed under 35 U.S.C. 146, and the decision of the district court is not appealed, the interference terminates on the date the time for filing an appeal from the court's decision expires. See section 2361 of the MPEP. The period of delay with respect to an application suspended by the PTO due to interference proceedings under 35 U.S.C. 135(a) not involving the application is calculated under § 1.701(c)(1)(ii) to include the number of days in the period beginning on the date prosecution in the application is suspended due to interference proceedings not involving the application and ending on the date of the termination of the suspension. The period of delay under § 1.701(a)(1) is the sum of the periods calculated under §§ 1.701(c)(1)(i) and (c)(1)(ii), to the extent that the periods are not overlapping.

Section 1.701(c)(2) is being added to set forth the method for calculating the period of delay where the delay was a result of the application being placed under a secrecy order.

Section 1.701(c)(3) is being added to set forth the method for calculating the period of delay where the delay was a result of appellate review. The period of delay is calculated under § 1.701(c)(3) to include the number of days in the period beginning on the date on which an appeal to the Board of Patent Appeals and Interferences was filed under 35 U.S.C. 134 and ending on the date of a final decision in favor of the applicant by the Board of Patent Appeals and Interferences or by a Federal court in an appeal under 35 U.S.C. 141 or a civil action under 35 U.S.C. 145.

Section 1.701(d) is being added to set forth the method for calculating any reduction in the period calculated under § 1.701(c)(3). As required by 35 U.S.C. 154(b)(3)(B), § 1.701(d)(1) provides that the period of delay calculated under § 1.701(c)(3) shall be reduced by any time during the period of appellate review that occurred before three years from the filing date of the first national application for patent presented for examination. The "filing date" for the purpose of § 1.701(d)(1) would be the earliest effective U.S. filing date, but not including the filing date of a provisional application or the international filing date of a PCT application. For PCT applications entering the national stage, the PTO will consider the "filing date" for the purpose of § 1.701(d)(1) to be the date on which applicant has complied with the requirements of § 1.494(b), or § 1.495(b), if applicable.

As contained in Public Law 103-465, 35 U.S.C. 154(b)(3)(C) states that the period of extension referred to in 35 U.S.C. 154(b)(2) "shall be reduced for the period of time during which the applicant for patent did not act with due diligence, as determined by the Commissioner." Section 1.701(d)(2) is being added to provide that the period of delay calculated under § 1.701(c)(3) shall be reduced by any time during the period of appellate review, as determined by the Commissioner, during which the applicant for patent did not act with due diligence. Section 1.701(d)(2) also provides that in determining the due diligence of an applicant, the Commissioner may examine the

facts and circumstances of the applicant's actions during the period of appellate review to determine whether the applicant exhibited that degree of timeliness as may reasonably be expected from, and which is ordinarily exercised by, a person during a period of appellate review. Acts which the Commissioner considers to constitute *prima facie* evidence of lack of due diligence under § 1.701(d)(2) are suspension at applicant's request under § 1.103(a) during the period of appellate review and abandonment during the period of appellate review.

Section 3.21 is being amended to provide that an assignment relating to a national patent application must identify the national patent application by the application number (consisting of the series code and the serial number, e.g., 07/123,456) and to eliminate the use of serial number and filing date as an identifier for national patent applications in assignment documents. This change is intended to eliminate any confusion as to whether an application identified by its serial number and filing date in an assignment document is an application filed under § 1.53(b)(1), 1.60 or 1.62 or a design application or a provisional application since there is a different series code assigned to each of these types of applications.

Section 3.21 is also being amended to provide that if an assignment of a patent application filed under § 1.53(b)(1) or § 1.62 is executed concurrently with, or subsequent to, the execution of the patent application, but before the patent application is filed, it must identify the patent application by its date of execution, name of each inventor, and title of the invention so that there can be no mistake as to the patent application intended.

Further, § 3.21 is being amended to provide that if an assignment of a provisional application is executed before the provisional application is filed, it must identify the provisional application by name of each inventor and title of the invention so that there can be no mistake as to the provisional application intended.

Section 3.81 is being amended to replace the reference to § 1.17(i)(1) with a reference to § 1.17(i) to be consistent with the change to § 1.17.

**Responses to and Analysis of Comments:** Forty-nine written comments were received in response to the Notice of Proposed Rulemaking. These comments, along with those made at the public hearing, have been analyzed. Some suggestions made in the comments have been adopted and others have not been adopted. Responses to the comments follow:

#### General Comments

1. *Comment:* One comment questioned the use of the word "proposed" in the notice of proposed rulemaking in describing the statutory amendments contained in Public Law 103-465. *Response:* The statutory changes contained in Public Law 103-465 were described as "proposed" changes in the Notice of Proposed Rulemaking because the President had not signed the legislation at the time the notice was prepared for publication. In fact, the legislation was signed by the President on December 8, 1994, which is the date of enactment.

2. *Comment:* Several comments urged the PTO to favorably consider the 17/20 patent term specified in H.R. 359 since this proposed legislation would overcome the existing impact of extended PTO prosecution and eliminate patent term extensions for prosecution delays. Furthermore, the proposed legislation is consistent with the Uruguay Round Agreements Act, Public Law 103-465.

*Response:* The administration and the PTO strongly believe that the 20-year patent term as enacted in Public Law 103-465 is the appropriate way to implement the 20-year patent term required by the GATT Uruguay Round Agreements Act. The PTO will take steps to ensure that processing and examination of applications are handled expeditiously.

3. *Comment:* One comment stated that the proposed rules are premature in view of the Rohrabacher bill, H.R. 359.

*Response:* The proposed rules are not premature. Public Law 103-465 was signed into law on December 8, 1994, with an effective date of June 8, 1995, for the implementation of the 20-year patent term and provisional applications. The Commissioner must promulgate regulations to implement the changes required by Public Law 103-465.

4. *Comment:* One comment stated that there is nothing in the

TRIPs agreement that requires the term to be measured from filing, nor that provisional applications be provided for, nor that new fees of \$730 as set forth in §§ 1.17(r) and (s) be established. It is suggested that 35 U.S.C. 154 be amended to provide that "every patent (other than a design patent) shall be granted a term of twenty years from the patent issue date, subject to the payment of maintenance fees." It was also suggested that the section regarding maintenance fees be amended to add a new fee payable at 16.5 years of \$5000 (for large entity)/\$2500 (for small entity) for maintenance of patent between 17 and 20 years.

*Response:* The suggestion has not been adopted. The administration and the PTO strongly believe that the 20-year patent term as enacted in Public Law 103-465 is the appropriate way to implement the 20-year patent term required by the GATT Uruguay Round Agreements Act. The establishment of a provisional application is not required by GATT. The provisional application has been adopted as a mechanism to provide easy and inexpensive entry into the patent system. The filing of provisional applications is optional. Provisional applications will place domestic applicants on an equal footing with foreign applicants as far as the measurement of term is concerned because the domestic priority period, like the foreign priority period, is not counted in determining the endpoint of the patent term. As to the §§ 1.17(r) and (s) fees, the statute authorizes the Commissioner to establish appropriate fees for further limited reexamination of applications and for examination of more than one independent and distinct inventions in an application.

5. *Comment:* One comment suggested that the 20-year patent term of claims drawn to new matter in continuation-in-part (CIP) applications be measured from the filing date of the CIP application, irrespective of any reference to a parent application under 35 U.S.C. 120.

*Response:* The suggestion has not been adopted. The term of a patent is not based on a claim-by-claim approach. Under 35 U.S.C. 154(a)(2), if an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(a), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(a). For a CIP application, applicant should review whether any claim in the patent that will issue is supported in an earlier application. If not, applicant should consider canceling the reference to the earlier filed application.

6. *Comment:* One comment objected to the 20-year term provisions of Public Law 103-465 because it was believed that payment of maintenance fees would be required earlier under 20-year term than under 17-year term.

*Response:* The payment of maintenance fees are not due earlier under 20-year term than under 17-year term. Maintenance fees continue to be due at 3.5, 7.5 and 11.5 years from the issue date of the patent.

7. *Comment:* Several comments suggested that the expiration date be printed on the face of the patent.

*Response:* The suggestion has not been adopted. The expiration date will not be printed on the face of the patent. The PTO will publish any patent term extension that is granted as a result of administrative delay pursuant to § 1.701 on the face of the patent. The term of a patent will be readily discernible from the face of the patent. Furthermore, it is noted that the term of a patent is dependent on the timely payment of maintenance fees which is not printed on the face of the patent.

8. *Comment:* One comment suggested that in order to aid the bar in advising clients as to whether a provisional application has had its priority claimed in a patent, the PTO should somehow link the provisional application number with the complete application number and/or the patent number.

*Response:* It is contemplated by the PTO that all provisional applications will be given application numbers, starting with a series code "60" followed by a six digit number, e.g., "60/123,456." If a subsequent 35 U.S.C. 111(a) application claims the benefit of the filing date of the provisional application pursuant to 35 U.S.C. 119(e) and the 35 U.S.C. 111(a) application results in a patent, the provisional application would be listed by its application number and filing date on the face of the patent under the heading "Related U.S. Application Data." The public will be able to identify an application under the above-noted heading as a provisional application by checking to see if it has a series code of "60."



9. *Comment:* Several comments suggested that the PTO consider modifying the rules to permit the filing of all applications by assignees. This would promote harmonization with other patent laws throughout the world and would eliminate one of the difficulties which will occur for the PTO in considering claims for priority based on the filing of a provisional application.

*Response:* Assignee filing was recommended in the 1992 Advisory Commission Report on Patent Law Reform. The PTO is currently undertaking a project to reengineer the entire patent process. The suggestion will be taken under advisement in that project.

10. *Comment:* Several comments stated that a complete provisional application should not be forwarded to a central repository for storage.

*Response:* In view of the relatively small filing fee for a provisional application and the fact that the provisional application will not be examined, PTO handling must be kept to a minimum and these provisional applications, once complete, will be sent to the Files Repository for storage rather than being kept in the examination area of the PTO.

11. *Comment:* One comment suggested that the provisional application be maintained with the 35 U.S.C. 111(a) application because the examiner may need it to determine whether the 35 U.S.C. 111(a) application is entitled to the benefit of the prior provisional application and in the event of 18-month publication, there will be a demand for accessibility by the public to the provisional and 35 U.S.C. 111(a) applications upon publication.

*Response:* The suggestion has not been adopted. Benefit of the same provisional application may be claimed in a number of 35 U.S.C. 111(a) applications. If the PTO is to maintain the provisional application file with one of several 35 U.S.C. 111(a) applications claiming benefit of the provisional application and the 35 U.S.C. 111(a) application containing the provisional application file were to go abandoned while one of the other 35 U.S.C. 111(a) applications issues, the public would be entitled to inspect the provisional application file but not the abandoned 35 U.S.C. 111(a) application file containing the provisional application file. This would create access problems.

12. *Comment:* One comment suggested that provisional applications be available in full to the public if the benefit of priority is being claimed.

*Response:* Section 1.14 relating to access applies to all applications including provisional applications. If the benefit of a provisional application is claimed in a later filed 35 U.S.C. 111(a) application which resulted in a patent, then access to the provisional application will be available to the public pursuant to § 1.14. The mere fact that a provisional application is claimed in a later filed 35 U.S.C. 111(a) application does not give the public access to the provisional application unless the 35 U.S.C. 111(a) application issues as a patent.

13. *Comment:* Several comments requested that the PTO clarify whether a 35 U.S.C. 111(a) application will be accorded an effective date as a reference under 35 U.S.C. 102(e) as of the filing date of the provisional application for which benefit under 35 U.S.C. 119(e) is claimed. If so, the comment questioned whether pending applications will be rejected under 35 U.S.C. 102(e) on the basis that an invention was described in a patent granted on a provisional application by another filed in the U.S. before the invention thereof by the applicant for patent.

*Response:* If a patent is granted on a 35 U.S.C. 111(a) application claiming the benefit of the filing date of a provisional application, the filing date of the provisional application will be the 35 U.S.C. 102(e) prior art date. A pending application will be rejected under 35 U.S.C. 102(e) on the basis that an invention was described in a patent granted on a 35 U.S.C. 111(a) application which claimed the benefit of the filing date of a provisional application by another filed in the U.S. before the invention thereof by the applicant for patent.

14. *Comment:* One comment suggested that the PTO issue a final rule stating that if a 35 U.S.C. 111(a) application claims the benefit of the filing date of a provisional application, the "inventive entity" for the purposes of 35 U.S.C. 102(e) will be the inventors listed on the issued patent, and the list of inventors in the provisional application shall have no effect on the identity of an "inventive entity" for the purposes of 35 U.S.C. 102(e).

*Response:* The suggestion has not been adopted. The "inventive

entity" for the purpose of 35 U.S.C. 102(e) is determined by the patent and not by the inventors named in the provisional application. As long as the requirements of 35 U.S.C. 119(e) are satisfied, a patent granted on a 35 U.S.C. 111(a) application which claimed the benefit of the filing date of a provisional application has a 35 U.S.C. 102(e) prior art effect as of the filing date of the provisional application based on the inventive entity of the patent. It is clear from 35 U.S.C. 102(e) that the inventive entity is determined by the patent and a rule to this effect is not necessary.

15. *Comment:* One comment requested the PTO to express its position as to whether the filing of a provisional application with the subsequent filing of a 35 U.S.C. 111(a) application claiming benefit of the provisional application under 35 U.S.C. 119(e) creates a prior art date against other patent applicants under 35 U.S.C. 102(g).

*Response:* As to 35 U.S.C. 102(g), the filing of a provisional application with the subsequent filing of a 35 U.S.C. 111(a) application claiming benefit of the provisional application under 35 U.S.C. 119(e) creates a prior art date under 35 U.S.C. 102(g) as of the filing date of the provisional application.

16. *Comment:* One comment suggested that in view of the 20-year patent term measured from filing, § 1.103(a) should be deleted. The PTO should not have the right to suspend action on any application, thereby reducing applicant's term of protection.

*Response:* Section 1.103(a) refers to suspension of action as a result of a request by applicant. If applicant wishes to suspend prosecution and thereby reduce his/her term of protection, applicant should be permitted to do so.

17. *Comment:* One comment suggested that in order to avoid delays resulting from consideration of petitions to withdraw premature notices of abandonment, examiners should be required to contact an attorney of record prior to abandoning the application to find out if a response to an Office communication has been filed.

*Response:* The suggestion has not been adopted. However, in order to avoid loss of patent term, applicants are encouraged to check on the status in cases where applicants have not received a return postcard from the PTO within two (2) weeks of the filing of any response to a PTO action.

18. *Comment:* One comment asked whether there is a "cut-off" date after which patentees may lose the opportunity to choose 17 vs. 20-year patent term.

*Response:* The "cut-off" date is June 8, 1995. A patent that is in force on June 8, 1995, or a patent that issues after June 8, 1995, on an application filed before June 8, 1995, is automatically entitled to the longer of the 20-year patent term measured from the earliest U.S. effective filing date or 17 years from grant. This is automatic by operation of law. Patentees need not make any election to be entitled to the longer term. A patent that issues on an application filed on or after June 8, 1995 is entitled to a 20-year patent term measured from the earliest U.S. effective filing date.

19. *Comment:* One comment stated that there is no clear guidance as to a patentee's "bonus rights" that may arise because of the difference in a 17-year term vs. a 20-year term. Will parties that were previously in a licensing arrangement have to renegotiate terms for the bonus patent term?

*Response:* Section 154(c) of title 35, United States Code, states that the remedies of sections 283 (injunction), 284 (damages) and 285 (attorney fees) shall not apply to acts which were commenced or for which substantial investment was made before June 8, 1995, and became infringing by reason of the 17/20 year term and that these acts may be continued only upon the payment of an equitable remuneration to the patentee that is determined in an action brought under chapters 28 and 29 of Title 35. There is no guidance provided in the statute as to the meaning of "substantial investment" and "equitable remuneration." Licensing arrangements are between the parties to the agreement and are determined by the terms of the agreement and state law and are outside the jurisdiction of the PTO.

20. *Comment:* One comment questioned whether an international application designating the U.S. filed before June 8, 1995, with entry into the U.S. national stage on or after June 8, 1995, preserves the 17-year patent term measured from grant.

*Response:* An international application designating the U.S. that is filed before June 8, 1995, with entry into the U.S. national stage under 35 U.S.C. 371 on or after June 8, 1995,

preserves the option for a 17-year patent term measured from date of grant.

21. *Comment:* One comment suggested that 35 U.S.C. 371(c) be amended because a declaration should not be required to obtain a filing date and a prior art date under 35 U.S.C. 102(e).

*Response:* The suggestion has not been adopted. This issue was not addressed in the Notice of Proposed Rulemaking. However, the suggestion will be taken under advisement as part of a comprehensive effort being conducted by the PTO to reengineer the entire patent process.

22. *Comment:* One comment suggested that §§ 1.604, 1.605 and 1.607 be amended to state that provisional applications are not subject to interference.

*Response:* The suggestion has not been adopted because it is unnecessary. By statute, 35 U.S.C. 111(b)(8), provisional applications are not subject to 35 U.S.C. 135, i.e., a provisional application will not be placed in interference.

23. *Comment:* One comment suggested that §§ 1.821-1.825 be amended so that (1) only unbranched sequences of ten or more amino acids and twenty or more nucleotides which are claimed have to be included in Sequence Listings, (2) previously published sequences can be omitted, and (3) the sequences of primers and oligonucleotide probes should not be included in a Sequence Listing if encompassed by another disclosed sequence.

*Response:* The suggestion has not been adopted. There was no change proposed to §§ 1.821-1.825 in the Notice of Proposed Rulemaking. However, the suggestion will be taken under advisement as part of a comprehensive effort being conducted by the PTO to reengineer the entire patent process.

24. *Comment:* One comment suggested that §§ 5.11 to 5.15 be amended to provide for the grant of a foreign license for a provisional application.

*Response:* The suggestion has not been adopted. The present language of §§ 5.11 to 5.15 already provides for the grant of a foreign license for a provisional application.

25. *Comment:* One comment suggested that in order to assist defense agencies in reviewing application for secrecy orders, PTO should (1) automatically impose a secrecy order on any application filed under 35 U.S.C. 111(a) if a secrecy order was previously imposed on corresponding provisional application, and (2) require applications filed under 35 U.S.C. 111(a) based on a previous provisional application to indicate changes made to the provisional application in the 35 U.S.C. 111(a) application by means of underlining and bracketing.

*Response:* The suggestions have not been adopted. The PTO cannot automatically impose a secrecy order on any 35 U.S.C. 111(a) applications even if a secrecy order was previously imposed on a provisional application, for which benefit under 35 U.S.C. 119(e) is claimed, unless the agency which imposed the secrecy order on the provisional application specifically requests the PTO to do so since the 35 U.S.C. 111(a) application could disclose subject matter which is different from that which is disclosed in the provisional application.

As to item (2), the PTO will not require applicants to identify the differences in subject matter disclosed in the 35 U.S.C. 111(a) application and the provisional application.

26. *Comment:* One comment suggested that in order to relieve defense agencies from possible liability for secrecy orders imposed for more than 5 years, the PTO should seek legislation setting patent term at 20 years from the earliest filing date or 17 years from the issue date, whichever is longer, for any patent application placed under secrecy order.

*Response:* The suggestion has not been adopted. The PTO strongly believes that the 20-year patent term as enacted in Public Law 103-465 is the appropriate way to implement the 20-year patent term required by the GATT Uruguay Round Agreements Act. The 5-year limit for patent term extension set forth in § 1.701(b) is required by statute, 35 U.S.C. 154(b).

#### Comments Directed To Specific Rules

27. *Comment:* One comment suggested that in order to eliminate the need for the expression "other than a provisional application" in other parts of the regulations, § 1.9 should be amended to identify a 35 U.S.C. 111(a) application by some term that can be used in the rules to distinguish that type of application from a provisional application.

*Response:* The suggestion has been adopted. The rules are being

amended to include a definition of the term "nonprovisional application" in § 1.9(a) to describe an application filed under 35 U.S.C. 111(a) or 371. Further, the term "nonprovisional application" is being used in the final rules where the rule applies only to applications filed under 35 U.S.C. 111(a) or 371 and not to provisional applications.

28. *Comment:* One comment suggested that the rules be simplified if a "national application" could be defined in § 1.9 to exclude a provisional application.

*Response:* The suggestion has not been adopted. Section 1.9(a), prior to this rulemaking, defined a national application to include any application filed under 35 U.S.C. 111. A provisional application is an application filed under 35 U.S.C. 111. It is appropriate to define a provisional application as a special type of national application.

29. *Comment:* One comment requested an explanation of the showing required in a petition under §§ 1.12 and 1.14 for access to pending applications and to assignment records for pending applications.

*Response:* There was no substantive change proposed to either § 1.12 or 1.14 in the Notice of Proposed Rulemaking. Thus, the showing required in a petition under § 1.12 or 1.14 remains the same after this final rulemaking as before. A discussion of such a petition can be found in section 103 of the MPEP.

30. *Comment:* Several comments objected to the definition in § 1.45(c) of joint inventors in provisional applications as being those having made a contribution to "the subject matter disclosed" in the provisional application. Various language, such as, "the subject matter which constitutes the invention," "subject matter disclosed and regarded to be the invention," "disclosed invention," "the inventive subject matter disclosed" was suggested. Another comment requested guidance as to the determination of inventorship in a provisional application.

*Response:* The suggestion has not been adopted. The term "invention" is typically used to refer to subject matter which applicant is claiming in his/her application. Since claims are not required in a provisional application, it would not be appropriate to reference joint inventors as those who have made a contribution to the "invention" disclosed in the provisional application. If the "invention" has not been determined in the provisional application because no claims have been presented, then the name(s) of those person(s) who have made a contribution to the subject matter disclosed in the provisional application should be submitted. Section 1.45(c) states that "if multiple inventors are named in a provisional application, each named inventor must have made a contribution, individually or jointly, to the subject matter disclosed in the provisional application." All that § 1.45(c) requires is that if someone is named as an inventor, that person must have made a contribution to the subject matter disclosed in the provisional application. When applicant has determined what the invention is by the filing of the 35 U.S.C. 111(a) application, that is the time when the correct inventors must be named. The 35 U.S.C. 111(a) application must have an inventor in common with the provisional application in order for the 35 U.S.C. 111(a) application to be entitled to claim the benefit of the provisional application under 35 U.S.C. 119(e).

31. *Comment:* Several comments suggested that it might be desirable to correct inventorship in a provisional application where an individual was erroneously named as an inventor and that the procedure for doing so should be set forth in § 1.48.

*Response:* Under 35 U.S.C. 119(e), as contained in Public Law 103-465, a later filed application under 35 U.S.C. 111(a) may claim priority benefits based on a copending provisional application so long as the applications have at least one inventor in common. An error in naming a person as an inventor in a provisional application would not require correction by deleting the erroneously named inventor from the provisional application since this would have no effect upon the ability of the provisional application to serve as a basis for a priority claim under 35 U.S.C. 119(e). However, in response to the comments, § 1.48 is being amended to include a new paragraph (e) which sets forth the requirements for deleting the names of the inventors incorrectly named as joint inventors in a provisional application, namely, a petition including a verified statement by the inventor(s) whose name(s) are being deleted stating that the error arose without deceptive intent, the fee set forth in § 1.17(q) and the written consent of all assignees.

32. *Comment:* One comment suggested that in order to make



the procedures for provisional applications as simple as possible, there is no need to provide any rules to add inventor(s) or change inventorship in a provisional application since the whole concept of inventorship is meaningless without a claim. Error in inventorship can be corrected by the filing of a 35 U.S.C. 111(a) application within 12 months after the filing of a provisional application.

**Response:** The suggestion has not been adopted. One of the requirements of 35 U.S.C. 119(e) is that a 35 U.S.C. 111(a) application must have at least one inventor in common with a provisional application in order for the 35 U.S.C. 111(a) application to be entitled to claim the benefit of the filing date of the provisional application. In situations where there is no inventor in common between the 35 U.S.C. 111(a) application and the provisional application due to error in naming the inventors in the provisional application, procedures must be established to permit applicant to correct the inventorship in the provisional application.

**33. Comment:** One comment suggested that an individual who is the inventor of subject matter disclosed in a provisional application, but who is not named as an inventor in the provisional application because that subject matter was not intended to be claimed in a later filed 35 U.S.C. 111(a) application, could be added as an inventor pursuant to § 1.48(d) in the provisional application if the subject matter was later claimed in the 35 U.S.C. 111(a) application.

**Response:** The individual could be added as an inventor pursuant to § 1.48(d) in the provisional application so long as the individual was originally omitted without deceptive intent.

**34. Comment:** One comment questioned whether it would be proper for a registered practitioner who did not file the provisional application to sign the statement required by § 1.48(d) that the error occurred without deceptive intention on the part of the inventors.

**Response:** It would be proper for a registered practitioner who did not file the provisional application to sign the statement required by § 1.48(d), if the registered practitioner has a reasonable basis to believe the truth of the statement being signed.

**35. Comment:** One comment suggested that there should be no diligence requirement to correct inventorship in a provisional application.

**Response:** Diligence is not a requirement to correct inventorship in a provisional application in either § 1.48(d) or 1.48(e).

**36. Comment:** One comment suggested that § 1.48(a) be amended by deleting the requirements for "a statement of facts verified by the original named inventor or inventors establishing when the error without deceptive intention was discovered and how it occurred" and for the written consent of any assignee.

**Response:** The suggestion has not been adopted. There was no substantive change proposed to § 1.48(a) in the Notice of Proposed Rulemaking. Since the correction of inventorship affects ownership rights, the existing rules are designed to provide assurances that all parties including the original named inventors and all assignees agree to the change of inventorship. If the requirements for verified statements of facts from the original named inventors and written consent of the assignees are to be deleted, the PTO would no longer have the assurances that all parties agree to the change.

**37. Comment:** One comment expressed concern that a provisional application filed without a claim will leave subsequent readers with little or no clue as to what the inventors in the provisional application considered to be their invention at the time the provisional application was filed and doubted that a provisional application filed without a claim defining the invention could ever provide a sufficient disclosure to support a claim for a foreign or U.S. priority date.

**Response:** Claims are not required by the statute to provide a specification in compliance with the requirements of 35 U.S.C. 112, first paragraph. However, if an applicant desires, one or more claims may be included in a provisional application. Any claim filed with a provisional application will, of course, be considered a part of the original provisional application disclosure.

**38. Comment:** One comment suggested that the PTO issue a specification format or guideline for a provisional application to enable an inventor to comply with 35 U.S.C. 112, first paragraph.

**Response:** The format of a provisional application is the same as for other applications and is set forth in existing § 1.77

which is applicable to provisional applications except no claims are required for provisional applications.

**39. Comment:** Several comments suggested that the PTO revise its rules to clarify that strict adherence to the enablement, description and best mode requirements of 35 U.S.C. 112, first paragraph, is not required in provisional applications.

**Response:** The suggestion has not been adopted. The substantive requirements of a specification necessary to comply with 35 U.S.C. 112, first paragraph, are established by court cases interpreting that section of the statute, not by rule. The case law applies to provisional applications as well as to applications filed under 35 U.S.C. 111(a).

**40. Comment:** Several comments suggested that the rules or comments published with the Final Rule indicate whether there is any requirement to update the best mode disclosed in the provisional application when filing the 35 U.S.C. 111(a) application.

**Response:** No rule was proposed to address the issue when going from a provisional application to a 35 U.S.C. 111(a) application because no current rule exists when going from one 35 U.S.C. 111(a) application to another 35 U.S.C. 111(a) application. The question of whether the best mode has to be updated is the same when going from one 35 U.S.C. 111(a) application to another 35 U.S.C. 111(a) application or from a provisional application to a 35 U.S.C. 111(a) application. Accordingly, the rationale of *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 U.S.P.Q.2d 1077 (Fed. Cir. 1994), would appear to be applicable. Clearly, if the substantive content of the application does not change when filing the 35 U.S.C. 111(a) application, there is no requirement to update the best mode. However, if subject matter is added to the 35 U.S.C. 111(a) application, there may be a requirement to update the best mode.

**41. Comment:** One comment suggested that § 1.51(c) be amended to permit a provisional application to be filed with an authorization to charge fees to a deposit account.

**Response:** Section 1.51(c) permits an application to be filed with an authorization to charge fees to a deposit account. Section 1.51(c) applies to provisional applications. Therefore, no change to § 1.51(c) is necessary.

**42. Comment:** One comment suggested that the PTO confirm that there will be no procedural examination of a provisional application other than to determine whether the provisional application complies with § 1.51(a)(2).

**Response:** The PTO intends to require compliance with the formal requirements of §§ 1.52(a)-(c) only to the extent necessary to permit the PTO to properly microfilm and store the application papers.

**43. Comment:** Several comments suggested that an English translation of a foreign language provisional application should not be required unless necessary in prosecution of the 35 U.S.C. 111(a) application to establish benefit. If an English translation is required, there is no useful purpose to require the translation at any time earlier than the filing of 35 U.S.C. 111(a) application claiming the benefit of the provisional application.

**Response:** Provisional applications may be filed in a language other than English as set forth in existing § 1.52(d). However, an English language translation is necessary for security screening purposes. Therefore, the PTO will require the English language translation and payment of the fee required in § 1.52(d) in the provisional application. Failure to timely submit the translation in response to a PTO requirement will result in the abandonment of the provisional application. If a 35 U.S.C. 111(a) application is filed without providing the English language translation in the provisional application, the English language translation will be required to be supplied in every 35 U.S.C. 111(a) application claiming priority of the non-English language provisional application.

**44. Comment:** One comment suggested that a new model oath or declaration form for use in claiming 35 U.S.C. 119(e) priority and a "cover sheet" for use in filing provisional applications be published as an addendum to the final rules.

**Response:** The suggestion has been adopted. See Appendix A for the sample cover sheet for filing a provisional application and Appendix B for the sample declaration for use in claiming 35 U.S.C. 119(e) priority.

**45. Comment:** One comment suggested that the statement in § 1.53(b)(2) that the provisional application will not be given a filing date if all the names of the actual inventor or inventor(s)

are not supplied be deleted and § 1.41 be amended to make an exception for provisional applications. The comment suggested that 35 U.S.C. 111(b) is satisfied as long as the name of one person who made an inventive contribution to the subject matter of the application is given.

**Response:** The suggestion has not been adopted. Section 111(b) of title 35, United States Code, states that "a provisional application shall be made or authorized to be made by the inventor." This language parallels 35 U.S.C. 111(a). The naming of inventors for obtaining a filing date for a provisional application is the same as for other applications. A provisional application filed with the inventors identified as "Jones et al." will not be accorded a filing date earlier than the date upon which the name of each inventor is supplied unless a petition with the fee set forth in § 1.17(i) is filed which sets forth the reasons the delay in supplying the names should be excused. Administrative oversight is an acceptable reason. It should be noted that for a 35 U.S.C. 111(a) application to be entitled to claim the benefit of the filing date of a provisional application, the 35 U.S.C. 111(a) application must have at least one inventor in common with the provisional application.

**46. Comment:** One comment suggested that a drawing should not be required to obtain a filing date for a provisional application. Whatever is filed should be given a serial number and filing date in order to establish status as a provisional application, regardless of what is in the specification or drawing. If the provisional application omitted drawings, has pages missing, or is otherwise incomplete, then applicant may not be able to rely on the filing date of the provisional application in a subsequently filed 35 U.S.C. 111(a) application. It should not be the job of the Application Branch to review compliance with § 1.81(a).

**Response:** Section 111(b) of title 35, United States Code, states that a provisional application must include a specification as prescribed by 35 U.S.C. 112, first paragraph and a drawing as prescribed by 35 U.S.C. 113. Drawings are required pursuant to 35 U.S.C. 113 if they are necessary to understand the subject matter sought to be patented. If a provisional application as filed omitted drawings and/or has pages missing, the provisional application is *prima facie* incomplete and no filing date will be granted. Application Branch currently reviews all applications to make sure that no filing date will be granted to an application that is *prima facie* incomplete. Application Branch will perform the same type of review with provisional applications. If a filing date is not granted to a provisional application because it is *prima facie* incomplete, applicant may petition the PTO under § 1.182 to grant a filing date to the provisional application as of the date of deposit of the application papers if it can be shown that the omitted items are not necessary for the understanding of the subject matter.

**47. Comment:** One comment objected to the requirement in § 1.53(b)(2)(i) for a cover sheet identifying the application as a provisional application because it is unnecessarily rigid and contrary to Congress' desire to keep the filing of provisional application as simple as possible.

**Response:** The requirement that a provisional application be specifically identified on filing as a provisional application is not seen to be burdensome on the applicant and is necessary for the PTO to properly process the papers as a provisional application. All an applicant is required to do in order to comply with the requirement of § 1.53(b)(2)(i) is to include a transmittal sheet identifying the papers being filed as a PROVISIONAL application.

**48. Comment:** Several comments suggested that in § 1.53(b)(2)(ii), as proposed, the phrase "the expiration of 12 months after the filing date of the provisional application" should read "the expiration of 12 months after the filing date of the § 1.53(b)(1) application".

**Response:** The suggestion has been adopted.

**49. Comment:** One comment objected to the requirement in § 1.53(b)(2)(ii) for a petition to convert an application filed under § 1.53(b)(1) to a provisional application and suggested that any confusion concerning applicant's intention could be handled informally without a petition or petition fee.

**Response:** The requirement for a petition and fee is intended to ensure that the cost of any PTO reprocessing is borne specifically by the applicant requesting the action.

**50. Comment:** Several comments suggested that the filing fee required in an application filed under 35 U.S.C. 111(a) claiming

benefit of the filing date of an earlier 35 U.S.C. 111(a) application which has been converted to a provisional application under proposed § 1.53(b)(2)(ii) be reduced, since the \$730/\$365 filing fee was paid in the earlier application.

**Response:** The suggestion has not been adopted. The filing fee required in an application filed under 35 U.S.C. 111(a) is set by statute. The statute does not provide for the suggested reduction in the filing fee.

**51. Comment:** One comment suggested that proposed § 1.53(b)(2)(iii) should apply retroactively to permit applications filed between June 9, 1994, and June 8, 1995, to be converted to provisional applications.

**Response:** The suggestion has not been adopted. The statute does not permit a provisional application to have a filing date prior to June 8, 1995.

**52. Comment:** One comment suggested that § 1.53(b)(2)(ii) be revised to state that the petition requesting conversion must also be filed before (1) the application becomes involved in interference, or (2) notice by the PTO of intent to publish the application as a statutory invention registration. This suggestion conforms with 35 U.S.C. 111(b)(8).

**Response:** The suggestion has not been fully adopted. It is not necessary to include interference in § 1.53(b)(2)(ii) because if a 35 U.S.C. 111(a) application becomes involved in an interference proceeding and applicant files a petition requesting conversion of that 35 U.S.C. 111(a) application to a provisional application, the 35 U.S.C. 111(a) will be removed from the interference proceeding upon granting the petition to convert. When a subsequent 35 U.S.C. 111(a) application is filed based on the provisional application, the subsequent 35 U.S.C. 111(a) application could be placed in the interference proceeding if necessary. As to the reference to statutory invention registration, § 1.53(b)(2)(ii) is being amended to require the petition and the fee be filed prior to the earlier of the abandonment of the 35 U.S.C. 111(a) application, the payment of the issue fee, the expiration of 12 months after the filing date of the 35 U.S.C. 111(a) application, or the filing of a request for a statutory invention registration under § 1.293.

**53. Comment:** One comment suggested that the procedures for converting a 35 U.S.C. 111(a) application to a provisional application be explained in greater detail in § 1.53(b)(2)(ii) or in the discussion. If a 35 U.S.C. 111(a) application is converted to a provisional application on the last day of the 12-month period, and a second 35 U.S.C. 111(a) application is concurrently filed, how should this be done and how should the first sentence in the second 35 U.S.C. 111(a) application be worded. Furthermore, if a 35 U.S.C. 111(a) application is converted to a provisional application on the last day of the 12-month period, will it be necessary to file a second 35 U.S.C. 111(a) application on the same day, or else lose the priority claim.

**Response:** The suggestion has not been adopted. The language in § 1.53(b)(2)(ii) is clear relating to the requirements for converting a 35 U.S.C. 111(a) application to a provisional application. If applicant wishes to convert a 35 U.S.C. 111(a) application to a provisional application, applicant must file a petition requesting the conversion along with the petition fee set forth in § 1.17(q). The petition and the fee must be filed prior to the earlier of the abandonment of the 35 U.S.C. 111(a) application, the payment of the issue fee, the expiration of 12 months after the filing date of the 35 U.S.C. 111(a) application, or the filing of a request for a statutory invention registration under § 1.293. In the example noted in the comment, if a 35 U.S.C. 111(a) application is converted to a provisional application on the last day of the 12-month period, a second 35 U.S.C. 111(a) application must be filed on that same day, otherwise, applicant will lose the priority pursuant to 35 U.S.C. 119(e). An example of how the first sentence of the second 35 U.S.C. 111(a) application would read is, "This application claims the benefit of U.S. Provisional Application No. 60/—, filed—, which was converted from Application No.—."

**54. Comment:** One comment suggested that the PTO consider a rule mandating that any prior U.S. application that would have been eligible for conversion to a provisional application that is abandoned in favor of a continuing application within one year of the earliest priority date asserted be deemed constructively converted to a provisional application.

**Response:** The suggestion has not been adopted. Conversion of a 35 U.S.C. 111(a) application to a provisional will be permitted only by way of a petition and under the conditions



set forth in § 1.53(b)(2)(ii). One reason for this is that the PTO plans to provide sufficient information on the printed patent to determine the end date of the 20-year patent term by identifying provisional applications using a unique series code, i.e., "60". Thus, a 35 U.S.C. 111(a) application converted to a provisional application will need to be reprocessed by the PTO with a new application number. The petition fee is intended to reimburse the PTO for the extra processing necessitated by the conversion.

55. *Comment:* One comment stated that § 1.53(b)(2)(ii) permits the conversion of a 35 U.S.C. 111(a) application to a provisional application. However, it is silent as to whether such a conversion would kill any benefit the 35 U.S.C. 111(a) application had of domestic and/or foreign priority.

*Response:* Section 111(b)(7) of title 35, United States Code, specifically states that a provisional application shall not be entitled to the right of priority of any other application under 35 U.S.C. 119 or 365(a) or to the benefit of an earlier filing date in the United States under 35 U.S.C. 120, 121, or 365(c). If a 35 U.S.C. 111(a) application is converted to a provisional application, the granting of the conversion will automatically eliminate any claim of priority which could have been made in the 35 U.S.C. 111(a) application.

56. *Comment:* Several comments suggested that it was inconsistent with the purpose of the provisional application to require any compliance with the Sequence Disclosure Rules §§ 1.821-1.823 and 1.825, since the provisional applications are not examined and there is no comparison of the sequences with the prior art.

*Response:* The Office agrees with the comments that a provisional application need not comply with the requirements of §§ 1.821 through 1.825. Section 1.53(b)(2)(iii) is being amended to indicate that the requirements of §§ 1.821 through 1.825 regarding sequence listings are not mandatory for a provisional application. However, applicants are cautioned that in order for a 35 U.S.C. 111(a) application to obtain the benefit of the filing date of an earlier filed provisional application, the claimed subject matter of the 35 U.S.C. 111(a) application must have been disclosed in the provisional application in a manner provided by 35 U.S.C. 112, first paragraph. Applicants are encouraged to follow the sequence rules to ensure that support for the invention claimed in the 35 U.S.C. 111(a) application can be readily ascertained in the provisional application.

57. *Comment:* One comment suggested that the language in § 1.53(e)(2) that a provisional application will become abandoned no later than twelve months after its filing date was misleading and that the words "no later than" should be deleted because it was believed that a provisional application could not be abandoned prior to twelve months after its filing date.

*Response:* The statute does not state that a provisional application can never be abandoned prior to twelve months after its filing date. In fact, a provisional application may be abandoned as a result of applicant's failure to timely respond to a PTO requirement. For example, if a provisional application which has been accorded a filing date does not include the appropriate filing fee or the cover sheet required by § 1.51(a)(2), applicant will be so notified if a correspondence address has been provided and given a period of time within which to file the fee, cover sheet and to pay the surcharge as set forth in § 1.16(l). Failure to timely respond will result in the abandonment of the application. This may occur prior to twelve months after its filing date. Furthermore, a provisional application may also be expressly abandoned prior to twelve months from its filing date.

58. *Comment:* One comment objected to the deletion of the "retention fee" practice in § 1.53(d) since it permits an applicant in a first application claiming benefits under 35 U.S.C. 119(a)-(d) or 120 to correct inventorship by filing a second application without having to pay the full filing fee in the first application.

*Response:* Since the comment indicated that there is a benefit to retain the retention fee practice, the proposal to eliminate the practice is withdrawn.

59. *Comment:* One comment stated that the language of §§ 1.53(d)(1) and (d)(2) indicates an intent by the PTO to mail the "Notice Of Missing Parts" to applicant's post office address and argues that the "Notice" should be mailed to the registered practitioner who filed the application on behalf of the applicant.

*Response:* The language in §§ 1.53(d)(1) and (d)(2) states that the applicant will be notified of the missing part, if a correspondence address is provided. This means that the "Notice" to

applicant will be mailed to the correspondence address provided in the application papers. Under current PTO practice, if no specific correspondence address is identified in the application, the address of the registered practitioner who filed the application on behalf of the applicant is used as the correspondence address. If no specific correspondence address or registered practitioner is identified in the application, the post office address of the first named inventor is used as the correspondence address. No change in current PTO practice in this regard is required as a result of § 1.53(d)(2) nor is any change planned.

60. *Comment:* Several comments objected to the proposed deletion of § 1.60. One comment suggested that the deletion of § 1.60 was a major rule change and should have been proposed separate from the proposed rules dealing with the changes in practice required by Public Law 103-465.

*Response:* In view of the comments received, the proposal to delete § 1.60 is withdrawn. However, the proposal will be considered as part of a comprehensive effort being conducted by the PTO to reengineer the entire patent process.

61. *Comment:* One comment suggested that in view of the deletion of § 1.60, language should be incorporated in § 1.53(a)(1) to state that a copy of the prior application along with a copy of the declaration may be filed to obtain a filing date. Furthermore, full details and guidelines of the procedure should accompany the rule.

*Response:* The suggestion has not been adopted. The proposal to delete § 1.60 is withdrawn in view of several comments received objecting to the deletion.

62. *Comment:* One comment suggested that the removal of the stale oath practice be codified.

*Response:* The suggestion has not been adopted. Neither the statute nor the rules require a recent date of execution to appear on the oath or declaration. The PTO practice of objecting to an oath or declaration where the time elapsed between the date of execution and the filing date of the application is more than three months is found in section 602.05 of the MPEP. Therefore, the removal of the stale oath practice will be accomplished by amending the MPEP.

63. *Comment:* One comment questioned whether a copy of an application faxed to an attorney could be filed in the PTO as the application papers.

*Response:* Yes. While a patent application may not be faxed directly to the PTO, an application faxed to an attorney may be forwarded to the PTO by mail or courier as the application papers provided the papers meet the formal requirements of § 1.52. Effective November 22, 1993, § 1.4 was amended to include a new paragraph (d) to specify that most correspondence filed in the PTO, which requires a person's signature, may be an original, a copy of an original or a copy of a copy. Only correspondence identified in §§ 1.4(e) and (f) require the original to be filed in the PTO. Thus, an oath or declaration required by § 1.63, 1.153, 1.162 or 1.175 may be an original, a copy of an original or a copy of a copy. See 1156 Off. Gaz. Pat. Office 61 (November 16, 1993).

64. *Comment:* One comment suggested that applicant be permitted to use § 1.62 procedure to file the 35 U.S.C. 111(a) application which claims the benefit of a provisional application, at least in those situations where the 35 U.S.C. 111(a) application has been converted to a provisional application which is followed by the filing of a second 35 U.S.C. 111(a) application.

*Response:* The suggestion has not been adopted. Section 1.62 will not be amended to permit the filing a 35 U.S.C. 111(a) application based on a provisional application because the PTO sees this situation as a trap for applicants. The filing procedures would be made more complicated if an exception is provided to address situations where a 35 U.S.C. 111(a) application is converted to a provisional application and a second 35 U.S.C. 111(a) application is later filed. However, the suggestion will be taken under advisement when greater familiarity with provisional applications is developed.

65. *Comment:* One comment suggested that § 1.62 procedure be replaced with a simple petition procedure to reopen prosecution.

*Response:* The suggestion is not being adopted. However, the suggestion will be taken under advisement as part of a comprehensive effort being conducted by the PTO to reengineer the entire patent process.

66. *Comment:* One comment suggested that the language in § 1.62(a) that requires an identification of the "applicant's name

of the prior complete application" is confusing and should be clarified.

*Response:* The suggestion has been adopted. Section 1.62 is being amended to require the identification of the "applicants named in the prior complete application."

67. *Comment:* One comment suggested that § 1.62 be amended to state that the refiling procedures set forth in § 1.62 may be used after the issue fee is paid when a petition under § 1.313(b)(5) is granted. This practice is permitted pursuant to the notice published in 1138 Off. Gaz. Pat. Office 40 (May 19, 1992).

*Response:* The suggestion has been adopted.

68. *Comment:* One comment suggested that § 1.62 be amended to clarify whether applicant need to re-list, in the § 1.62 application, all the references cited by the examiner and applicant in the parent application in order to get those references printed on the eventual patent.

*Response:* The suggestion has not been adopted. Section 609 of the MPEP (Sixth Edition, Jan. 1995) has been amended to clarify that in a § 1.62 application, references submitted and cited in the parent application need not be resubmitted. These references will be printed on the patent. However, in any continuing application filed under § 1.53(b)(1) or 1.60, a list of the references must be resubmitted if applicant wishes to have the references printed in the eventual patent.

69. *Comment:* One comment suggested that § 1.67 should go into more detail on when supplemental oaths are required in § 1.53 filings of continuation and divisional applications.

*Response:* The suggestion has not been adopted because it is seen to be unnecessary and no substantive change was proposed to § 1.67 in the Notice of Proposed Rulemaking.

70. *Comment:* One comment suggested that "not but" in § 1.67(b) should read "but not".

*Response:* The suggestion has been adopted.

71. *Comment:* Several comments suggested that a rule be provided to state that an application for patent is permitted to claim the benefit of the filing date of more than one prior provisional application so long as the applicant complies with all statutory provisions.

*Response:* The suggestion has been adopted. Section 1.78(a)(3) is being amended to indicate that applicants are permitted to separately claim the benefit of the filing date of more than one prior provisional application in a later filed 35 U.S.C. 111(a) application provided all statutory requirements of 35 U.S.C. 119(e) are complied with. It is noted that current practice permits an application to claim the benefits of the filing date of more than one prior foreign application under 35 U.S.C. 119(a)-(d) and of more than one prior copending U.S. application under 35 U.S.C. 120, without an explicit statement to that effect in the rules. Since the final rules are being amended to specifically permit applications filed under 35 U.S.C. 111(a) to claim the benefits of the filing date of more than one prior copending provisional application, corresponding changes are also being made to §§ 1.55 and 1.78(a)(1) relating to claims for the benefits available under 35 U.S.C. 119(a)-(d) and 120 to be consistent with § 1.78(a)(3).

72. *Comment:* Several comments requested that the PTO specify language to use in the first sentence of an application when priority is based on more than one provisional application.

*Response:* Section 1.78(a)(4) requires that "any application claiming the benefit of a prior filed copending provisional application must contain or be amended to contain in the first sentence of the specification following the title a reference to such prior provisional application, identifying it as a provisional application, and including the provisional application number." Where a 35 U.S.C. 111(a) application claims the benefit of more than one provisional application, a suitable reference would read, "This application claims the benefit of U.S. Provisional Application No. 60/—, filed — and U.S. Provisional Application No. 60/—, filed —." In addition, for an application which is claiming the benefit under 35 U.S.C. 120 of a prior application, which in turn claims the benefit of a provisional application under 35 U.S.C. 119(e), a suitable reference would read, "This application is a continuation of U.S. application No. 08/—, filed —, now abandoned, which claims the benefit of U.S. Provisional Application No. 60/—, filed —."

73. *Comment:* One comment suggested that the rules address the effect on patent term where an applicant in a continuing application deletes the reference to the prior filed application

before the patent issues.

*Response:* An applicant has full control over claims to the benefit of an earlier filing date under 35 U.S.C. 120, 121 or 365(c). The 20-year patent term will be based upon the filing date of the earliest U.S. application that the applicant makes reference to under 35 U.S.C. 120, 121 and 365(c). Whether an applicant is entitled to the benefit of the filing date of an earlier application is something that an applicant should examine before the patent is issued. The PTO is not, unless it comes up as an issue in the examination process, going to determine whether any of the claims are entitled to the earlier filing date. Applicant however, should determine whether the claims are entitled to or require the benefit of the earlier filing date. If not, the applicant should consider canceling the reference to the earlier filed application to avoid having the 20-year patent term measured from that earlier filing date. An amendment adding or deleting a reference to an earlier filed application presented prior to a final action will be entered, however, the claims may be subject to possible intervening prior art.

74. *Comment:* One comment stated that in view of the fact that a provisional application is not entitled to claim the benefit of a prior filed copending national or international application as stated in § 1.53(b)(2)(iii), the phrase "other than a provisional application" in § 1.78(a)(2) is unnecessary.

*Response:* Section 1.78(a)(2) is being amended to state that "any nonprovisional application claiming the benefit of a prior copending nonprovisional or international application must contain..." Section 1.78(a)(2) addresses a 35 U.S.C. 111(a) application which claims the benefit of a prior copending 35 U.S.C. 111(a) application or international application.

75. *Comment:* Several comments objected to the content requirements for drawings filed in a provisional application as originally set forth in proposed § 1.83(a)(2). One comment suggested that no rule was necessary to set forth the required content of drawings in a provisional application.

*Response:* In view of the comments received, the proposed amendment to § 1.83 is withdrawn. Under 35 U.S.C. 113, first sentence, applicant must furnish drawings in a provisional application "where necessary for the understanding of the subject matter sought to be patented." This requirement is also stated in existing § 1.81(a). Therefore, no further elaboration on the content of the drawings in a provisional application is believed necessary in the rules.

76. *Comment:* One comment suggested that the rules specify that formal drawings are not required in a provisional application.

*Response:* The suggestion has not been adopted. However, the PTO intends to examine provisional applications for requirements of form only to the extent that is necessary to permit normal storage and microfilming of the application papers. Formal drawings are usually not required for those purposes.

77. *Comment:* Several comments suggested that § 1.97(d) be amended to require the PTO to consider any information disclosure statement submitted after a final rejection or notice of allowance if an appropriate fee is paid.

*Response:* The suggestion has not been adopted because no substantive change to this rule was proposed in the Notice of Proposed Rulemaking. The existing rules are designed to encourage prompt submission of information to the PTO. To permit applicant to merely pay a fee to have any information disclosure statement submitted after a final rejection or Notice of Allowance would be contrary to the effort to encourage prompt submissions.

78. *Comment:* One comment suggested that § 1.97 be changed so that an Office action which uses a newly cited reference as a ground for rejection under 35 U.S.C. 102 or 103 cannot be made final.

*Response:* The suggestion has not been adopted because no substantive change to this rule was proposed in the Notice of Proposed Rulemaking.

79. *Comment:* One comment suggested that the words "which are not examined" in § 1.101 as proposed are unnecessary and could create a negative implication that some provisional applications are examined.

*Response:* The suggestion has not been adopted. By statute, provisional applications are not subject to 35 U.S.C. 131, i.e., the Commissioner is not permitted to examine a provisional application for patentability.

80. *Comment:* Several comments stated that it is unfair to



require small entities to pay the full \$730.00 fee set forth in proposed § 1.129. It is suggested that the fee be changed to \$365.00 or less.

**Response:** Pursuant to Public Law 103-465, the Commissioner has the authority to establish appropriate fees for the further limited reexamination of applications and for the examination of more than one independent and distinct invention in an application. As a result of additional review, it was concluded that these fees may be reduced by 50% for small entities. Sections 1.17(r) and (s) are being amended to indicate that the fees are reduced by 50% for small entities, that is, \$365.00 for small entities.

81. **Comment:** Several comments suggested that the transitional procedure set forth in § 1.129(a) as proposed is equivalent to filing one application, i.e., it provides for an extra examination and reexamination after the original final rejection, and, therefore, the requirement for two \$730.00 fees, which is equivalent to two filing fees, is unwarranted. Another comment suggested that if the proposed \$730.00 fee is adopted, the examiner should be instructed to treat the after-final amendment as any other initial filing, i.e., a new application, not as an amendment submitted after a non-final office action.

**Response:** Under existing PTO practice, it would not be proper to make final a first Office action in a continuing or substitute application where the continuing or substitute application contains material which was presented in the earlier application after final rejection or closing of prosecution but was denied entry because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised. The identical procedure will apply to examination of a submission considered as a result of the procedure under § 1.129(a). Thus, under § 1.129(a), if the first submission after final rejection was initially denied entry in the application because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised, then the next action in the application will not be made final. Likewise, if the second submission after final rejection was initially denied entry in the application because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised, then the next action in the application will not be made final. Thus, the fee required by § 1.129(a) has been set at the amount required for filing an application because the procedure provided by the rule is equivalent to the filing of two applications. No new matter can be entered by payment of the fee set forth in § 1.17(r).

82. **Comment:** Several comments suggested that the fees required for filing a provisional application and those fees required by §§ 1.129(a) and (b) for the transitional procedures should not be greater than the average cost of processing such matters by the PTO. Two comments stated that the fee required by § 1.129(a) is excessive relative to PTO costs.

**Response:** The fee required for filing a provisional application is set by Public Law 103-465 and the PTO has no discretion with respect to the amount of that particular fee. As to the fee required by § 1.129(a), the procedures relating to the first submission provided by § 1.129(a) is equivalent to the filing of a file wrapper continuation application under § 1.62, and therefore, the fee required with the first submission is appropriately set at the same amount as a filing fee, which is \$730.00. The \$730.00 fee is subject to a 50% reduction for small entities. The second submission is equivalent to the filing of a second file wrapper continuation application and the fee for the second submission is appropriately set at the same amount as a filing fee. As to the fee required by § 1.129(b), the procedures set forth in § 1.129(b) permit applicants to retain multiple inventions in a single application rather than having to file multiple divisional applications. The fee for each independent and distinct invention in excess of one is appropriately set at the same amount as the filing fee for a divisional application, which is \$730.00. The \$730.00 fee is subject to a 50% reduction for small entities.

83. **Comment:** One comment suggested that the time period for the payment of the \$730.00 fee for the transitional after-final practice be extended if applicant files a petition seeking reversal of the examiner's refusal to enter the amendment after final without fee, until one month after an unfavorable decision on the petition.

**Response:** If an earlier filed petition seeking reversal of the examiner's refusal to enter the amendment after final is granted by the Director finding that the final rejection was premature,

but the petition had not been decided by the time the § 1.129(a) fee was due, applicant must submit the § 1.129(a) fee so as to toll the time period for response to the final rejection. Otherwise, the application would be abandoned. Upon granting of such a petition by the Director, the § 1.129(a) fee paid will be refundable to applicant on request. Applications that fall under § 1.129(a) are under final rejection and there is a time period running against the applicant. Applicant must toll that time period by paying the transitional after-final fee set forth in § 1.129(a) and any necessary extension of time fees and Notice of Appeal fee. Section 1.129(a) is being amended to indicate that the submission and the fee set forth in § 1.17(r) may be submitted before the filing of the Appeal Brief and prior to abandonment of the application.

84. **Comment:** One comment suggested that if it is decided that the transitional after-final practice is made permanent, the PTO should seek legislative authorization to provide reduced fees for small entities.

**Response:** If it is decided that the transitional after-final practice be made permanent, the PTO will propose legislation to accomplish this change.

85. **Comment:** Several comments suggested that §§ 1.129(a) and (b) should apply to all applications regardless of whether they were filed before or after June 8, 1995. Several comments suggested that the practices set forth in §§ 1.129(a) and (b) should be made permanent.

Several comments suggested that an applicant should be permitted to have a submission entered and considered after any final rejection upon payment of a fee as set forth in § 1.17(r), not just the first and second final rejections.

**Response:** The suggestions have not been adopted at this time. However, the PTO is undertaking a project to reengineer the entire patent process. These suggestions will be taken under advisement in that project.

86. **Comment:** One comment suggested that the PTO make an effort to treat applications in which a submission under § 1.129(a) has been filed on an expedited basis.

**Response:** Once the submission is filed and the fee set forth in § 1.17(r) is paid the finality of the last PTO action is withdrawn. The filing of the submission and the fee under § 1.129(a) is equivalent to the filing of a continuing application and will be treated in the same fashion and under the same turnaround time frame as a continuing application.

87. **Comment:** One comment suggested that PTO practice be changed so that a first Office action in a continuing application cannot be made final.

One comment suggested that PTO practice regarding second action final be relaxed.

**Response:** The suggestions have not been adopted at this time. However, the PTO is undertaking a project to reengineer the entire patent process. These suggestions will be taken under advisement in that project.

88. **Comment:** One comment stated that in proposed § 1.129, there is no express provision for the finality of the previous rejection to be withdrawn if applicant complies with the proposed rule. It is suggested that the proposed rule state that the finality of the previous action would be withdrawn if applicant complied with the rule when making a first or second submission after a final action.

**Response:** The suggestion has been adopted.

89. **Comment:** One comment requested that the PTO clarify whether § 1.129(a) required the first final rejection to be specifically withdrawn and a different final (i.e., one containing a new ground of rejection) rejection made before applicant is entitled to make a second submission.

**Response:** The final rule provides that the finality of the previous final office action is automatically withdrawn upon the timely filing of the first § 1.129(a) submission and the fee set forth in § 1.17(r). If the first PTO action following the payment of the § 1.17(r) fee is a non-final office action, a further response from applicant will be entered and considered as a matter of right without payment of the fee set forth in § 1.17(r). If the next office action or any subsequent action is made final, the finality of that office action will be automatically withdrawn upon the timely filing of a second § 1.129(a) submission and the fee set forth in § 1.17(r).

90. **Comment:** One comment suggested that the PTO not permit the first PTO action following the payment of the § 1.17(r) fee to be made final under any circumstances.

**Response:** The suggestion has not been adopted. The first PTO action following the payment of the § 1.17(r) fee may be made final under the same conditions that a first office action may be made final in a continuing application (see section 706.07(b) of the MPEP). However, it would not be proper to make final a first Office action in a continuing or substitute application where the continuing or substitute application contains material which was presented in the earlier application after final rejection or closing of prosecution but was denied entry because (1) new issues were raised that required further consideration and/or search, or (2) the issue of new matter was raised. The procedure set forth in section 706.07(b) of the MPEP will apply to examination of a submission considered as a result of the procedure under § 1.129(a).

91. **Comment:** Several comments suggested that the filing of the first submission under § 1.129(a) within the statutory period for response set in final rejection should toll the running of the six-month statutory period.

**Response:** The filing of a submission, e.g., an information disclosure statement or an amendment, after a final rejection without payment of the fee set forth in § 1.17(r) will not toll the period for response set in the final rejection. However, § 1.129(a) is being amended to provide in the rule that the finality of the previous Office action is automatically withdrawn upon the filing of the submission and the payment of the fee set forth in § 1.17(r). Thus, the filing of a submission and the payment of the fee set forth in § 1.17(r) and any extension of time fees and Notice of Appeal fee, if they are necessary to avoid abandonment of the application, will automatically toll the period for response set in the final rejection. It must be kept in mind that the provisions of § 1.129 apply only to an application, other than for reissue or a design patent, that has been pending for at least two years as of June 8, 1995, taking into account any reference made in such application to any earlier filed application under 35 U.S.C. 120, 121 and 365(c).

92. **Comment:** One comment asked (1) whether it would be necessary to file a Notice of Appeal and appeal fee with or after the first submission and fee if the examiner acts on the first submission and before the end of the six months from the date of the final rejection issues (a) a notice of allowance, (b) a non-final action, or (c) a second final rejection; (2) would the Notice of Appeal and fee be due only at the end of the six months from the date of the final rejection regardless of whether the examiner has acted on the submission by then; and (3) if the Notice of Appeal and fee have once been paid following a first final rejection, would a second notice and fee need to be paid if a second final rejection were issued and applicant desired to file a second submission under § 1.129(a).

Another comment suggested that the appeal fee set forth in § 1.17(e) should not be required where the Notice of Appeal is filed with a § 1.129(a) submission and the fee set forth in § 1.17(r). **Response:** As to questions (1) and (2) and the second comment, if the first submission and the proper fee set forth in § 1.17(r) are timely filed in response to the final rejection, the finality of the previous rejection will be automatically withdrawn and applicant need not file the Notice of Appeal or the appeal fee. For example, if the first submission and the proper fee set forth in § 1.17(r) were filed on the last day of the six-month period for response to the final rejection, applicant must also file a petition for three months extension of time with the appropriate fee in order to avoid abandonment of the application. In such case, applicant need not file the Notice of Appeal or the appeal fee if the proper fee set forth in § 1.17(r) was timely paid. However, under the same fact situation, if applicant failed to submit the proper fee set forth in § 1.17(r), the finality of the previous rejection would not be withdrawn and the time period for response would still be running against applicant. In such case, a Notice of Appeal and appeal fee must also accompany the papers filed at the six-month period in order to avoid abandonment of the application. The proper fee set forth in § 1.17(r) must be filed prior to the filing of the Appeal Brief and prior to the abandonment of the application.

As to question (3), if the Notice of Appeal and fee have once been paid following a first final rejection and applicant timely files a first submission and the proper fee set forth in § 1.17(r), the finality of the previous final rejection will be withdrawn and the appeal fee paid could be applied against any subsequent appeal. If the examiner issues a non-final rejection

in response to applicant's first submission, a further response from applicant will be entered and considered as a matter of right. If any subsequent Office action is made final, applicant may file a second submission along with the proper fee pursuant to § 1.129(a). If the second submission and the proper fee set forth in § 1.17(r) are timely filed in response to the subsequent final rejection, the finality of the previous final rejection will be withdrawn. Any submission filed after a final rejection made in the application subsequent to the fee under § 1.129(a) having been paid twice will be treated as set forth in § 1.116. Applicant may, upon payment of the appeal fee, appeal a final rejection within the time allowed for response pursuant to § 1.191.

93. **Comment:** One comment questioned whether the "first submission" under § 1.129(a) has to be the first response filed after a final rejection or could it include subsequent responses to the same final rejection.

**Response:** The "first submission" under § 1.129(a) would include all responses filed prior to and with the payment of the fee required by § 1.129(a) provided the submission and fee are filed prior to the filing of the Appeal Brief and prior to abandonment of the application.

94. **Comment:** One comment suggested that § 1.129(a) be changed to permit the procedure to be available up until the filing of an Appeal Brief since it is not uncommon to file an amendment after a Notice of Appeal is filed but before the filing of an Appeal Brief.

**Response:** The suggestion has been adopted.

Section 1.129(a) is being amended to indicate that the submission and the fee set forth in § 1.17(r) must be submitted before the filing of the Appeal Brief and prior to abandonment of the application.

95. **Comment:** One comment suggested that the transitional after-final practice be available at any time after final, including after the resolution of an appeal unfavorable to applicant in whole or in part.

**Response:** The suggestion has not been adopted. Section 1.129(a) is being amended to indicate that the submission and the fee set forth in § 1.17(r) must be submitted before the filing of the Appeal Brief and prior to abandonment of the application. The suggestion to extend the period to after the resolution of an appeal unfavorable to applicant in whole or in part has not been adopted because the suggestion would further unduly extend prosecution of the application.

96. **Comment:** One comment stated that if an examiner must withdraw the finality of the rejection as a result of the transitional provision, the examiner should be credited with two counts in order to be compensated for the additional work.

**Response:** The examiner credit system is not part of this rule-making package. However, as part of the Public Law 103-465 implementation plan, some accommodation will be made for the extra work performed.

97. **Comment:** One comment stated that regarding the transitional after-final practice, the fee should not be required if the only reason is to have the PTO consider recently obtained art.

**Response:** Under current practice, if applicant submits prior art after final rejection but before the payment of issue fee, the art will be considered if applicant makes the required certification and submits a petition with the required petition fee of \$130.00 (see section 609 of the MPEP). If applicant can make the certification, applicant would not have to rely on the transitional after-final procedure to have the prior art considered. In the event that applicant cannot make the certification, then the procedure under § 1.129(a) is available if applicant wishes the PTO to consider the prior art without refiling the application.

98. **Comment:** One comment suggested that the PTO modify existing restriction practice to make it more difficult for examiners to require restriction, for example, by requiring every restriction requirement to show two-way distinctness and separate status in the art established by means other than reference to the PTO's classification system.

**Response:** The suggestion has not been adopted. However, the PTO is undertaking a project to reengineer the entire patent process. This suggestion will be taken under advisement in that project.

99. **Comment:** One comment suggested that the pendency periods required by §§ 1.129(a) and (b) should be 18 months rather than 2-year and 3-year, respectively.

**Response:** The pendency periods set forth in the rule which



establish eligibility for the transitional procedures are set forth in Public Law 103-465.

100. *Comment:* One comment suggested that § 1.129(a) be amended to permit prosecution to be reopened after a Notice of Allowance or final rejection upon the filing of a form requesting that prosecution be reopened and payment of the necessary fee.

*Response:* The procedures set forth in § 1.129(a) are not applicable to amendments filed after a Notice of Allowance. Amendments filed after the mailing of a Notice of Allowance are governed by § 1.312. The procedures set forth in § 1.129(a) are applicable to amendments filed after a final rejection. If applicant submits an amendment after final and the examiner notifies the applicant in writing that the amendment is not entered, § 1.129(a) permits applicant to submit a letter prior to abandonment of the application and prior to the filing of the Appeal Brief, requesting entry of the prior filed amendment along with the payment of the appropriate fee set forth in § 1.17(r). The letter requesting entry of the prior filed amendment would be equivalent to "a form" as suggested in the comment.

101. *Comment:* One comment suggested that the PTO liberalize its current practice under § 1.116 to make it easier for amendments or evidence to be entered and considered after a final rejection.

*Response:* The suggestion has not been adopted since no change was proposed to § 1.116 in the Notice of Proposed Rulemaking. However, the suggestion will be taken under advisement as part of a comprehensive effort being conducted by the PTO to reengineer the entire patent process. It should be noted that any change to liberalize the current practice under § 1.116 would necessitate increasing fees.

102. *Comment:* Several comments suggested that the transitional restriction provision be modified to state that no restriction requirement shall be made or maintained in any application pending for three years on the effective date of the legislation. The comment stated that if restriction requirements made prior to April 8, 1995, are permitted to be maintained then applicants will be forced to file divisional applications resulting in the automatic loss of term after June 8, 1995. A heavy penalty will be placed on the chemical, pharmaceutical and biotechnology industries, who have less than 4 months to search through the ancestors of all pending applications and to identify all restriction requirements and to file divisional applications before June 8, 1995. The comment further suggested that the current restriction practice be changed in view of the implementation of the 20-year term.

*Response:* The suggestion has not been adopted. The two-month date set forth in § 1.129(b)(1)(i) is from the Statement of Administrative Action, which is part of Public Law 103-465. Under section 102 of Public Law 103-465, "the statement of administrative action approved by the Congress shall be regarded as an authoritative expression by the United States concerning the interpretation and application of the Uruguay Round Agreements and this Act in any judicial proceeding in which a question arises concerning such interpretation or application." The Commissioner does not have any authority to establish rules which are inconsistent with the Act. It is noted that in cases where a restriction requirement was made prior to April 8, 1995, applicant will have sufficient time to file divisional applications prior to June 8, 1995, so as to retain the benefit of the 17-year patent term for those divisional applications.

The PTO is currently reviewing the restriction practice in view of the implementation of the 20-year patent term. It is noted that a change in restriction practice without changes to other fees would have a negative impact on funding needed to operate the PTO.

103. *Comment:* Several comments suggested that proposed exceptions (1) and (2) in § 1.129(b) ignore the mandatory language of section 532(2)(B) of Public Law 103-465 and should be deleted.

*Response:* The suggestion has not been adopted. The exceptions referred to are contained in the Statement of Administrative Action, which is part of Public Law 103-465. Under section 102 of Public Law 103-465, "the statement of administrative action approved by the Congress shall be regarded as an authoritative expression by the United States concerning the interpretation and application of the Uruguay Round Agreements and this Act in any judicial proceeding in which a question arises

concerning such interpretation or application."

104. *Comment:* One comment asked whether "restriction" under § 1.129(b) apply to election of species under § 1.146.

*Response:* "Restriction" under § 1.129(b) applies to both requirements under § 1.142 and elections under § 1.146.

105. *Comment:* Several comments requested that clarification be made as to what constitutes "actions by the applicant" in § 1.129(b)(1) and specifically, whether a request for extension of time under § 1.136(a) constitutes such "actions" by the applicant.

*Response:* Examples of what constitute "actions by the applicant" in § 1.129(b)(1) are: (1) applicant abandons the application and continues to refile the application such that no Office action can be issued in the application, and (2) applicant requests suspension of prosecution under § 1.103(a) such that no Office action can be issued in the application. Extension of time under § 1.136(a) would not constitute such "actions by the applicant" under § 1.129(b)(1).

106. *Comment:* One comment suggested that the one-month period set forth in § 1.129(b) is insufficient to give an applicant time to file a petition under § 1.144 from a restriction requirement. Several comments suggested that § 1.129(b) be amended to permit applicant to challenge the restriction requirement by way of a petition before being required to pay the fees set forth in § 1.17(s).

*Response:* Section 1.129(b)(2) is being amended in the final rule package to indicate that applicant will be given "a time period" to (1) make an election, if no election has been previously made, and pay the fee set forth in § 1.17(s), (2) confirm an earlier election and pay the fee set forth in § 1.17(s), or (3) file a petition under § 1.129(b)(2) traversing the restriction requirement. If applicant chooses not to pay the fee set forth in § 1.17(s), applicant may file a petition under § 1.129(b)(2) requesting immediate review by the Group Director of the restriction requirement. No petition fee is required. A petition under § 1.129(b)(2) rather than under § 1.144 would be more appropriate under the circumstances since a petition under § 1.144 requires the examiner to make the restriction final before the petition can be considered.

107. *Comment:* One comment suggested that if applicant elects not to pay the fee set forth in § 1.17(s), applicant should be allowed to elect the invention to be examined.

*Response:* The suggestion has been adopted. Section 1.129(b) is being amended to indicate that if applicant chooses not to pay the fees for the additional inventions, applicant must elect the invention to be examined and the claims directed to the non-elected inventions for which no fee has been paid will be withdrawn from consideration.

108. *Comment:* One comment suggested that the PTO amend the rules to permit all, or at least several, inventions to be examined in a single application upon payment of an appropriate fee.

*Response:* The suggestion has not been adopted at this time. However, the PTO is currently undertaking a project to reengineer the entire patent process. The suggestion will be taken under advisement in this project.

109. *Comment:* One comment suggested that PTO follow the wording of 35 U.S.C. 121 and only require restriction where an application claims two or more independent and distinct inventions rather than two or more independent or distinct inventions.

*Response:* In making restriction requirements, the PTO has always followed the wording of 35 U.S.C. 121 to require restriction if two or more independent and distinct inventions are claimed in an application rather than independent or distinct as suggested by the comment. The term "independent" includes species and related inventions such as combination/subcombination and process and product. Restriction is proper if these independent inventions are patentably distinct (see section 802.01 of the MPEP).

110. *Comment:* One comment suggested that the standard for determining whether an application contains independent and distinct inventions should only be the "unity of invention" standard used for PCT applications.

*Response:* The suggestion has not been adopted. The current restriction practice for 35 U.S.C. 111(a) applications is governed by 35 U.S.C. 121 and §§ 1.141, 1.142 and 1.146. The PCT "unity of invention" standard only applies to PCT applications and applications filed under 35 U.S.C. 371. The PTO

is currently reviewing the restriction practice in view of the implementation of the 20-year patent term. It is noted that a change in restriction practice without changes to other fees would have a negative impact on funding needed to operate the PTO.

111. *Comment:* One comment suggested that the PTO apply the PCT unity of invention standard as interpreted by the EPO and that § 1.475(b) be amended to permit a broad range of claims in a single application.

*Response:* The PTO is currently undertaking a project to reengineer the entire patent process. The suggestion will be taken under advisement in this project.

112. *Comment:* One comment suggested that the PTO examiner should not be permitted to issue a restriction requirement or an election of species requirement if the ISA and the IPEA have found that an application complies with the unity of invention requirement.

Another comment suggested that the PTO consider allowing applicants to retain all claims in a single application when the claims are related, e.g., method and apparatus claims.

Another comment suggested that all species be searched before the first Office action regardless of whether one species is found to be unpatentable.

Another comment suggested that election of species requirements be prohibited.

*Response:* The suggestions have not been adopted. These issues were not addressed in the Notice of Proposed Rulemaking. However, the PTO is currently undertaking a project to reengineer the entire patent process. The suggestions will be taken under advisement in that project.

113. *Comment:* One comment suggested that decisions on whether to issue a restriction requirement be made within two-three months of the application filing date, and, if the requirement is traversed, the examiner should determine within four-five months of the filing date whether to maintain the requirement. Decisions on petitions to withdraw a restriction requirement should be decided within one month.

*Response:* The suggestion has not been adopted. Current practice dictates that restriction requirements be made at the earliest appropriate time in the pendency of a given application, e.g., in the first Office action. It would be difficult to issue a restriction requirement within two-three months of the application filing date as suggested since a large number of applications are filed with missing parts and applicants are given a time period to submit the missing parts. Furthermore, applications must be processed by the Application Branch and must be screened by Licensing and Review for national security. Petitions to withdraw a restriction requirement should be acted on by the Group Director expeditiously.

114. *Comment:* One comment argued that the phrases, "so as to be pending for a period of no longer than 12 months" and "under no circumstances will the provisional application be pending after 12 months", in § 1.139 were repetitious and suggested that one or both of the phrases be deleted.

*Response:* The suggestion has not been adopted. The statements are included for emphasis.

115. *Comment:* One comment suggested that § 1.139 clearly state that if the revival petition is filed later than 12 months after filing of the provisional application, then the revival is for the sole purpose of providing copendency for a 35 U.S.C. 111(a) application filed during that 12-month period.

*Response:* The suggestion has not been adopted. The proposed language is not necessary.

116. *Comment:* One comment stated that 35 U.S.C. 154(b) as contained in Public Law 103-465 does not give the Commissioner any authority to decide the period of extension. Therefore, proposed § 1.701 is without statutory basis.

*Response:* 35 U.S.C. 6(a) gives the Commissioner authority to establish regulations not inconsistent with law.

Section 1.701 is consistent with 35 U.S.C. 154(b) and furthermore, the Commissioner has the authority under 35 U.S.C. 154(b)(3)(C) to establish regulations to address the standards for determining due diligence.

117. *Comment:* One comment questioned whether patent term extension under 35 U.S.C. 154(b) is available for patents issuing: (1) before June 8, 1995, with a 17-year patent term or a 17/20 year patent term; (2) on or after June 8, 1995, on applications filed before June 8, 1995, with a 17-year patent term or a 17/20 year patent term.

*Response:* None of the patents set forth in the examples are eligible for patent term extension. Under the terms of the statute, patent term extension is only available for patents issued on applications filed on or after June 8, 1995.

118. *Comment:* Several comments questioned whether a patent issued on a continuing application is entitled to a patent term extension under 35 U.S.C. 154(b) due to interference, secrecy order, or appellate review delays occurring in the examination of the parent application.

*Response:* If the delay in the parent application contributed to a delay in the issuance of a patent in the continuing application, the patent granted on the continuing application may be eligible for an extension under 35 U.S.C. 154(b).

119. *Comment:* One comment suggested that the patent term be extended for a period of time equal to the time necessary to revive an application improperly abandoned due to PTO error. Another comment suggested that patent term extension be available for other PTO delays.

*Response:* The suggestions have not been adopted. Section 154(b) of title 35, United States Code, only permits patent term extension for delays due to interferences, secrecy orders, and/or successful appeals.

120. *Comment:* One comment suggested that the period of an extension granted under § 1.701 be printed on the face of the patent.

*Response:* The PTO will publish on the face of the patent any patent term extension that is granted pursuant to § 1.701.

121. *Comment:* One comment suggested that the word "interference" be inserted before the word "proceedings" in § 1.701(a)(1).

*Response:* The suggestion has been adopted.

122. *Comment:* One comment stated that the last sentence of § 1.701(b) is confusing because it suggests that patent term extension will be available in cases of terminal disclaimer and that the extension begins on the terminal disclaimer date rather than the original expiration date. This statement is contrary to 35 U.S.C. 154(b)(2) which does not permit any patent term extension for appellate delay if the patent is subject to a terminal disclaimer.

*Response:* In order to reduce confusion, the last sentence of § 1.701(b) is being amended to state that the extension will run from the expiration date of the patent. The reference to "terminal disclaimer" is being deleted.

123. *Comment:* Two comments stated that if an application involved in an interference proceeding contains uninvolved claims, those uninvolved claims should not be entitled to extension of patent term under proposed § 1.701 because applicant could cancel those uninvolved claims from the application and refile those claims in a continuation application. It is suggested that if an applicant leaves conclusively uninvolved claims (where no § 1.633(c)(4) motion is filed) in the application in interference, applicant does not get the benefit of the extension for any claim.

*Response:* The suggestion has not been adopted. The statute, 35 U.S.C. 154(b), grants patent term extension to a patent if the issuance of the patent was delayed due to interference proceeding under 35 U.S.C. 135(a). The statute does not exclude applications containing uninvolved claims. The Commissioner does not have the authority to establish regulations which are inconsistent with the law. Therefore, an application involved in an interference which contains uninvolved claims will be entitled to patent term extension if the issuance of the patent was delayed due to interference proceeding under 35 U.S.C. 135(a).

124. *Comment:* One comment asked whether applicant is entitled to patent term extension regardless of whether an interference involving applicant's application is ultimately declared.

One comment asked if the PTO ends the suspension without declaring an interference, and continued prosecution results in filing of a continuation or divisional application, are such subsequent cases entitled to the extension.

*Response:* An application will not be suspended unless it is decided that an interference can be declared involving that application. If prosecution of applicant's application is suspended due to an interference not involving applicant's application and an interference involving applicant's application is later declared, applicant will be entitled to patent term extension under § 1.701(c)(1)(ii) for the suspension period and under § 1.701(c)(1)(i) for the interference period. However, if prose-



cution of applicant's application is suspended due to an interference not involving applicant's application and if the PTO ends the suspension of the application without declaring an interference involving applicant's application, that application will be entitled to patent term extension under § 1.701(c)(1)(ii). If prosecution results in filing of a continuing application and if the delay in the parent application contributed to a delay in the issuance of a patent on the continuing application, the patent granted on the continuing application may be eligible for an extension under 35 U.S.C. 154(b).

**125. Comment:** One comment stated that delays in the issuance of a patent can exceed the five-year limit provided for in proposed § 1.701(b). Where the delay was not the fault of the applicant, why should there be this maximum?

Another comment stated that in a biotechnology application, if suspension of the application results in a declared interference, the period of delay calculated under § 1.701(c)(1)(i) will likely consume most of the five-year maximum extension. This renders the value of any time period measured under § 1.701(c)(1)(ii) negligible, thus diminishing the rights of applicant due to the unregulated suspension powers of the PTO.

**Response:** The five-year limit for patent term extension set forth in § 1.701(b) is required by statute, 35 U.S.C. 154(b).

**126. Comment:** One comment suggested that § 1.701(c)(1)(i) be amended to state that an application added after an interference is declared is entitled to an extension measured only from the date of redeclaration.

**Response:** The suggestion has not been adopted. The language in § 1.701(c)(1)(i) is clear that for an application that is added to an interference, that application is entitled to an extension measured from the date of redeclaration of the interference.

**127. Comment:** One comment stated that § 1.701(c)(1)(ii) does not address the case where a suspended application is added to the interference without the suspension being lifted.

**Response:** Section 1.701(c)(1)(ii) is being amended to reference the endpoint for the suspension period to the date of termination of the suspension. Where prosecution of an application is suspended due to interference proceedings not involving the application, the suspension is made pursuant to § 1.103(b). When that application is added to an interference, the suspension pursuant to § 1.103(b) will be automatically lifted. The application is entitled to patent term extension for the period of suspension pursuant to § 1.701(c)(1)(ii) and for the period of interference pursuant to § 1.701(c)(1)(i). Under § 1.701(c)(1)(ii), the period of suspension begins on the date the application is suspended and ends on the date the suspension under § 1.103(b) is terminated, which in this case would be the same date as the date of redeclaration of the interference.

**128. Comment:** One comment suggested that the phrase "if any," in § 1.701(c)(1)(i) and (ii) is unnecessary.

**Response:** The suggestion has not been adopted. However, § 1.701(c)(1)(i) is being amended for clarity by deleting the phrase "if any" after the first occurrence of "interference" and by inserting the same phrase after the phrase "the number of days."

**129. Comment:** Several comments suggested that the phrase "was declared or redeclared" in § 1.701(c)(1)(i) be changed to "was first declared—"

**Response:** The suggestion has not been adopted. The language of the rule reads "with respect to each interference in which the application was involved, the number of days in the period beginning on the date the interference was declared or redeclared to involve the application in the interference...." An interference may be declared as A vs. B and later redeclared as A vs. B vs. C. Under the rule, the period of extension would be counted, with respect to applications A and B, from the date the interference was declared to involve the applications A and B. With respect to application C, the period of extension would be counted from the date the interference was redeclared to involve the application C. No ambiguity is seen in the language as originally proposed.

**130. Comment:** One comment suggested that the use of the phrase "appellate review" in reference to an action under 35 U.S.C. 145 or 146 is incorrect, since an action under 35 U.S.C. 145 or 146 is not considered as an "appellate review" and suggests that § 1.701(a)(3) be amended so that the introductory phrase reads "Appellate review by the Board of Patent Appeals and Interferences or review by a Federal court under 35 U.S.C. 141 or 145...."

**Response:** The suggestion has not been adopted. The use of the phrase "appellate review" in reference to an action under 35 U.S.C. 145 or 146 is technically incorrect. However, Public Law 103-465 provides for extension of patent term for "delay due to appellate review by the Board of Patent Appeals and Interferences or by a Federal court". The introductory phrase referred to in the comment uses the exact language found in the statute.

**131. Comment:** One comment suggested that § 1.701(a) be amended to specify whether extensions for appellate delays are available for reissue applications.

**Response:** The suggestion has not been adopted. Under 35 U.S.C. 251, the term of a reissue patent is "for the unexpired part of the term of the original patent." Therefore, patent term extension for appellate delays is not available for reissue applications.

**132. Comment:** One comment suggested that § 1.701(d) be deleted.

**Response:** The suggestion has not been adopted. Section 1.701(d) sets forth the language found in the statute, 35 U.S.C. 154(b)(3) and further provides a standard for determining due diligence.

**133. Comment:** Several comments suggested that the lack of due diligence set forth in § 1.701(d)(2) be limited to the acts which occurred during the appellate period (after the filing of a Notice of Appeal) and not during prosecution.

**Response:** The suggestion has been adopted. Section 1.701(d) is being amended accordingly.

**134. Comment:** One comment suggested that the rules be made clear that a suspension under § 1.103 does not constitute a lack of due diligence under § 1.701(d)(2).

**Response:** The suggestion has not been adopted. A request for suspension pursuant to § 1.103(a) during the appellate review period will be considered to be prima facie evidence of lack of due diligence.

**135. Comment:** Several comments stated that the rules permit extensions of time and the filing of informal applications. These acts should not constitute lack of due diligence since the proposed rule defined the standard for determining due diligence as whether the applicant exhibited that degree of timeliness as may reasonably be expected from, and which is ordinarily exercised by, a person. One comment suggested that the Office adopt a gross negligence standard.

**Response:** The examples of acts that may constitute lack of due diligence set forth in the Notice of Proposed Rulemaking (extensions of time, filing of nonresponsive submissions, and filing of informal applications) are being withdrawn. The suggestion regarding the adoption of a gross negligence standard has not been adopted. As set forth in § 1.701(d)(2), the standard for determining due diligence is whether applicant exhibited that degree of timeliness as may reasonably be expected from, and which is ordinarily exercised by, a person during the appellate review period.

**136. Comment:** One comment stated that the PTO list in the rule all circumstances in which an applicant will be considered not to have acted with due diligence.

Another comment suggested that objective criteria for "diligence" be set forth in § 1.701(d)(2).

**Response:** The suggestion has not been adopted. Whether an action by the applicant constitutes lack of due diligence will be determined by the facts and circumstances of each case. Since lack of due diligence is determined on a case-by-case basis, it would not be possible to list all circumstances in the rule. Examples of acts which will constitute prima facie evidence of lack of due diligence are: (1) abandonment of the application during appellate review; and (2) suspension of action under § 1.103(a) during appellate review.

**137. Comment:** One comment suggested that guidance be provided in the comments to the Notice of Final Rules identifying in what circumstance is a patent issued "pursuant to an appellate decision reversing an adverse determination of patentability."

Several comments questioned whether the reversal of all rejections on one of several appealed claims would entitle applicant to an extension under § 1.701(a)(3). Two comments suggested that the rule be redrafted to allow appropriate extension of term where the Board or a court reverses at least "in part."

**Response:** Extension of patent term under § 1.701(a)(3) is applicable if all the rejections of any one claim are ultimately

reversed. The rule is clear and no clarification is needed.

**138. Comment:** One comment stated that § 1.701 does not address the situation where applicant appeals with both allowed and rejected claims. In such case, patent term extension should be available for any claims that were allowed prior to appellate review, if the allowed claims were in the same application, whether or not the decision of the examiner on the rejected claims is ultimately reversed. Applicant should not have to refile the allowed claims and rejected claims in separate cases in order to take advantage of the patent term extension.

**Response:** If applicant chooses to keep the allowed claims with the rejected claims in the application on appeal, patent term extension pursuant to 35 U.S.C. 154(b)(2) is only available if a patent was issued pursuant to a decision reversing an adverse determination of patentability and if the patent is not subject to a terminal disclaimer due to the issuance of another patent claiming subject matter that is not patentably distinct from that under appellate review. If the appellate review is not successful, applicant will not be entitled to patent term extension.

**139. Comment:** One comment questioned whether the phrase "if the patent is not subject to a terminal disclaimer" in § 1.701(a)(3) is intended to be limited to those applications in which a terminal disclaimer has actually been filed or encompass those applications in which a double patenting rejection has been made and a terminal disclaimer suggested by an examiner.

**Response:** The calculation of any applicable extension under § 1.701 will be made prior to the mailing of the Notice of Allowance and Issue Fee Due. At that time, any double patenting rejection would have been resolved and a terminal disclaimer would have been filed if one was required.

**140. Comment:** One comment stated that § 1.701(d)(1) is inconsistent with 35 U.S.C. 154(b)(2) and (b)(3), because the period of extension for appellate review would be calculated under § 1.701(d)(1) by first subtracting the period of appellate review occurring within three years of the filing date before the five-year limit is imposed. It is suggested that § 1.701 be modified to be consistent with 35 U.S.C. 154(b)(2) which requires the five-year limit to be imposed before the subtraction for appellate review occurring within three years of the filing date.

**Response:** The suggestion has not been adopted. Section 1.701 is not inconsistent with 35 U.S.C. 154(b)(2) and (b)(3). The period of extension referred to in 35 U.S.C. 154(b)(2) is defined in 35 U.S.C. 154(b)(3). Therefore, one must determine the period of extension in 35 U.S.C. 154(b)(3)(A), then reduce that period by the time determined in 35 U.S.C. 154(b)(3)(B) and (b)(3)(C). Then, according to 35 U.S.C. 154(b)(2), the resulting time period may not be more than five years.

**141. Comment:** One comment suggested that the Commissioner identify a senior person who is charged with approving all reductions in extension of patent term rather than leaving the decision to the examiner or the SPE.

One comment questioned who will make the calculation of the period of patent term extension under § 1.701 and whether that calculation can be challenged and by whom.

**Response:** It is contemplated that the period of patent term extension calculated and any reduction in the extension of patent term will not be made by an examiner. It is noted that the period of patent term extension will be identified in the Notice of Allowance and Issue Fee Due and if applicant disagrees with the period, applicant may request further review by way of a petition under § 1.181. If an error is noted after the patent issues, patentee or any third party may seek correction of the period of patent term extension granted by filing a request for a Certificate of Correction pursuant to § 1.322.

**142. Comment:** One comment questioned whether a challenge to the period of patent term extension calculated by the PTO under § 1.701 would be required to be made within a fixed period.

**Response:** No. However, the longer applicant delays filing a petition under § 1.181 challenging the period of extension calculated by the PTO, the less likely any error will be corrected before the patent is issued with the error printed on the patent. If the patent issues with an incorrect period of extension, applicant should file a request for a Certificate of Correction pursuant to § 1.322 instead of a petition under § 1.181.

**143. Comment:** One comment suggested that § 1.701(d)(2) be amended to require PTO to notify applicant in writing of any intent to reduce the term extension for lack of due diligence,

stating the specific basis, and provide applicant with a reasonable opportunity to respond.

**Response:** The suggestion has not been adopted. The period of patent term extension will be identified in the Notice of Allowance and Issue Fee Due and if applicant disagrees with the period, applicant may request further review by way of a petition under § 1.181.

**144. Comment:** One comment suggested that a cover sheet for use in recording assignments be included in the final rules package as an addendum.

**Response:** The suggestion has not been adopted. A sample cover sheet for use in recording assignments was published as Appendix B in the Federal Register on July 6, 1992, at 57 FR 29634 and in the Official Gazette on July 28, 1992, at 1140 Off. Gaz. Pat. Office 63 and may be obtained from Assignment Branch.

#### Other Considerations

This final rule change is in conformity with the requirements of the Regulatory Flexibility Act, 5 U.S.C. 601 et seq., Executive Order 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq. This final rule has been determined not to be significant for the purposes of E.O. 12866.

The Assistant General Counsel for Legislation and Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration, that these final rule changes will not have a significant economic impact on a substantial number of small entities (Regulatory Flexibility Act, 5 U.S.C. 605(b)). The principal impact of these changes is to provide a procedure for domestic applicants to quickly and inexpensively file a provisional application. The filing date of the provisional application will not be used to measure the term of a patent granted on an application which claims the earlier filing date of the provisional application.

The Patent and Trademark Office has also determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in E.O. 12612.

These final rules contain collections of information subject to the requirements of the Paperwork Reduction Act (Act). The provisional application has been approved by the Office of Management and Budget under control numbers 0651-0031 and 0651-0032. The cover sheet is approved under OMB control number 0651-0037. The cover sheet is necessary to expedite the processing of a provisional application and improve quality. Public reporting burden for the collection of information on the cover sheet is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to the Office of Assistance Quality and Enhancement Division, Patent and Trademark Office, Washington, D.C. 20231, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503 (ATTN: Paperwork Reduction Act Projects 0651-0031, 0651-0032, and 0651-0037).

#### List of Subjects

##### 37 CFR Part 1

Administrative practice and procedure, Courts, Freedom of Information, Inventions and patents, Reporting and record keeping requirements, Small businesses.

##### 37 CFR Part 3

Administrative practice and procedure, Inventions and patents, Reporting and record keeping requirements.

For the reasons set forth in the preamble, 37 CFR Parts 1 and 3 are amended as follows:

#### PART 1 - RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 continues to read as follows:



Authority: 35 U.S.C. 6 unless otherwise noted.

2. Section 1.1 is amended by adding new paragraph (i) to read as follows:

**§ 1.1 All communications to be addressed to Commissioner of Patents and Trademarks.**

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(i) The filing of all provisional applications and any communications relating thereto should be additionally marked "Box Provisional Patent Application."

\*\*\*\*\*

3. Section 1.9 is amended by revising paragraph (a) to read as follows:

**§ 1.9 Definitions.**

(a)(1) A national application as used in this chapter means a U.S. application for patent which was either filed in the Office under 35 U.S.C. 111, or which entered the national stage from an international application after compliance with 35 U.S.C. 371.

(2) A provisional application as used in this chapter means a U.S. national application for patent filed in the Office under 35 U.S.C. 111(b).

(3) A nonprovisional application as used in this chapter means a U.S. national application for patent which was either filed in the Office under 35 U.S.C. 111(a), or which entered the national stage from an international application after compliance with 35 U.S.C. 371.

\*\*\*\*\*

4. Section 1.12 is amended by revising paragraph (c) to read as follows:

**§ 1.12 Assignment records open to public inspection.**

\*\*\*\*\*

(c) Any request by a member of the public seeking copies of any assignment records of any pending or abandoned patent application preserved in secrecy under § 1.14, or any information with respect thereto, must

(1) Be in the form of a petition accompanied by the petition fee set forth in § 1.17(i), or

(2) Include written authority granting access to the member of the public to the particular assignment records from the applicant or applicant's assignee or attorney or agent of record.

\*\*\*\*\*

5. Section 1.14 is amended by revising paragraph (e) to read as follows:

**§ 1.14 Patent applications preserved in secrecy.**

\*\*\*\*\*

(e) Any request by a member of the public seeking access to, or copies of, any pending or abandoned application preserved in secrecy pursuant to paragraphs (a) and (b) of this section, or any papers relating thereto, must

(1) Be in the form of a petition and be accompanied by the petition fee set forth in § 1.17(i), or

(2) Include written authority granting access to the member of the public in that particular application from the applicant or the applicant's assignee or attorney or agent of record.

\*\*\*\*\*

6. Section 1.16 is amended by revising paragraphs (a)-(g) and by adding new paragraphs (k) and (l) to read as follows:

**§ 1.16 National application filing fees.**

(a) Basic fee for filing each application for an original patent, except provisional, design or plant applications:

By a small entity (§ 1.9(f)) .....\$365.00  
By other than a small entity .....730.00

(b) In addition to the basic filing fee in an original application, except provisional applications, for filing or later presentation of each independent claim in excess of 3:

By a small entity (§ 1.9(f)) .....38.00  
By other than a small entity .....76.00

(c) In addition to the basic filing fee in an original application, except provisional applications, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes.):

By a small entity (§ 1.9(f)) .....11.00  
By other than a small entity .....22.00

(d) In addition to the basic filing fee in an original application, except provisional applications, if the application contains, or is amended to contain, a multiple dependent claim(s), per application:

By a small entity (§ 1.9(f)) .....120.00  
By other than a small entity .....240.00

(If the additional fees required by paragraphs (b), (c), and (d) of this section are not paid on filing or on later presentation of the claims for which the additional fees are due, they must be paid or the claims canceled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

(e) Surcharge for filing the basic filing fee or oath or declaration on a date later than the filing date of the application, except provisional applications:

By a small entity (§ 1.9(f)) .....65.00  
By other than a small entity .....130.00

(f) Basic fee for filing each design application:

By a small entity (§ 1.9(f)) .....150.00  
By other than a small entity .....300.00

(g) Basic fee for filing each plant application, except provisional applications:

By a small entity (§ 1.9(f)) .....245.00  
By other than a small entity .....490.00

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(k) Basic fee for filing each provisional application:

By a small entity (§ 1.9(f)) .....75.00  
By other than a small entity .....150.00

(l) Surcharge for filing the basic filing fee or cover sheet (§ 1.51(a)(2)(i)) on a date later than the filing date of the provisional application:

By a small entity (§ 1.9(f)) .....25.00  
By other than a small entity .....50.00

\*\*\*\*\*

7. Section 1.17 is amended by revising paragraphs (h) and (i), and by adding new paragraphs (q), (r) and (s) to read as follows:

**§ 1.17 Patent application processing fees.**

\*\*\*\*\*

(h) For filing a petition to the Commissioner under a section listed below which refers to this paragraph.....130.00

§ 1.47 - for filing by other than all the inventors or a person not the inventor

§ 1.48 - for correction of inventorship, except in provisional applications

§ 1.84 - for accepting color drawings or photographs

§ 1.182 - for decision on questions not specifically provided for

§ 1.183 - to suspend the rules

§ 1.295 - for review of refusal to publish a statutory invention registration

§ 1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of patent

§ 1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in expired patent

§ 1.644(e) - for petition in an interference

§ 1.644(f) - for request for reconsideration of a decision on petition in an interference

§ 1.666(c) - for late filing of interference settlement agreement

§§ 5.12, 5.13 and 5.14 - for expedited handling of a foreign filing license

§ 5.15 - for changing the scope of a license

§ 5.25 - for retroactive license

(i) For filing a petition to the Commissioner under a section listed below which refers to this paragraph.....130.00

§ 1.12 - for access to an assignment record

§ 1.14 - for access to an application

§ 1.53 - to accord a filing date, except in provisional applications

§ 1.55 - for entry of late priority papers

§ 1.60 - to accord a filing date

§ 1.62 - to accord a filing date

§ 1.97(d) - to consider an information disclosure statement

§ 1.102 - to make application special

§ 1.103 - to suspend action in application

§ 1.177 - for divisional reissues to issue separately

§ 1.312 - for amendment after payment of issue fee

§ 1.313 - to withdraw an application from issue

§ 1.314 - to defer issuance of a patent

§ 1.666(b) - for access to interference settlement agreement

§ 3.81 - for patent to issue to assignee, assignment submitted after payment of the issue fee

\*\*\*\*\*

(q) For filing a petition to the Commissioner under a section listed below which refers to this paragraph.....50.00

§ 1.48 - for correction of inventorship in a provisional application

§ 1.53 - to accord a provisional application a filing date or to convert an application filed under § 1.53(b)(1) to a provisional application

(r) For entry of a submission after final rejection under § 1.129(a):

By a small entity (§ 1.9(f)) .....365.00  
By other than a small entity .....730.00

(s) For each additional invention requested to be examined under § 1.129(b):

By a small entity (§ 1.9(f)) .....365.00  
By other than a small entity .....730.00

8. Section 1.21 is amended by revising paragraph (l) to read as follows:

**§ 1.21 Miscellaneous fees and charges.**

The Patent and Trademark Office has established the following fees for the services indicated:

\*\*\*\*\*

(l) For processing and retaining any application abandoned pursuant to § 1.53(d)(1) unless the required basic filing fee has been paid .....\$130.00

\*\*\*\*\*

9. Section 1.28 is amended by revising paragraph (a) to read as follows:

**§ 1.28 Effect on fees of failure to establish status, or change status, as a small entity.**

(a) The failure to establish status as a small entity (§§ 1.9(f) and 1.27 of this part) in any application or patent prior to paying, or at the time of paying, any fee precludes payment of the fee in the amount established for small entities. A refund pursuant to § 1.26 of this part, based on establishment of small entity status, of a portion of fees timely paid in full prior to establishing status as a small entity may only be obtained if a verified statement under § 1.27 and a request for a refund of the excess amount are filed within two months of the date of the timely payment of the full fee. The two-month time period is not extendable under § 1.136. Status as a small entity is waived for any fee by the failure to establish the status prior to paying, at the time of paying, or within two months of the date of payment of, the fee. Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application may rely on a verified statement filed in the prior application if the nonprovisional application includes a reference to the verified statement in the prior application or includes a copy of the verified statement in the prior application and status as a small entity is still proper and desired. Once status as a small entity has been established in an application or patent, the status remains in that application or patent without the filing of a further verified statement pursuant to § 1.27 of this part unless the Office is notified of a change in status.

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10. Section 1.45 paragraph (c) is revised to read as follows:

**§ 1.45 Joint inventors.**

\*\*\*\*\*

(c) If multiple inventors are named in a nonprovisional application, each named inventor must have made a contribution, individually or jointly, to the subject matter of at least one claim of the application and the application will be considered to be a joint application under 35 U.S.C. 116. If multiple inventors are named in a provisional application, each named inventor must have made a contribution, individually or jointly, to the subject matter disclosed in the provisional application and the provisional application will be considered to be a joint application under 35 U.S.C. 116.

11. Section 1.48 is revised to read as follows:

**§ 1.48 Correction of inventorship.**

(a) If the correct inventor or inventors are not named in a nonprovisional application through error without any deceptive intention on the part of the actual inventor or inventors, the application may be amended to name only the actual inventor or inventors. Such amendment must be diligently made and must be accompanied by:



(1) a petition including a statement of facts verified by the original named inventor or inventors establishing when the error without deceptive intention was discovered and how it occurred;

(2) an oath or declaration by each actual inventor or inventors as required by § 1.63;

(3) the fee set forth in § 1.17(b); and

(4) the written consent of any assignee. When the application is involved in an interference, the petition shall comply with the requirements of this section and shall be accompanied by a motion under § 1.634.

(b) If the correct inventors are named in the nonprovisional application when filed and the prosecution of the application results in the amendment or cancellation of claims so that less than all of the originally named inventors are the actual inventors of the invention being claimed in the application, an amendment shall be filed deleting the names of the person or persons who are not inventors of the invention being claimed. The amendment must be diligently made and shall be accompanied by:

(1) A petition including a statement identifying each named inventor who is being deleted and acknowledging that the inventor's invention is no longer being claimed in the application; and

(2) The fee set forth in § 1.17(b).

(c) If a nonprovisional application discloses unclaimed subject matter by an inventor or inventors not named in the application, the application may be amended pursuant to paragraph (a) of this section to add claims to the subject matter and name the correct inventors for the application.

(d) If the name or names of an inventor or inventors were omitted in a provisional application through error without any deceptive intention on the part of the actual inventor or inventors, the provisional application may be amended to add the name or names of the actual inventor or inventors. Such amendment must be accompanied by:

(1) a petition including a statement that the error occurred without deceptive intention on the part of the actual inventor or inventors, which statement must be a verified statement if made by a person not registered to practice before the Patent and Trademark Office; and

(2) the fee set forth in § 1.17(q).

(e) If a person or persons were named as an inventor or inventors in a provisional application through error without any deceptive intention, an amendment may be filed in the provisional application deleting the name or names of the person or persons who were erroneously named. Such amendment must be accompanied by:

(1) a petition including a statement of facts verified by the person or persons whose name or names are being deleted establishing that the error occurred without deceptive intention;

(2) the fee set forth in § 1.17(q); and

(3) the written consent of any assignee.

12. Section 1.51 is amended by revising paragraphs (a) and (b) to read as follows:

#### § 1.51 General requisites of an application.

(a) Applications for patents must be made to the Commissioner of Patents and Trademarks.

(1) A complete application filed under § 1.53(b)(1) comprises:

(i) A specification, including a claim or claims, see §§ 1.71 to 1.77;

(ii) An oath or declaration, see §§ 1.63 and 1.68;

(iii) Drawings, when necessary, see §§ 1.81 to 1.85; and

(iv) The prescribed filing fee, see § 1.16.

(2) A complete provisional application filed under § 1.53(b)(2) comprises:

(i) A cover sheet identifying:

(A) The application as a provisional application,

(B) The name or names of the inventor or inventors,

(see § 1.41),

(C) The residence of each named inventor,

(D) The title of the invention,

(E) The name and registration number of the attorney or agent (if applicable),

(F) The docket number used by the person filing the application to identify the application (if applicable),

(G) The correspondence address, and

(I) The name of the U.S. Government agency and Government contract number (if the invention was made by an agency of the U.S. Government or under a contract with an agency of the U.S. Government);

(ii) A specification as prescribed by 35 U.S.C. 112, first paragraph, see § 1.71;

(iii) Drawings, when necessary, see §§ 1.81 to 1.85; and

(iv) The prescribed filing fee, see § 1.16.

(b) Applicants are encouraged to file an information disclosure statement in nonprovisional applications. See §§ 1.97 and 1.98. No information disclosure statement may be filed in a provisional application.

\*\*\*\*\*

13. Section 1.53 paragraphs (a)-(e) are revised to read as follows:

#### § 1.53 Application number, filing date, and completion of application.

(a) Any application for a patent received in the Patent and Trademark Office will be assigned an application number for identification purposes.

(b)(1) The filing date of an application for patent filed under this section, except for a provisional application, is the date on which: a specification containing a description pursuant to § 1.71 and at least one claim pursuant to § 1.75; and any drawing required by § 1.81(a), are filed in the Patent and Trademark Office in the name of the actual inventor or inventors as required by § 1.41. No new matter may be introduced into an application after its filing date (§ 1.118). If all the names of the actual inventor or inventors are not supplied when the specification and any required drawing are filed, the application will not be given a filing date earlier than the date upon which the names are supplied unless a petition with the fee set forth in § 1.17(i) is filed which sets forth the reasons the delay in supplying the names should be excused. A continuation or divisional application (filed under the conditions specified in 35 U.S.C. 120 or 121 and § 1.78(a)) may be filed under this section, § 1.60 or § 1.62. A continuation-in-part application may be filed under this section or § 1.62.

(2) The filing date of a provisional application is the date on which: a specification as prescribed by 35 U.S.C. 112, first paragraph; and any drawing required by § 1.81(a), are filed in the Patent and Trademark Office in the name of the actual inventor or inventors as required by § 1.41. No amendment, other than to make the provisional application comply with all applicable regulations, may be made to the provisional application after the filing date of the provisional application. If all the names of the actual inventor or inventors are not supplied when the specification and any required drawing are filed, the provisional application will not be given a filing date earlier than the date upon which the names are supplied unless a petition with the fee set forth in § 1.17(q) is filed which sets forth the reasons the delay in supplying the names should be excused.

(i) A provisional application must also include a cover sheet identifying the application as a provisional application. Otherwise, the application will be treated as an application filed under § 1.53(b)(1).

(ii) An application for patent filed under § 1.53(b)(1) may be treated as a provisional application and be accorded the original filing date provided that a petition requesting the conversion, with the fee set forth in § 1.17(q), is filed prior to the earlier of the abandonment of the § 1.53(b)(1) application, the payment of the issue fee, the expiration of 12 months after the filing date of the § 1.53(b)(1) application, or the filing of a request for a statutory invention registration under § 1.293. The grant of any such petition will not entitle applicant to a refund of the fees which were properly paid in the application filed under § 1.53(b)(1).

(iii) A provisional application shall not be entitled to the right of priority under § 1.55 or 35 U.S.C. 119 or 365(a) or to the benefit of an earlier filing date under § 1.78 or 35

U.S.C. 120, 121 or 365(c) of any other application. No claim for priority under § 1.78(a)(3) may be made in a design application based on a provisional application. No request under § 1.293 for a statutory invention registration may be filed in a provisional application. The requirements of §§ 1.821-1.825 regarding application disclosures containing nucleotide and/or amino acid sequences are not mandatory for provisional applications.

(c) If any application is filed without the specification, drawing or name, or names, of the actual inventor or inventors required by paragraph (b)(1) or (b)(2) of this section, applicant will be so notified and given a time period within which to submit the omitted specification, drawing, name, or names, of the actual inventor, or inventors, in order to obtain a filing date as of the date of filing of such submission. A copy of the "Notice of Incomplete Application" form notifying the applicant should accompany any response thereto submitted to the Office. If the omission is not corrected within the time period set, the application will be returned or otherwise disposed of; the fee, if submitted, will be refunded less the handling fee set forth in § 1.21(n). Any request for review of a refusal to accord an application a filing date must be by way of a petition accompanied by the fee set forth in § 1.17(i), if the application was filed under § 1.53(b)(1), or by the fee set forth in § 1.17(q), if the application was filed under § 1.53(b)(2).

(d)(1) If an application which has been accorded a filing date pursuant to paragraph (b)(1) of this section does not include the appropriate filing fee or an oath or declaration by the applicant, applicant will be so notified, if a correspondence address has been provided and given a period of time within which to file the fee, oath, or declaration and to pay the surcharge as set forth in § 1.16(e) in order to prevent abandonment of the application. A copy of the "Notice to File Missing Parts" form mailed to applicant should accompany any response thereto submitted to the Office. If the required filing fee is not timely paid, or if the processing and retention fee set forth in § 1.21(l) is not paid within one year of the date of mailing of the notification required by this paragraph, the application will be disposed of. No copies will be provided or certified by the Office of an application which has been disposed of or in which neither the required basic filing fee nor the processing and retention fee has been paid. The notification pursuant to this paragraph may be made simultaneously with any notification pursuant to paragraph (c) of this section. If no correspondence address is included in the application, applicant has two months from the filing date to file the basic filing fee, oath or declaration and to pay the surcharge as set forth in § 1.16(e) in order to prevent abandonment of the application; or, if no basic filing fee has been paid, one year from the filing date to pay the processing and retention fee set forth in § 1.21(l) to prevent disposal of the application.

(2) If a provisional application which has been accorded a filing date pursuant to paragraph (b)(2) of this section does not include the appropriate filing fee or the cover sheet required by § 1.51(a)(2), applicant will be so notified if a correspondence address has been provided and given a period of time within which to file the fee, cover sheet and to pay the surcharge as set forth in § 1.16(l) in order to prevent abandonment of the application. A copy of the "Notice to File Missing Parts" form mailed to applicant should accompany any response thereto submitted to the Office. If the required filing fee is not timely paid, the application will be disposed of. No copies will be provided or certified by the Office of an application which has been disposed of or in which the required basic filing fee has not been paid. The notification pursuant to this paragraph may be made simultaneously with any notification pursuant to paragraph (c) of this section. If no correspondence address is included in the application, applicant has two months from the filing date to file the basic filing fee, cover sheet and to pay the surcharge as set forth in § 1.16(l) in order to prevent abandonment of the application.

(e)(1) An application for a patent filed under paragraph (b)(1) of this section will not be placed upon the files for examination until all its required parts, complying with the rules relating thereto, are received, except that certain minor informalities may be waived subject to subsequent correction whenever required.

(2) A provisional application for a patent filed under paragraph (b)(2) of this section will not be placed upon the files for

examination and will become abandoned no later than twelve months after its filing date pursuant to 35 U.S.C. 111(b)(1).

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14. Section 1.55 is revised to read as follows:

#### § 1.55 Claim for foreign priority.

(a) An applicant in a nonprovisional application may claim the benefit of the filing date of one or more prior foreign applications under the conditions specified in 35 U.S.C. 119(a)-(d) and 172. The claim to priority need be in no special form and may be made by the attorney or agent if the foreign application is referred to in the oath or declaration as required by § 1.63. The claim for priority and the certified copy of the foreign application specified in 35 U.S.C. 119(b) must be filed in the case of an interference (§ 1.630), when necessary to overcome the date of a reference relied upon by the examiner, when specifically required by the examiner, and in all other cases, before the patent is granted. If the claim for priority or the certified copy of the foreign application is filed after the date the issue fee is paid, it must be accompanied by a petition requesting entry and by the fee set forth in § 1.17(i). If the certified copy filed is not in the English language, a translation need not be filed except in the case of interference; or when necessary to overcome the date of a reference relied upon by the examiner; or when specifically required by the examiner, in which event an English language translation must be filed together with a statement that the translation of the certified copy is accurate. The statement must be a verified statement if made by a person not registered to practice before the Patent and Trademark Office.

(b) An applicant in a nonprovisional application may under certain circumstances claim priority on the basis of one or more applications for an inventor's certificate in a country granting both inventor's certificates and patents. To claim the right of priority on the basis of an application for an inventor's certificate in such a country under 35 U.S.C. 119(d), the applicant when submitting a claim for such right as specified in paragraph (a) of this section, shall include an affidavit or declaration. The affidavit or declaration must include a specific statement that, upon an investigation, he or she is satisfied that to the best of his or her knowledge, the applicant, when filing the application for the inventor's certificate, had the option to file an application for either a patent or an inventor's certificate as to the subject matter of the identified claim or claims forming the basis for the claim of priority.

15. Section 1.59 is revised to read as follows:

#### § 1.59 Papers of application with filing date not to be returned.

Papers in an application which has received a filing date pursuant to § 1.53 will not be returned for any purpose whatever. If applicants have not preserved copies of the papers, the Office will furnish copies at the usual cost of any application in which either the required basic filing fee (§ 1.16) or, if the application was filed under § 1.53(b)(1), the processing and retention fee (§ 1.21(l)) has been paid. See § 1.618 for return of unauthorized and improper papers in interferences.

16. Section 1.60 is amended by revising paragraph (b) to read as follows:

#### § 1.60 Continuation or divisional application for invention disclosed in a prior nonprovisional application.

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(b) An applicant may omit signing of the oath or declaration in a continuation or divisional application (filed under the conditions specified in 35 U.S.C. 120 or 121 and § 1.78(a)) if:

(1) the prior application was a nonprovisional application and a complete application as set forth in § 1.51(a)(1);

(2) applicant indicates that the application is being filed pursuant to this section and files a true copy of the prior complete application as filed including the specification (with



claims), drawings, oath or declaration showing the signature or an indication it was signed, and any amendments referred to in the oath or declaration filed to complete the prior application;

(3) the inventors named in the continuation or divisional application are the same or less than all the inventors named in the prior application; and

(4) the application is filed before the patenting, or abandonment of, or termination of proceedings on the prior application. The copy of the prior application must be accompanied by a statement that the application papers filed are a true copy of the prior complete application. Such statement must be by the applicant or applicant's attorney or agent and must be a verified statement if made by a person not registered to practice before the Patent and Trademark Office. Only amendments reducing the number of claims or adding a reference to the prior application (§ 1.78(a)) will be entered before calculating the filing fee and granting the filing date. If the continuation or divisional application is filed by less than all the inventors named in the prior application, a statement must accompany the application when filed requesting deletion of the names of the person or persons who are not inventors of the invention being claimed in the continuation or divisional application. Except as provided in paragraph (d) of this section, if a true copy of the prior application as filed is not filed with the application or if the statement that the application papers are a true copy is omitted, the application will not be given a filing date earlier than the date upon which the copy and statement are filed, unless a petition with the fee set forth in § 1.17(i) is filed which satisfactorily explains the delay in filing these items.

17. Section 1.62 is amended by revising paragraphs (a) and (e) to read as follows:

**§ 1.62 File wrapper continuing procedure.**

(a) A continuation, continuation-in-part, or divisional application, which uses the specification, drawings and oath or declaration from a prior nonprovisional application which is complete as defined by § 1.51(a)(1), and which is to be abandoned, may be filed under this section before the payment of the issue fee, abandonment of, or termination of proceedings on the prior application, or after payment of the issue fee if a petition under § 1.313(b)(5) is granted in the prior application. The filing date of an application filed under this section is the date on which a request is filed for an application under this section including identification of the application number and the names of the inventors named in the prior complete application. If the continuation, continuation-in-part, or divisional application is filed by less than all the inventors named in the prior application a statement must accompany the application when filed requesting deletion of the names of the person or persons who are not inventors of the invention being claimed in the continuation, continuation-in-part, or divisional application.

(e) An application filed under this section will utilize the file wrapper and contents of the prior application to constitute the new continuation, continuation-in-part, or divisional application but will be assigned a new application number. Changes to the prior application must be made in the form of an amendment to the prior application as it exists at the time of filing the application under this section. No copy of the prior application or new specification is required. The filing of such a copy or specification will be considered improper, and a filing date as of the date of deposit of the request for an application under this section will not be granted to the application unless a petition with the fee set forth in § 1.17(i) is filed with instructions to cancel the copy or specification.

18. Section 1.63 is amended by revising paragraph (a) to read as follows:

**§ 1.63 Oath or declaration.**

(a) An oath or declaration filed under § 1.51(a)(1)(ii) as a part of a nonprovisional application must:

- (1) Be executed in accordance with either § 1.66 or § 1.68;
- (2) Identify the specification to which it is directed;
- (3) Identify each inventor and the residence and country of citizenship of each inventor; and
- (4) State whether the inventor is a sole or joint inventor of the invention claimed.

19. Section 1.67 is amended by revising paragraph (b) to read as follows:

**§ 1.67 Supplemental oath or declaration.**

(b) A supplemental oath or declaration meeting the requirements of § 1.63 must be filed when a claim is presented for matter originally shown or described but not substantially embraced in the statement of invention or claims originally presented or when an oath or declaration submitted in accordance with § 1.53(d)(1) after the filing of the specification and any required drawings specifically and improperly refers to an amendment which includes new matter. No new matter may be introduced into a nonprovisional application after its filing date even if a supplemental oath or declaration is filed. In proper cases, the oath or declaration here required may be made on information and belief by an applicant other than inventor.

20. Section 1.78 is amended by revising paragraphs (a)(1) and (a)(2) and by adding new paragraphs (a)(3) and (a)(4) to read as follows:

**§ 1.78 Claiming benefit of earlier filing date and cross-references to other applications.**

(a)(1) A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. In addition, each prior application must be:

- (i) complete as set forth in § 1.51(a)(1); or
- (ii) entitled to a filing date as set forth in § 1.53(b)(1), § 1.60 or § 1.62 and include the basic filing fee set forth in § 1.16; or

(iii) entitled to a filing date as set forth in § 1.53(b)(1) and have paid therein the processing and retention fee set forth in § 1.21(l) within the time period set forth in § 1.53(d)(1).

(2) Any nonprovisional application claiming the benefit of one or more prior filed copending nonprovisional applications or international applications designating the United States of America must contain or be amended to contain in the first sentence of the specification following the title a reference to each such prior application, identifying it by application number (consisting of the series code and serial number) or international application number and international filing date and indicating the relationship of the applications. Cross-references to other related applications may be made when appropriate. (See § 1.14(b)).

(3) A nonprovisional application other than for a design patent may claim an invention disclosed in one or more prior filed copending provisional applications. Since a provisional application can be pending for no more than twelve months, the last day of pendency may occur on a Saturday, Sunday, or Federal holiday within the District of Columbia which for copendency would require the nonprovisional application to be filed prior to the Saturday, Sunday, or Federal holiday. In

order for a nonprovisional application to claim the benefit of one or more prior filed copending provisional applications, each prior provisional application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. In addition, each prior provisional application must be:

- (i) complete as set forth in § 1.51(a)(2); or
- (ii) entitled to a filing date as set forth in § 1.53(b)(2) and include the basic filing fee set forth in § 1.16(k).

(4) Any nonprovisional application claiming the benefit of one or more prior filed copending provisional applications must contain or be amended to contain in the first sentence of the specification following the title a reference to each such prior provisional application, identifying it as a provisional application, and including the provisional application number (consisting of series code and serial number).

21. Section 1.83 is amended by revising paragraphs (a) and (c) to read as follows:

**§ 1.83 Content of drawing.**

(a) The drawing in a nonprovisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box).

(c) Where the drawings in a nonprovisional application do not comply with the requirements of paragraphs (a) and (b) of this section, the examiner shall require such additional illustration within a time period of not less than two months from the date of the sending of a notice thereof. Such corrections are subject to the requirements of § 1.81(d).

22. Section 1.97 is amended by revising paragraph (d) to read as follows:

**§ 1.97 Filing of information disclosure statement.**

(d) An information disclosure statement shall be considered by the Office if filed after the mailing date of either a final action under § 1.113 or a notice of allowance under § 1.311, whichever occurs first, but before payment of the issue fee, provided the statement is accompanied by:

- (1) A certification as specified in paragraph (e) of this section;
- (2) A petition requesting consideration of the information disclosure statement; and
- (3) The petition fee set forth in § 1.17(i).

23. Section 1.101 is amended by revising paragraph (a) to read as follows:

**§ 1.101 Order of examination.**

(a) Nonprovisional applications filed in the Patent and Trademark Office and accepted as complete applications are assigned for examination to the respective examining groups having the classes of inventions to which the applications relate. Nonprovisional applications shall be taken up for examination by the examiner to whom they have been assigned in the order in which they have been filed except for those applications in which examination has been advanced pursuant to § 1.102. See § 1.496 for order of examination of international applications in the national stage.

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24. Section 1.102 is amended by revising paragraph (d) to read as follows:

**§ 1.102 Advancement of examination.**

(d) A petition to make an application special on grounds other than those referred to in paragraph (c) of this section must be accompanied by the petition fee set forth in § 1.17(i).

25. Section 1.103 is amended by revising paragraph (a) to read as follows:

**§ 1.103 Suspension of action.**

(a) Suspension of action by the Office will be granted for good and sufficient cause and for a reasonable time specified upon petition by the applicant and, if such cause is not the fault of the Office, the payment of the fee set forth in § 1.17(i). Action will not be suspended when a response by the applicant to an Office action is required.

26. A new, undesignated center heading and new section 1.129 are added to Subpart B - National Processing Provisions to read as follows:

**Transitional Provisions**

**§ 1.129 Transitional procedures for limited examination after final rejection and restriction practice.**

(a) An applicant in an application, other than for reissue or a design patent, that has been pending for at least two years as of June 8, 1995, taking into account any reference made in such application to any earlier filed application under 35 U.S.C. 120, 121 and 365(c), is entitled to have a first submission entered and considered on the merits after final rejection under the following circumstances: The Office will consider such a submission, if the first submission and the fee set forth in § 1.17(r) are filed prior to the filing of an appeal brief and prior to abandonment of the application. The finality of the final rejection is automatically withdrawn upon the timely filing of the submission and payment of the fee set forth in § 1.17(r). If a subsequent final rejection is made in the application, applicant is entitled to have a second submission entered and considered on the merits after the subsequent final rejection under the following circumstances: The Office will consider such a submission, if the second submission and a second fee set forth in § 1.17(r) are filed prior to the filing of an appeal brief and prior to abandonment of the application. The finality of the subsequent final rejection is automatically withdrawn upon the timely filing of the submission and payment of the second fee set forth in § 1.17(r). Any submission filed after a final rejection made in an application subsequent to the fee set forth in § 1.17(r) having been twice paid will be treated as set forth in § 1.116. A submission as used in this paragraph includes, but is not limited to, an information disclosure statement, an amendment to the written description, claims or drawings and a new substantive argument or new evidence in support of patentability.

(b)(1) In an application, other than for reissue or a design patent, that has been pending for at least three years as of June 8, 1995, taking into account any reference made in the application to any earlier filed application under 35 U.S.C. 120, 121 and 365(c), no requirement for restriction or for the filing of divisional applications shall be made or maintained in the application after June 8, 1995, except where:

- (i) the requirement was first made in the application or any earlier filed application under 35 U.S.C. 120, 121 and 365(c) prior to April 8, 1995;
- (ii) the examiner has not made a requirement for restriction in the present or parent application prior to April 8, 1995, due to actions by the applicant; or



(iii) the required fee for examination of each additional invention was not paid.

(2) If the application contains more than one independent and distinct invention and a requirement for restriction or for the filing of divisional applications cannot be made or maintained pursuant to this paragraph, applicant will be so notified and given a time period to:

(i) elect the invention or inventions to be searched and examined, if no election has been made prior to the notice, and pay the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in excess of one which applicant elects;

(ii) confirm an election made prior to the notice and pay the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in addition to the one invention which applicant previously elected; or

(iii) file a petition under this section traversing the requirement. If the required petition is filed in a timely manner, the original time period for electing and paying the fee set forth in § 1.17(s) will be deferred and any decision on the petition affirming or modifying the requirement will set a new time period to elect the invention or inventions to be searched and examined and to pay the fee set forth in § 1.17(s) for each independent and distinct invention claimed in the application in excess of one which applicant elects.

(3) The additional inventions for which the required fee has not been paid will be withdrawn from consideration under § 1.142(b). An applicant who desires examination of an invention so withdrawn from consideration can file a divisional application under 35 U.S.C. 121.

(c) The provisions of this section shall not be applicable to any application filed after June 8, 1995.

27. Section 1.137 is amended by revising paragraph (c) to read as follows:

#### § 1.137 Revival of abandoned application.

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(c) In all applications filed before June 8, 1995, and in all design applications filed on or after June 8, 1995, any petition pursuant to paragraph (a) of this section not filed within six months of the date of abandonment of the application, must be accompanied by a terminal disclaimer with fee under § 1.321 dedicating to the public a terminal part of the term of any patent granted thereon equivalent to the period of abandonment of the application. The terminal disclaimer must also apply to any patent granted on any continuing application entitled under 35 U.S.C. 120 to the benefit of the filing date of the application for which revival is sought.

\*\*\*\*\*

28. Section 1.139 is added to read as follows:

#### § 1.139 Revival of provisional application.

(a) A provisional application which has been accorded a filing date and abandoned for failure to timely respond to an Office requirement may be revived so as to be pending for a period of no longer than twelve months from its filing date if it is shown to the satisfaction of the Commissioner that the delay was unavoidable. Under no circumstances will the provisional application be pending after twelve months from its filing date. A petition to revive an abandoned provisional application must be promptly filed after the applicant is notified of, or otherwise becomes aware of, the abandonment, and must be accompanied by:

(1) the required response unless it has been previously filed;

(2) the petition fee as set forth in § 1.17(i); and

(3) a showing that the delay was unavoidable. The showing must be a verified showing if made by a person not registered to practice before the Patent and Trademark Office.

(b) A provisional application which has been accorded a filing date and abandoned for failure to timely respond to an Office requirement may be revived so as to be pending for a period of no longer than twelve months from its filing date if

the delay was unintentional. Under no circumstances will the provisional application be pending after twelve months from its filing date. A petition to revive an abandoned provisional application must be:

(1) accompanied by the required response unless it has been previously filed;

(2) accompanied by the petition fee as set forth in § 1.17(m);

(3) accompanied by a statement that the delay was unintentional. The statement must be a verified statement if made by a person not registered to practice before the Patent and Trademark Office. The Commissioner may require additional information where there is a question whether the delay was unintentional; and

(4) filed either:

(i) within one year of the date on which the provisional application became abandoned; or

(ii) within three months of the date of the first decision on a petition to revive under paragraph (a) of this section which was filed within one year of the date on which the provisional application became abandoned.

(c) Any request for reconsideration or review of a decision refusing to revive a provisional application upon petition filed pursuant to paragraphs (a) or (b) of this section, to be considered timely, must be filed within two months of the decision refusing to revive or within such time as set in the decision.

(d) The time periods set forth in this section cannot be extended, except that the three-month period set forth in paragraph (b)(4)(ii) of this section and the time period set forth in paragraph (c) of this section may be extended under the provisions of § 1.136.

29. Section 1.177 is revised to read as follows:

#### § 1.177 Reissue in divisions.

The Commissioner may, in his or her discretion, cause several patents to be issued for distinct and separate parts of the thing patented, upon demand of the applicant, and upon payment of the required fee for each division. Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts, subject to the provisions of §§ 1.83 and 1.84. On filing divisional reissue applications, they shall be referred to the Commissioner. Unless otherwise ordered by the Commissioner upon petition and payment of the fee set forth in § 1.17(i), all the divisions of a reissue will issue simultaneously; if there is any controversy as to one division, the others will be withheld from issue until the controversy is ended, unless the Commissioner orders otherwise.

30. Section 1.312 is amended by revising paragraph (b) to read as follows:

#### § 1.312 Amendments after allowance.

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(b) Any amendment pursuant to paragraph (a) of this section filed after the date the issue fee is paid must be accompanied by a petition including the fee set forth in § 1.17(i) and a showing of good and sufficient reasons why the amendment is necessary and was not earlier presented.

31. Section 1.313 is amended by revising paragraph (a) to read as follows:

#### § 1.313 Withdrawal from issue.

(a) Applications may be withdrawn from issue for further action at the initiative of the Office or upon petition by the applicant. Any such petition by the applicant must include a showing of good and sufficient reasons why withdrawal of the application is necessary and, if the reason for the withdrawal is not the fault of the Office, must be accompanied by the fee set forth in § 1.17(i). If the application is withdrawn from issue, a new notice of allowance will be sent if the application is again allowed. Any amendment accompanying a petition to

withdraw an application from issue must comply with the requirements of § 1.312.

\*\*\*\*\*

32. Section 1.314 is revised to read as follows:

#### § 1.314 Issuance of patent.

If payment of the issue fee is timely made, the patent will issue in regular course unless the application is withdrawn from issue (§ 1.313), or issuance of the patent is deferred. Any petition by the applicant requesting a deferral of the issuance of a patent must be accompanied by the fee set forth in § 1.17(i) and must include a showing of good and sufficient reasons why it is necessary to defer issuance of the patent.

33. Section 1.316 is amended by revising paragraph (d) to read as follows:

#### § 1.316 Application abandoned for failure to pay issue fee.

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(d) In all applications filed before June 8, 1995, any petition pursuant to paragraph (b) of this section not filed within six months of the date of abandonment of the application, must be accompanied by a terminal disclaimer with fee under § 1.321 dedicating to the public a terminal part of the term of any patent granted thereon equivalent to the period of abandonment of the application. The terminal disclaimer must also apply to any patent granted on any continuing application entitled under 35 U.S.C. 120 to the benefit of the filing date of the application for which revival is sought.

\*\*\*\*\*

34. Section 1.317 is amended by removing and reserving paragraph (d):

#### § 1.317 Lapsed patents; delayed payment of balance of issue fee.

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(d) [Reserved]

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35. Section 1.666 is amended by revising paragraph (b) to read as follows:

#### § 1.666 Filing of interference settlement agreements.

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(b) If any party filing the agreement or understanding under paragraph (a) of this section so requests, the copy will be kept separate from the file of the interference, and made available only to Government agencies on written request, or to any person upon petition accompanied by the fee set forth in § 1.17(i) and on a showing of good cause.

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36. Section 1.701 is added to Subpart F to read as follows:

#### § 1.701 Extension of patent term due to prosecution delay.

(a) A patent, other than for designs, issued on an application filed on or after June 8, 1995, is entitled to extension of the patent term if the issuance of the patent was delayed due to:

(1) interference proceedings under 35 U.S.C. 135(a); and/or

(2) the application being placed under a secrecy order under 35 U.S.C. 181; and/or

(3) appellate review by the Board of Patent Appeals and Interferences or by a Federal court under 35 U.S.C. 141 or 145, if the patent was issued pursuant to a decision reversing

an adverse determination of patentability and if the patent is not subject to a terminal disclaimer due to the issuance of another patent claiming subject matter that is not patentably distinct from that under appellate review.

(b) The term of a patent entitled to extension under paragraph (a) of this section shall be extended for the sum of the periods of delay calculated under paragraphs (c)(1), (c)(2), (c)(3) and (d) of this section, to the extent that these periods are not overlapping, up to a maximum of five years. The extension will run from the expiration date of the patent.

(c)(1) The period of delay under paragraph (a)(1) of this section for an application is the sum of the following periods, to the extent that the periods are not overlapping:

(i) with respect to each interference in which the application was involved, the number of days, if any, in the period beginning on the date the interference was declared or redeclared to involve the application in the interference and ending on the date that the interference was terminated with respect to the application; and

(ii) the number of days, if any, in the period beginning on the date prosecution in the application was suspended by the Patent and Trademark Office due to interference proceedings under 35 U.S.C. 135(a) not involving the application and ending on the date of the termination of the suspension.

(2) The period of delay under paragraph (a)(2) of this section for an application is the sum of the following periods, to the extent that the periods are not overlapping:

(i) the number of days, if any, the application was maintained in a sealed condition under 35 U.S.C. 181;

(ii) the number of days, if any, in the period beginning on the date of mailing of an examiner's answer under § 1.193 in the application under secrecy order and ending on the date the secrecy order and any renewal thereof was removed;

(iii) the number of days, if any, in the period beginning on the date applicant was notified that an interference would be declared but for the secrecy order and ending on the date the secrecy order and any renewal thereof was removed; and

(iv) the number of days, if any, in the period beginning on the date of notification under § 5.3(c) and ending on the date of mailing of the notice of allowance under § 1.311.

(3) The period of delay under paragraph (a)(3) of this section is the sum of the number of days, if any, in the period beginning on the date on which an appeal to the Board of Patent Appeals and Interferences was filed under 35 U.S.C. 134 and ending on the date of a final decision in favor of the applicant by the Board of Patent Appeals and Interferences or by a Federal court in an appeal under 35 U.S.C. 141 or a civil action under 35 U.S.C. 145.

(d) The period of delay set forth in paragraph (c)(3) shall be reduced by:

(1) any time during the period of appellate review that occurred before three years from the filing date of the first national application for patent presented for examination; and

(2) any time during the period of appellate review, as determined by the Commissioner, during which the applicant for patent did not act with due diligence. In determining the due diligence of an applicant, the Commissioner may examine the facts and circumstances of the applicant's actions during the period of appellate review to determine whether the applicant exhibited that degree of timeliness as may reasonably be expected from, and which is ordinarily exercised by, a person during a period of appellate review.

#### Part 3— Assignment, Recording, and Rights of Assignee

37. The authority citation for 37 CFR Part 3 continues to read as follows:

Authority: 15 U.S.C. 1123; 35 U.S.C. 6.

38. Section 3.21 is revised to read as follows:

#### § 3.21 Identification of patents and patent applications.

An assignment relating to a patent must identify the patent by the patent number. An assignment relating to a national patent application must identify the national patent application by the application number (consisting of the series code and

the serial number, e.g., 07/123,456). An assignment relating to an international patent application which designates the United States of America must identify the international application by the international number (e.g., PCT/US90/01234). If an assignment of a patent application filed under § 1.53(b)(1) or § 1.62 is executed concurrently with, or subsequent to, the execution of the patent application, but before the patent application is filed, it must identify the patent application by its date of execution, name of each inventor, and title of the invention so that there can be no mistake as to the patent application intended. If an assignment of a provisional application is executed before the provisional application is filed, it must identify the provisional application by name of each inventor and title of the invention so that there can be no mistake as to the provisional application intended.

39. Section 3.81 is amended by revising paragraph (b) to read as follows:

**§ 3.81 Issue of patent to assignee.**

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(b) If the assignment is submitted for recording after the date of payment of the issue fee, but prior to issuance of the patent, the assignee may petition that the patent issue to the assignee. Any such petition must be accompanied by the fee set forth in § 1.17(i) of this Chapter.

April 17, 1995

BRUCE A. LEHMAN  
Assistant Secretary of Commerce and  
Commissioner of Patents and Trademarks

Appendix A

**PROVISIONAL APPLICATION COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53 (b)(2).

Docket Number		Type a plus sign (+) inside this box →	
INVENTOR(s)/APPLICANT(s)			
LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY)
TITLE OF THE INVENTION (250 characters max)			
CORRESPONDENCE ADDRESS			
STATE	ZIP CODE	COUNTRY	
ENCLOSED APPLICATION PARTS (check all that apply)			
<input type="checkbox"/> Specification	Number of Pages	<input type="checkbox"/> Small Entity Statement	
<input type="checkbox"/> Drawing(s)	Number of Sheets	<input type="checkbox"/> Other (specify)	
METHOD OF PAYMENT (check one)			
<input type="checkbox"/> A check or money order is enclosed to cover the Provisional filing fees			PROVISIONAL FILING FEE AMOUNT (\$)
<input type="checkbox"/> The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number:			

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☐ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: \_\_\_\_\_

Respectfully submitted,

SIGNATURE \_\_\_\_\_

Date / /

TYPED or PRINTED NAME \_\_\_\_\_

REGISTRATION NO. \_\_\_\_\_  
(if appropriate)

☐ Additional inventors are being named on separately numbered sheets attached hereto

**PROVISIONAL APPLICATION FILING ONLY**

Burden Hour Statement: This form is estimated to take 2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Office of Assistance Quality and Enhancement, Division, Patent and Trademark Office, Washington, DC 20231, and to the Office of Information and Regulatory Affairs, Office of Management and Budget (Project 0651-00X0), Washington, DC 20503. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner of Patents and Trademarks, Washington, DC 20231.



## Appendix B

DECLARATION FOR PATENT APPLICATION		Docket Number (Optional)																		
<p>As a below named inventor, I hereby declare that:</p> <p>My residence, post office address and citizenship are as stated below next to my name.</p> <p>I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled _____, the specification of which is attached hereto unless the following box is checked:</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"><input type="checkbox"/> was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).</div> <p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.</p> <p>I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.</p> <table style="width: 100%; border-collapse: collapse;"><tr><td style="width: 33%; border-bottom: 1px solid black;">(Number)</td><td style="width: 33%; border-bottom: 1px solid black;">(Country)</td><td style="width: 33%; border-bottom: 1px solid black;">(Day/Month/Year Filed)</td></tr><tr><td style="border-bottom: 1px solid black;">(Number)</td><td style="border-bottom: 1px solid black;">(Country)</td><td style="border-bottom: 1px solid black;">(Day/Month/Year Filed)</td></tr></table> <p>I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.</p> <table style="width: 100%; border-collapse: collapse;"><tr><td style="width: 33%; border-bottom: 1px solid black;">(Application Number)</td><td style="width: 33%; border-bottom: 1px solid black;">(Filing Date)</td><td style="width: 33%;"></td></tr><tr><td style="border-bottom: 1px solid black;">(Application Number)</td><td style="border-bottom: 1px solid black;">(Filing Date)</td><td></td></tr></table> <p>I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.</p> <table style="width: 100%; border-collapse: collapse;"><tr><td style="width: 33%; border-bottom: 1px solid black;">(Application Number)</td><td style="width: 33%; border-bottom: 1px solid black;">(Filing Date)</td><td style="width: 33%; border-bottom: 1px solid black;">(Status -- patented, pending, abandoned)</td></tr><tr><td style="border-bottom: 1px solid black;">(Application Number)</td><td style="border-bottom: 1px solid black;">(Filing Date)</td><td style="border-bottom: 1px solid black;">(Status -- patented, pending, abandoned)</td></tr></table> <p>I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:</p> <p>Address all telephone calls to _____ at telephone number _____</p> <p>Address all correspondence to _____</p> <p>_____</p> <p>_____</p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p> <p>Full name of sole or first inventor (given name, family name) _____</p> <p>Inventor's signature _____ Date _____</p> <p>Residence _____ Citizenship _____</p> <p>Post Office Address _____</p> <p>Full name of second joint inventor, if any (given name, family name) _____</p> <p>Second inventor's signature _____ Date _____</p> <p>Residence _____ Citizenship _____</p> <p>Post Office Address _____</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"><input type="checkbox"/> Additional inventors are being named on separately numbered sheets attached hereto</div>			(Number)	(Country)	(Day/Month/Year Filed)	(Number)	(Country)	(Day/Month/Year Filed)	(Application Number)	(Filing Date)		(Application Number)	(Filing Date)		(Application Number)	(Filing Date)	(Status -- patented, pending, abandoned)	(Application Number)	(Filing Date)	(Status -- patented, pending, abandoned)
(Number)	(Country)	(Day/Month/Year Filed)																		
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(Application Number)	(Filing Date)																			
(Application Number)	(Filing Date)																			
(Application Number)	(Filing Date)	(Status -- patented, pending, abandoned)																		
(Application Number)	(Filing Date)	(Status -- patented, pending, abandoned)																		

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Certificates of Correction Issue of May 2, 1995				5,355,762	5,365,256	5,375,879	5,384,634
B1 4,193,499	5,233,546	5,312,614	5,342,462	5,355,961	5,365,316	5,376,185	5,384,868
D. 352,786	5,236,664	5,312,678	5,342,604	5,355,963	5,365,483	5,376,302	5,385,092
D. 355,514	5,237,308	5,312,707	5,342,893	5,356,313	5,365,827	5,376,359	5,385,899
P. 8,527	5,247,059	5,312,973	5,343,085	5,356,513	5,366,122	5,376,432	5,386,019
P. 8,724	5,248,349	5,313,182	5,343,362	5,356,683	5,366,214	5,376,676	5,386,060
P. 8,931	5,252,505	5,315,329	5,344,632	5,356,746	5,366,271	5,376,709	5,386,067
Re. 34,619	5,254,139	5,317,551	5,344,886	5,356,837	5,366,462	5,376,747	5,386,377
Re. 34,775	5,256,999	5,317,581	5,345,840	5,356,909	5,366,642	5,376,842	5,386,404
4,742,074	5,260,142	5,317,910	5,346,212	5,356,922	5,366,895	5,376,998	5,386,422
4,847,246	5,264,718	5,319,099	5,346,638	5,356,949	5,367,137	5,377,179	5,386,609
4,862,088	5,268,486	5,319,144	5,346,707	5,356,976	5,367,826	5,377,601	5,386,747
4,950,624	5,270,412	5,319,776	5,346,785	5,357,099	5,368,801	5,378,677	5,386,871
5,000,783	5,272,170	5,320,099	5,346,992	5,357,268	5,368,894	5,378,679	5,387,084
5,016,267	5,274,084	5,321,180	5,347,031	5,357,320	5,369,002	5,378,765	5,387,265
5,026,735	5,275,650	5,321,351	5,347,442	5,357,354	5,369,163	5,378,807	5,387,345
5,047,385	5,276,875	5,321,354	5,347,714	5,357,578	5,369,486	5,378,823	5,387,679
5,056,403	5,276,890	5,321,394	5,348,130	5,357,648	5,369,615	5,379,017	5,387,709
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5,084,978	5,283,817	5,326,929	5,349,420	5,358,739	5,370,084	5,380,124	5,388,985
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5,186,939	5,300,116	5,334,761	5,352,969	5,361,154	5,372,390	5,382,036	5,392,076
5,192,385	5,300,318	5,334,999	5,353,137	5,362,471	5,372,435	5,382,095	5,392,623
5,202,252	5,302,521	5,335,643	5,353,196	5,362,474	5,373,418	5,382,371	5,392,987
5,204,830	5,302,957	5,336,596	5,353,274	5,362,607	5,373,489	5,382,531	5,393,008
5,205,917	5,304,130	5,339,529	5,353,566	5,363,170	5,373,994	5,382,870	5,393,303
5,210,874	5,304,472	5,339,810	5,354,045	5,363,214	5,374,514	5,383,010	5,393,717
5,222,037	5,305,123	5,340,644	5,354,637	5,363,373	5,374,609	5,383,076	5,393,812
5,223,096	5,305,600	5,341,161	5,354,839	5,363,454	5,374,634	5,383,734	5,394,998
5,225,051	5,308,196	5,341,187	5,355,151	5,364,219	5,374,771	5,384,114	5,395,120
5,225,173	5,310,604	5,341,775	5,355,315	5,364,247	5,375,117	5,384,316	5,395,827
5,231,009	5,312,388	5,342,310	5,355,703	5,364,359	5,375,126	5,384,378	5,395,966
				5,364,742	5,375,460	5,384,609	5,396,622
				5,364,753	5,375,550	5,384,624	5,397,911
							5,397,948

Summary of Final Decisions  
Issued by the  
Trademark Trial and Appeal Board  
February 27-March 3, 1995

Date Issued	Type of Case <sup>(1)</sup>	Proceeding or App'n No.	Party/Parties	Issue	TTAB Decision	Opposer's Petitioner's Mark and Goods/Services	Applicant's Respondent's Mark and Goods/Services	Mark and Goods Cited by Examining Attorney	Recommended for Publication
2-27	EX	74/330,819	E-Systems, Inc.	2(c)(1)	Refusal Affirmed		"DATALIBRARY" [computer hardware]		No
3-2	OPP	89,762	Hal Holdings Corp v. Imagine Inc.	2(d)	Opposition Dismissed	"SUCCESS" [magazines]	"SUCCESS WORKSHOP" [periodic newsletters concerned with reaching individual goals in the career development, financial, health and other self-improvement fields]		No

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Box 16	Deposit Account Replenishment Checks.
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Arkansas	Little Rock: Arkansas State Library .....	(501) 682-2053
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	Sacramento: California State Library .....	(916) 654-0069
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	San Francisco Public Library .....	Not Yet Operational
	Sunnyvale Patent Clearinghouse .....	(408) 730-7290
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	Dallas Public Library .....	(214) 670-1468
	Houston: The Fondren Library, Rice University .....	(713) 527-8101 Ext. 2587
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	Richmond: James Branch Cabell Library, Virginia Commonwealth University.....	(804) 828-1104
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West Virginia	Morgantown: Evansdale Library, West Virginia University .....	(304) 293-2510
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	Milwaukee Public Library.....	(414) 286-3247
Wyoming	Casper: Natrona County Public Library .....	Not Yet Operational

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LAWRENCE J. GOFFNEY Jr., Assistant Commissioner for Patents  
EDWARD R. KAZENSKE, Deputy Assistant Commissioner for Patents  
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J.O. THOMAS, JR., Deputy Assistant Commissioner for Patent Process Services

PATENT EXAMINING GROUPS	Phone number Area Code 703	New Case Date*
CHEMICAL EXAMINING GROUPS		
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 1100— JOHN E. KITTLE, Director .....	308-0661	02/10/94
ORGANIC CHEMISTRY, GROUP 1200—RICHARD V. FISHER, Director .....	308-1235	04/08/94
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 1300—BARRY S. RICHMAN, Director .....	308-0651	06/14/94
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INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 2100—STEWART LEVY, Director .....	308-1782	06/07/94
SPECIAL LAWS AND ADMINISTRATION, GROUP 2200—ROBERT E. GARRETT, Director .....	308-0511	08/18/93
COMPUTER SYSTEMS AND COMPUTER APPLICATION, GROUP 2300— BOBBY R. GRAY, Director .....	305-9600	03/03/94
PACKAGES, CLEANING, TEXTILES AND GEOMETRICAL INSTRUMENTS GROUP 2400—GERALD GOLDBERG, Director.....	308-0771	01/19/94
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 2500— JANICE A. HOWELL, Director.....	308-0956	11/23/93
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 2600—NICHOLAS P. GODICI, Director .....	305-4700	09/07/93
DESIGN, GROUP 2900—JOHN E. KITTLE, Director .....	308-0661	06/01/93
MECHANICAL EXAMINING GROUPS		
HANDLING AND TRANSPORTATION MEDIA, GROUP 3100—F.R. SCHMIDT, Director .....	308-1113	01/24/94
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 3200—CARLTON R. CROYLE, Director.....	308-1148	01/04/94
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 3300—J.J. LOVE, Director .....	308-0858	03/31/94
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 3400—DONALD G. KELLY, Director .....	308-0861	01/13/94
GENERAL CONSTRUCTION, PETROLEUM AND MINING ENGINEERING, GROUP 3500—A.L. SMITH, Director.....	308-1021	01/31/94

\*A communication from the examiner should have been received in most applications filed prior to this date.

**Expiration of Patents:** The patents within the range of numbers indicated below expire during April 1995 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents.....	Numbers 4,081,864 to 4,086,663 inclusive
Plant Patents.....	4,232 to 4,244



## TRADEMARK OPERATION

Bruce Lehman, Commissioner  
Philip G. Hampton II, Assistant Commissioner  
Robert M. Anderson, Deputy Assistant Commissioner  
David E. Bucher, Director, Trademark Examining Operation  
Condition of Trademark Applications as of March 1, 1995

Law Office	Oldest Date	
	New*	Amendment Filed
Law Office 3—Kathryn A. Erskine, Managing Attorney, (703) 308-9103 Scientific Equipment, Furniture, Houseware and Glass—Int. Classes 9, 20, 21 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/04/94	12/30/94
Law Office 4—Sharon Marsh, Managing Attorney, (703) 308-9104 Scientific Equipment, Furniture, Houseware and Glass—Int. Classes 9, 20, 21, Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	08/30/94	12/16/94
Law Office 5—Mary Sparrow, Managing Attorney, (703) 308-9105 Cosmetics, Cleaning Preparations, Paper Products and Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/03/94	12/08/94
Law Office 6—Myra Kurzbard, Managing Attorney, (703) 308-9106 Scientific Equipment, Furniture, Houseware and Glass—Int. Classes 9, 20, 21, Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	09/28/94	11/30/94
Law Office 7—David Shallant, Managing Attorney, (703) 308-9107 Lubricants, Fuels, Industrial Equipment & Materials—Int. Classes 4, 6, 11, 14, 19 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	09/01/94	12/13/94
Law Office 8—Thomas Lamone, Managing Attorney, (703) 308-9108 Cosmetics, Cleaning Preparations, Paper Products & Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/13/94	12/16/94
Law Office 9—Sidney Moskowitz, Managing Attorney, (703) 308-9109 Lubricants, Industrial Equipment, Materials & Musical Instruments—Int. Classes 4, 6, 7, 8, 12, 13, 15, 16, 17, 18, 19, Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	09/09/94	12/09/94
Law Office 10—Jean Logan, Managing Attorney, (703) 308-9110 Cordage, Fibers, Yarns, Threads, Fabrics, Clothing & Floor Coverings—Int. Classes 22, 23, 24, 25, 26, 27 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	09/12/94	10/24/94
Law Office 11—Thomas Howell, Managing Attorney, (703) 308-9111 Paints, Pharmaceuticals & Medical Apparatus—Int. Classes 2, 5, 10 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/02/94	10/24/94
Law Office 12—Deborah Cohn, Managing Attorney, (703) 308-9112 Cosmetics, Cleaning Preparations, Paper Products & Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/17/94	01/15/95
Law Office 13—Craig Morris, Managing Attorney, (703) 308-9113 Chemicals, Food, Beverages, Wines & Spirits—Int. Classes 1, 29, 30, 31, 32, 33 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	07/05/94	10/21/94
Law Office 14—Ron Williams, Managing Attorney, (703) 308-9114 Chemicals, Food, Beverages, Wines & Spirits—Int. Classes 1, 29, 30, 31, 32, 33 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/04/94	01/03/95
Law Office 15—Paul Fahrenkopf, Managing Attorney, (703) 308-9115 Rubber, Leather Goods & Clothing—Int. Classes 17, 18, 25 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42.....	10/06/94	11/16/94
**Collective Marks—Class 200		
**Certification Marks—Classes A & B		
Office of Trademark Services—Jodi Rush, Director (703) 308-9000		
Post Registration Section—Jacqueline Cole, Managing Attorney, (703) 308-9500		
Affidavits Under Sections 8 & 15 (All Classes).....	08/02/94	—0—
Renewals (All Classes).....	10/13/94	—0—
Section 12(C) Publications (All Classes).....	—0—	—0—

- \*\* Assigned to each law office
- Applicants with inquiries concerning the status of their applications and a touch tone phone should call (703) 308-8747 from 6:30 a.m. to Midnight Est, Monday thru Friday. This automated voice system will provide the current status of your application. Applicants are urged not to file unnecessary inquiries concerning the status of their applications. See Section 411 of the *Trademark Manual of Examining Procedure*.
- \* These dates identify the oldest unassigned new case in each law office. All cases with earlier dates have either been examined and made the subject of an action or are currently being worked on by the assigned examiner.

1174 OG 54

## REEXAMINATIONS

MAY 2, 1995

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,246,102 (2550th)  
METHOD FOR SEPARATING POLLUTANTS FROM LIQUID

Ulf R. Hjelmner, Nynäshamn, and Hans F. Larsson, Vasterhaninge, both of Sweden, assignors to Rederiaktiebolaget Nordstjernan, Stockholm, Sweden

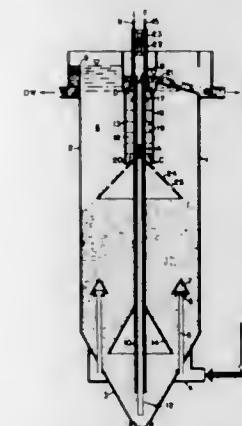
Reexamination Request Nos. 90/002,817, Aug. 14, 1992 and 90/002,496, Oct. 31, 1991.

Reexamination Certificate for Patent No. 4,246,102, issued Jan. 20, 1981, Ser. No. 855,323, Nov. 28, 1977.

Claims priority, application Sweden, Nov. 29, 1976, 76133677  
The portion of the term of this patent subsequent to Nov. 20, 1995, has been disclaimed.

Int. Cl.<sup>6</sup> B01D 24/46

U.S. Cl. 210—704



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-12 is confirmed.

Claim 13 is determined to be patentable as amended.

13. In a process for separating pollutants from a liquid, an improved liquid purification step, wherein pollutants are assembled and separated from the liquid, comprising adding to the liquid to be filtered chemicals facilitating at least one of the processes of precipitation and flocculation, continuously directing the liquid containing the chemicals from the chemical addition [located] location directly to a zone of moving particulate filter material forming a filter bed, absent intermediate passage through any flocculation tank and absent intermediate passage through any sedimentation basin, passing the liquid containing the chemicals upwardly through the filter bed to provide at least one of the precipitation and flocculation processes within the moving particulate material of the bed, moving the particulate material of the filter bed downwardly relative to the liquid and in addition to the movement of the liquid, maintaining a zone of filtrate above the filter bed in direct contact with the filter bed, removing soiled particulate material and pollutants from the filter bed, cleaning the particulate material using filtrate from the zone of filtrate above the filter bed, and returning the particulate material to the top of the filter bed, said steps of removing, cleaning and returning the particulate material being simultaneous with the passing of liquid through the filter bed and including the step of supplying air to transport soiled filter particles from the filter bed to a wash path for said step of cleaning.

B1 4,349,962 (2551st)  
CUTTING DOWN MACHINE

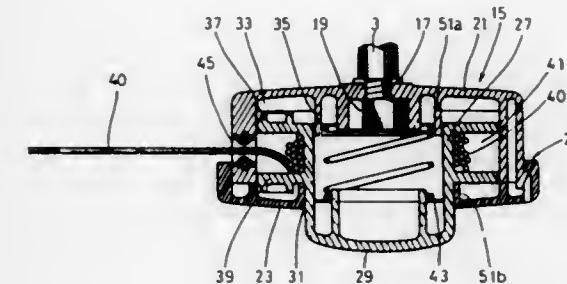
Hidehiko Itagaki, Kasukabe, and Yuji Suzuki, Akishima, both of Japan, assignors to Komatsu Zenoah Co., Higashiyamato, Japan

Reexamination Request No. 90/003,440, May 20, 1994.

Reexamination Certificate for Patent No. 4,349,962, issued Sep. 21, 1992, Ser. No. 171,789, Jul. 24, 1980.

Claims priority, application Japan, Jun. 14, 1980, 55-79620  
Int. Cl.<sup>6</sup> A01G 3/00; A01D 50/00

U.S. Cl. 30—276



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-7 is confirmed.

1. A cutting down machine comprising:

a case driven through a rotating shaft by a prime mover which is rotatably supported by a supporting base;

said case comprising a case body having an inner peripheral surface, a bottom surface, an engaging portion on said bottom surface, and a cover member detachably mounted on said bottom surface;

a reel provided with a pair of flange portions axially spaced apart to define a groove for winding therearound and accommodating therein a cutting down tape, said flanged portions having an outer periphery in slidable confronting relation with said inner peripheral surface of said case to support the reel for rotation with and slidably disposed in the case and energized downward;

a number of first and second engaging portions disposed in confronting inner side surfaces of the case;

a number of first and second engaging protrusions engageable with said first and second engaging portions and placed in the vicinity of the outer peripheral portion of the reel;

engaging areas of said first and second engaging portions and of said first and second engaging protrusions being situated at an upper and a lower two positions;

said two engaging areas at the upper and lower portions being provided at different phases in a rotating direction; and

said reel having a pressing member at a lower portion thereof protruding downward from said cover member of the case.

B1 4,773,920 (2552nd)

## COATED ABRASIVE SUITABLE FOR USE AS A LAPPING MATERIAL

Jonathan N. Chasman, Shoreview; Ramon F. Hegel, St. Paul; Philip E. Kendall, Woodbury; Nathan B. Postma, White Bear Lake, and Douglas S. Spencer, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Reexamination Request No. 90/003,371, Mar. 28, 1994.  
Reexamination Certificate for Patent No. 4,773,920, issued Sep. 27, 1988, Ser. No. 27,329, Mar. 18, 1987.

Int. Cl.<sup>6</sup> B24D 11/00

U.S. Cl. 51—295

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 3, 4 and 12 are cancelled.

Claims 1, 5, 9 and 14 are determined to be patentable as amended.

Claims 2, 6–8, 10–11 and 13 dependent on an amended claim, are determined to be patentable.

New claims 15 and 16 are added and determined to be patentable.

1. A coated abrasive suitable for use as a lapping material, said coated abrasive comprising
  - (a) a backing; and
  - (b) an abrasive coating adhered to said backing, said abrasive coating being formed by coating a suspension comprising lapping size abrasive grains and binder curable by free-radical polymerization onto said backing and curing said binder by free-radical polymerization, wherein said binder is selected from the group consisting of isocyanurate acrylates, isocyanurate methacrylates, diisocyanate acrylates, and diisocyanate methacrylates.

B1 4,997,657 (2553rd)

## METHOD FOR IMPROVING SKIN SMOOTHNESS

David F. Horrobin, and John C. M. Stewart, both of Guildford, England, assignors to Efamol Holdings plc., Guildford, England

Reexamination Request No. 90/002,775, Jul. 9, 1992.  
Reexamination Certificate for Patent No. 4,997,657, issued Mar. 5, 1991, Ser. No. 321,204, Mar. 9, 1989.

Claims priority, application United Kingdom, Mar. 22, 1988, 8806737

Int. Cl.<sup>6</sup> A61K 7/48

U.S. Cl. 424—401

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is determined to be patentable as amended.

Claims 2–6 dependent on an amended claim, are determined to be patentable.

1. A method of improving the smoothness of healthy skin by topically applying daily to the [affected] healthy skin a composition of GLA or DGLA or both or a physiologically acceptable and equivalent derivative, the acid(s) being present in a concentration of 0.01 to 20% by weight of the or each acid or molar equivalent amount(s) or derivative(s).

B1 5,042,220 (2554th)

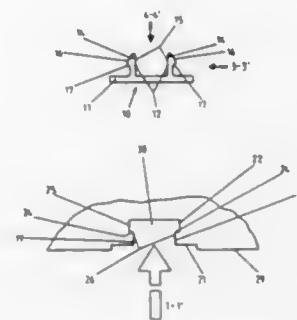
## FASTENER AND STRIP MOUNTING SYSTEM

Peter Jackson, Oswestry, United Kingdom, assignor to Richard Burbidge Limited, Oswestry, England

Reexamination Request No. 90/003,464, Jun. 13, 1994.  
Reexamination Certificate for Patent No. 5,042,220, issued Aug. 27, 1991, Ser. No. 355,745, May 22, 1989.

Int. Cl.<sup>6</sup> E04C 2/38; F16B 19/00

U.S. Cl. 52—717.1



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 3, 5 and 8 are cancelled.

Claims 1, 2, 4, 6 and 7 are determined to be patentable as amended.

1. A wooden architectural [moulding] molding strip mounting and jointing system comprising:
  - a plurality of spaced individual unitary fasteners (10);
  - a continuous length of rigid wooden architectural molding [moulding] (18) having a continuous mounting groove (30) of re-entrant profile, in the rear face of said molding [moulding], and having inwardly facing internal ledges (24) in said mounting groove and a decorative outer profile on an opposite front face of the molding [moulding], each of said fasteners comprising:
    - a base portion (11);
    - a plurality of opposed resiliently deformable limbs (12) upstanding from said base portion; said limbs movable towards each other;
  - profiled outwardly facing and tapering noses (14) on the [outer] ends of said limbs, and spaced to engage said mounting groove in the rear face of a wooden [moulding] molding length;
  - beveled contact surfaces (16) on said noses forming a progressive ramp surface [for engagement with said internal ledges (24)]; for entry of said noses into said groove whereby an external [ledges] ledge (17) [on said] at the underside of each [noses] nose adjacent said beveled contact [surfaces] surface [for engaging] can engage said internal [ledges] ledge of said mounting groove, the distance between said internal ledges (24) being sufficient to allow the limbs (12) to be received within said groove (30) in the relaxed condition in which said limbs lie generally parallel to each other;
  - the interaction of said external ledges on the fastener limbs and the [moulding] molding mounting groove forming a releasable latch assembly securing the fasteners and [moulding] molding together in intimate contact, the latch assembly being operated by transverse translational movement of the fastener and [moulding] molding, together or apart; and
  - rectangular corner blocks, with whose side faces the ends of said strip elements of pre-profiled sections, severed at right angles to the section length, can simply be butted.

B1 5,051,114 (2555th)

## PERFLUORODIOXOLE MEMBRANES

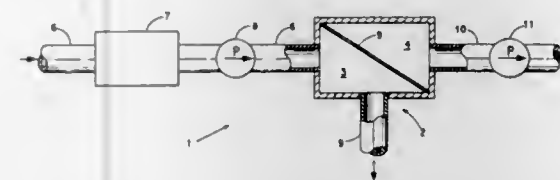
Stuart M. Nemser, and Ian C. Roman, both of Wilmington, Del., assignors to Du Pont Canada Inc., Mississauga, Canada and E. I. Du Pont de Nemours and Company, Wilmington, Del.

Reexamination Request No. 90/002,953, Feb. 4, 1993.  
Reexamination Certificate for Patent No. 5,051,114, issued Sep. 24, 1991, Ser. No. 538,066, Jun. 13, 1990.

Continuation-in-part of Ser. No. 366,400, Jun. 15, 1989, abandoned

Int. Cl.<sup>6</sup> B01D 53/22, 71/32

U.S. Cl. 95—47



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–41 are cancelled.

1. A method for the enrichment of the amount of a gaseous organic compound in a gaseous admixture of said organic compound and at least one of oxygen and nitrogen, said method comprising:

- (a) providing in a membrane separation cell a selectively permeable membrane having a feed side and a permeate side, said membrane being virtually defect-free with an oxygen/nitrogen selectivity of at least 1.4 and formed from an amorphous polymer of perfluoro-2,2-dimethyl-1,3-dioxole, and feeding said admixture to the feed side of said membrane, said membrane being at a temperature of less than the glass transition temperature of the polymer; and
- (b) removing from the feed side of the membrane, a gaseous admixture of said organic compound that is enriched in the amount of organic compound.

B1 5,127,602 (2556th)

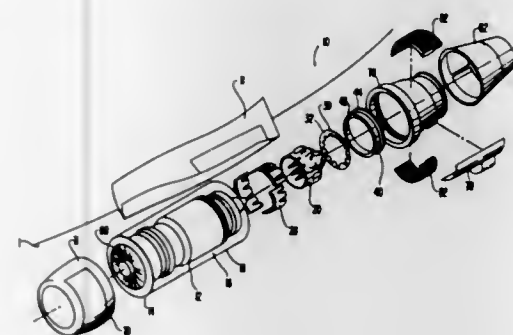
## NOISE REDUCTION KIT FOR JET TURBINE ENGINES

John G. Batey, Cordova; Park W. Burrets; William F. Grewe, both of Memphis; Bruce G. Whitestone, Germantown, and Mark D. Yerger, Collierville, all of Tenn., assignors to Federal Express Corporation, Memphis, Tenn.

Reexamination Request No. 90/003,531, Aug. 16, 1994.  
Reexamination Certificate for Patent No. 5,127,602, issued Jul. 7, 1992, Ser. No. 439,538, Nov. 21, 1989.

Int. Cl.<sup>6</sup> B64C 37/02

U.S. Cl. 244—1 N



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–6 is confirmed.

1. A noise reduction kit for modifying a fan jet engine having a core engine generating axial exhaust gas flow through a downstream end thereof, an outer casing defining an annular bypass duct surrounding the core engine, a fan at the upstream end of the core engine for generating axial fan air flow through the bypass duct, a thrust-reverser for selectively converting axial flow of exhaust gas and fan air into reverse thrust, and a tail pipe assembly disposed to axially receive and exhaust the exhaust gas and fan air, the kit comprising:

- a mixer having an upstream end and an annular mixer wall axially extending downstream therefrom, the wall being formed into a plurality of circumferentially alternating radially inward and radially outward lobes, the radially inward lobes defining cold chutes for radially inwardly diverting fan air and the radially outward lobes defining hot chutes for permitting radially outward expansion of exhaust gas;
- an annular mounting bracket for fixing the mixer to the casing in position downstream of the coaxial with the core engine;
- a fairing having an upstream end for coaxial attachment to the downstream end of the core engine and an annular, axially-extending fairing wall for attachment to the upstream end of the mixer, the fairing wall being shaped to aerodynamically conform to the lobes of the mixer to direct fan air to the cold chutes and exhaust gas to the hot chutes; and
- an annular spacer for axial disposition between the downstream end of the core engine and the thrust reverser, the spacer extending the axial flow path sufficiently to permit achieving generally smooth laminar flow of mixed exhaust gas and fan air downstream of the mixer.

B1 5,240,960 (2557th)

## 3-CYCLOALKYL-PROPANAMIDES

Philip T. Hambleton; Charles J. R. Hedgecock; David P. Kay; Elizabeth A. Kuo, all of Swindon Wilts, and Wilfred R. Tully, Cirencester Glos, all of Great Britain, assignors to Roussel-Uclaf, Paris, France

Reexamination Request No. 90/003,522, Aug. 5, 1994.  
Reexamination Certificate for Patent No. 5,240,960, issued Aug. 31, 1993, Ser. No. 785,087, Oct. 30, 1991.

Claims priority, application United Kingdom, Oct. 30, 1990, 9023535; Mar. 15, 1991, 9105516

Int. Cl.<sup>6</sup> A61K 31/275; C07C 255/31

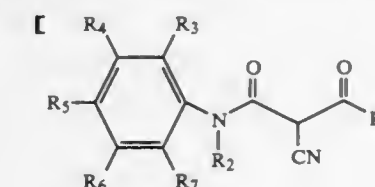
U.S. Cl. 514—521

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is determined to be patentable as amended.

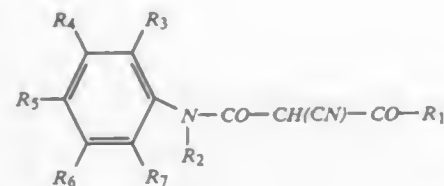
Claims 2 to 12, dependent on an amended claim, are determined to be patentable.

1. A compound selected from the group consisting of all tautomeric forms of a cycloalkyl-propanamide of the formula

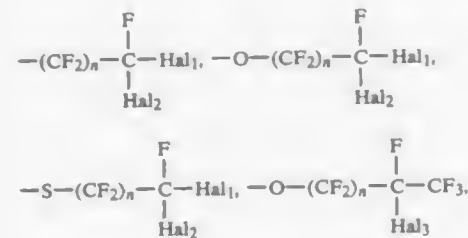




-continued



wherein  $R_1$  is cycloalkyl of 3 to 6 carbon atoms,  $R_2$  is hydrogen or alkyl of 1 to 3 carbon atoms,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$  and  $R_7$  are individually selected from the group consisting of hydrogen, halogen,  $-\text{NO}_2$ , azido,  $-\text{CN}$ , alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms,  $-(\text{CH}_2)_m-\text{CF}_3$ ,  $-\text{O}-(\text{CH}_2)_m-\text{CF}_3$ ,  $-\text{S}-(\text{CH}_2)_m-\text{CF}_3$ ,  $m$  is an integer from 0 to 3,  $-\text{CF}_2-\text{Hal}$ ,  $-\text{OCF}_2-\text{Hal}$ ,



$n$  is an integer from 1 to 3,  $\text{Hal}$ ,  $\text{Hal}_1$ ,  $\text{Hal}_2$  and  $\text{Hal}_3$  are individually halogen, and  $-\text{COR}'$ ,  $\text{R}'$  is  $-\text{OH}$  or alkyl of 1 to 3 carbon atoms or alkoxy of 1 to 3 carbon atoms or  $R_4$  and  $R_5$  together are  $-\text{O}-\text{CH}_2-\text{O}-$  and their non-toxic, pharmaceutically acceptable basic salts.

# B1 5,251,873 (2558th) MEDICAL COUPLING SITE

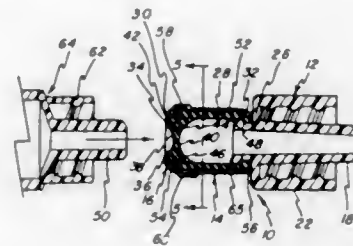
Gordon E. Atkinson, Cedarville, and Dennis A. Boehmer, Beavercreek, both of Ohio, assignors to Vernay Laboratories, Inc., Yellow Springs, Ohio

Reexamination Request No. 90/003,280, Dec. 15, 1993.

Reexamination Certificate for Patent No. 5,251,873, issued Oct. 12, 1993, Ser. No. 893,813, Jun. 4, 1992.

Int. Cl.<sup>6</sup> F16L 37/28

U.S. Cl. 251-149.1



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 5-7 and 17 are cancelled.

Claims 1-4, 8-10, 16, 18 and 19 are determined to be patentable as amended.

Claims 11-15 and 20-22, dependent on an amended claim, are determined to be patentable.

New claims 23-41 are added and determined to be patentable.

1. A medical coupling site comprising:
  - a base;
  - a retainer engaged with said base;
  - a valve element supported in contact with said base and retained in position on said base by said retainer; [and]
  - said valve element including a tubular member and a diaphragm formed integrally of an elastomeric material, said diaphragm including an opening and said tubular member including opposing inner and outer walls wherein said inner wall defines a cavity for receiving an end of a male luer taper inserted past said diaphragm through said opening; and
  - a lug supported on and extending radially outwardly from said retainer for threadably engaging threads on an internally threaded locking collar to hold said locking collar in engagement with said coupling site.

## STATUTORY INVENTION REGISTRATIONS

PUBLISHED MAY 2, 1995

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

### H1433

#### GUN LINER REPAIR APPARATUS

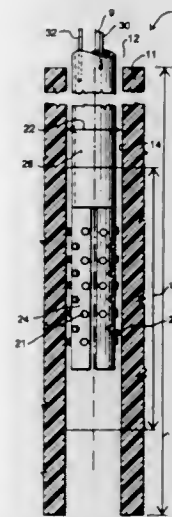
Elvin G. Estes; Jon Hahne; Richard J. Hayes, and Robert Husson, all of Austin, Tex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 5, 1994, Ser. No. 177,828

Int. Cl.<sup>6</sup> B24B 1/00

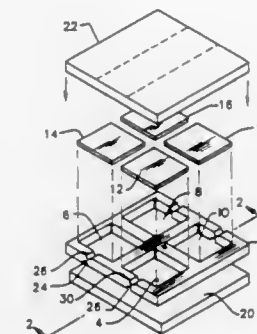
U.S. Cl. 451-57

8 Claims



6. A process for repair of a liner including the steps of: grinding away a damaged area of a surface of a liner within a selected length of the liner; forming a deposit of new material over the damaged area; and honing away a portion of the deposit to obtain an inner diameter of the liner which is about equal in size to its original inner diameter before damage.

maintaining said given temperature and said given pressure for a period of time;



reducing the temperature while maintaining the given pressure; and removing the pressure.

### H1435

#### SOI CMOS DEVICE HAVING BODY EXTENSION FOR PROVIDING SIDEWALL CHANNEL STOP AND BODYTIE

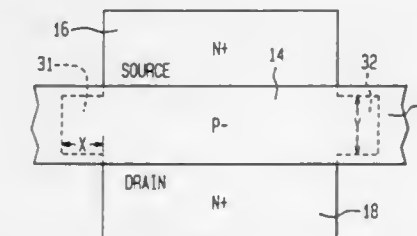
Richard D. Cherne, 7920 Timberlake Dr., W. Melbourne, Fla. 32904; Jack E. Clark, II, 277 Hurst Rd., NE., Palm Bay, Fla. 32907; Glenn A. Dejong, 10890 S. Tropical Trail, Merritt Island, Fla. 32952; Richard L. Lichtel, 234 Windover Ln., Corrales, N. Mex. 87048; Wesley H. Morris, 4612 Pinehurst Dr., S., Austin, Tex. 78747, and William H. Speece, 533 Hatcher St., SE., Palm Bay, Fla. 32909

Filed Oct. 21, 1991, Ser. No. 780,251

Int. Cl.<sup>6</sup> H01L 23/00

U.S. Cl. 257-347

3 Claims



1. A mesa field effect transistor architecture comprising:
  - a dielectric support substrate; and
  - a mesa field effect transistor structure disposed on said dielectric support substrate, said mesa field effect transistor structure including
    - a body mesa of a first conductivity type formed on a first surface portion of said dielectric support substrate, said body mesa having first and second sidewalls on opposite sides of said body mesa and first and second endwalls at opposite ends of said body mesa,
    - a source mesa of a second conductivity type formed on a second surface portion of said dielectric support substrate contiguous with said first surface portion, said source mesa having third and fourth sidewalls on opposite sides of said source mesa and third and fourth endwalls at opposite ends of said source mesa, said third sidewall of said source mesa adjoining and forming a source/body junction with said first sidewall of said

### H1434 METHOD AND APPARATUS FOR CONFORMAL EMBEDDED CERAMIC ARMOR

Sheldon Cytron, Mountain Lakes, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 30, 1993, Ser. No. 113,633

Int. Cl.<sup>6</sup> F41H 5/04

U.S. Cl. 89-36.02

7 Claims

1. A method for forming armor comprising: forming an assembly by surrounding at least one ceramic tile with material that becomes superplastic when it is subjected to increasing pressure while at a selected temperature; heating the assembly to a given temperature; subjecting the assembly to a pressure that increases to a given value;

body mesa, and wherein said third and fourth endwalls of said source mesa adjoin no semiconductor material and are spaced apart from the first and second endwalls of said body mesa,

a drain mesa of said second conductivity type formed on a third surface portion of said dielectric support substrate contiguous with said first surface portion and spaced apart from said second surface portion by said first surface portion of said dielectric support substrate, said drain mesa having fifth and sixth sidewalls on opposite sides of said drain mesa, and fifth and sixth endwalls at opposite ends of said drain mesa, said fifth sidewall of said drain mesa adjoining and forming a drain/body junction with said second sidewall of said body mesa, and wherein said fifth and sixth endwalls of said drain mesa adjoin no semiconductor material and are spaced apart from the first and second endwalls of said body mesa, and

a gate layer overlying said body mesa and being operative to induce a channel in that portion of said body mesa disposed between and adjoining said source and drain mesas,

and wherein said body mesa extends beyond said third endwall of said source mesa and beyond said fifth endwall of said drain mesa to said first endwall thereof as a first body mesa extension, and beyond said fourth endwall of said source mesa and beyond said sixth endwall of said drain mesa to said second endwall thereof as a second body mesa extension,

and wherein a first portion of said first body mesa extension underlies said gate layer and is spaced apart from said that portion of said body mesa disposed between and adjoining said third sidewall of said source mesa and said fifth sidewall of said drain mesa by a second portion of said first body mesa extension that is located beyond said third endwall of said source mesa and beyond said fifth endwall of said drain mesa, said first portion of said first body mesa extension having a first impurity concentration greater than a second impurity concentration of said that portion of said body mesa disposed between said source and drain mesa regions, so as to form a first body mesa extension channel stop, and said second portion of said first body mesa extension having a third impurity concentration less than said first impurity concentration of said first portion of said first body mesa extension,

and wherein a first portion of said second body mesa extension underlies said gate layer and is spaced apart from said that portion of said body mesa disposed between and adjoining said third sidewall of said source mesa and said fifth sidewall of said drain mesa, by a second portion of said second body mesa extension that is located beyond said fourth endwall of said source mesa and beyond said sixth endwall of said drain mesa, said first portion of said second body mesa extension having a fourth impurity concentration greater than said second impurity concentration of said that portion of said body mesa disposed between said source and drain mesa regions, so as to form a second body mesa extension channel stop, and said second portion of said second body mesa extension having a fifth impurity concentration less than said fourth impurity concentration of said first portion of said second body mesa extension.

# H1436 INTERFEROMETRIC FIBER OPTIC SENSOR CONFIGURATION WITH PUMP-INDUCED PHASE CARRIER

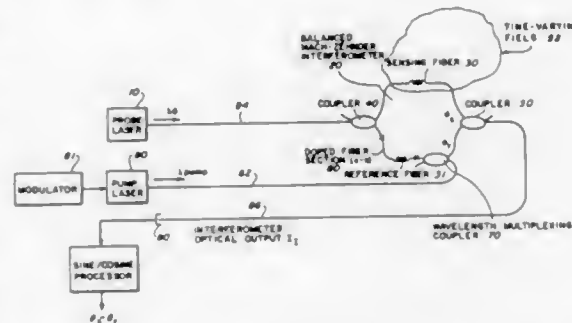
Alan D. Kersey, 9035 Silvercreek Ct., Fairfax Station, Va. 22039, and Carl A. Villarruel, 10007 Whidbey La., Burke, Va. 22015

Filed Oct. 13, 1992, Ser. No. 959,584

Int. Cl.<sup>6</sup> G01B 9/02

U.S. Cl. 356—345

19 Claims



9. An interferometric fiber optic sensor comprising:
  - a laser source for generating light at a first predetermined wavelength;
  - a balanced fiber interferometer for sensing a time-varying field to be measured, said balanced fiber interferometer coupled to said laser source and having first and second fiber arms, a predetermined one of said first and second fiber arms being doped with an element for introducing an optically adjustable absorption spectrum into said predetermined fiber arm when said predetermined fiber arm is pumped by light at a second predetermined wavelength;
  - a pump laser for generating light at the second predetermined wavelength so that an effective index for a guided mode in said predetermined fiber arm and a phase delay of output light passing through said balanced fiber interferometer are changed;
  - a first wavelength division multiplexing coupler for applying light from said pump laser to said balanced fiber interferometer in the opposite direction to the light from said laser source;
  - a modulator for causing said pump laser to selectively generate and apply light at the second predetermined wavelength to said predetermined fiber arm to provide a passive all-optical phase shift interrogation of said balanced fiber interferometer; and
  - means coupled to said balanced fiber interferometer being responsive to light passing through said balanced fiber interferometer with a changed phase delay for producing a demodulated output phase difference signal corresponding to the time-varying field being sensed.

# H1437 GRAFTED COPOLYMERS

Heinz H. Spelthann, 54, Route-Du-Creux-De-Boisset, CH-1286 Soral, Geneva, Switzerland

Filed Mar. 4, 1994, Ser. No. 205,442

Int. Cl.<sup>6</sup> C08L 27/06; C08G 63/91

U.S. Cl. 525—190

6 Claims

1. A thermoplastic copolymer comprising
  - (a) an acrylic acid ester polymer;
  - (b) vinyl chloride; and
  - (c) a copolymer consisting essentially of, by weight,
    - (i) 40–40% ethylene;
    - (ii) 3–30% carbon monoxide; and
    - (iii) 5–60% of n-butyl acrylate.

# H1438 MODIFIED BLOCK COPOLYMERS FUNCTIONALIZED IN THE MONOALKENYL AROMATIC OR VINYLARENE BLOCK

William P. Gergen, Houston, and Robert G. Lutz, Spring, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 766,217, Aug. 16, 1985, abandoned.

This application Dec. 18, 1992, Ser. No. 994,065

Int. Cl.<sup>6</sup> C08F 297/04; C08C 19/00

U.S. Cl. 525—314

13 Claims

1. A functionalized selectively hydrogenated block copolymer of the formula  $B_n(AB)_oA_p$  where  $n=0$  or 1,  $o=1$  or 2,  $p=0$  or 1, A is predominately a polymerized monalkenyl aromatic hydrocarbon block and B prior to hydrogenation is predominately a polymerized conjugated diene hydrocarbon block to which has been grafted carbon dioxide wherein substantially all of the carbon dioxide molecules are grafted to the block copolymer in the monoalkenyl aromatic hydrocarbon blocks.

# H1439 METHOD TO INCREASE THE LEVEL OF $\alpha$ -GLYCOL IN LIQUID EPOXY RESIN

Thomas J. Hairston, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 18, 1993, Ser. No. 138,661

Int. Cl.<sup>6</sup> C08F 283/00; C08G 59/00; C07D 301/27

U.S. Cl. 525—523

8 Claims

1. A process in which a mixture that contains liquid epoxy resin and water is reacted at elevated temperatures in order to hydrolyze epoxy groups into  $\alpha$ -glycol groups, characterized in that:

- (1) the reaction temperature is between 130° C. and 200° C.;
- (2) the reaction mixture contains between 0.5 and 10 parts water per 100 parts resin by weight; and
- (3) the mixture contains 0 to 1 weight percent organic solvents and 0 to 100 ppm each of: organic acids, organic diacids, phosphonium compounds, and alkali or alkaline

earth metals and their salts, said percentages being based upon the weight of liquid epoxy resin.

# H1440

## FITTED BELT FOR ABSORBENT GARMENT

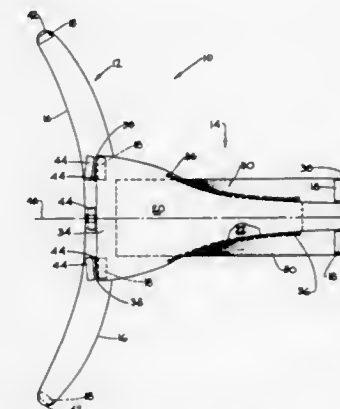
Nancy A. New, Gary D. LaVon, and David R. Bennett, all of 6100 Center Hill Rd., Cincinnati, Ohio 45224

Division of Ser. No. 814,302, Dec. 20, 1991, abandoned, which is a continuation of Ser. No. 707,234, May 21, 1991, abandoned, which is a continuation of Ser. No. 454,104, Dec. 20, 1989, abandoned. This application Apr. 7, 1993, Ser. No. 44,562

Int. Cl.<sup>6</sup> A61F 13/16

U.S. Cl. 604—386

13 Claims



10. A disposable absorbent article having a front end edge and a rear end edge, said disposable absorbent article comprising a liquid pervious topsheet, a liquid impervious backsheet joined to said topsheet, and an absorbent core positioned between said topsheet and said backsheet, wherein said front end edge of said disposable absorbent article is concave upward and disposed below a wearer's stomach and abdomen when said disposable absorbent article is worn.

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# REISSUES

MAY 2, 1995

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## Re. 34,921 CUTTING REEL SUSPENSION WITH ADJUSTABLE SPRING DOWNLOADING

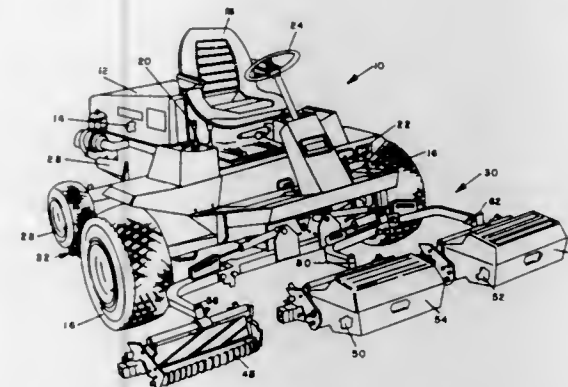
Gary R. Lamusga, Eden Prairie, and Daniel E. Peterson, Northfield, both of Minn., assignors to The Toro Company, Bloomington, Minn.

Original No. 5,042,236, dated Aug. 27, 1991, Ser. No. 478,233, Feb. 8, 1990. Application for reissue Jun. 1, 1993, Ser. No. 71,143

Int. Cl.<sup>6</sup> A01D 75/30

U.S. Cl. 56—7

19 Claims



14. A lift arm assembly for a turf mower having a frame, comprising:

- (a) at least one lift arm, each lift arm including inner and outer ends;
- (b) means for pivotally securing the inner end of each lift arm to the frame for pivotal movement between raised and lowered positions;
- (c) at least one cutting reel;
- (d) means for pivotally securing one of said cutting reels to the outer end of each of said lift arms;
- (e) means coupled between each lift arm and said frame for effecting relative pivotal movement thereof; and
- (f) means coupled between said frame and each lift arm for normally biasing the outer ends of the lift arm and cutting reel suspended thereon toward the lowered position.

## Re. 34,922 WATERCRAFT

Toshiyuki Hattori, and Fumuhiko Ebihara, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Original No. 5,255,626, dated Oct. 26, 1993, Ser. No. 786,536, Nov. 1, 1991. Application for reissue Mar. 7, 1994, Ser. No. 206,714

Claims priority, application Japan, Oct. 9, 1991, 3-262355

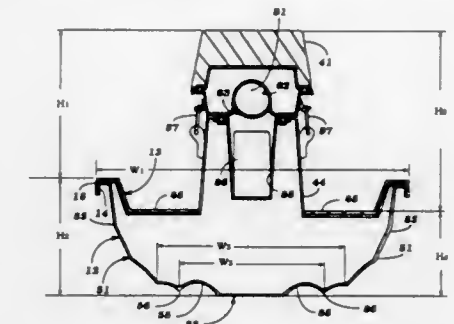
Int. Cl.<sup>6</sup> B63B 1/20

U.S. Cl. 114—270

5 Claims

1. A hull for a small watercraft which facilitates leaning of the hull like a motorcycle when turning and which resists capsizing, said hull having a pair of widely spaced gunnels extending along its outer sides, a seat positioned between said gunnels and of a height to accommodate a rider in a partially standing posture, a pair of transversely spaced apart foot areas on opposite sides of said seat to accommodate the feet of a rider, a pair of generally downwardly converging side sections each extending from a respective gunnel to a lower hull area, the lower ends of said side sections being spaced apart a width substantially narrower in width than at said gunnels and disposed below the centers of said foot areas, said lower hull area

being comprised of a flat central area and a pair of curved side portions connected at one side to said flat central area by a respective chine and connected at the other sides to said side



sections, said side sections each being formed with a further chine spaced transversely outwardly from said foot areas and adjacent the respective of said gunnels and substantially above said lower ends.

## Re. 34,923 VALVE STEM SEAL LEAK PROTECTION AND DETECTION APPARATUS

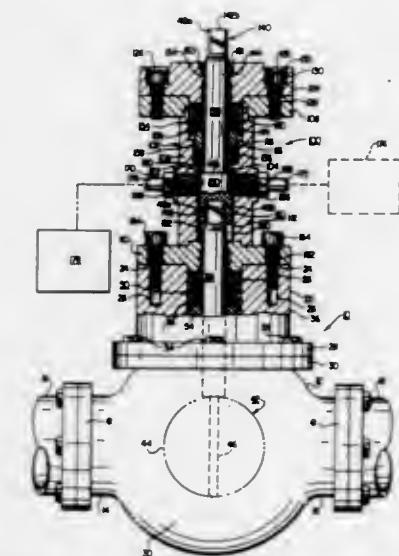
J. O. Ruesch, Wadenswil, Switzerland, assignor to Neotecha AG, Hombrechtikon, Switzerland

Original No. 4,972,867, dated Nov. 27, 1990, Ser. No. 431,665, Nov. 3, 1989. Application for reissue Nov. 25, 1992, Ser. No. 981,795

Int. Cl.<sup>6</sup> F16K 43/00; G01M 3/08

U.S. Cl. 137—15

28 Claims



28. A method of detecting leakage from a valve having an exposed rotatable valve stem extending therefrom for opening and closing the valve, comprising the steps of:

- attaching a jacket means to a valve neck portion in a configuration covering the exposed rotatable valve stem, said jacket means having flange means extended therefrom so as to be removable as a single unit and adapted to be directly secured to said valve neck portion;
- concurrently by the step of attaching providing a primary seal



structure to provide a sealing engagement around said valve stem when said flange means is secured to said valve neck portion;  
 providing a rotatable handle extension in the jacket having a first end extending from the jacket for turning the extension about its axis and a second end connecting the handle extension to the valve stem for transferring the rotation of the handle extension to the valve stem;  
 providing a sealed chamber in the jacket communicating with the exposed rotatable valve stem for isolating the exposed rotatable valve stem by attaching the jacket to the valve; and, sampling the fluid of the sealed chamber for fluid leakage around the valve stem past the primary seal.

Re. 34,924

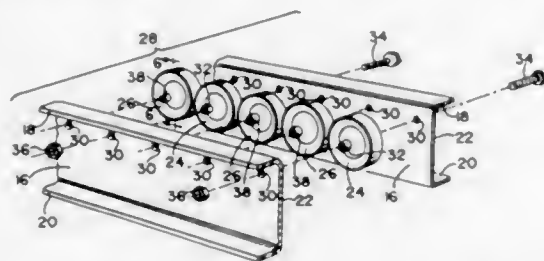
# ROLLER TRACK FOR STORAGE RACK, ROLLER CONVEYOR, OR SIMILAR APPARATUS

Charles E. Highsmith, Springfield, Tenn., assignor to UNR Industries, Inc., Chicago, Ill.  
 Original No. 5,056,642, dated Oct. 15, 1991, Ser. No. 582,255, Sep. 13, 1990. Application for reissue Nov. 23, 1993, Ser. No. 156,357

Int. Cl.<sup>6</sup> B65G 13/00

U.S. Cl. 193—35 R

13 Claims



1. For a storage rack or roller conveyor, a roller track comprising two walls disposed in parallel relation to each other so as to define a space between the walls and a longitudinal array of freely rotatable rollers journaled between the walls in such manner that the rollers extend upwardly from the space between the walls, each roller having a spindle and being journaled on the spindle, the rollers being divided into a first group wherein the rollers are journaled on spindles bolted to and between the walls and a second group wherein the rollers are journaled on spindles held by but not bolted to the walls, wherein the rollers are arranged along a substantial portion of the roller track in a repeating pattern, in which every nth roller is a roller of the first group while every other roller is a roller of the second group, n being a whole number greater than one.

Re. 34,925

# GOLF CLUB HEAD

James F. McKeighen, 1293 Calma Ct., Vista, Calif. 92038  
 Original No. 5,028,049, dated Jul. 2, 1991, Ser. No. 428,821, Oct. 30, 1989. Application for reissue Jun. 29, 1993, Ser. No. 85,578

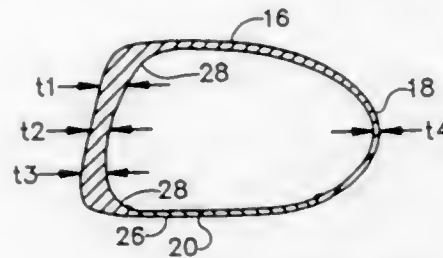
Int. Cl.<sup>6</sup> A63B 53/04

U.S. Cl. 273—167 H

24 Claims

1. A golf club head, comprising:  
 an integral, empty hollow body, the body having a front striking face, a bottom wall, an upper wall, a rounded rear wall, a heel, a toe, and an integral hollow neck extending upwardly from the heel of said body at a predetermined angle for attaching said golf club head to a shaft;  
 said body and neck being formed entirely of cast titanium or titanium alloy; and  
 said front striking face having a thickness which varies across its area and is thinnest at the geometrical center of the striking face and thickest around the entire periphery of the striking face; and  
 said striking face having upper, lower, and side peripheral

edges defining corners and the thickness of the striking face varying around its outer periphery and [is] being thicker



at the corners of the peripheral edges than at the center of each peripheral edge.

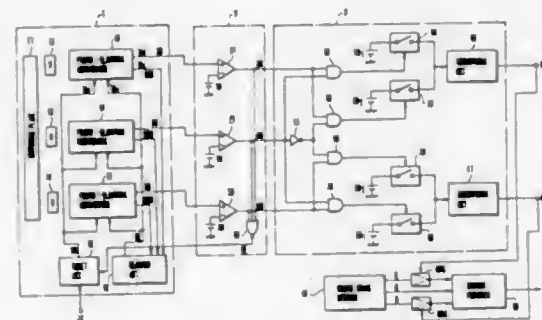
Re. 34,926

# COLOR TEMPERATURE DETECTING DEVICE FOR PRODUCING A COLOR TEMPERATURE SIGNAL DEVELOPED USING THE RATIO BETWEEN COLOR COMPONENT SIGNALS

Teruo Hieda; Hiroyuki Shimizu, and Kazunori Masuda, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Original No. 4,942,459, dated Jul. 17, 1990, Ser. No. 192,958, May 12, 1988. Application for reissue Jul. 16, 1992, Ser. No. 915,467  
 Claims priority, application Japan, May 15, 1987, 62-117017; May 15, 1987, 62-117018; May 15, 1987, 62-117019  
 Int. Cl.<sup>6</sup> H04N 9/73, 9/097

U.S. Cl. 348—223

7 Claims



1. A color temperature detecting device comprising:  
 (a) color component detecting means for detecting electric charges for color components excited by incident light and accumulated with the lapse of time to produce color component signals;  
 (b) comparison means for comparing the color component signals with respective given reference signals to produce discharge time length signals which correspond to the respective accumulated amounts of the electrical charges, said comparison means including: hold means for holding each of said color component signals; discharge means for discharging each of said color component signals held by said hold means; and a comparator for comparing outputs of said hold means with respective predetermined reference levels; and  
 (c) an output part for obtaining a ratio between the color components on the basis of the discharge time length signals produced from said comparison means to produce as color temperature information a signal according to said ratio.

Re. 34,927

# MAGNETIC TAPE CASSETTE WITH TAPE PROTECTIVE CLOSURE AND LOCK MECHANISM

Hiroshi Meguro, Miyagi; Yoshinori Yamamoto, Kanagawa; Masao Ohya, Tokyo; Kenichi Horikawa, Tokyo; Shigeru Mizusawa, Tokyo, and Kenji Kawakami, Tokyo, all of Japan, assignors to Sony Corporation

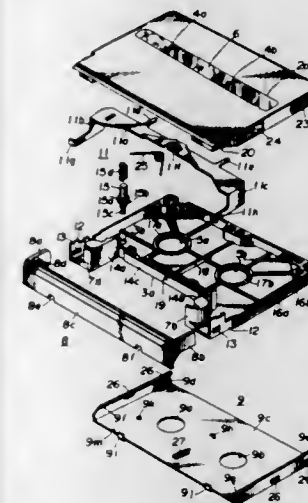
Original No. 4,881,137, dated Nov. 14, 1989, Ser. No. 240,423, Sep. 1, 1988. Continuation of Ser. No. 791,796, Nov. 8, 1991, abandoned, which is a continuation of Ser. No. 867,940, May 29, 1986, abandoned, which is a division of Ser. No. 704,943, Feb. 25, 1985, Pat. No. 4,843,510. Application for reissue Mar. 28, 1994, Ser. No. 218,696

Claims priority, application Japan, Mar. 7, 1984, 59-43574

Int. Cl.<sup>6</sup> G11B 23/04, 15/32

U.S. Cl. 360—96.5

47 Claims



1. A cassette holder in a recording [and] and/or reproducing apparatus said cassette holder comprising:  
 a holder body defining therein a cassette reception space and having a floor on which [said] a cassette is mounted; and  
 unlocking means, incorporated in said holder body and cooperatively associated with [said] a locking means of said cassette, for unlocking said locking means to allow movement of [said] a shutter member of said cassette from [said] a first position to [said] a second position when said [magnetic tape] cassette is inserted into said cassette

reception space in a correct orientation, said unlocking means also serving to inhibit insertion of said [magnetic tape] cassette into said cassette reception space of said cassette holder in an improper orientation.

Re. 34,928

# SCREW THREADED FASTENERS

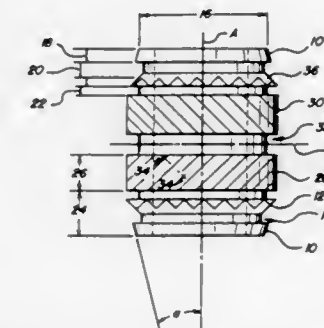
Anthony M. Highfield, Madeley, England, assignor to P.S.M. International PLC, West Midlands, England  
 Original No. 4,941,788, dated Jul. 17, 1990, Ser. No. 358,127, May 30, 1989. Application for reissue Jun. 25, 1992, Ser. No. 905,545

Claims priority, application United Kingdom, Aug. 3, 1988, 8818414

Int. Cl.<sup>6</sup> F16B 37/00

U.S. Cl. 411—178

11 Claims



1. A double ended fastener which is symmetrical about a mid-point on its longitudinal axis, comprising:

- a pilot portion at each end;
- an encircling groove next to each pilot portion;
- a minor toothed portion next to said groove and having helical teeth;
- a second like groove next to said minor toothed portion; and
- a major toothed portion next to said second groove and extending towards said mid-point, said major toothed portion having helical teeth, the fastener having a female screw-threaded bore provided over the whole of its length.

## PLANT PATENTS

GRANTED MAY 2, 1995

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

9,122

SHRUB ROSE PLANT NAMED WINNIPEG PARKS  
Lynn M. Collicutt, Morden, Canada, assignor to Her Majesty  
the Queen in Right of Canada, as represented by the Minister  
of Agriculture, Ottawa, Canada

Filed Dec. 21, 1993, Ser. No. 170,810

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—1

1 Claim

1. A new and distinct variety of shrub rose plant characterized by the following combination of characteristics:

- (a) forms singly or in small clusters attractive relatively large medium-red blossoms which change to a dark pink-red coloration upon maturity having reflexed sepals;
- (b) exhibit a slightly spreading growth habit;
- (c) propagates well by the use of softwood stem cuttings;
- (d) exhibits good winter hardiness; and
- (e) is particularly well suited for growing in the landscape;

substantially as herein shown and described.

9,123

APPLE TREE NJ109

Joseph C. Goffreda, Kendall Park, and Anna M. Voordeckers,  
East Windsor, both of N.J., assignors to Rutgers University,  
New Brunswick, N.J.

Filed Apr. 29, 1994, Ser. No. 235,855

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—35.1

1 Claim

1. A new and distinct apple tree cultivar, substantially as herein shown and described.

9,124

ROSEMARY PLANT NAMED 'RENZELS'

Philip A. Johnson, 360 Marshall Dr., Walnut Creek, Calif.  
94598

Filed Apr. 13, 1994, Ser. No. 226,999

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—54.1

1 Claim

1. A new and distinct variety of rosemary plant as substantially shown and described herein, that is characterized particularly as to novelty by the unique combination of its extremely prostrate habit and rich blue-violet flowers.

9,125

AZALEA HYBRID PLANT 'PAUL A. KOHL'

Paul A. Kohl, deceased, late of St. Louis, Mo., and by Rosalie K.  
Buckley, Successor Trustee, 3641 Flora Pl., St. Louis, Mo.  
63110

Filed Mar. 18, 1994, Ser. No. 210,711

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—56

1 Claim

1. A new variety of hybrid semi-evergreen azalea plant as described and illustrated, characterized by a compact globular form, tolerant of rapid changes in temperature, resistant to drought and excessive moisture, hardy at —10° F. in mid-western United States' seasons, good rooting habit and blooms having a diameter of 1 32/32 to 2 15/32 inches, which appear generally in duplicate with an occasional triplicate, the plant blooms from early Apr. to mid-May in St. Louis, Mo., with single, uniform pink flowers that are of open funnel-shaped form with non-petaloid stamens.

9,126

CHRYSANTHEMUM PLANT NAMED WARM MEGAN  
Leon Glicenstein, Salinas, Calif., assignor to Yoder Brothers,  
Inc., Barberton, Ohio

Filed Nov. 22, 1993, Ser. No. 155,238

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—82.3

1 Claim

1. A new and distinct Chrysanthemum plant named Warm Megan, as described and illustrated.

9,127

ZOYSIAGRASS PLANT NAMED 'DE ANZA'

Victor A. Gibeault, Riverside; Matthew K. Leonard, Romoland;  
Victor B. Youngner, deceased, late of Riverside, and Violet E.  
Janowitz, heir, Corona, all of Calif., assignors to The Regents  
of the University of California, Alameda, Calif.

Filed Jan. 13, 1994, Ser. No. 181,860

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—90

1 Claim

1. A new and distinct variety of Zoysiagrass named 'De Anza', substantially as described and illustrated, which has a longer growing season and green color retention in winter and less purple pigmentation than the variety 'El Toro'.



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**PATENTS**  
**GRANTED MAY 02, 1995**

**ERRATA**

For CLASS	See PATENT NO.
005-093 .....	5,410,765
451-043 .....	5,410,843
074-473 .....	5,410,931
210-222 .....	5,411,143
211-030 .....	5,411,144
211-050 .....	5,411,145
211-059 .....	5,411,146
228-001 .....	5,411,195
248-551 .....	5,411,223
251-129 .....	5,411,241
434-269 .....	5,411,437
606-144 .....	5,411,481
216-062 .....	5,411,628
216-034 .....	5,411,629
216-022 .....	5,411,630
216-072 .....	5,411,631
204-164 .....	5,411,638
507-117 .....	5,411,670
504-139 .....	5,411,939
504-206 .....	5,411,944
560-033 .....	5,412,142
395-024 .....	5,412,256
327-536 .....	5,412,257
327-170 .....	5,412,258
326-021 .....	5,412,259
326-039 .....	5,412,257
264-041 .....	5,412,261
326-064 .....	5,412,262
327-566 .....	5,412,263
327-389 .....	5,412,264
318-102 .....	5,412,291

ERRATA-CONTINUED

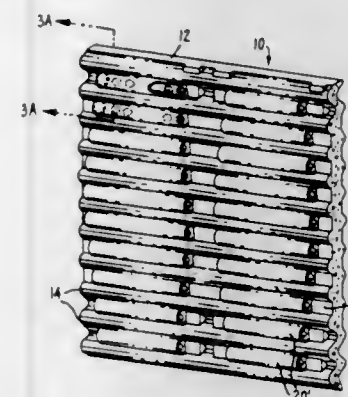
For CLASS	See PATENT NO.
355-260 .....	5,412,364
342-174 .....	5,412,414
348-072 .....	5,412,478
348-594 .....	5,412,479
395-003 .....	5,412,540
370-095 .....	5,412,760

PATENTS

GRANTED MAY 2, 1995

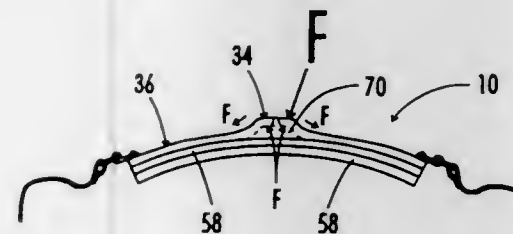
GENERAL AND MECHANICAL

5,410,755  
**PROTECTIVE DEVICE WITH TUBULAR  
CONSTRUCTION FOR BACKSIDE OF WEARER**  
Douglas M. Obujen, P.O. Box 160446, Cupertino, Calif. 95014  
Continuation-in-part of Ser. No. 943,314, Sep. 10, 1992, Pat. No.  
5,297,293. This application Dec. 14, 1993, Ser. No. 167,598  
The portion of the term of this patent subsequent to Mar. 29,  
2011, has been disclaimed.  
Int. Cl.<sup>6</sup> A41D 13/00  
U.S. Cl. 2-2 17 Claims



1. A protective device comprising, in combination:  
a foam padding member having a plurality of spaced apart  
ridges having tops on at least one broad surface thereof,  
a plurality of flexible tubular elements fixedly secured to said  
padding member in between the ridges thereof, said flexi-  
ble tubular elements having a plurality of openings trans-  
versely through the walls thereof facing said padding  
member, and  
a bonding material fixedly securing said tubular elements to  
said padding member, said bonding material extending  
through said openings and including a cap portion inside  
said tubular elements and with each cap portion larger in  
diameter than the diameter of said adjacent opening,  
whereby the protective device worn on the human body cush-  
ions impact over a wide force range while remain comfortable  
for active movement of the human body.

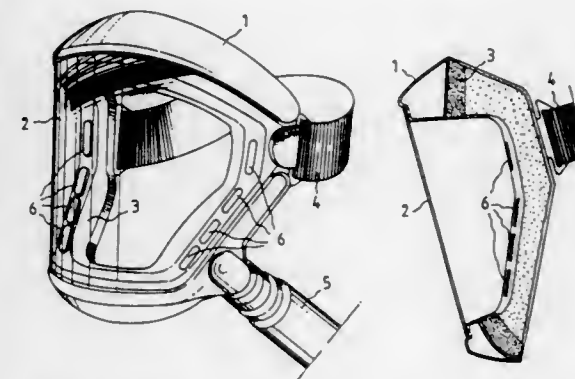
5,410,756  
**BODY ARMOR WITH THERMOFORMABLE SHOCK  
DISPERSING MEANS**  
John Hutson, 877 Hillhaven Ct., Nashville, Tenn. 37220  
Continuation of Ser. No. 25,595, Mar. 3, 1993, abandoned. This  
application Aug. 12, 1994, Ser. No. 289,495  
Int. Cl.<sup>6</sup> A41D 13/00  
U.S. Cl. 2-2 20 Claims



1. A thermoformable protective pad to be worn on the  
human body to shield the body from impact forces, compris-  
ing:

a thermoformable base having a top surface, a bottom sur-  
face, and an edge forming a boundary for said base;  
shock dispersing means projecting above said top surface for  
receiving and dispersing impact forces;  
shock absorbing means adjacent said base for absorbing  
impact forces; and  
said thermoformable is capable of withstanding and under-  
going repeated heating and reshaping cycles, and  
said shock dispersing means is integral with and surrounded  
by said base, enabling said impact forces to be dispersed  
radially outwardly from said shock dispersing means to  
said base.

5,410,757  
**FACE SHIELD**  
Teppo T. Vienamo, Helsinki; Pauli J. Saari, Isokyrö; Timo E.  
Holmlund, and Jyrki H. V. Järvinen, both of Vassa, all of  
Finland, assignors to Kemira Oy, Finland  
Continuation of Ser. No. 829,758, Jan. 31, 1992, abandoned. This  
application May 23, 1994, Ser. No. 247,495  
Claims priority, application Finland, Jun. 1, 1990, 902746  
Int. Cl.<sup>6</sup> A41D 13/00  
U.S. Cl. 2-9 15 Claims



9. A face shield comprising:  
a) a unitary frame comprising at least one air inlet and an  
enclosed, one-piece channel defining at least one opening  
therein;  
b) a source of pressurized air connected to the at least one air  
inlet;  
c) a shield plate connected to the frame;  
d) a ribbon connected to the frame and operable to secure  
the face shield to the head of a user; and  
e) an open-celled padding material connected to the frame  
and positioned to rest against the face of the user when the  
face shield is secured to the user, whereby the source of  
pressurized air forces air into the interior of the face shield  
through the air inlet, the channel and the at least one  
opening in the channel to be breathed by the user, and  
exhaled air and the excess pressurized air is forced  
through the open-celled padding material to exit the face  
shield.

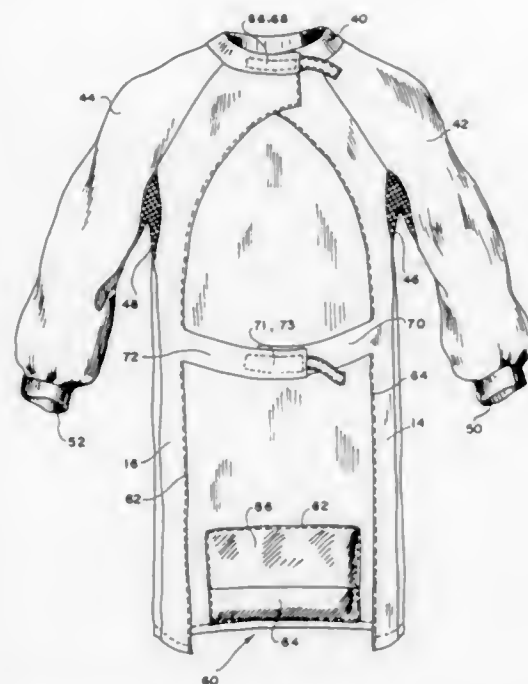


5,410,758

PROTECTIVE GARMENT HAVING RETAINING BAG  
Pam Dupont, and Debra Benoit, both of Houma, La., assignors  
to Embellished Uniforms, Houma, La.  
Filed Nov. 15, 1993, Ser. No. 151,915  
Int. Cl.<sup>6</sup> A41D 13/12

U.S. Cl. 2—51

11 Claims



7. A protective garment, comprising:

a fluid repellent front panel sized and shaped to cover at least an upper torso of a user;

a pair of fluid repellent back panels fixedly attached along side seams to the front panel and adapted for detachable fastening to each other;

means for securing free edges of the back panels, said securing means comprising at least one elongated fastener attached to a collar portion of one back panel, an inner surface of the fastener and a corresponding exterior surface of a collar portion of the second back panel being provided with matching hook and loop fastening elements, wherein said elongated fastener has a length greater than a length of the corresponding fastening element, so as to allow self-mating of the elongated fastener when the garment is being cleaned;

a pair of fluid repellent sleeve portions, each of said sleeve portions having a stretchable woven cuff secured to a free end thereof;

ventilated panels fitted between the sleeve portions and the side seams, said ventilated panels being formed from an open mesh material; and

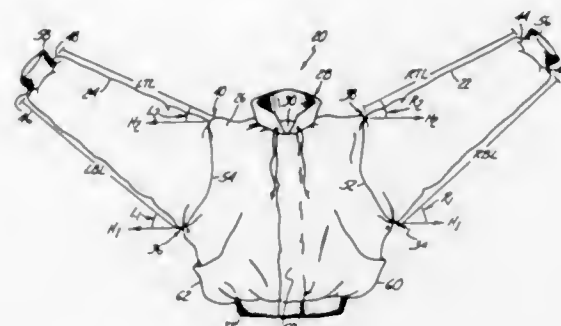
a fluid repellent retaining bag fixedly attached horizontally to a lower inner surface of the front panel, said bag receiving a contaminated folded protective garment, said bag comprising a reversible elongated bag panel and a flap covering at least a portion of the bag panel, said flap having one unsecured side which extends horizontally across entire length of the bag panel, said flap closing the retaining bag after the bag has been turned inside out and the folded garment has been positioned therein, said bag being formed from a material having a contrasting color in relation to the remainder of the garment, so as to alert personnel of the presence of a contaminated garment retained in the bag.

5,410,759

TOP GARMENT PATTERNED WITH SLEEVES ABOVE THE HEAD  
Todd N. Hari, 8535 Central Ave. NE., Ste. 101, Blaine, Minn. 55434  
Continuation of Ser. No. 21,513, Feb. 23, 1993, abandoned. This application Jul. 20, 1994, Ser. No. 278,064  
Int. Cl.<sup>6</sup> A41D 27/10

U.S. Cl. 2—108

19 Claims



1. A top garment comprising:

a body section which includes a front panel, a back panel and which has a neck opening at an upper end;

a right sleeve attached to the body section by first and second right continuous seams each extending between a right top point of attachment of the right sleeve to the front and back panels and a right base point of attachment to the front and back panels, the first right seam attaching the right sleeve to the front panel and the second right seam attaching the right sleeve to the back panel, at least one of the first and second right seams being semi-circular between the right top point of attachment and the right base point of attachment, the right sleeve having a right top length between the right top point of attachment of the right sleeve to the body section and a right top sleeve end, and a right base length between the right base point of attachment of the right sleeve to the body section and a right bottom sleeve end, wherein the right base length is greater than the right top length; and

a left sleeve attached to the body section by first and second left continuous seams each extending between a left top point of attachment of the left sleeve to the front and back panels and a left base point of attachment to the front and back panels, the first left seam attaching the left sleeve to the front panel and the second left seam attaching the left sleeve to the back panel, at least one of the first and second left seams being semi-circular between the left top point of attachment and the left base point of attachment, the left sleeve having a left top length between the left top point of attachment of the left sleeve to the body section and a left top sleeve end, and a left base length between the left base point of attachment of the left sleeve to the body section and a left bottom sleeve end, wherein the left base length is greater than the left top length.

5,410,760

TENNIS BALL CAP

Michael W. Zumbiel, 5026 Relleum Ave., Cincinnati, Ohio 45238

Division of Ser. No. 18,057, Feb. 16, 1993, Pat. No. 5,343,567.  
This application May 24, 1994, Ser. No. 248,174

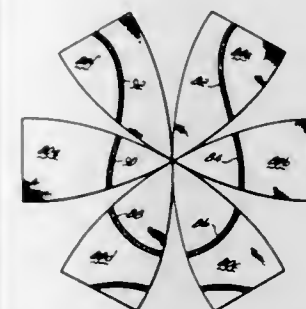
The portion of the term of this patent subsequent to Sep. 6, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> A42B 1/00

U.S. Cl. 2—195.1

1 Claim

1. A simulated tennis ball cap comprising a plurality of generally triangular fabric gores having two opposing lengthwise edges and a base edge, said gores being connected one with another along said lengthwise

edges to thereby form fabric gore seams, said connected gores defining the crown of said cap, and a tennis ball pattern formed on the outer surface of said gores wherein a section of said pattern is carried by each of said gores, said pattern including substantial portions of two



peanut-shaped regions defined by a simulated ball seam and said pattern sections on said gores being aligned to simulate approximately one half of a tennis ball when said gores are connected, wherein said simulated ball seam traverses a majority of said fabric gore seams when said gores are connected.

5,410,761

VISOR DAZZLER

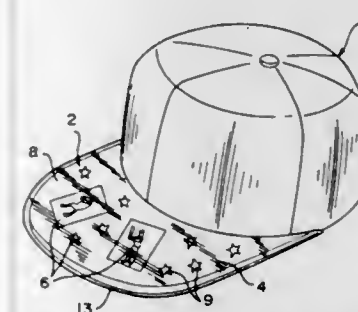
Darlene A. Connelly; Renee M. Connelly; Marie B. Connelly; Michelle M. Connelly, and Christine M. Connelly, all of 12006 Thackeray Ct., Bowie, Md. 20720

Filed Aug. 16, 1993, Ser. No. 106,707

Int. Cl.<sup>6</sup> A42B 1/24

U.S. Cl. 2—195.1

4 Claims



1. A cap comprising a crown and a visor in the form of an arcuate member adjacent and secured to said crown, said visor having a top surface and an undersurface, an insert located on the top surface of the visor having a top and bottom side and being made of flexible but sturdy material, and having a thin layer of peelable plastic fixed on said top side, a plurality of varied pictorial displays adhesively secured to said peelable plastic, a transparent plastic envelope comprising a top sheet and a bottom sheet of symmetrical material, said sheets having outer edges and being bonded together on said outer edges and having an arcuate configuration that fits smoothly over said top surface and said undersurface of the visor and said insert, said sheets of said envelope extending to and adjacent said crown, said bottom sheet having a strip of hook and loop material fastened on each end of said sheet in the region where said sheet is adjacent said crown, a corresponding strip of hook and loop material fastened on said visor in the region where said visor is adjacent said crown, and so arranged that when said envelope is slipped over said visor, said strips of hook and loop material on said visor and said envelope will be in juxtaposed and fastening position.

5,410,762

BELT STRAP FOR JOGGER'S COMPACT PORTABLE DEVICE

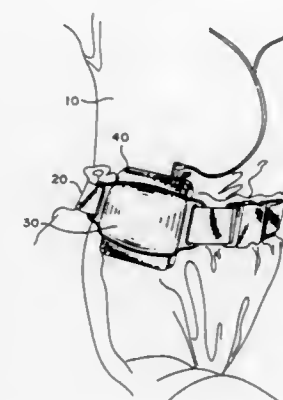
Donald D. Maskovich, 9150 Winding Oak Dr., Fair Oaks, Calif. 95628

Filed Oct. 22, 1993, Ser. No. 141,782

Int. Cl.<sup>6</sup> A41F 3/02

U.S. Cl. 2—338

8 Claims



1. An apparatus for securing a compact portable device relative to an active wearer's body, comprising:

an elastic belt;

an elastic strap having at least two opposing belt receiving slots for permitting a free end of said belt to be threaded therethrough, said elastic strap and said belt defining an open ended vertical space such that movement of a compact portable device which may be positionable therebetween is restrained when said belt is tightened; and

a grommet for reinforcing each said belt receiving slots, the peripherals of said grommet being bonded along the edge of said belt receiving slots for minimizing wear and tear on said slots notwithstanding repeated uses, wherein, relative movement between said compact portable device and the active wearer's body is minimized.

5,410,763

EYESHIELD WITH DETACHABLE COMPONENTS

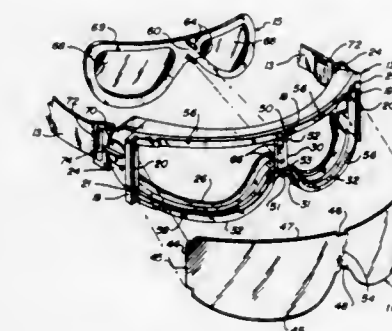
Maurice Bollé, Oyonnax, France, assignor to Etablissements Bolle, Oyonnax, France

Filed Feb. 11, 1993, Ser. No. 16,742

Int. Cl.<sup>6</sup> A61F 9/02

U.S. Cl. 2—436

14 Claims



1. Protective eyewear comprising:

a lens having a peripheral edge formed thereabout, the peripheral edge of said lens defined by opposing, upstanding side edge portions of said lens, a horizontally-extending top edge portion of said lens, and a horizontally-extending bottom edge portion of said lens, the top edge portion having an upper notch formed substantially midway along the length thereof, and the bottom edge portion having a

lower notch formed substantially midway along the length thereof in vertical alignment with the upper notch;

a flexible frame for maintaining the lens in a spaced apart relation to the wearer's face, the frame further comprising: an upper bracket attached thereto for releasably retaining the top edge portion of the lens near the upper notch formed therealong;

a lower bracket attached thereto for releasably retaining the bottom edge portion of the lens near the lower notch formed therealong; and

opposing slots formed in the frame for releasably retaining the opposing, upstanding side edge portions of the lens wherein the lens, when retained by said flexible frame, contacts with the flexible frame along the opposing, upstanding edge portions and at the upper and lower notches, respectively, of the peripheral edge thereof and is spaced-apart from the frame along remaining portions of the peripheral edge thereof; and

a mounting member for maintaining the frame with attached lens on the head of the wearer.

5,410,764

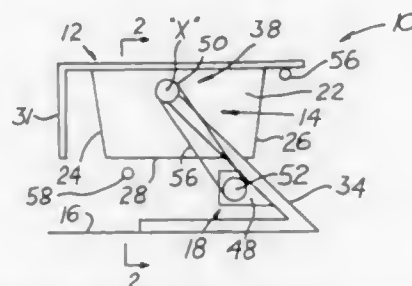
## TILTABLE BATHTUB DEVICE

Clete Darnell, 5210 Kentucky Dam Rd., Paducah, Ky. 42003  
Filed Nov. 29, 1991, Ser. No. 800,021

The portion of the term of this patent subsequent to Feb. 2, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> A47K 3/022

U.S. Cl. 4—540

5 Claims



1. A tiltable bathtub device comprising:
  - a bathtub having two spaced-apart interior end walls each having top end, an interior front side wall having a top end, an interior back side wall having a top end spaced from the interior front side wall, and a floor;
  - pivot mounting means structurally associated with the bathtub for supporting the bathtub above a floor of a bathroom and for the pivotal movement of the bathtub about a generally longitudinal axis of the bathtub between a horizontal position and a tilted position;
  - means for selectively pivoting the bathtub about the pivot axis;
  - a bathtub bay back panel having a bottom edge in juxtaposition to the top end of the bathtub back side wall, and projecting upwardly from the top end of the bathtub back side wall in overlaying relationship to a bathroom wall adjacent the interior back side wall of the bathtub, and,
  - pivot means pivotally attaching the bottom edge of the bathtub bay back panel to the top end of the bathtub interior back side wall.

5,410,765

## CRIB BUMPER PAD

Kevin Dicken, 6257 Clause Rd., Riverbank, Calif. 95367

Filed Nov. 24, 1993, Ser. No. 157,867

Int. Cl.<sup>6</sup> A47D 7/00

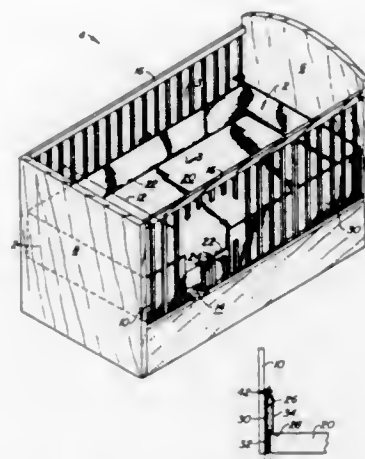
U.S. Cl. 5—93.1

14 Claims

1. In a crib having a plurality of vertical support posts, a headboard and a footboard forming an interior boundary and a mattress disposed within the crib, the mattress defining a space

between the periphery of the mattress and the interior boundary of the crib, a bumper pad comprising:

flexible padding extending around the interior boundary of the crib to form a cushioned bumper along the mattress periphery adjacent the support posts, headboard and footboard;



at least one stiffener affixed to the padding and extending into the space between the mattress periphery and the interior boundary of the crib, the flexible padding having an underside and the stiffener being permanently secured to said underside; and

means for securing the padding to the support posts.

5,410,766

## AUTOMATIC TOILET FLUSHING APPARATUS

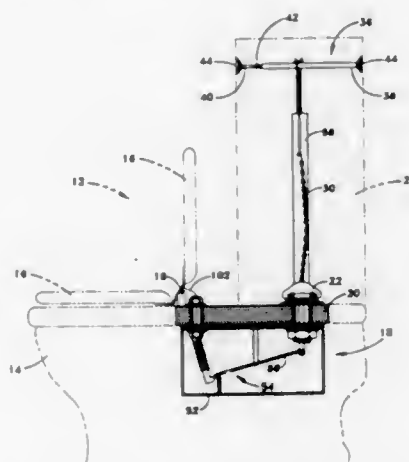
Mark A. Schumacher, 2632 E. 22nd St., Farmington, N. Mex. 87401

Filed May 9, 1994, Ser. No. 240,163

Int. Cl.<sup>6</sup> E03D 5/04

U.S. Cl. 4—250

14 Claims



1. An automatic toilet flushing apparatus for a toilet having a toilet bowl, a cover member for selectively moving between an open and a closed position with respect to the toilet bowl, a water tank, and a trippable flapper valve for admitting water from the water tank into the toilet bowl when the flapper valve is tripped, said automatic toilet flushing apparatus comprising:
  - an actuating lever pivotally mounted about a first fulcrum, said actuating lever having a first end and a second end;
  - a tripping lever pivotally mounted about a second fulcrum, said tripping lever also having a first end and a second end;

a first link connecting said first end of said actuating lever to the flapper valve;

a second link connecting said second end of said actuating lever to said second end of said tripping lever; and

tripping means for initially pivoting said tripping lever about said second fulcrum and for thereafter releasing said tripping lever when the cover member is moved to the closed position with respect to the toilet bowl, said tripping means comprising:

a hollow member having a longitudinal axis;

a catch member disposed within said hollow member for sliding reciprocation therewithin along said longitudinal axis;

an outstanding projection provided on said catch member for engaging said first end of said tripping lever, said outstanding projection projecting outside of said hollow member;

a third link connecting said catch member and the cover member;

a spring positioned within said hollow member and urging said catch member along said longitudinal axis of said hollow member; and

biasing means for biasing said tripping lever in a direction for applying tension to said first and second links.

5,410,767

## EXAMINATION TABLE CONNECTED TO A FLOOR STAND VIA AN ARTICULATED LEVER ARRANGEMENT

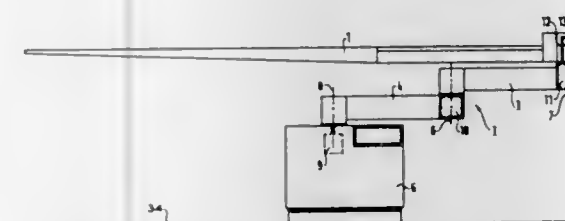
Sigvard Barud, Jaerfaella, Sweden, assignor to Siemens Elema AB, Solna, Sweden

Filed Nov. 17, 1993, Ser. No. 153,110

Claims priority, application Sweden, Dec. 3, 1992, 9203643  
Int. Cl.<sup>6</sup> A61B 6/04

U.S. Cl. 5—601

7 Claims



1. An examination table comprising, for use in an examination room having a floor:
  - a floor stand disposed on and extending above the floor;
  - a support plate disposed in a horizontal plane on said floor stand, said support plate having a longitudinal axis and a long side substantially parallel to said longitudinal axis; and

means for displacing said support plate along said longitudinal axis relative to said floor stand, said means for displacing including an articulated lever system comprising a first arm having first and second ends and a second arm having first and second ends, said second ends of said first and second arms being rotatably connected together around a first shaft, said first end of said first arm being rotatably connected to said support plate around a second shaft extending beneath said support plate, and said first end of said second arm being rotatably connected to said floor stand around a third shaft, said first, second and third shafts being vertically disposed relative to said horizontal plane, and said first, second and third shafts being operatively interconnected by a mechanical linkage means for causing said first and second arms always to move parallel to said horizontal plane, and for causing said first arm to make an angle between said first arm and said long side of said support plate which is equal to an angle between said

long side of said support plate and said second arm for all positions of said support plate.

5,410,768

## METHOD AND APPARATUS USEFUL FOR THE MAINTENANCE OF BLOOD CIRCULATION

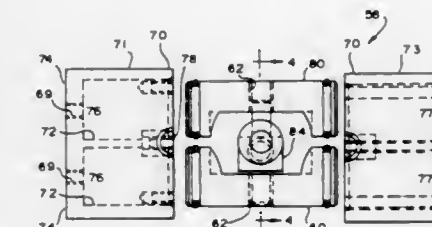
Lewis A. Manson, 2222 Westerland, Suite 1, Houston, Tex. 77063, and Russell C. Chase, 6626 Guhn Rd., Houston, Tex. 77429

Filed Jan. 21, 1993, Ser. No. 6,428

Int. Cl.<sup>6</sup> A61G 7/00

U.S. Cl. 5—609

19 Claims



10. Apparatus for attachment to a hospital-type bed to provide a periodic reduction in pressure on body pressure points, said hospital-type bed having a bedframe, said bedframe having four corners with bedleg receiving mounts positioned near the corners, said apparatus comprising:
  - a means for raising and lowering one side of said bed, said means for raising and lowering comprising a pair of shaft drivers adapted for mounting on the bedleg receiving mounts of the bedframe; and
  - a means for repeatedly actuating the raising and lowering means, each complete cycle of raising and lowering one side of said bed having a cycle period between about 1 minute and about 120 minutes in duration, said means for repeatedly actuating the raising and lowering means adapted for mounting beneath the bedframe.

5,410,769

## BILATERAL HEAD AND ARMS IMMOBILIZATION SUPPORT FOR MEDICAL PURPOSES AND METHODS

Glenn N. Waterman, Salt Lake City, Utah, assignor to Diacor, Inc., Salt Lake City, Utah

Filed Oct. 8, 1993, Ser. No. 134,143

Int. Cl.<sup>6</sup> A47C 20/02; A47G 9/00

U.S. Cl. 5—632

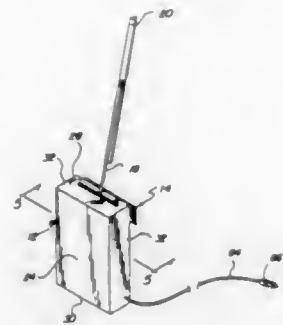
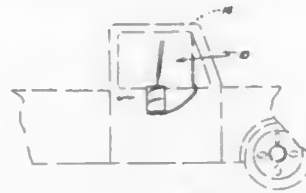
27 Claims

1. A method of immobilizing the arms of a prone patient overhead during a medical procedure, comprising the steps of: providing a portable base adapted to be removably positioned on a patient support; placing the head of the patient above the base; relocating an adjustable head support with respect to the base to be disposed directly below the head of the patient; placing the head upon the relocated head support; placing the arms of the patient overhead and above the base; relocating adjustable arm supports with respect to the base to be disposed below the arms of the patient; placing the arms upon the relocated arm supports.
15. A patient support mechanism for use as an aid in performance of medical procedures comprising: a portable base adapted to be removably positioned on a patient support; an adjustable head support carried by but movable with



mounting means for mounting said housing on said vehicle door to place said blade in contact with said window, said mounting means including

a suspension bracket mounted to said rear wall of said housing on said rear wall at a position closer to said top wall than said bottom wall, said suspension bracket including a first bracket member extending outwardly from said rear wall from a position between the top and bottom walls and having a distal end; and a second bracket member extending downwardly from said distal end of said first bracket member away from said top wall, towards said bottom wall and substantially parallel to said rear wall, said bracket being operable to be inserted between a window



base and an adjoining portion of a vehicle door to releasably secure said housing to said vehicle door; an interface material coupled to and substantially co-extensive with said rear wall, said interface material extending onto interior surfaces of both said first bracket member and said second bracket member, said interface material comprising a substantially resilient, magnetic material which enhances a mounting of said housing to an associated vehicle; and, means to reciprocate said wiper arm.

5,410,775

# APPARATUS FOR POWERED COLLECTION OF LOOSE-FILL PACKAGING MATERIAL

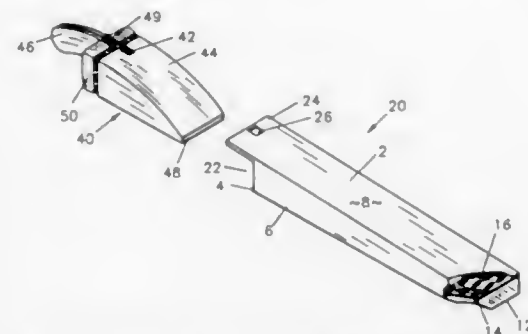
Thomas N. Frazier, 195 State St., San Mateo, Calif. 94401

Filed Jul. 21, 1993, Ser. No. 95,605

Int. Cl.<sup>6</sup> A47L 5/24

U.S. Cl. 15—338

14 Claims



1. An attachment for a powered vacuum cleaner or reversible blower device of the type pumping air to create suction at an intake, the attachment comprising:  
collection body means defining at least one interior chamber for holding lightweight materials such as loose fill packaging materials for disposal or re-use;  
coupling means defined in the collection body means for

releasable attachment to the cleaner or blower device, the intake communicating with the interior chamber when the coupling means is attached to the cleaner or blower device;

inlet means communicating the ambience with the interior chamber, the suction provided at the inlet means being insufficient to attract an appreciable amount of dirt particles;

one-way door means for opening and closing the inlet means and defining at least one aperture for allowing air to move collected lightweight materials away from behind the one-way door means prior to opening thereof in response to initiation of suction flow through the chamber and closing in the cessation absence of suction flow; and outlet means in the collection body means for emptying the lightweight materials from the interior chamber.

5,410,776

# CEILING FAN BRUSH AND ADJUSTABLE ANGLE TUBE VACUUM CONNECTOR FOR SAME

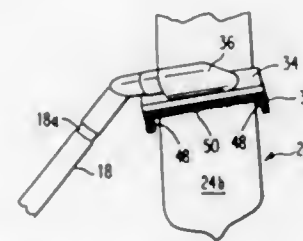
Norman J. Schneider, 1120 S. King St., Honolulu, HI. 96814  
Division of Ser. No. 929,336, Aug. 14, 1992, Pat. No. 5,313,687.

This application Dec. 15, 1993, Ser. No. 166,879

Int. Cl.<sup>6</sup> F16L 27/00

U.S. Cl. 15—398

8 Claims



1. An adjustable angle tube vacuum connector for detachably mounting a vacuum tool to a vacuum cleaner hose or extension wand, said adjustable angle tube vacuum connector comprising an end-to-end coupled first, curved adjustable angle connector tube and a second, straight adjustable angle connector tube, said curved adjustable angle connector tube comprising a cylindrical straight portion at one end and an integral arcuately curved portion at an opposite end, wherein said arcuate curved portion terminates in an end face oblique to the axis of the cylindrical straight portion, and wherein said straight adjustable angle connector tube comprises a straight cylindrical tube having an end face at one end oblique to the axis of said straight cylindrical tube and means for mechanically coupling said oblique end faces of said first tube and said second tube together in face-to-face relationship, with said tubes being mutually rotatable relative to each other over at least 180° of rotation such that the angular relationships between the axes of the respective tubes vary during rotation of one with respect to the other.

5,410,777

# AUTOMATIC CHECKING MECHANISM

Rudolf Gruber, Claremont, Canada, assignor to Multimatic Inc., Markham, Canada

Filed Nov. 1, 1991, Ser. No. 786,725

Claims priority, application Canada, Nov. 2, 1990, 2029257

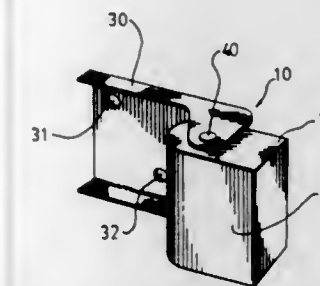
Int. Cl.<sup>6</sup> E05F 3/12, 3/22

U.S. Cl. 16—58

31 Claims

1. A hinge comprising a check or stop for a moveable member, the hinge having a first half and a second half, one of the halves having disposed therewith actuated means, actuated by the movement of the moveable member and the movement of the first half and second half of the hinge with respect to one another, the hinge having disposed therewith automatic switching means having means to provide a first value of a

predetermined characteristic when the moveable member is substantially static and means to reduce the value of the predetermined characteristic to a second substantially lower value of the predetermined characteristic when the moveable member is substantially in motion, the switching means to control the checking and release of the actuated means and the moveable member, the moveable member being moveable from a first state, wherein the moveable member is substantially static, checked, and exhibits a first value for a predetermined characteristic of the actuated means, to a second state wherein the moveable member is substantially in motion, unchecked, and



exhibits a second value of the predetermined characteristic of the actuated means, the value of the predetermined characteristic of the actuated means being available to the automatic switching means, wherein when the moveable member is in a static state the first value of the predetermined characteristic available to the automatic switching means provides checking of the actuated means and checking of the motion of the moveable member, wherein when the moveable member is substantially in motion the second value of the predetermined characteristic available to the automatic switching means provides release of the actuated means and the moveable member to allow ease of movement thereof.

5,410,778

# CRANK HANDLE FOR WINDOW PANE OR THE LIKE

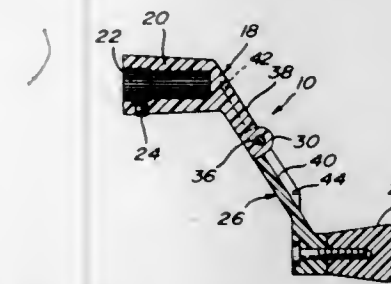
Yves Langevin, 136 Hickson Street, St-Lambert, Québec, Canada

Filed Aug. 30, 1993, Ser. No. 112,990

Int. Cl.<sup>6</sup> B25G 1/04

U.S. Cl. 16—115

4 Claims



1. A crank handle for a crank shaft mounted to a window sill operable to actuate a movable window pane comprising: a first member having an inner end, an outer end and an intermediate section between said ends, said outer end defining a part adapted to be engaged to the crank shaft, and a pivotable second member having an inner end, an outer end and an intermediate section between said ends, said inner end of said second member being connected about a hinge axis to said outer end of said first member said outer end of said second member carrying a knob; said intermediate sections having outer faces having complementarily shaped groove and projection means; said intermediate sections being substantially of equal length and extending, when in operative condition, along a longitudinal axis perpendicular to said hinge axis, characterized in that, when said second member is pivoted about said hinge axis, said groove and projection means imbricate so that

said intermediate sections overlap one another to reduce by half the length of said handle; said knob extending parallel and adjacent to said crank engaging part of said first member.

5,410,779

# HINGE

Igor I. Esman, ulitsa Respublikanskaya, 26, kv.151, and Anatoly K. Gleb, ulitsa Ya. Mavra, 31, kv.108, both of Minsk, Belarus  
PCT No. PCT/SU91/00049, § 371 Date Nov. 25, 1992, § 102(e)  
Date Nov. 25, 1992, PCT Pub. No. WO91/15646, PCT Pub. Date Oct. 17, 1991

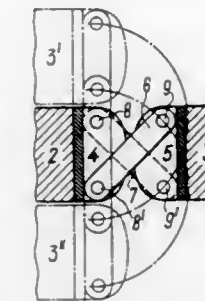
PCT Filed Mar. 27, 1991, Ser. No. 952,506

Claims priority, application U.S.S.R., Mar. 27, 1990, 4806073

Int. Cl.<sup>6</sup> E05D 15/32

U.S. Cl. 16—370

14 Claims



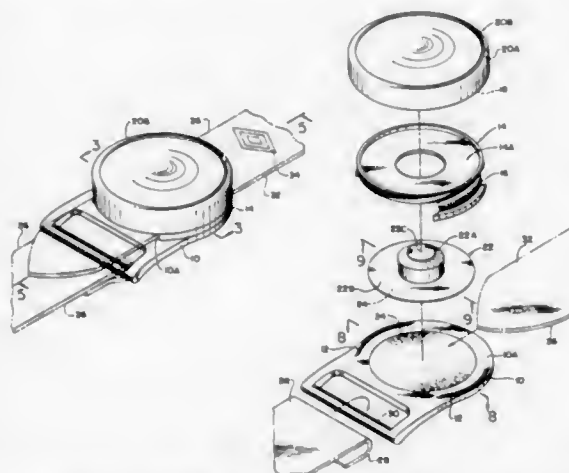
1. A hinge for first and second suspension members (2,3) comprising:

a first joining component (4) attachable to a first suspension member (2), said first joining component (4) having a first rotation axle (8) and a second rotation axle (8'), and a second joining component (5) attachable to a second suspension member (3), said second joining component (5) having a first rotation axle (9) and a second rotation axle (9');  
first and second levers (7,6) connecting said joining components (4,5) to each other, said first lever (7) having a first end rotatably mounted on said first axle (8) of said first joining component (4) and a second end rotatably mounted on said second axle (9') of said second joining component (5), said second lever (6) having a first end rotatably mounted on said first axle (9) of said second joining component (5) and a second end rotatably mounted on said second axle (8') of said first joining component (4), said levers (6,7) being disposed in different, parallel planes and having opposite angles of inclination to define an intersection point (0) of longitudinal axes (F1F4 and F2F3) passing through the respective levers, said levers being pivotably movable concurrently in said parallel planes around said axes (8,9' and 8',9) between open and closed positions of the suspension members of the hinge, said levers (6,7) being of equal length between said axes (8,9' and 8',9), and a locus of points formed, upon turning of the joining components (4,5) relative to each other, by said intersection point (0) of longitudinal axes (F1F4 and F2F3) of the levers (6,7) in a plane parallel to the plane of lever movement, being an elliptical curve, whereby low bending deformations of said hinge, its rigidity and essentially gap-free mutual coupling of said joining components (4,5) and said suspension members (2,3) in any position of said hinge between said open and closed positions are achieved, said joining components (4,5) having end surfaces (11,12) facing one another which in the open position of the hinge are in adjoining relation with substantially no gap therebetween, said end surfaces being of convex, curvature having generating lines extending parallel to axes of rotation of said rotation axes, said convex, curvature of said end surfaces being of semi-elliptical shape corresponding to the elliptical curvature of said locus of points formed by said intersection point (0) of the



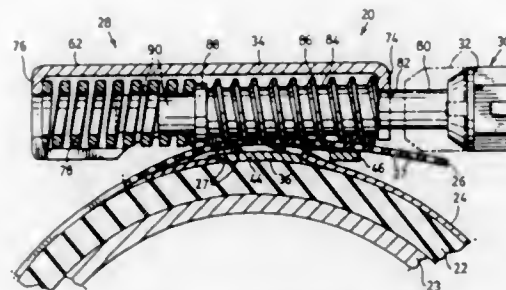
longitudinal axes of said levers, upon turning of said components, and enabling said components to turn to said open position substantially through an angle of 360° while maintaining substantially no gap between said end surfaces (11, 12) of said joining components (4, 5).

5,410,780  
**ROUND ROTATABLE BELT BUCKLE**  
 Howard Silagy, 100A Tec St., Hicksville, N.Y. 11801  
 Filed May 16, 1994, Ser. No. 243,417  
 Int. Cl.<sup>6</sup> A44B 11/00  
 U.S. Cl. 24—168



1. A round rotatable belt buckle in the use of which a surface-decorated belt with opposite ends and in encircling relation about a user has said one opposite end attached thereto and said other opposite end adapted to be selectively engaged thereby, said buckle comprising a housing base, an internal housing member of an inverted U-shape in cross section consisting of an externally threaded circular side wall and a horizontally oriented top wall with a central opening therein attached to said housing base to define therebetween a passageway for receiving in projected relation therethrough said belt end to be engaged, a rotatable cap of a U-shape in cross section consisting of a circular internally threaded side wall and a horizontally oriented top wall threadably engaged in covering relation over said internal housing member by said external and internal threads of said side walls thereof, and a belt-engaging member frictionally rotatably attached in depending relation from said cap to extend through said central opening of said internal housing member into said passageway and having a belt-engaging surface in facing relation to said housing base, whereby rotation of said cap is adapted to urge said belt-engaging surface into descending closing and ascending opening movement in relation to a belt end positioned on said housing base and upon closing movement resulting in engagement therewith such that the frictional engagement between said cap and said belt-engaging member is exceeded and any rotation of said belt-engaging member obviated so as to correspondingly obviate any abrading of the engaged belt surface as might otherwise be caused by such rotation.

5,410,781  
**CONSTANT TENSION CLAMP**  
 Theodore R. Anjos, Smyrna; Michael H. Reese, Murfreesboro; Watkins Crockett, IV, Franklin; Gene C. Holz, Murfreesboro, and Frank Segato, Smyrna, all of Tenn., assignors to Tridon Limited, Burlington, Canada  
 Filed Dec. 13, 1993, Ser. No. 165,292  
 Int. Cl.<sup>6</sup> F16L 33/08  
 U.S. Cl. 24—274 R 3 Claims



1. A hose clamp for compressing a hose radially to hold the hose on a pipe, the clamp comprising:  
 a band for wrapping about the hose over the pipe and having a first end and a free end, the band defining parallel angled slots adjacent the free end;  
 a clamp housing including a base attached to said first end and a cover having a screw thread housing and a coil spring housing, the screw thread housing and the coil spring housing being aligned about a common axis and the screw thread housing being cylindrical and tubular, the cover further including a first end wall forming part of the screw thread housing and a second end wall forming part of the coil spring housing;  
 means coupling the cover to the base with said common axis being spaced from and extending generally parallel to the band;  
 a helical coil spring contained and located in the coil spring housing;  
 an adjustment screw passing through the first end wall, the screw having a head operable to rotate the screw, a thread in engagement with the angled slots so that rotation of the screw will adjust the band about a hose, a shank between the thread and the head and part of the shank and the head projecting outside the clamp housing, a thrust surface adjacent the thread and remote from the head and a short end piece at an end of the screw from the head, the end piece being engaged inside an adjacent end of the helical coil spring to locate the coil spring and the screw about said axis and terminating inside the coil spring remote from the second end wall; and  
 the helical coil spring being in alignment with the screw and in compressive engagement between the thrust surface and the second end wall so that after the screw has been rotated to tighten the band, the screw can subsequently be further rotated to compress the helical coil spring and thereby store energy in the coil spring for use in automatically tightening the clamp should the hose creep to a smaller diameter.

5,410,782  
**CLIP DEVICE FOR SUPPORTING A PANEL**  
 Scott N. Holyoake, Auckland, New Zealand, assignor to Holyoake Industries Limited, Auckland, New Zealand  
 Filed Mar. 29, 1994, Ser. No. 219,212  
 Int. Cl.<sup>6</sup> E04B 1/38  
 U.S. Cl. 24—505 12 Claims

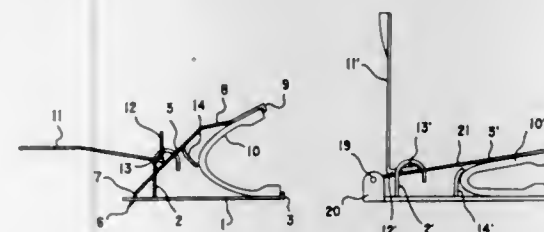
1. A clip device for locating an object in an aperture in a panel and against a front surface thereof, said clip device comprising: means for mounting said clip device on said object, a pivotal member having an engaging surface for engage-

ment with a rear surface of said panel adjacent said aperture, said pivotal member being pivotally supported on said mounting means so as to be pivotal relative to said mounting means between a first position wherein said engaging surface is retracted from engagement with a peripheral surface of said panel adjacent said aperture when said object is being positioned in said aperture, and a second position wherein said engaging surface is extended so as to be engageable with said rear surface when said object is positioned in said aperture, means for retain-



ing said pivotal member in either of said first and second positions, and means for actuating said pivotal member from said first position to said second position, said actuating means comprising a selection member which is moveable between an operative condition wherein a portion of said selection member protrudes into a field of operation of said actuating means, and an inoperative condition wherein a portion of said selection member is retracted from said field of operation of said actuating means.

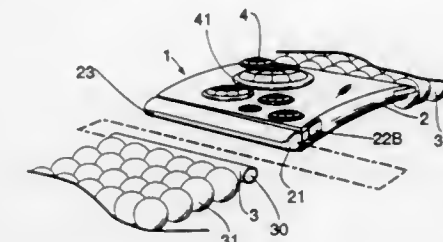
5,410,783  
**CLAMP FOR LEAF OF SHEET SHAPED PRODUCTS**  
 Titus A. Stoelinga, Arnhem, Netherlands, assignor to Enrico Leliveld, Arnhem, Netherlands  
 Filed Dec. 30, 1993, Ser. No. 175,752  
 Claims priority, application Netherlands, Jan. 4, 1993, 9300002  
 Int. Cl.<sup>6</sup> A44B 21/00  
 U.S. Cl. 24—516 9 Claims



1. A clamp for leaf or sheet shaped products, comprising:  
 a base plate;  
 a clamping plate having an edge;  
 a pivoting means for pivotally connecting said base plate and said clamping plate for movement of said edge toward and away from said base plate;  
 an operating member which engages said clamping plate and which is movable between a first position in which said edge of said clamping plate is remote from said base plate and a second position in which said edge of said clamping plate is pressed against said base plate, the movement of said operating member from said first position to said second position passing a dead center whereby the second position is stable; and  
 a spring means for urging said clamping plate away from said base plate, said spring means being a strip bent into a U-shape so as to have first and second leg portions and being made from an elastic material, said first and second leg portions having (a) first and second outsides which lie against said base plate and said clamping plate respectively and (b) first and second insides which serve as

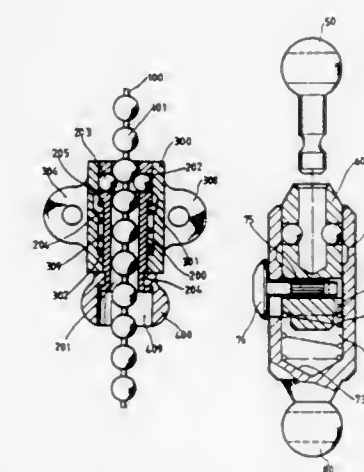
gripping surfaces for the products to be clamped when said operating member is in the second position.

5,410,784  
**INTERCHANGEABLE CLASP**  
 Teresa Katz, 153 W. 93rd St., New York, N.Y. 10025  
 Filed Feb. 22, 1993, Ser. No. 21,164  
 Int. Cl.<sup>6</sup> A44C 5/14  
 U.S. Cl. 24—589 1 Claim



1. An interchangeable clasp which comprises:  
 a body having at least one recess formed therein, the recess being elongated in dimension and having an opening to the exterior of the body;  
 at least one connector, the connector being configured to removably fit within the recess when inserted through the opening; and  
 a slidably mounted member mounted within a track formed within the body for electively retaining the connector within the recess the slidably mounted member moving from a first position wherein the opening to the exterior of the body is open to a second position wherein the opening to the exterior of the body is closed; and means for biasing the slidably mounted member.

5,410,785  
**DEVICE TO DETACHABLY CONNECT TWO OBJECTS**  
 Yu-Hwei Huang, No. 5, Alley 2, Lane 85, Min Tsu Road, Lu Chou Hsiang, Taipei Hsien,  
 Filed Sep. 29, 1993, Ser. No. 128,942  
 Int. Cl.<sup>6</sup> A44B 11/25  
 U.S. Cl. 24—635 6 Claims



1. A connector comprising:  
 a casing, said casing comprising a central through hole, an annular inside groove around the central through hole of said casing;  
 a bushing made to slide in the central through hole of said casing, said bushing comprising a central through hole and a plurality of radial through holes around the central through hole of said bushing;

a lock bolt device inserted into the central through hole of said bushing;  
 steel balls respectively inserted in the radial through holes on said bushing and engaged with said lock bolt device to lock said lock bolt device in place;  
 a spring element disposed around said bushing within said casing; and  
 a control knob pulled to move said bushing;  
 whereby said lock bolt device is unlocked and removed from said bushing as said bushing compresses said spring element as the control knob is pulled, the bushing moving away from form said radial through holes and thereby permitting said steel balls to disengage from said lock bolt device and move into the annular inside groove of said casing.

5,410,786

# PROCESS AND ARRANGEMENT FOR THE WARPING OF THREADS ONTO A DRUM HAVING A CONICAL SURFACE

Bogdan Bogucki-Land, Offenbach am Main, Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Obertshausen, Germany

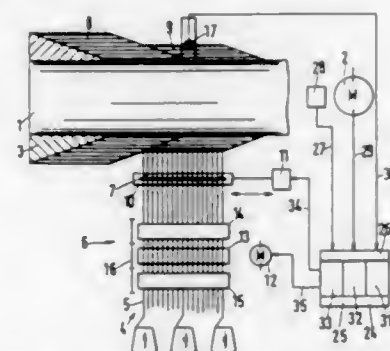
Filed Feb. 16, 1994, Ser. No. 197,056

Claims priority, application Germany, Feb. 18, 1993, 43 04 956.7

Int. Cl.<sup>6</sup> D02H 13/34; B65H 54/12

U.S. Cl. 28—191

26 Claims



1. Process for warping threads with a slide onto a rotating drum having a cone into a plurality of successive warp bands, said drum and said slide being relatively and axially displaceable with respect to each other to shape the bands, their windings and their form, said process comprising the steps of:

warping the threads for a first one of the bands based on a predetermined advancement schedule for the slide, the warping of the first one of the bands, after a predetermined initial phase, being performed by:

- measuring an aspect parameter signifying the form of the winding of the first one of the bands,
- correcting the predetermined advancement schedule of the slide based on a comparison of the aspect parameter and a targeted parametric value to compose a corrected advancement schedule, and
- storing a successive plurality of descriptive parameters signifying the evolving form of the winding of the band when successive revolutions of the drum meet a predetermined drum schedule;

warping the threads for successive ones of the bands by:

- advancing the slide according to the corrected advancement schedule obtained during the first one of the bands, at least for times after the initial phase,
- measuring the descriptive parameter according to the predetermined drum schedule during the warping of the bands, and
- adjusting tension of thread being delivered depending upon current deviations of the descriptive parameter from corresponding stored values of the descriptive parameter.

5,410,787

# APPARATUS FOR STRETCHING A SYNTHETIC YARN IN A STRETCHING BATH

Felix Graf, and Vittorio Arnosti, both of Winterthur, Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

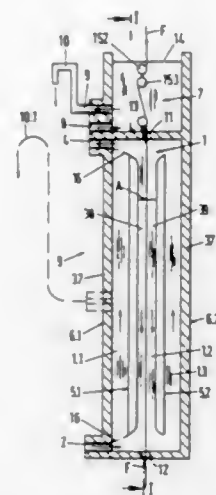
Filed Mar. 4, 1994, Ser. No. 205,722

Claims priority, application Switzerland, May 3, 1993, 00674/93

Int. Cl.<sup>6</sup> D02J 1/22; D01D 5/14

U.S. Cl. 28—246

14 Claims



1. An apparatus for stretching a synthetic yarn comprising two guide walls which are situated in a stretching bath and which are situated during the operation at a predefined distance from one another in a braking liquid, at least one of said guide walls being provided with a structured surface situated opposite the yarn in the braking liquid, with the yarn being guided along a predefined path substantially parallel to and adjacent said surface so that vibration of the yarn is suppressed, said at least one guide wall being a plate provided with a plurality of holes penetrating the plate to produce the structured surface.

5,410,788

# YARN CONDITIONING PROCESS & APPARATUS

Kiyohiro Tsuzuki, Greenville, S.C., assignor to TNS Mills, Inc., Greenville, S.C.

Continuation-in-part of Ser. No. 137,281, Oct. 14, 1993, which is a continuation-in-part of Ser. No. 974,232, Nov. 10, 1992, Pat. No. 5,269,052. This application Feb. 8, 1994, Ser. No. 192,997

Int. Cl.<sup>6</sup> B65H 54/00, 71/00; F26B 13/30

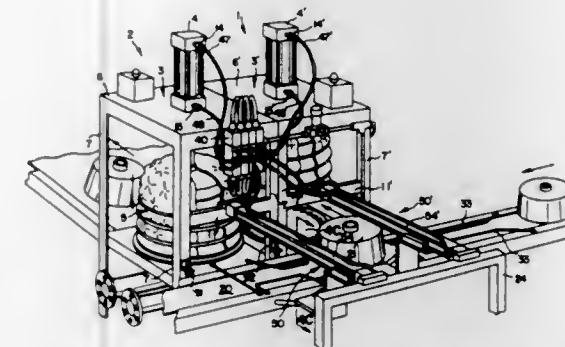
U.S. Cl. 28—290

10 Claims

1. A process for conditioning an individual yarn package comprising:

- providing a yarn package having unwanted twist in the wound yarn;
- placing said yarn package into a yarn conditioning chamber;
- creating a first partial vacuum within said conditioning chamber;
- introducing a conditioning vapor into said conditioning chamber until a second partial vacuum is achieved within said conditioning chamber;

maintaining said second partial vacuum until said yarn is set with a relaxed twist;  
 restoring ambient conditions to said chamber;



removing said yarn package from said conditioning chamber.

5,410,789

# METHOD OF MANUFACTURING PIEZOELECTRIC-RESONATOR HAVING VIBRATING SPACES FORMED THEREIN

Kazuyuki Noto, Jiro Miyazaki, Taketoshi Hino, and Daisaku Kugou, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd, Nagaokakyo, Japan

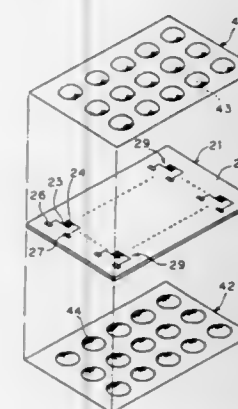
Filed Nov. 12, 1993, Ser. No. 150,848

Claims priority, application Japan, Nov. 13, 1992, 4-303326; Nov. 13, 1992, 4-303327; Apr. 16, 1993, 5-089955

Int. Cl.<sup>6</sup> H01L 41/22, 41/08

U.S. Cl. 29—25.35

8 Claims



1. A method of manufacturing a piezoelectric-resonator comprising the steps of:

- preparing a piezoelectric substrate having two opposed major surfaces;
- providing a piezoelectric resonance element on said piezoelectric substrate, said piezoelectric resonance element including vibrating electrodes disposed on said opposed major surfaces of the piezoelectric substrate, said vibrating electrodes defining a vibrating region and being opposed to each other through said piezoelectric substrate, and terminal electrodes that are connected with said vibrating electrodes;
- preparing a pair of sheets;
- bonding each of said sheets to a respective major surface of said piezoelectric substrate in a region excluding said vibrating region;
- forming a concave portion in each of said sheets, thereby defining a cavity for enclosing said vibrating region so as

to prevent said sheets from coming into contact with said vibrating region; and  
 applying protective resin for covering each said major surface of said piezoelectric substrate with said corresponding sheet interposed therebetween.

5,410,790

# MACHINE TOOL ADJUSTABLE HEAD

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan, Prov. of China

Filed Nov. 22, 1993, Ser. No. 155,225

Int. Cl.<sup>6</sup> B23Q 3/04; B23C 1/12

U.S. Cl. 29—40

6 Claims

1. A machine tool having a work supporting table and comprising:

- a main shaft rail body having a front face located adjacent to the work supporting table and further having at least one pair of vertically extending sliding rails, the at least one pair of sliding rails located in a vertical plane extending obliquely to the front face;
- a first sliding machine seat slidably attached to the at least one pair of sliding rails so as to be movable in a substantially vertical direction, the first sliding machine seat having a first mounting surface extending parallel to the vertical plane of the sliding rails;
- a second machine seat attached to the first mounting surface so as to be rotatable with respect to the first sliding machine seat, the second machine seat having a second mounting surface located in a vertical plane extending obliquely to the vertical plane of the sliding rails; and,
- a main shaft machine seat attached to the second machine seat.

5,410,791

# FABRICATION CHUCK

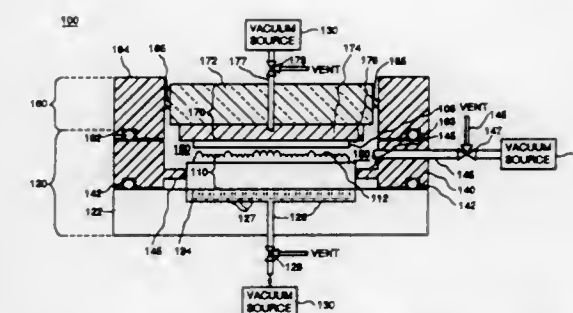
Reinhold F. Wirth, Ballston Spa, and Stanley J. Lubowski, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 1, 1993, Ser. No. 84,115

Int. Cl.<sup>6</sup> B23P 19/02

U.S. Cl. 29—235

10 Claims



1. A vacuum fabrication chuck for applying a thin membrane to an irregularly-shaped surface of a workpiece without causing deformation of protrusions from the surface of the workpiece, comprising:

- a foundation adapted to hold said workpiece in a selected workpiece fabrication position;
- an upper chuck assembly adapted to be detachably mounted to said foundation such that an assembly chamber is formed therebetween, said upper chuck assembly further comprising a frame and a moveable applicator disposed therein said applicator having a substantially flat mating surface disposed towards said assembly chamber and adapted to retain said thin membrane on said mating surface, said applicator further being adapted to selectively release said thin membrane from said mating surface, said applicator being displaceable within said assembly chamber to be disposed in close proximity to said workpiece



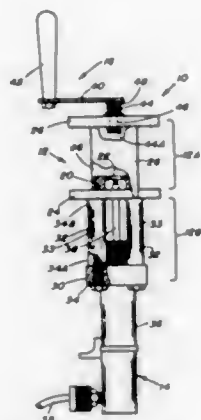
and laterally aligned with registration guides to dispose said thin membrane on said workpiece whereby said membrane can be selectively disposed in a desired position over said irregularly-shaped surface of said workpiece; said fabrication chuck further comprising vacuum piping coupled to said applicator mating surface so as to selectively draw suction through a porous material disposed on said mating surface said fabrication chuck also comprising vacuum piping coupled to said foundation so as to selectively draw a suction on the interior of said assembly chamber in which said workpiece is disposed.

5,410,792

**CASTER WHEEL AXLE EXTRACTION APPARATUS**  
Gregory L. Freeman, 201 S. Fulton St., Salisbury, N.C. 28144  
Filed Mar. 2, 1994, Ser. No. 204,634  
Int. Cl.<sup>6</sup> B23P 19/04

U.S. Cl. 29—252

15 Claims



1. An extraction apparatus for use in removing an inner component from an outer component within which the inner component is tightly fitted, said extraction apparatus comprising:

- a housing defining a compartment having an annular seat at an inner end for receiving and seating an outer component in said compartment with an inner component tightly slidably fitted through the outer component being aligned along a longitudinal axis of the housing and with an aperture defined through said annular seat;
- an actuator having an elongated cylinder supported adjacent to said housing and an elongated piston rod extending from said cylinder along said longitudinal axis such that, upon selective actuation of said actuator, said piston rod is extendable along said longitudinal axis through said aperture in said seat and into contact with the inner component fitted through the outer component seated in said compartment of said housing; and
- means for engaging the outer component about the inner component and clamping the outer component against said seat on said inner end of said compartment, said engaging and clamping means having a central bore aligned with said aperture through said seat so as to permit passage therethrough of the inner component in response to axial movement thereof relative to and extraction thereof from the outer component upon said selected actuation of said actuator to cause extension of the piston rod toward and into forceable engagement with the inner component.

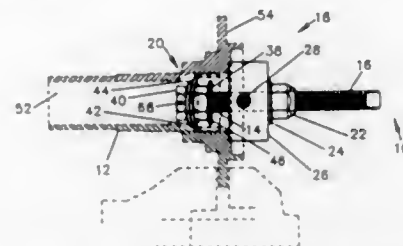
5,410,793

**TOOL USED FOR REMOVING SPINDLE BEARINGS**  
Charles E. VanBibber, 8308 Balmoral Dr., Tallahassee, Fla. 32311

Filed Nov. 1, 1993, Ser. No. 143,628  
Int. Cl.<sup>6</sup> B23P 19/04

U.S. Cl. 29—263

19 Claims



1. A tool for removing a bearing from a spindle comprising: an elongated threaded rod; said elongated threaded rod having a first diameter, a top end portion, and a bottom end portion; said top end portion having a first threaded nut, a first washer, a puller body member, and a second washer; said first threaded nut being threadably attached to said top end portion of said elongated threaded rod; said first washer is located beneath said threaded nut; said first washer includes a first hole having a second diameter and said first hole being located in the center of said first washer; said second diameter being slightly larger than said first diameter; said elongated threaded rod is received in said first hole; said puller body member is located beneath said first washer and includes a circular top wall, an encompassing cylindrical side wall, and an open bottom; said circular top wall affixed to said encompassing cylindrical side wall; said circular top wall includes a second hole having a third diameter and said second hole being located in the center of said circular top wall; said third diameter being slightly larger than said first diameter; said elongated threaded rod is received in said second hole; said second washer is located beneath said puller body member; said second washer includes a third hole having a fourth diameter and said third hole is being located in the center of said second washer; said fourth diameter being slightly larger than said first diameter; said elongated threaded rod is received in said third hole; said bottom end portion including a second threaded nut, a third washer, an extractor and a fourth threaded nut; said second threaded nut being permanently attached to said bottom end portion of said elongated threaded rod by a securing means; said second threaded nut having a top surface and a bottom surface; said top surface faces said top end portion; said third washer being in direct contact with said top surface of said second threaded nut; said third washer includes a fourth hole and said fourth hole being located in the center of said third washer; said fourth hole having a fifth diameter; said fifth diameter being slightly larger than said first diameter;

said elongated threaded rod is received in said fourth hole; said extractor being located atop of said third washer and being in direct contact with said third washer; said extractor having a fifth hole and said fifth hole being located in the center of said extractor; said fifth hole having a sixth diameter; said sixth diameter being larger than said first diameter; said elongated threaded rod is received in said fifth hole; said extractor extends outwardly beyond said third washer; said third nut being located atop of said extractor and being in direct contact with said extractor; said third nut being threadably attached to said elongated threaded rod; and said third nut constrains said extractor and said third washer to a fixed position.

5,410,794

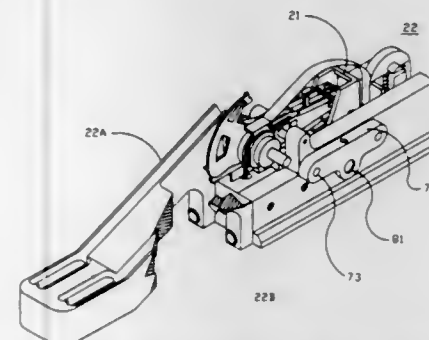
**CADDY AND CARRIER TOOL FOR ASSEMBLING A HEAD ARM STACK**

Larry E. Tucker, Fremont, Calif., assignor to Read-Rite Corporation, Milpitas, Calif.

Filed Apr. 22, 1994, Ser. No. 231,157  
Int. Cl.<sup>6</sup> B25B 24/14

U.S. Cl. 29—281.5

11 Claims



1. A tool for assembling magnetic head arm components in a head stack for use in a rotary actuator disk drive having at least one disk and a spindle assembly including a pivot bearing assembly including a pivot bearing for rotating said disk and a flat coil member for passing signals to said disk drive comprising:

- a caddy base;
- a component caddy for positioning in said caddy base, said caddy being separable and removable from said caddy base, said caddy being configured to hold said magnetic head arm components;
- means for clamping said caddy to said caddy base;
- a fixture for holding said pivot bearing assembly and for aligning said head arm components with said pivot bearing;
- means for releasing said caddy from said caddy base so that said caddy and said head arm components are transportable independently of said caddy base after release of said caddy from said caddy base.

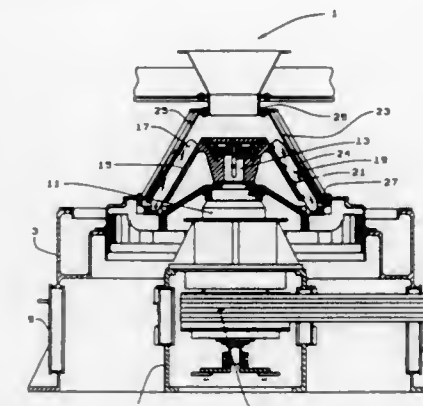
5,410,795

**METHOD OF ASSEMBLY AND APPARATUS FOR A SCREEN IN A CENTRIFUGAL SEPARATOR**  
Harry E. Derton, East Carondelet, Ill., and Dewey M. Cope, Affton, Mo., assignors to Centrifugal & Mechanical Industries, Inc., St. Louis, Mo.

Filed Oct. 12, 1993, Ser. No. 133,908  
Int. Cl.<sup>6</sup> B23P 6/00; B04B 1/04

U.S. Cl. 29—402.15

6 Claims



1. In a vertical centrifugal separator having a vertical drive mechanism including a drive shaft, a cone attached to the drive shaft, a flight assembly attached to the cone, a frustoconical screen around the flight assembly driven by the drive mechanism, and a rounded support basket to seat the screen in a fixed position within the basket, an improvement in the method of assembling the screen within the basket including the steps of: inserting the screen vertically disposed into the basket; said screen having an upper end and a lower end, and said basket having proximate upper and lower portions; pulling the upper end of the screen upwardly into the basket thereby conforming the screen to the rounded support basket; attaching the lower end of the screen to a lower portion of the basket; and attaching by bolts the proximate upper end of the screen to the proximate upper portion of the basket.

5,410,796

**COPPER/COPPER ALLOY AND GRAPHITE FIBER COMPOSITE AND METHOD**

Joseph K. Weeks, Jr., Salt Lake City, Utah, assignor to Technical Research Associates, Inc., Salt Lake City, Utah

Filed Oct. 6, 1993, Ser. No. 132,472  
Int. Cl.<sup>6</sup> B21C 37/06

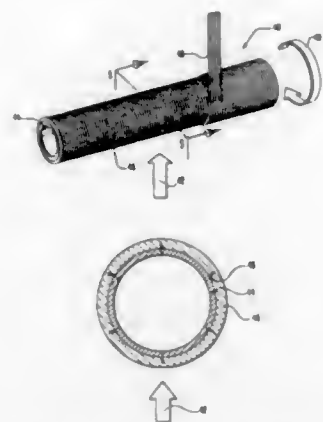
U.S. Cl. 29—419.1

13 Claims

1. A method for producing a structure from a graphite fiber composite with a copper/copper alloy matrix comprising the steps of:

- coating graphite fibers with a refractory metal to produce a body of coated graphite fibers;
- forming a structure with said body of coated graphite fibers, said forming step comprising preparing said structure as a structure selected from the group consisting of a winding body of said coated graphite fibers, a woven body of said coated graphite fibers, and a non-woven body of said coated graphite fibers, said preparing step further comprising forming said winding body by wrapping said coated graphite fibers about a cylindrical shape; and

infiltrating said structure with molten copper/copper alloy, said copper/copper alloy wetting said coated graphite



fibers thereby producing said graphite fiber composite with said copper/copper alloy matrix.

5,410,797

# **METHOD OF MAKING A CATHETER WITH FLEXIBLE SIDE PORT ENTRY**

Thomas A. Steinke, San Diego; Leonard F. Briggs, Chula Vista, and Garry E. Rupp, San Diego, all of Calif., assignors to Medtronic, Inc., Minneapolis, Minn.

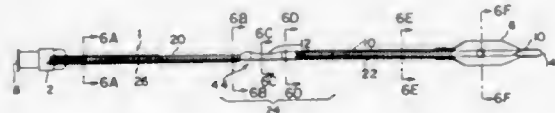
Division of Ser. No. 919,672, Jul. 27, 1992, Pat. No. 5,328,472.

This application Feb. 28, 1994, Ser. No. 203,205

Int. Cl.<sup>6</sup> B23P 11/00

U.S. Cl. 29—435

13 Claims



4. A method of making a catheter comprising the following steps:

providing a spring coil shaft defining an inflation lumen, the shaft having a distal end, a proximal end, and a side port entry;

providing a balloon located generally at the distal end of the shaft, the balloon having a distal end and a proximal end, the distal end of the balloon being sealed to the inflation lumen; and

providing a guidewire lumen extending from the spring coil shaft distal end to the side port entry, said guidewire lumen adapted to receive a guidewire in a sliding fit.

5,410,798

# **METHOD FOR PRODUCING A COMPOSITE GOLF CLUB HEAD**

Kun-Nan Lo, No. 33, Hsiang-Ho Rd., Li-Lin Tsun, Tan-Tzu Hsiang, Taichung Hsien, Taiwan, Prov. of China

Filed Jan. 6, 1994, Ser. No. 178,042

Int. Cl.<sup>6</sup> B23P 11/02

U.S. Cl. 29—527.2

2 Claims

1. A method for producing a composite golf club head, comprising the steps of:

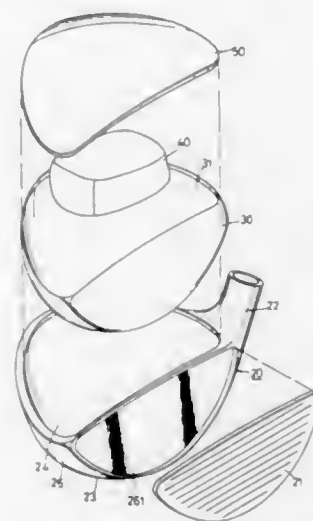
(1) forming a metal hollow casing which has an outline of a golf club head, said metal hollow casing having a shaft connecting portion, an open top portion, a side wall, and a closed bottom portion which is integrally formed with said side wall;

(2) disposing a bowl-shaped laminated member in said metal

hollow casing, said bowl-shaped laminated member being made of a carbon fiber composite material, and being configured to correspondingly abut an internal wall face of said metal hollow casing, and having an open end adjacent to said open top portion of said metal hollow casing;

(3) providing an expansible pocket in said bowl-shaped laminated member, said expansible pocket containing a mixture of sodium nitrite, ammonium chloride and water;

(4) disposing a sheet of carbon fiber composite material over said open top portion of said metal hollow casing in order



to close said open top portion of said metal hollow casing and said open end of said bowl-shaped laminated member;

(5) disposing said metal hollow casing in a mold;

(6) heating said mold to a temperature of 140°–160° C. in order to allow said mixture in said expansible pocket to react and produce nitrogen gas, thereby swelling said expansible pocket and forcing said bowl-shaped laminated member to attach to said metal hollow casing, and allowing said sheet of carbon fiber composite material and said bowl-shaped laminated member to harden and connect integrally to each other.

5,410,799

# **METHOD OF MAKING ELECTROSTATIC SWITCHES FOR INTEGRATED CIRCUITS**

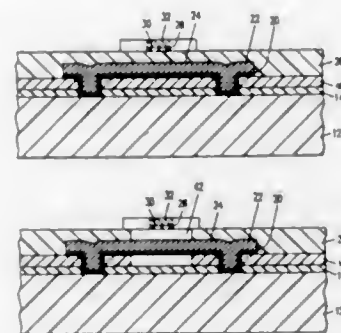
Michael E. Thomas, Milpitas, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Mar. 17, 1993, Ser. No. 32,615

Int. Cl.<sup>6</sup> H01H 11/00

U.S. Cl. 29—622

8 Claims



1. A method of fabricating an electrostatic switch on a substrate comprising the steps of:

- forming a first layer of electrically conductive material over a surface of said substrate;
- forming said first layer of electrically conductive material into a first electrical contact means;
- forming a layer of electrically insulating material over said first electrical contact means;
- forming a second layer of electrically conductive material over said layer of electrically insulating material;
- forming said second layer of electrically conductive material into a second electrical contact means having a predetermined spaced relationship with respect to said first electrical contact means; and
- creating a void in said layer of electrically insulating material between at least a portion of said first electrical contact means and said second electrical contact means.

5,410,800

# **TUBE EXPANDER WITH ROD SUPPORT APPARATUS**

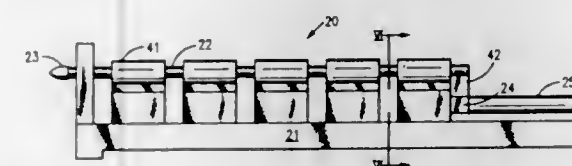
Kenneth P. Gray, E. Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 14, 1994, Ser. No. 209,768

Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 29—727

1 Claim



1. An improved apparatus (20) for radially expanding a tube, said apparatus being of the type in which a ram (25), having a first axis of movement, through an expander rod (22) having a second axis of movement, drives an expander bullet (23) through said tube, in which the improvement comprises:

said first axis of movement being offset from said second axis of movement;

said ram imparting its driving force to said expander rod through a connector link (32);

a rod support member (31) having

a first passage (43) surrounding said first axis of movement,

a second passage (44) that provides a path for movement of said ram during a stroke of said expander rod,

a third passage (45) connecting said first passage and said second passage and through which said connector link may pass.

5,410,801

# **APPARATUS FOR MANUALLY CONTROLLED PLACEMENT OF COMPONENTS ON CIRCUIT BOARDS**

Avraham Shiloh; Peretz J. Shiloh; Adam Shiloh, all of Huntingdon Valley, and Steven R. Evers, Feasterville, all of Pa., assignors to Automated Production Systems, Huntingdon Valley, Pa.

Filed Feb. 8, 1993, Ser. No. 14,544

Int. Cl.<sup>6</sup> H05K 13/00

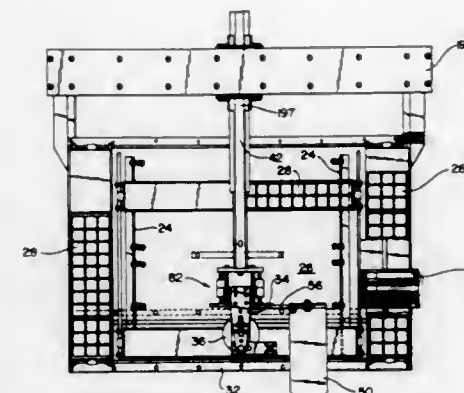
U.S. Cl. 29—740

20 Claims

1. A pick and place apparatus for engaging and placing components on a circuit board, comprising: table means defining a work surface for receiving the circuit board;

a carriage carrying at least one element for operating on the circuit board, and a movable support for the carriage, the movable support being freely movable by manual force and guiding the carriage in a plane parallel to the work surface, the movable support including coarse positioning means and fine positioning means, coupled between the table means and the carriage, the coarse and fine positioning means independently positioning the carriage and defining coarse and fine displacements that are added to

one another for determining a position of the at least one element in the plane; wherein the coarse positioning means is coupled between the table means and the fine positioning means, and the fine positioning means is coupled between the coarse positioning means and the carriage; and, at least one control handle mounted on the carriage and arranged to move the element for operating on the circuit board.



board, and a hand rest coupled to the coarse positioning means adjacent the carriage, the fine positioning means and the hand rest being positioned and dimensioned such that the control handle remains within finger range of an operator's hand on the hand rest, whereby an operator can use arm movements for coarse positioning by exertion of force on the hand rest, and finger movements for accurate operation of said element for operating on the circuit board.

5,410,802

# **DEPTH ADJUSTMENT MECHANISM IN A TERMINAL INSERTION MACHINE**

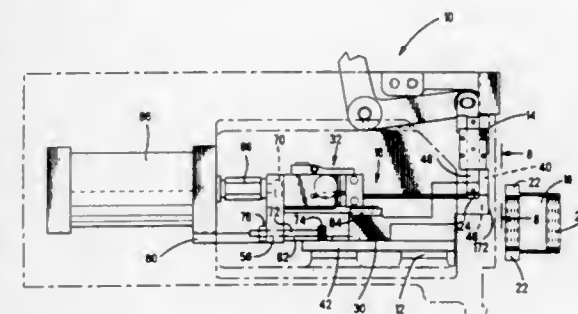
Richard A. Buckley, Camp Hill, Pa., assignor to The Whitaker Corporation, Wilmington, Del.

Filed Sep. 23, 1993, Ser. No. 125,988

Int. Cl.<sup>6</sup> B23P 19/04; H01R 43/20

U.S. Cl. 29—748

19 Claims



1. In a machine for inserting a body into a cavity in a housing, wherein said machine has a frame, a workstation for positioning said body adjacent said housing, insertion means operable for moving said body from said workstation into said cavity, and actuator means for effecting operation of said insertion means,

a depth adjustment mechanism for controlling a depth of insertion of said body into said cavity, comprising:

an adjustable stop associated with said actuator means and arranged to engage said frame for grossly limiting the depth of insertion wherein said insertion means is operable for moving said body into said cavity only until said adjustable stop engages said frame; and,

a fine adjusting mechanism coupling said actuator means to said insertion means for fine adjusting the depth of inser-



tion of said body into said cavity, wherein said fine adjusting mechanism includes:

- a carriage coupled to said actuator means and arranged to move in response thereto in a first direction toward said housing and in a second direction away therefrom;
- a tool holder having said insertion means attached thereto, said tool holder carried by said carriage and arranged for selective movement with respect to said carriage in said first and second directions; and,
- adjusting means associated with both said carriage and said tool holder for effecting said selective movement of said tool holder, thereby selectively varying a distance between said carriage and said tool holder.

5,410,803

# FEED MECHANISM IN A TOOL FOR TERMINATING RIBBON CABLE TO A CONNECTOR

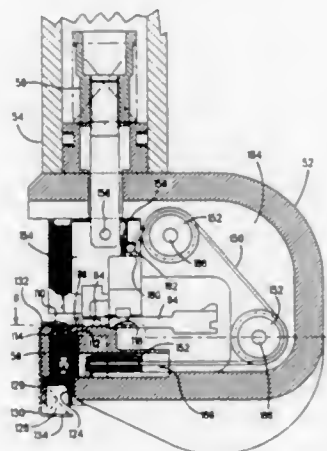
George H. Gerhard, Jr., Laureldale, Pa., assignor to The Whittaker Corporation, Wilmington, Del.

Filed Dec. 16, 1993, Ser. No. 169,030

Int. Cl.<sup>6</sup> H01R 43/055, 43/045

U.S. Cl. 29—753

11 Claims



- In a tool for attaching individual conductor of a ribbon cable to respective terminals of a strip of terminals of an electrical connector wherein said tool includes a frame, a work surface within said frame, a ram arranged to undergo reciprocating motion along an axis within said frame toward and away from said work surface to effect termination of said conductors to said terminals, a track for guiding and positioning each of said terminals of said connector in seriatim into insertion position on said work surface in alignment with said axis, feed means associated with said ram for advancing strip of terminals and said conductors in a direction of feed so that with each downward stroke of said ram one of said terminals which has been previously moved into said insertion position along with one of said conductors to be terminated thereto is terminated, and with each upstroke of said ram said one terminal and said one conductor are moved away from said insertion position and another of said terminals and another of said conductors to be terminated thereto are automatically moved in said direction of said feed into said insertion position, wherein said feed means includes means actuated by said ram for receiving and storing energy provided by said ram only when said ram is moving toward said work surface, releases stored energy to effect said feeding of said strip of terminals and conductors only when said ram is moving away from said work surface.

5,410,804

# METHOD FOR MANUFACTURING A SINGLE PRODUCT FROM INTEGRATED CIRCUITS RECEIVED ON A LEAD FRAME

Hendrikus T. Berendts, Doornenburg, Netherlands, assignor to ASM-Fico Tooling B.V., Ad Herwen, Netherlands

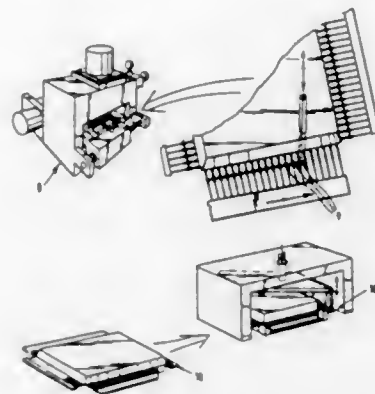
Filed Sep. 14, 1993, Ser. No. 117,154

Claims priority, application Netherlands, Mar. 15, 1991, 9100470

Int. Cl.<sup>6</sup> H01R 43/00

U.S. Cl. 29—827

9 Claims



- A method for manufacturing an individual product from an encapsulated, integrated circuit arranged on a support frame with leads, comprising the consecutive steps of:
  - cutting the individual encapsulated, integrated circuit out of a lead frame;
  - cutting away lead-connecting strips to form leads;
  - bending the leads; and
  - cutting the leads to a desired length.

5,410,805

# METHOD AND APPARATUS FOR ISOLATION OF FLUX MATERIALS IN "FLIP-CHIP" MANUFACTURING

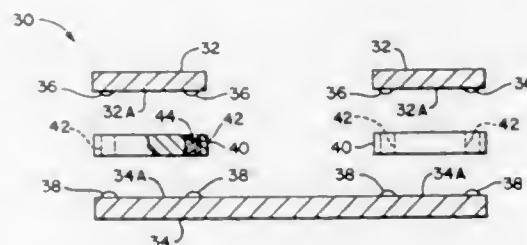
Nicholas F. Pasch, Redwood City; Vahak K. Sahakian, Los Altos Hills, and Conrad J. Dell'Oca, Palo Alto, all of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Continuation of Ser. No. 981,096, Nov. 24, 1992, Pat. No. 5,299,730, which is a division of Ser. No. 775,009, Oct. 11, 1991, Pat. No. 5,168,346, which is a division of Ser. No. 576,182, Aug. 30, 1990, Pat. No. 5,111,279, which is a continuation of Ser. No. 400,572, Aug. 28, 1989, abandoned. This application Feb. 10, 1994, Ser. No. 194,241

Int. Cl.<sup>6</sup> H05K 3/34

U.S. Cl. 29—830

19 Claims



- Preformed planar structure for interposing between a chip and a substrate, comprising:
  - a preformed planar structure having a planar core and two opposing planar faces, the preformed planar structure suitably sized to be interposed between the chip and the substrate, formed of suitable material and shaped suitably for receiving flux in selected areas.

5,410,806

# METHOD FOR FABRICATING CONDUCTIVE EPOXY GRID ARRAY SEMICONDUCTORS PACKAGES

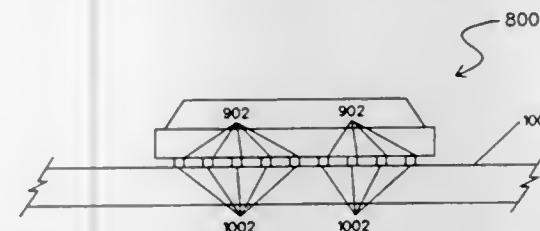
Mark Schneider, San Jose, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.

Filed Sep. 15, 1993, Ser. No. 121,678

Int. Cl.<sup>6</sup> H05K 3/34

U.S. Cl. 29—840

3 Claims



- A method for fabricating a semiconductor device assembly, comprising the steps of:
  - attaching a semiconductor device having attachment pads thereon to a printed wiring board assembly having conductive traces thereon;
  - connecting the semiconductor device attachment pads to the printed wiring board conductive traces;
  - encapsulating the semiconductor device and part of the printed wiring board surface;
  - depositing conductive epoxy onto selected areas of the printed wiring board having connection pads connected to the conductive traces; and
  - heating the printed wiring board and deposited conductive epoxy to B-stage the epoxy so that conductive epoxy contacts are formed thereby.

5,410,807

# HIGH DENSITY ELECTRONIC CONNECTOR AND METHOD OF ASSEMBLY

Arthur Bross, and Thomas J. Walsh, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

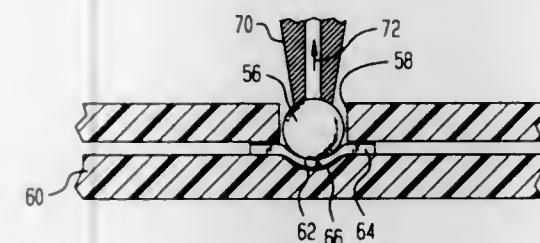
Division of Ser. No. 830,874, Feb. 4, 1992, Pat. No. 5,338,208.

This application Mar. 30, 1994, Ser. No. 219,918

Int. Cl.<sup>6</sup> H01R 9/06

U.S. Cl. 29—843

8 Claims



- A method of assembling an electrical connector comprising a plurality of metal balls having a precious contact metal on an outer surface thereof and a plurality of solder plated contact lands which serve as miniature springs and lie on spaced centers, the method comprising the steps of:
  - capturing on said spaced centers respective ones of the balls;
  - captivating the balls to respective ones of the contact lands with sufficient force to cause the contact lands to deflect and to obtain electrical and mechanical contact between the balls and the contact lands; and
  - re-flow soldering the balls to the lands while the lands are deflected to cause soldered joints between the balls and lands while leaving portions of the precious contact metal on each of the balls exposed such that stable low resistance

electrical connections to the exposed portions of the balls can thereafter be made and un-made a plurality of times.

5,410,808

# METHOD OF MAKING A DOUBLE WALL TWIST TUBE

Elmo W. Geppelt; William H. Poore, both of Tulsa, and Mark A. Smith, Broken Arrow, all of Okla., assignors to G.P. Industries, Inc., Tulsa, Okla.

Filed Feb. 24, 1993, Ser. No. 21,881

Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 29—890.036

13 Claims



- A method of producing a double wall twist tube having an inside wall, an outside wall and space therebetween comprising the following steps:
  - positioning a smaller tubular blank within a larger tubular blank, the tubular blanks being of substantially the same length;
  - grasping said tubular blanks adjacent a first end with a rotatable means;
  - grasping said tubular blanks adjacent a second end with a stationary means; and
  - rotating said first end of said tubular blanks relative to said second end to form at least one spiral corrugation simultaneously in said larger and smaller tubular blanks.

5,410,809

# METHOD OF MAKING A BEARING CAGE WITH DEPRESSED SLOT END

Richard L. Alling, Torrington, Conn., assignor to The Torrington Company, Torrington, Conn.

Division of Ser. No. 40,399, Mar. 30, 1993, Pat. No. 5,391,005.

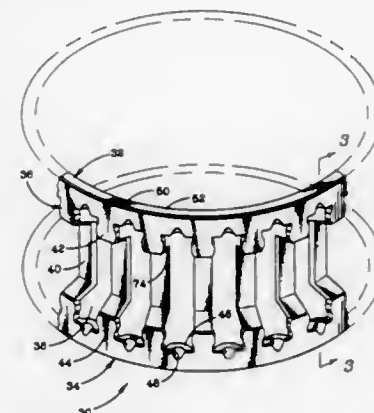
This application Feb. 10, 1994, Ser. No. 196,002

The portion of the term of this patent subsequent to Aug. 9, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 29—898.067

13 Claims



- A method for forming a roller bearing cage, the method comprising the steps of:
  - forming a flat strip of metal such that a center relief portion is offset with respect to two edge portions that lie within a plane;
  - forming depressions in the two edge portions and piercing center slots across the center relief portion such that a partially formed bearing cage is formed having roller

receiving slots and slot end depressions at both ends of the roller receiving slots; and forming the partially formed bearing cage into a circular hoop having an axis such that the edge portions form rings at axial ends of the circular hoop.

5,410,810

## SAFETY RAZORS

Robert Gillibrand, Reading, United Kingdom, assignor to The Gillette Company, Boston, Mass.

PCT No. PCT/US91/07468, § 371 Date May 27, 1993, § 102(e) Date May 27, 1993, PCT Pub. No. WO92/06827, PCT Pub. Date Apr. 30, 1992

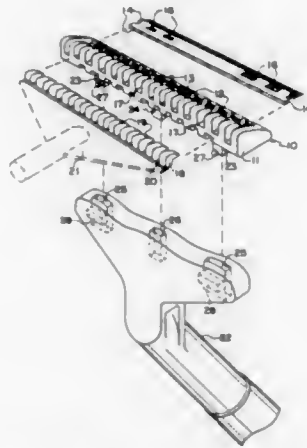
PCT Filed Oct. 10, 1991, Ser. No. 30,079

Claims priority, application United Kingdom, Oct. 22, 1990, 9022945

Int. Cl.<sup>6</sup> B26B 21/18

U.S. Cl. 30—41

2 Claims



1. A safety razor which comprises a razor blade unit having at least one generally planar blade with a cutting edge, which blade unit is readily flexible about an axis or axes parallel with the plane of said at least one blade and extending substantially perpendicular to the cutting edge thereof;

a handle; and, connecting means disposed cooperatively on said blade unit and said handle for connecting the blade unit to the handle which means permits flexing of the blade unit, the blade unit comprising:

a molded plastic housing including: a guard portion having spaced apart teeth interconnected by a thin, flexible web; a cap portion having spaced apart teeth interconnected by a thin, flexible web; said at least one blade being clamped between said cap portion and said guard portion.

said blade unit further comprising a molding having spaced apart teeth interconnected by a thin, flexible web, said molding including a mixture of polyethylene oxide and a structural polymer, the teeth of said molding positioned between the teeth of said cap portion, the teeth of the polyethylene oxide-containing molding being narrower than the space between the teeth of the cap portion so that the blade unit can flex concavely.

5,410,811  
DRY SHAVING APPARATUS WITH A PIVOTALLY MOUNTED SHAVING HEAD ASSEMBLY  
Jürgen Wolf, Kriftel, and Michael Odemer, Frankfurt, both of Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Germany

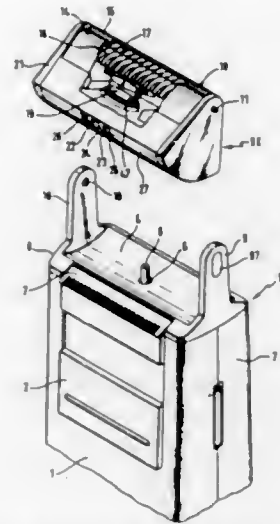
Filed Feb. 4, 1994, Ser. No. 191,985

Claims priority, application Germany, Feb. 11, 1993, 43 03 972.3

Int. Cl.<sup>6</sup> B26B 19/12

U.S. Cl. 30—43.9

13 Claims



1. A dry shaving apparatus comprising a housing having two plastic support lugs, and a shaving head assembly arranged between the two support lugs, said shaving head assembly comprising a plastic shaving head frame, at least one outer cutter, and at least one inner cutter operatively associated with the outer cutter, said shaving head assembly being mounted on the support lugs in a manner pivotal about a pivot axis by means of bearing screws,

said shaving apparatus further comprising two biased springs and two metal bearing elements, wherein each of said bearing elements is provided with a thread, is fixedly arranged in a respective one of the support lugs, and has an end surface facing the shaving head frame, wherein each of the bearing screws is in fixed threaded engagement with a respective one of said bearing elements to form pivot bearings for the shaving head frame, and wherein the shaving head frame is held in abutment with the end surface of each of the bearing elements by a respective one of the biased springs which has one of its ends resting against the respective bearing screw while its other end is supported by the shaving head frame.

5,410,812

## RAZOR HEAD OF A WET RAZOR

Wolfgang Althaus, Wuppertal, Germany, assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 15, 1993, Ser. No. 33,305

Claims priority, application United Kingdom, Mar. 13, 1992, 9205547

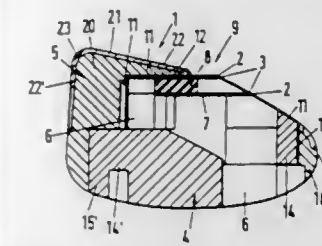
Int. Cl.<sup>6</sup> B26B 21/14

U.S. Cl. 30—77

12 Claims

1. A razor head, comprising: a plastic body having a rear cover and a front guardbar that define surface points for engaging the skin of a user, with said plastic body also having a support means; a razor blade means secured to said support means and having at least one cutting edge; and a series of strands that extend over and perpendicular to said

at least one cutting edge of said razor blade means, wherein said at least one cutting edge protrudes by at least 0.02 mm and at most 0.4 mm beyond a tangent plane



formed by said skin-engaging surface points of said guard-bar and said cover, and wherein said strands are spaced at least 2 mm from one another and have a thickness of at least 0.1 mm.

5,410,813

## TOOL FOR CUTTING SHEET MATERIAL

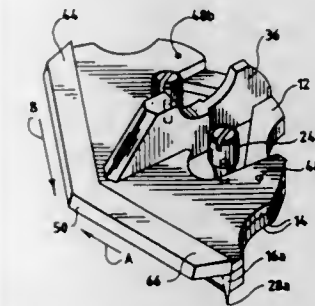
Paul S. Carlson, Urbana, Ill., assignor to Hobbico, Inc., Champaign, Ill.

Continuation of Ser. No. 37,137, Mar. 25, 1993, abandoned. This application Oct. 4, 1994, Ser. No. 317,779

Int. Cl.<sup>6</sup> B26B 29/02

U.S. Cl. 30—287

13 Claims



1. A tool capable of severing sheet material at a first uniform predetermined distance from a first line of intersection of a first surface and second surface forming an "inside" edge with an angle therebetween of less than 180°, and capable of severing sheet material at a second uniform predetermined distance from a second line of intersection of a third and fourth surface forming an "outside" edge with an angle therebetween of greater than 180°, said tool comprising:

a body with a front edge adapted to slidably guide the tool along said first surface or said third surface and a substantially flat bottom surface adapted to slidably guide the tool along said second surface,

cutting means extending beyond said front edge of said body, which is maintained by said front edge and said flat surface of said body at said first predetermined distance from said first line of intersection,

a removable spacer plate and means for engaging said removable spacer plate at a predetermined position with respect to said body, wherein said spacer plate includes a lip with a substantially flat surface adapted to slidably guide said tool along said fourth surface,

so that when said removable spacer plate is disengaged from said body, said tool may be guided along said first and second surfaces by said front edge and said bottom surface, respectively, such that said cutting means severs sheet material applied to said first surface at said first uniform predetermined distance from said first line of intersection, and when said removable spacer plate is engaged with said body, said tool may be guided along said third and fourth surfaces by said front edge of said body and said lip of said spacer plate, respectively, so that said cutting means severs sheet material applied

to said third surface at said second uniform predetermined distance from said second intersection.

5,410,814

## BABY BOTTLE NIPPLE OPENER

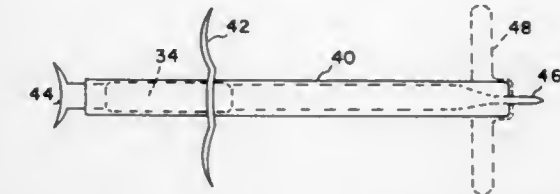
Francis A. Caban, 2727 W. Dr. M. L. King, Jr. Blvd., Suite 620, Tampa, Fla. 33607

Filed Sep. 7, 1993, Ser. No. 123,158

Int. Cl.<sup>6</sup> B26F 1/00

U.S. Cl. 30—368

20 Claims



1. A hand-operated device for making an opening of a predetermined size in a tip of a baby bottle nipple, the device comprising:

a generally tubular housing having a first end with a first opening therein, said first end having a hemispheric shape corresponding to the interior of a baby bottle nipple so that a baby bottle nipple may be conformably placed on said housing first end with a tip of the baby bottle nipple covering said first opening;

a lancet carried within said housing and having a first end that may be moved along a longitudinal axis of said housing and extended through said first opening, said lancet first end having a blade for piercing a baby bottle nipple; engaging means in said housing for controlling movement of said lancet through said housing so that said blade may be extended a predetermined distance from said housing first end and so that the size of an opening made in a baby bottle nipple may be controlled; and

grasping means attached to said housing for holding said device with one hand.

5,410,815

## AUTOMATIC PLAYER IDENTIFICATION SMALL ARMS LASER ALIGNMENT SYSTEM

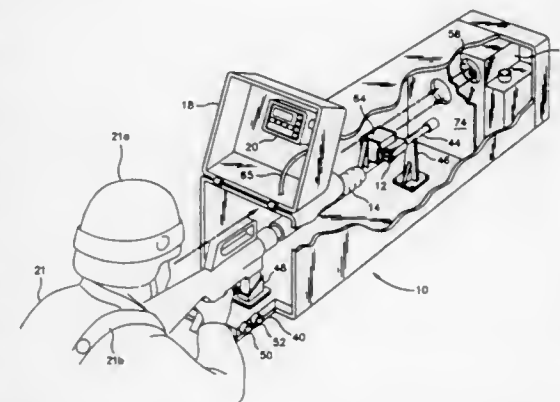
Himanshu Parikh, San Diego, and Fritz W. Healey, Carlsbad, both of Calif., assignors to Cubic Defense Systems, Inc., San Diego, Calif.

Filed Apr. 29, 1994, Ser. No. 237,717

Int. Cl.<sup>6</sup> F41G 1/54

U.S. Cl. 33—234

20 Claims



1. A system for automatic boresight alignment of a laser transmitter mounted to a small arms weapon, the laser transmitter having a laser energizable to emit a laser beam and being



adjustable to steer the laser beam in azimuth and elevation, the system comprising:

- a base unit;
- first optical means mounted to the base unit for generating an image of a target reticle visible to a user;
- means mounted to the base unit for supporting the weapon and enabling the user to adjust an azimuth and an elevation of the weapon to aim the weapon at the image of the target reticle and for holding the weapon in an aimed position;
- alignment head means connectable to the laser transmitter for adjusting the transmitter to steer the laser beam in azimuth and elevation;
- second optical means mounted to the base unit for receiving the laser beam and for generating an error signal representative of a displacement between a received location of the laser beam and the image of the target reticle; and
- control circuit means connected to the alignment head means and the second optical means for energizing the laser and adjusting the laser transmitter utilizing the error signal to steer the laser beam in azimuth and elevation until the laser beam is substantially aligned with a bore-sight of the weapon.

5,410,816

## TILE, ANGLE-CUTTING GAUGE

Joseph Ruggiero, 509 E. Broadway, Port Jefferson, N.Y. 11777

Continuation of Ser. No. 113,075, Aug. 30, 1993, Pat. No.

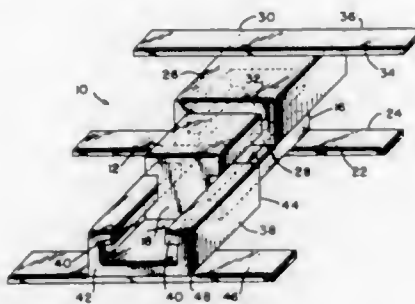
5,361,508. This application Aug. 23, 1994, Ser. No. 294,408

The portion of the term of this patent subsequent to Nov. 8, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> G01B 5/00

U.S. Cl. 33—527

5 Claims



1. A tile, angle-cutting gauge, comprising:
  - a body having a longitudinal axis, and a straight-edged member extending perpendicular to said axis;
  - a first slide block coupled only to an upper portion of said body, and having a second straight-edged member extending perpendicular to said axis; and
  - a second slide block coupled only to a lower portion of said body, and having a third straight-edged member extending perpendicular to said axis; wherein
  - said first and second slide blocks are substantially identical, and are movable, relative to said body, into a fully surmounting alignment of one of said blocks with the other thereof;
  - said body has a leading end and a trailing end; and
  - said leading end comprises an abutment.

5,410,817

## MEASURING TOOL WITH CONCENTRIC POINT

William S. Kiah, 14045 Heritage, Riverview, Mich. 48192

Filed May 18, 1993, Ser. No. 63,408

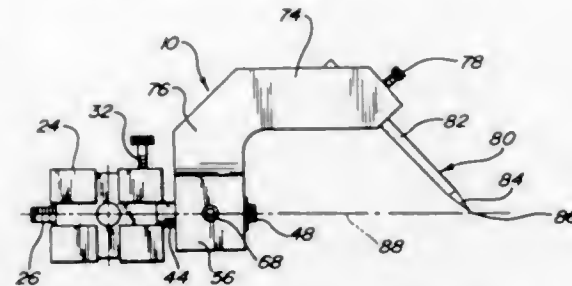
Int. Cl.<sup>6</sup> G01B 5/20

U.S. Cl. 33—559

16 Claims

1. A measuring tool, comprising:
  - means for coupling the measuring tool to a machine;
  - a selectively rotatable stylus retainer having a base portion

- including an axial bore and a branched arm portion extending from the base portion;
- a shaft which extends between the stylus retainer and said means for coupling the measuring tool to a machine disposed along a central axis; and



- a substantially linear stylus which extends from the stylus retainer at a 45° angle relative to the central axis, said stylus being selectively adjustable along said 45° angle and settable to terminate at the central axis such that a contact point for contacting the workpiece falls concentrically on the central axis.

5,410,818

## SCROLL CHAMFER GAUGE

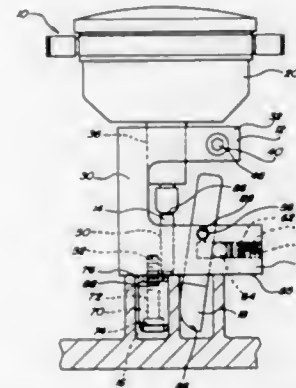
Daniel C. Chalk, Springboro, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Filed Jun. 25, 1993, Ser. No. 83,104

Int. Cl.<sup>6</sup> G01B 5/24

U.S. Cl. 33—833

19 Claims



1. A chamfer gauge for directly measuring a chamfer located between a first and a second surface, said chamfer gauge comprising:
  - means for locating said gauge with respect to said first surface;
  - means for locating said gauge with respect to said second surface;
  - probe means for locating the intersection of said chamfer with said second surface while said gauge is positioned by said means for locating said gauge with respect to said first surface and said means for locating said gauge with respect to said second surface; and
  - means associated with said probe means for directly indicating the axial length of said chamfer along said second surface.

5,410,819

## MOUNTING SYSTEM FOR PAPER DRYER NOZZLE BOX

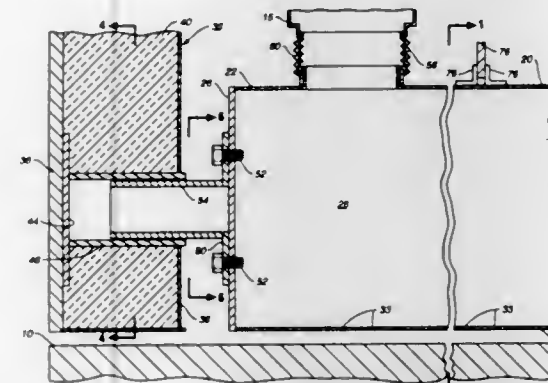
John R. Joiner, Vancouver, Wash., assignor to James River Paper Company, Inc., Richmond, Va.

Filed Mar. 18, 1994, Ser. No. 214,450

Int. Cl.<sup>6</sup> F26B 11/02

U.S. Cl. 34—122

10 Claims



1. In a Yankee dryer including a rotatable dryer drum having a paper web support surface for transporting a paper web in the machine direction upon rotation of the dryer drum and a hood having a hood interior at least partially encompassing said dryer drum, apparatus comprising, in combination:

- a nozzle box including nozzle box side walls and nozzle box end walls defining a nozzle box interior, said nozzle box defining at least one exit opening between said nozzle box end walls for directing heated air from the nozzle box interior toward said dryer drum paper web support surface;
- support walls for supporting said nozzle box at a location adjacent to said dryer drum with said nozzle box extending in the cross-machine direction, said support walls comprising two opposed support walls adjacent to and spaced from said nozzle box end walls; and
- interconnection means interconnecting said support walls and respective nozzle box end walls to maintain said nozzle box at said location, said interconnection means comprising projections having distal ends extending between said support walls and said nozzle box end walls and a receptacle for receiving each said projection distal end and allowing end-wise movement of said nozzle box end walls relative to said support walls responsive to expansion and contraction of said nozzle box due to changes in temperature of said nozzle box.

5,410,820

## HINGED SHOE SOLE ASSEMBLY FOR FIXED AND VARIABLE HEEL HEIGHT SHOES

Michael C. Goodman, P.O. Box 1011, Bellflower, Calif. 90706-9998

Continuation-in-part of Ser. No. 934,006, Aug. 21, 1992, which is a continuation-in-part of Ser. No. 702,588, May 17, 1991, abandoned. This application Mar. 11, 1994, Ser. No. 212,342

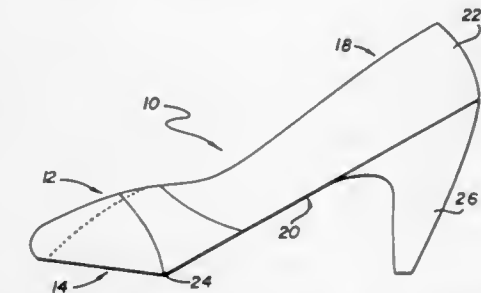
Int. Cl.<sup>6</sup> A43B 13/00, 21/36

U.S. Cl. 36—25 R

4 Claims

1. A shoe having a hinged sole assembly comprising:
  - a forward sole section having an upper surface and a lower surface; and
  - a rigid rear sole section having a substantially planar upper surface and a lower surface; and
  - a hinge connecting said rear sole section to said front sole section in pivotable connection along a straight hinge line, and
  - wherein a reference line passing through the two points of the hinged sole assembly perimeter that are furthest apart defines a longitudinal axis, and wherein a medial reference

line on the medial side of the sole perimeter parallel to the longitudinal axis which passes through the perimeter of the sole at the point furthest from the longitudinal axis defines one point on the sole perimeter through which the hinge line of said hinge passes, and wherein a lateral reference line on the lateral side of the sole perimeter parallel to the longitudinal axis which passes through the perimeter of the sole at the point furthest from the longitudinal axis defines the other point on the sole perimeter through which the hinge line of said hinge passes, and



wherein said rear sole section has a high heel attached to the rear of the bottom surface of said rear sole section such that when the shoe sole assembly is resting upright on level ground, the difference in height above said ground of the highest point on the upper surface of said rear sole section and the lowest point on the upper surface of said rear sole section is at least one inch and not more than five inches.

5,410,821

## SHOE WITH INTERCHANGABLE SOLES

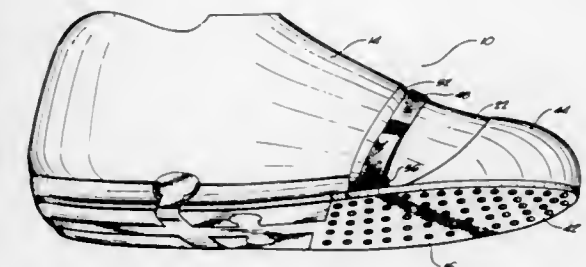
Eric Hilgendorf, 3500 Tanglebrush #188, The Woodlands, Tex. 77380

Filed Jan. 21, 1992, Ser. No. 822,666

Int. Cl.<sup>6</sup> A43B 13/36

U.S. Cl. 36—100

12 Claims



1. A shoe comprising:
  - a shoe upper having an interior for receiving a human foot, said shoe upper having a bottom surface formed thereon, said shoe upper having a toe area formed therein;
  - a slotted member formed on an exterior surface of said shoe upper, said slotted member formed on a back outer surface of said shoe upper opposite said toe area and above said bottom surface, said slotted member extending upwardly from an end of said bottom surface, said slotted member comprising a first quartercircle having an indentation formed adjacent said shoe upper and a second quartercircle facing said first quartercircle, said second quartercircle having another indentation formed adjacent said shoe upper, said first and second quartercircles having a slot extending therebetween;
  - a removable sole affixed across a forward portion of the bottom surface of said shoe upper, said removable sole having a toe receptacle for slidably fitting against and over said toe area of said shoe upper; and

locking means formed on said removable sole for fastening said sole to the bottom surface of said shoe upper, said locking means connected to said removable sole so as to cause tension on said sole rearward of said toe receptacle, said locking means comprising:

a longitudinal strut extending toward said slotted member along the bottom surface of said shoe upper, said longitudinal strut having an end engaging said slotted member so as to tension said removable sole.

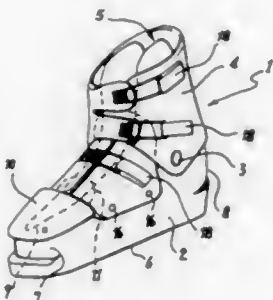
5,410,822

**SKI BOOT WITH TOE PIECE AND OVERLAPPING FLAP**  
 Franco Vaccari, Montebelluna, Italy, assignor to Dolomite S.p.A., Montebelluna, Italy  
 Continuation of Ser. No. 137,277, Oct. 14, 1993, abandoned.  
 This application Sep. 30, 1994, Ser. No. 316,389  
 Claims priority, application European Pat. Off., Oct. 16, 1992, 92830576

Int. Cl.<sup>6</sup> A43B 5/04

U.S. Cl. 36—117

7 Claims



1. A sport shoe comprising:

- a shell having longitudinally opposed toe and heel regions, an instep region, an entrance port, and a notch formed in the instep region extending from said entrance port to the vicinity of the toe region,
- a bootleg encircling said entrance port, and
- closure means for partially covering said notch,
- said closure means comprising, at said toe region, a toe piece having an inner and outer surface, said inner surface directly overlying the shell in substantially mating contact with the toe region, said toe piece having a lug projecting towards said heel region,
- said closure means further comprising, at said instep region, intermediate between said toe region and said entrance port, at least one flap bridging said notch and fastened onto said shell so as to close said notch, said at least one flap partially extending under said bootleg and said lug of said toe piece intervening in use between the said at least one flap and the shell to clamp said toe piece onto the shell through said flap.

5,410,823

**REPLACEABLE GOLF CLEAT**

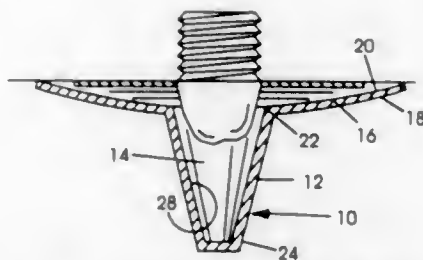
Simon J. Iyoo, 8605 Golf Ridge Dr., Charlotte, N.C. 28277  
 Filed Jan. 26, 1994, Ser. No. 187,095  
 Int. Cl.<sup>6</sup> A43C 15/00

U.S. Cl. 36—127

21 Claims

1. A spike structure for attachment to the outer, earth-engaging surface of a worn spike on the sole of a shoe, comprising:
- a spike member having a base and a tip;
  - a flange having an upper surface and a lower surface depending from and extending outwardly from, said base of said spike member;
  - a cavity in the spike structure adapted for receiving the nub of the worn spike; and
  - means for permanently attaching the spike structure to the

worn spike, said means for permanently attaching being an adhesive positioned on an inner portion of the cavity and



flange so as to create a bond between the spike structure and the worn spike.

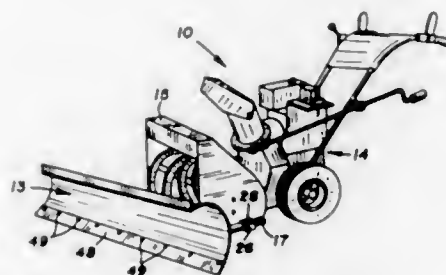
5,410,824

**ADAPTABLE SNOW SCRAPER**

Donald A. Pedersen, 6222 Elinor St., Duluth, Minn. 55807  
 Filed Dec. 3, 1993, Ser. No. 161,166  
 Int. Cl.<sup>6</sup> E01H 5/09

U.S. Cl. 37—242

24 Claims



1. A material scraping apparatus for removing material from a surface comprising: a snowblower, the snowblower having a housing with a first upright wall, and a second upright wall transversely spaced from the first upright wall, skid plates located adjacent said upright walls, fastener means extended through the walls coupling the skid plates to the housing, a frame mounted on the housing, the frame including laterally adjustable means to fit different sized snowblower housings, a plate mounted on the frame for rotation about an axis vertically disposed relative to the frame, a plow secured to the plate and having a blade for scraping material from a surface, means co-operating with the frame and plate to limit rotation of the plate and hold the plow in a selected position relative to the frame, and coupling means mounted on the first and second upright walls of the housing with the fastening means and operable to releasably couple the frame to the housing and hold the skid plates above the surface when the blade scrapes material from the surface whereby the blade is maintained in engagement with the surface.

5,410,825

**SELF-PROPELLED SNOWTHROWER**

Michael J. Perrelli, 312 N. Wrexham Ct., Tonawanda, N.Y. 14150

Filed Oct. 25, 1993, Ser. No. 140,485

Int. Cl.<sup>6</sup> E01H 5/09

U.S. Cl. 37—254

5 Claims

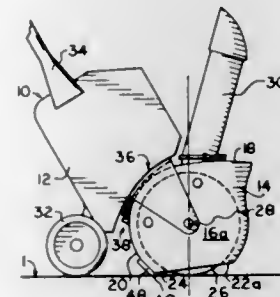
1. An improved snowthrower comprising:
- a body;
  - a housing connected to said body, said housing including a pair of spaced side walls, a rear wall, and a top wall cooperating to define a downwardly and forwardly projecting snow-receiving opening for said housing;
  - a chute opening through said top wall;
  - an auger carried by an axle mounted between said side walls

for rotation about an axis, said auger extending partially downwardly through said snow-receiving opening for engagement with the ground;

drive means for rotating said auger to propel said snowthrower forward by continuous engagement of said auger with the ground and throwing snow from said housing through said chute;

a laterally extending bottom scraper edge carried by said rear wall; and

biasing means for biasing said scraper edge for continuous contact with the ground, while permitting resilient displacement of said scraper edge responsive to ground terrain;



said housing being pivotally connected to said body by a generally U-shaped mounting bracket, said mounting bracket including a base portion fixed to said body and having opposite ends, and a pair of opposing leg portions extending one from each of said opposite ends, said axle being rotatably journaled by said leg portions, said housing being connected to said mounting bracket between said leg portions for pivotal motion about said axis, and said biasing means being connected to said housing and said mounting bracket for urging said housing about said axis in a first pivotal direction such that said scraper edge is biased for continuous contact with the ground, whereby a gap is prevented from opening between said scraper edge and the ground during forward motion of said snowthrower.

5,410,826

**ASSEMBLY AND METHOD FOR TOOTH TIP RETENTION**

Darryl R. Immel, Waterford; Andrew P. Dretzka, Cudahy, and Harvey J. Kallenberger, Wind Lake, all of Wis., assignors to Harnischfeger Corporation, Milwaukee, Wis.

Filed Mar. 1, 1993, Ser. No. 24,393

Int. Cl.<sup>6</sup> E02F 09/28

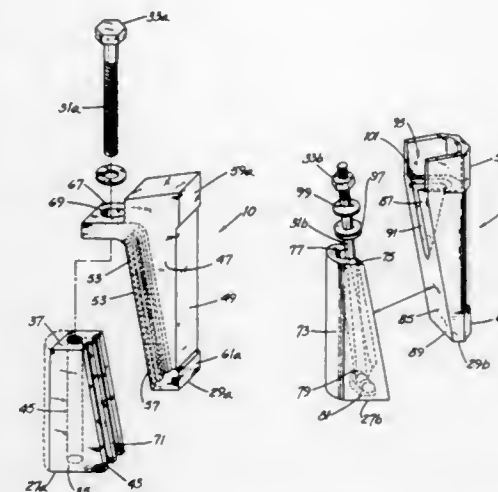
U.S. Cl. 37—457

17 Claims

1. In a digging tooth assembly having first and second wedged members retaining a digging tooth tip on a tooth base, the tooth tip having an underside, the improvement comprising:

- a tension member coupled to the first member and engaging the second member;
- the second member has a pair of protrusions straddling the base and bearing against a respective pair of surfaces of the tooth tip for retaining such second member at a position with respect to such base and for urging the tip against the base;
- the tension member has an adjustable effective length, and wherein:
- the tip is a sleeve-type tip;
- the wedged members are retained in a hole extending downward from the top of the tip;

the wedged members are drawn into wedged engagement with one another by the tension member; the hole has a top end; and



the wedged members are configured to be withdrawn through such top end without having access to the underside of the tooth tip.

5,410,827

**WINDOW BADGE**

Leslie P. Smith, 66 Ormond Avenue, Hampton, Middlesex TW12 2RX, England

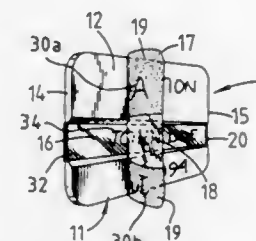
Filed Jan. 28, 1993, Ser. No. 10,115

Claims priority, application United Kingdom, Jan. 31, 1992, 9202051

Int. Cl.<sup>6</sup> A44C 3/00

U.S. Cl. 40—1.5

4 Claims



4. A window badge comprising:
- a substrate having an elongate channel therein;
  - a see-through panel having a front surface and a rear surface, said rear surface being united with said substrate and bridging the channel such that opposite ends of the channel are open;
  - an elongate strip having indicia thereon, said strip being slidable longitudinally of the channel so that the indicia are visible through said panel and said strip being adapted to be united with said substrate so as to locate said strip relative to said substrate; and
  - wherein said strip is longer than the channel and opposite end portions of said strip are provided with adhesive and adapted to be folded and united with said substrate.



5,410,828

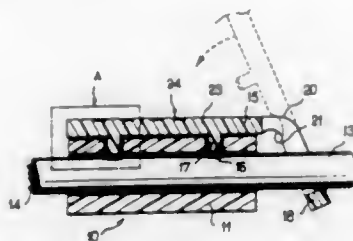
**IDENTIFICATION DEVICE FOR A CONDUCTOR**  
Jean-Marie Millet, Ruffey Les Echirey, and Daniel Makuc,  
Dijon, both of France, assignors to Telemecanique, Rueil-Malmaison, France

Filed Jan. 19, 1993, Ser. No. 6,130

Claims priority, application France, Jan. 22, 1992, 92 00684  
Int. Cl.<sup>6</sup> G09F 3/00

U.S. Cl. 40—316

8 Claims



1. Identification device for a conductor, pipe or cable having a jacket, comprising:

- a sleeve-shaped support having therethrough an axial passage shaped to fit around a jacket of a cable to be identified, and
- a stopping element, which carries at least one identifying element and which is firmly attached to the sleeve-shaped support, said stopping element including a hook formed at one end of the stopping element as a resilient link in order that the hook in a working position surrounds at least a portion of a circumference of a jacket received in said axial passage at a location where the hook in the working position is forced against the portion of the circumference of the jacket so that axial motion of the sleeve-shaped support is stopped, and wherein the stopping element is attached in a detachable manner to the sleeve-shaped support by at least one sufficiently long stud means for penetrating forcibly through a bore extending through the sleeve-shaped support.

5,410,829

**DISPLAY ARRANGEMENTS**

Frank Schwab, Starzach, and Thomas Wahr, Balingen/Hesselwangen, both of Germany, assignors to Kerstin Schwab, Starzach, Germany

Filed Aug. 27, 1992, Ser. No. 938,006

Claims priority, application United Kingdom, Aug. 30, 1991, 9118666

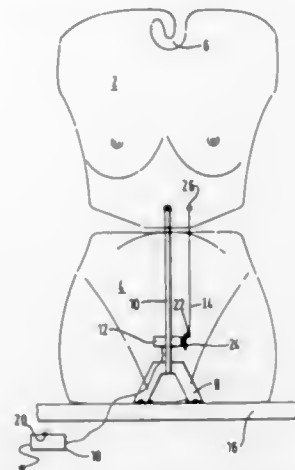
Int. Cl.<sup>6</sup> G09F 19/08

U.S. Cl. 40—414

11 Claims

1. A clothing display arrangement for supporting clothing to be displayed, the arrangement comprising:
- a lower hip-shaped torso display portion;
  - a support upstanding from and fixed relative to said lower hip-shaped torso display portion;
  - an upper chest-shaped torso display portion;
  - pivotal means pivotally supporting the upper chest-shaped display portion on the support for pivotal movement about a pivotal axis; and

drive means coupling said lower hip-shaped display portion to said upper chest-shaped display portion to cause said



upper chest-shaped portion to oscillate about said pivotal axis.

5,410,830

**SCROLLING SIGN FOR MENU DISPLAY UNIT**

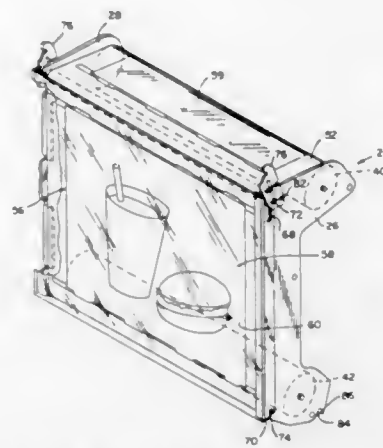
Robert B. Aiken, Sr., Mequon, Wis., assignor to Milwaukee Sign Co., Grafton, Wis.

Filed Apr. 8, 1992, Ser. No. 865,115

Int. Cl.<sup>6</sup> G09F 11/18

U.S. Cl. 40—518

18 Claims



1. A scrolling web sign mechanism for selectively displaying any of a variety of graphic and alpha-numeric display panels in a format permitting ready changeover of the panels, the sign mechanism comprising:

- a frame having sides, an open front, and a back for defining a display window between the sides, said display window having spaced apart edges;
- an elongated, flexible web having opposite ends and side edges adapted for substantially spanning the spaced apart edges of the window;
- at least one display panel;
- a pair of rollers, one of said rollers being mounted in the frame for rotation about an axis on either side of the window, each of said rollers being adapted for receiving one of said ends of the web, the rollers adapted to be rotated for scrolling the web past the window as the web is unwound from one of said rollers and wound on the other of said rollers; and
- mounts secured to the web and adapted for releasably securing the panel to the web, said mounts comprising a plural-

ity of spacers mounted in a spaced apart relationship on said web on a line parallel to the axes of said rollers for defining a plurality of gaps between adjacent spacers and an elongate strip secured to the spacers for defining a channel between the web and the strip in the gaps between adjacent spacers, said display panel including substantially U-shaped fasteners mounted on the display panel and adapted to be loosely received in the channel, whereby the display panel can move relative to the web in a direction substantially parallel to the edges of said window.

5,410,831

**EXTRACTORS FOR AUTOMATIC PISTOLS**

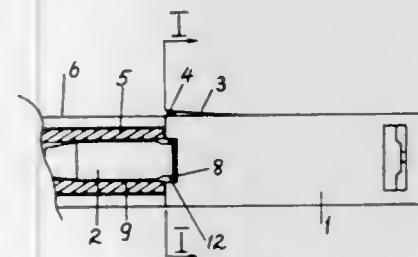
Edward K. Feik, 126 Skye Pt Rd, Coal Point NSW 2283, Australia

Filed Aug. 22, 1994, Ser. No. 293,458

Int. Cl.<sup>6</sup> F41A 9/53, 15/10

U.S. Cl. 42—25

2 Claims



1. An extractor as fitted to an automatic pistol comprising:
- a frame and a slide with a breech block at the rear and slideable on the frame;
  - a barrel with the slide over said barrel forming a cartridge chamber;
  - and the extractor with a claw and a coloured dot embodied in said extractor, said extractor positioned at the front face and on the side of the breech block for extracting a cartridge, said extractor is provided with an apex and a radius on its claw so that when the cartridge is being loaded into the chamber the extractor is being forced out to the side to protrude out of the breech block when the cartridge is fully loaded in the chamber, the apex of the claw engaging a cartridge with a groove, said groove having a high point thereby exposing the coloured dot, which is clearly visible and indicating that the chamber is loaded.

5,410,832

**WEAPON CHAMBER SAFETY PLUG KIT**

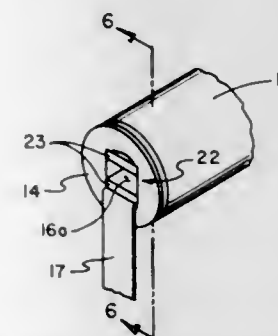
Terry L. Barnhart, 2828 Wildwood Cir., Odessa, Tex. 79761

Filed Feb. 18, 1994, Ser. No. 199,005

Int. Cl.<sup>6</sup> F41A 17/44

U.S. Cl. 42—70.11

5 Claims



1. A weapon chamber safety plug kit comprising:
- a plug member having a cylindrical body portion, with the body portion arranged for reception within a firearm

chamber, the body portion having a rear wall and being symmetrically oriented about a longitudinal axis, the rear wall being orthogonally oriented relative to the axis, with the rear wall having a rear wall recess located medially of the rear wall for receiving a fire pin therewithin; and, a substantially flat, flexible flag strip extending from the rear wall and substantially orthogonally relative to said longitudinal axis for passing through a tortuous passage of a firearm and projecting both laterally and exteriorly of said firearm when said firearm chamber is closed.

5,410,833

**RECOIL ABSORBING FIREARM STOCK**

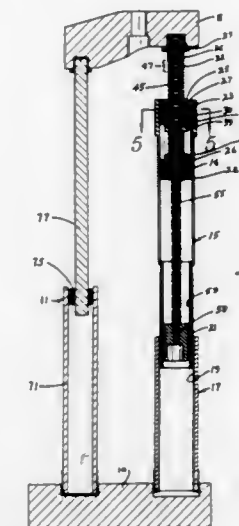
Douglas F. Paterson, 1002 Sun Dr., Colorado Springs, Colo. 80906

Filed Jul. 16, 1993, Ser. No. 92,699

Int. Cl.<sup>6</sup> F41C 23/06, 23/14

U.S. Cl. 42—73

8 Claims



1. A gun stock for absorbing recoil energy in a shoulder firearm having a receiver and firing chamber, comprising,
- a stock butt portion,
  - a stock grip portion attached to the receiver of the firearm, at least one compressible first strut interconnecting the butt portion and the grip portion and carrying compressible spring means to absorb the recoil energy, said first strut comprising cylinder means having one end thereof secured to the stock butt portion,
  - a tubular shaft telescopically disposed within the cylinder means and where one end thereof emerges from the cylinder means and is attached to the stock grip portion,
  - plug means disposed within the cylinder means intermediate its ends,
  - a rod having first and second ends disposed within the cylinder means where said first end is secured to the plug means and the second end is disposed within the said tubular shaft
  - a stack of compressible disc shaped springs disposed within said tubular shaft and circumscribed around the rod between the stock grip portion and the plug means.

5,410,834

## RIFLE WITH INTERCHANGEABLE BARREL

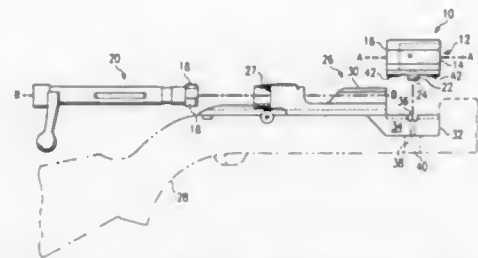
Michael E. Benton, Rte. #6, P.O. Box 972, Cleburne, Tex. 76031, and Robert C. Brown, P.O. Box 1751, Tallulah, La. 71282, assignors to Michael Edward Benton, Cleburne, Tex. and Robert Charles Brown, Tallulah, La.

Filed Aug. 5, 1993, Ser. No. 102,583

Int. Cl.<sup>6</sup> F41A 21/48

U.S. Cl. 42—75.02

16 Claims



1. A receiver block for easy attachment and removal of a barrel on a rifle having a fixed bolt guide assembly, said receiver block comprising:

- (a) a wall defining a receiver block having a generally cylindrical passageway therethrough having first and second ends and an axis therethrough;
- (b) said first end of said passageway being adapted to receive the barrel;
- (c) said second end of said passageway containing at least one locking lug extending partially into said passageway; and
- (d) alignment structure on said receiver block for removably mounting and aligning said receiver block on said bolt guide assembly.

5,410,835

## FIREARM BIPOD

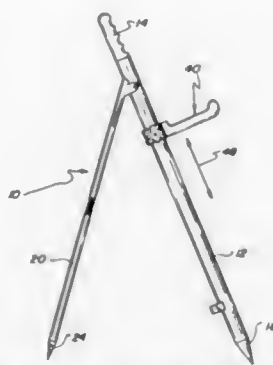
W. Moray Vetter, P.O. Box 633, Moorefield, W. Va. 26836

Continuation-in-part of Ser. No. 731,945, Jul. 18, 1991, Pat. No. 344,566. This application Dec. 27, 1993, Ser. No. 172,924

Int. Cl.<sup>6</sup> F41C 29/00

U.S. Cl. 42—94

10 Claims



10. A new and improved firearm bipod comprising:
- an elongated first strut having a top end and a bottom end and a first longitudinal axis,
  - an elongated second strut having a top end and a bottom end and a second longitudinal axis,
  - means for connecting said first strut to said second strut such that said top end of said second strut engages said first strut proximal to the top end thereof and said first axis intersects said second axis, and
  - arm means extending from either said first strut or said second strut for providing support for a firearm, said arm means extending from said first or second strut at a loca-

tion thereon below said intersection of said first and second axis.

5,410,836

## FLY FISHERMAN'S LURE HOLDER

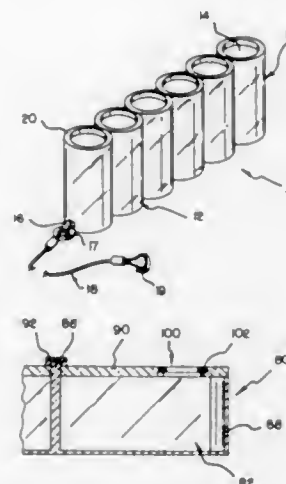
Richard A. Hardy, 8828 Pecan Cir., West Jordan, Utah 84088

Filed Jan. 13, 1994, Ser. No. 181,301

Int. Cl.<sup>6</sup> A01K 97/06

U.S. Cl. 43—57.1

2 Claims



1. A new and improved fly fisherman's lure holder for holding fishing lures and permitting selection and extraction of a single lure using one hand comprising:

- a multiplicity of permanently adjoined elongated tubular structures each having an open top portion, a central portion, and a closed end bottom portion wherein said tubular structures are of sufficient inside diameter and length to accommodate a variety of fishing lures individually,
- said multiplicity of permanently adjoined tubular structures comprising at least three transparent plastic tubes with circular cross-sections, the closed end of said tubular structures being perforated with one or more holes having a maximum perforation dimension substantially smaller than the tubular structure bore diameter,
- a multiplicity of annular permanent magnets individually affixed to a step in the open top portion of each said tubular structures,
- an eyelet affixed to at least one adjoined tubular structures,
- a means for disposition of said tubular structures upon the clothing worn by humans while practicing fishing, said disposition means engaging said eyelet,
- said means for disposition upon the clothing of a fisherman comprising a strap having a first end portion, a central portion, and a second end portion wherein, the first end portion comprising a fixed Loop engaging an eyelet of the tubular structures, the central portion comprising an elongated strap, and the second end portion comprising a hook for attachment to the clothing worn by the fisherman wherein said hook can only be engaged or disengaged by the intentional action of a human.

5,410,837

## ONE WAY ANIMAL PEST TUNNEL

Charles Kazzyk, P.O. Box 8045, Saddle Brook, N.J. 07662

Filed May 27, 1993, Ser. No. 68,551

Int. Cl.<sup>6</sup> A01M 23/00

U.S. Cl. 43—66

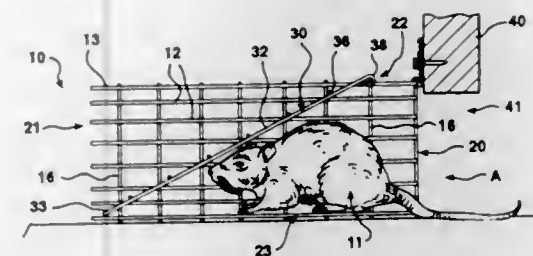
8 Claims

4. A tunnel for permitting passage of an animal pest through the tunnel in one direction but preventing the return of an animal pest in the opposite direction comprising:

a cylindrical wire mesh tunnel having longitudinal and circumferential members, the tunnel having a top, a bottom, a first end and a second end, the first and second ends being open;

tunnel attachment means for attaching the tunnel to a hole in a structure, the tunnel attachment means including a hole cover fastened to the structure, an aperture formed in the hole cover and means for attaching the tunnel to the hole cover;

a door attached within and extending across the cylindrical tunnel;



door attachment means for attaching the door within and across the tunnel;

biasing means for biasing the door in a closed position across the tunnel;

wherein an animal pest can enter the first end of the tunnel and proceed through the tunnel, past the tunnel door by pushing the door against its bias to open the door, but the animal pest cannot pass through the tunnel in the opposite direction because it cannot overcome the bias of the door.

5,410,838

## TREE STAND CONTAINER

Phyllis C. O'Leary, and Michael F. O'Leary, both of 79 Seward St., San Francisco, Calif. 94114

Filed Nov. 25, 1992, Ser. No. 981,872

Int. Cl.<sup>6</sup> A47G 7/02

U.S. Cl. 47—40.5

15 Claims



1. A portable container for holding water for a cut tree, wherein a tree is maintained in an upright position within said container by a tree base having horizontal support members disposed on the lower end of the tree, the container comprising a plurality of integrally connected container segments extending radially from a central portion of said container, each of said container segments having a generally rectangular shape with a horizontal bottom surface and side walls extending generally vertically from said bottom surface and tapered slightly outwardly therefrom, the side walls of said container segments being coextensive with exterior side walls of said container, said container forming a top opening to receive a tree base formed from horizontal support members and capable

of maintaining said base and the lower end of a cut tree in water, said container having an inner watertight surface extending along said bottom surface and said side walls and further comprising a plurality of removable lids disposed on the upper end of said side walls, each of said lids comprising a flat top surface shaped to substantially cover the top opening of one of said container segments and a flange depending downwardly along the outer edges of said top surface.

5,410,839

## CHRISTMAS TREE WATERING FUNNEL WITH INDICATING LIGHT AND FLOAT

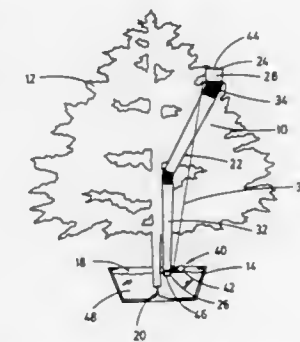
Hugh A. Granger, 1615 S. Pacific, Fullerton, Calif. 92633

Filed Jul. 18, 1994, Ser. No. 283,202

Int. Cl.<sup>6</sup> A47G 7/02

U.S. Cl. 47—40.5

17 Claims



1. An apparatus for maintaining a water supply in a stand supporting a cut plant comprising:
- a rigid conduit comprising a top portion integrally formed to a bottom portion, said top portion having a diameter greater than the diameter of the bottom portion;
  - a float assembly pivotally affixed to the bottom portion of said conduit, said float assembly including a float body adapted to float on the surface of the water supply in said stand;
  - a light assembly affixed to the top portion of said conduit and coupled to said float assembly, said light assembly including a light source activated by movement of said float assembly, said float assembly activating said light source when the water supply in said stand drops below a desired minimum level; and
  - a connecting member affixed to said float assembly and said light assembly for coupling said float assembly to said light assembly.

5,410,840

## PROCESS FOR PRODUCING A SUPPORT-FREE VEGETATION MAT, PARTICULARLY FOR ROOF GREENING

Gilbert Loesken, Uetersen, Germany, assignor to aktual Bauteile und Umweltschutz Systeme, GmbH & Co. KG, Tornesch, Germany

Filed Jan. 25, 1994, Ser. No. 187,394

Claims priority, application European Pat. Off., Jan. 27, 1993, 93101164

Int. Cl.<sup>6</sup> A01G 9/02

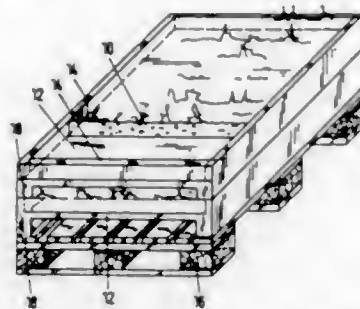
U.S. Cl. 47—58

12 Claims

1. A method of producing a vegetation mat which is free of support comprising the steps of providing a plurality of substrate units, each having first raised edges which are stackable and an additional edge, growing a vegetation mat segment on



each of said plurality of substrate units, stacking said substrate units, transporting said units to a use location and sliding said



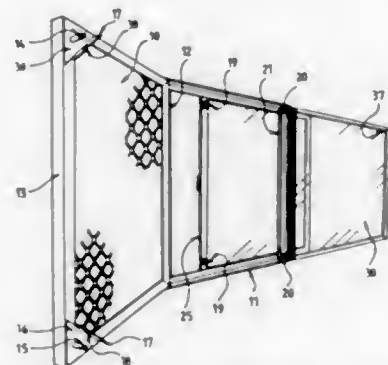
vegetation mat segment from said units via said additional edge to form said vegetation mat.

5,410,841

**SLIDING DOOR AND WINDOW SECURITY MEANS**  
Patrick W. Harris, and Maureen A. Harris, both of 15 Woodland Crescent, North Buderim, Queensland, 4556, Australia  
Filed Apr. 15, 1994, Ser. No. 228,515  
Int. Cl.<sup>6</sup> E05B 65/04

U.S. Cl. 49—67

11 Claims



1. A security panel release mechanism for a sliding door or window assembly of the type having a pane movable in a frame to an open attitude in which its free edge is spaced from the frame member with which it engages when closed, the opening so exposed being secured by a security panel; characterized in that (1) the security panel is so mounted that it is movable between a closed position in which it is effective to prevent access to the opening and an open position in which the opening is available as an emergency exit, (2) the security panel is normally held in the closed position by lock means retaining the security panel adjacent the pane frame, and (3) the pane is fitted with lock release means normally ineffective so that the pane opening and closing functions are available, but adapted to be rendered operative in an emergency whereby sliding movement of the pane causes its lock release means to render the security panel lock means inoperative to free the security panel for movement to its open position.

5,410,842

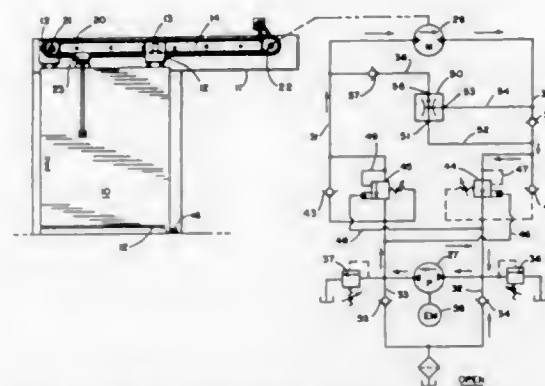
**TWO SPEED HYDRAULIC DOOR OPERATOR**  
Joel W. Watson, Oconomowoc, Wis., assignor to ASI Technologies, Inc., Milwaukee, Wis.  
Filed Nov. 12, 1993, Ser. No. 152,623  
Int. Cl.<sup>6</sup> E05F 15/02

U.S. Cl. 49—360

10 Claims

1. In a door operator having a hydraulic system for opening and closing the door including a reversible hydraulic motor connected to a pump through a pair of hydraulic lines that are selectively connected to the output of the pump to drive the

motor in one direction to open the door and in an opposite direction to close the door, the improvement wherein: a bypass valve assembly is connected across the hydraulic



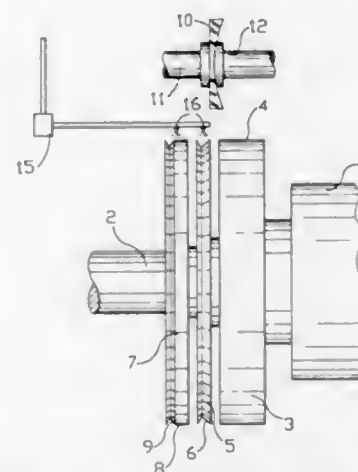
lines between the pump and motor to bypass a portion of the flow from the pump to the motor when the pump output is connected to rotate the motor in a direction that will close the door.

5,410,843

**PROCESS FOR FINISHING THE EDGE OF CORRECTIVE LENSES MADE OF PLASTIC**  
Lutz Gottschald, Meerbusch, Germany, assignor to Wernicke X Co. GmbH, Düsseldorf, Germany  
Filed May 16, 1991, Ser. No. 701,675  
Int. Cl.<sup>6</sup> B24B 9/14

U.S. Cl. 450—43

5 Claims



1. Process for finishing the edges of a corrective lens made of thermoplastic material or of a mixture of thermoplastic and thermosetting plastic materials, including a dry first profiling step using a relatively rough grinding wheel and a dry second profiling step using a relatively fine grinding wheel and a wet third step applying cooling liquid to the contact area between said corrective lens and said fine grinding wheel.

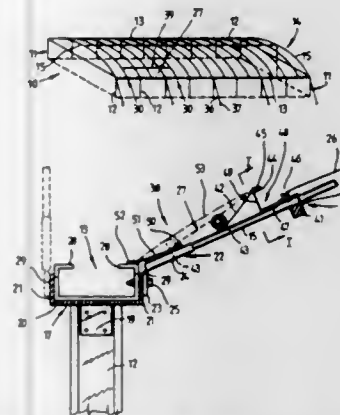
5,410,844

**BUILDING VENT ASSEMBLY**

Gary M. Lynch, "Tallaroak", Mt Cotton Rd., Mt. Cotton, Queensland 4163, Australia  
Continuation-in-part of Ser. No. 394,660, Aug. 16, 1989, Pat. No. 5,140,788. This application Aug. 19, 1992, Ser. No. 931,979  
Claims priority, application Australia, Aug. 16, 1988, P19880  
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.  
Int. Cl.<sup>6</sup> A01G 15/00

U.S. Cl. 52—63

17 Claims



1. A building of the type having a roof comprising a roof frame assembly terminating at one side of said building at a side frame member extending longitudinally of said building, said roof supporting:  
a vent assembly adjacent said side frame member, said vent assembly including:  
a further frame member supported on said roof frame assembly at a position spaced from and extending substantially parallel to said side frame member;  
a vent opening into said building between said side and further frame member; and  
vent closing means secured to said further frame member and movable to open and close said vent opening.

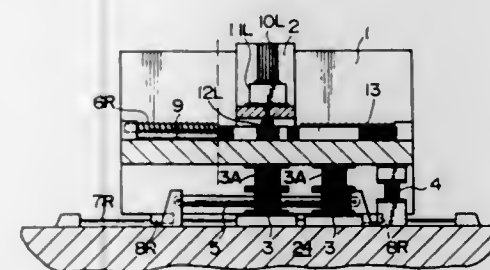
5,410,845

**VIBRATION CONTROL DEVICE FOR STRUCTURE**

Mitsuo Sakamoto; Norihide Koshika; Isao Nishimura; Katsuyasu Sasaki, and Satoshi Orui, all of Tokyo, Japan, assignors to Kajima Corporation, Tokyo, Japan  
Filed Feb. 11, 1993, Ser. No. 16,709  
Claims priority, application Japan, Feb. 14, 1992, 4-028540  
Int. Cl.<sup>6</sup> F04B 1/98

U.S. Cl. 52—167.2

17 Claims



1. In combination, a structure and horizontal vibration control device for said structure comprising:  
a solid first additional mass body having a predetermined mass secured to and movable horizontally relative to the said structure;  
spring means intervened between said structure and said first additional mass body to provide a period for said first

additional mass body which synchronizes with the natural period of said structure;  
a solid second additional mass body supported on said first additional mass body having a predetermined mass and movable horizontally relative to said first additional mass body; and  
drive means mounted on and secured to said solid second additional mass body and drivingly connected to said first additional mass body for applying a control force between said first and second solid additional mass bodies;  
wherein said spring means includes a laminated rubber member sandwiched between and secured to said structure and said first additional mass body, and auxiliary spring means intervened between said structure and said first additional mass body for period adjustment of said first additional mass body.

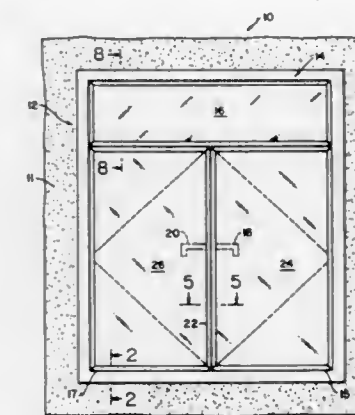
5,410,846

**WINDOW STRUCTURE**

Harry Frambach, 130 Powell Rd., Allendale, N.J. 07401  
Filed Aug. 20, 1993, Ser. No. 109,627  
Int. Cl.<sup>6</sup> E06B 1/04

U.S. Cl. 52—204.5

11 Claims



1. A steel window structure for placement within a masonry opening, said window structure simulating a narrow masonry-to-glass and glass-to-glass sight lines) prevailing in older steel window structures which secured monolithic non-insulating panes of glass;

said steel window structure having means for securing a glass means having at least one pane of glass, said glass means having a thickness in the range between  $\frac{1}{8}$ " and 1"; said steel window structure having a perimeter mainframe, conjoined within said perimeter mainframe are at least one semi T mainframe bar for securing at least one fixed light-glass means and at least one full T mainframe bar for securing at least two operable light glass means;  
said perimeter mainframe having a first frame portion and a second flange-portion, said semi T mainframe bar having a first frame portion and a second flange portion, said semi T mainframe bar and said perimeter mainframe forming a box like structure for securing said fixed light glass means within the perimeter mainframe and said semi T mainframe bar;  
said full T mainframe bar having a first frame portion and a second flange portion, said full T mainframe bar having a left side and a right side, means for securing a first operable light glass means within said left side of said full T mainframe bar within a second box like structure formed by said left side of said full T mainframe bar and said semi T mainframe bar and said perimeter mainframe, means for securing a second operable light glass means within said right side of said full T mainframe bar within a third box like structure formed by said right side of said full T

mainframe bar and said semi T mainframe bar and said perimeter mainframe;  
 said means for securing said operable light glass means including an operable vent bar for each operable light glass means, said operable vent bar having a first frame portion and a second flange portion, said operable vent bar being connected to a hinge structure mounted in an area between said perimeter mainframe and said operable vent bar and/or said semi T mainframe bar and said operable vent bar;  
 said fixed light glass means and said first and second operable light glass means, including exterior moldings connected to the exterior portion of said glass means, and the exterior portion of said second flange portion of said perimeter mainframe, said second flange portion of said semi T mainframe bar, and said second flange portion of said operable vent bar, said moldings simulating a putty slope configuration of said older steel window structures, so that when viewed from the exterior said sight line between said masonry and said fixed light glass means, and the sight lines between said fixed light glass means and said operable light glass means appears as a uniform profile, the sight line distance between the glass means-to-glass means sight line being between a minimum of 1 1/4" and a maximum of 4".

5,410,847

# JUNCTION STRUCTURE BETWEEN STEEL MEMBER AND STRUCTURAL MEMBER

Yasuo Okawa; Akiyoshi Ito; Hiroshi Hayasaka, all of Tokyo; Toshio Saeki; Naoki Tanaka, both of Chofu, and Kiyobumi Sugawara, Sendai, all of Japan, assignors to Kajima Corporation, Tokyo, Japan

Continuation of Ser. No. 805,049, Dec. 11, 1991, abandoned.

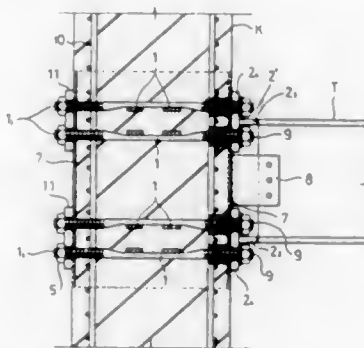
This application Feb. 4, 1994, Ser. No. 192,066

Claims priority, application Japan, Dec. 12, 1990, 2-401568; Dec. 17, 1990, 2-402791; Jan. 18, 1991, 3-004324; Feb. 25, 1991, 3-030002; Mar. 18, 1991, 3-051890; Mar. 18, 1991, 3-051891

Int. Cl.<sup>6</sup> E04B 1/24, 1/58

U.S. Cl. 52—272

38 Claims



1. A junction structure, comprising:
  - a vertical column, said vertical column being a reinforced concrete column;
  - a steel beam to be horizontally connected to the reinforced concrete column, the steel beam having a flange;
  - a plurality of rod-like metal connectors intersecting at right angles with each other in their intermediate portions within an internal portion of the reinforced concrete column, each of said metal connectors having bolt portions at both ends;
  - a coupler having two ends, one end of the coupler being connected to the bolt portion of one of the metal connectors; and
  - a junction hardware to be connected to the flange of the steel beam, the junction hardware being fixed relative to the bolt portion of the metal connector through a second end of the coupler.

5,410,848

# COMPOSITE FOR TURNING A CORNER OR FORMING A COLUMN, MOLD AND METHOD FOR PRODUCING GLAZED UNIT FOR SUCH

John McClinton, Hanover, and Russell P. Rich, Baltimore, both of Md., assignors to The Burns & Russell Company, Baltimore, Md.

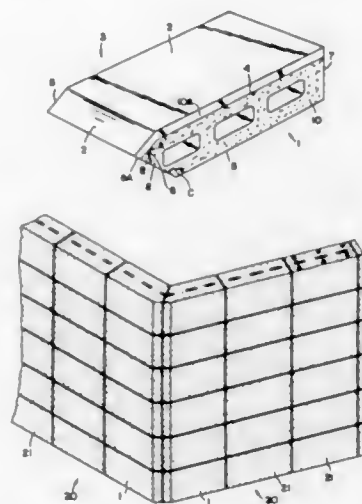
Continuation-in-part of Ser. No. 919,988, Jul. 27, 1992, Pat. No. 5,285,611, which is a continuation-in-part of Ser. No. 795,773, Nov. 21, 1991, Pat. No. 5,212,925. This application Nov. 5, 1992, Ser. No. 971,629

The portion of the term of this patent subsequent to May 25, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> E04C 1/00

U.S. Cl. 52—284

47 Claims



1. A column composite or portion thereof comprising at least two glazed angled masonry building units each having an angled return portion wherein each glazed masonry building unit comprises a front face, a back face, a top face, a bottom face and two side faces wherein said front face is glazed with a resinous composition and is intended to be exposed and comprises a planar portion that is opposite to said back face and a second segment that intersects said planar portion to thereby form an obtuse, acute or right angle and wherein the length of said second segment is shorter than the length of said planar portion;
  - one of said side faces being angled and intersecting said second segment and said back face forming an obtuse angle with said back face and forming an angle with said second segment, and wherein the angled side face of one of the glazed units is opposed to the opposite side face of an adjacent second glazed unit.

5,410,849

# MODIFIED INSULATED PANEL

Michael E. Christopher, Houston, Tex., assignor to Texas Aluminum Industries, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 946,756, Sep. 17, 1992, Pat. No. 5,293,728. This application Mar. 14, 1994, Ser. No. 209,980

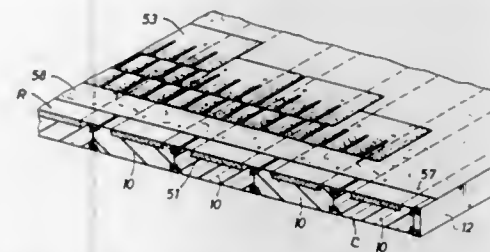
Int. Cl.<sup>6</sup> E04B 7/00, 9/00; E04C 2/00

U.S. Cl. 52—309.2

12 Claims

1. An insulated building panel connectable to a like adjacent second insulated panel to form a roof member for receiving a roofing surface for a building system, the panel comprising:
  - a central core of insulating material including first and second major, lateral, flat surfaces extending between side faces wherein one of said lateral surfaces comprises a roofing surface and the other comprises a ceiling surface,

said roofing surface having a generally rectangular singular recess extending generally across it therein; shingle support member fitted in said recess of said core for receiving and retaining roofing shingle fasteners; and first and second relatively thin, substantially flat and oppositely positioned metallic sheets bonded to said first and second major flat surfaces of the core and to the shingle



support member, the metallic sheets forming male and female side edge connectors adapted to be respectively joined to female and male side edge connectors of a like adjacently positioned panel to form a building system; said central core having a border portion between said recess and said side faces for compressible support of said metallic sheets during their flexure when connecting and disconnecting with like adjacently positioned panels.

5,410,850

# SPACER FOR REINFORCEMENTS

Siegfried Dreizler, Im Hegnach 5, D-7333 Ebersbach, Germany

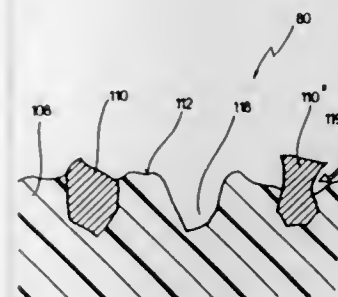
Filed Jun. 18, 1992, Ser. No. 900,126

Claims priority, application Germany, Jun. 19, 1991, 41 20 215.5

Int. Cl.<sup>6</sup> E04C 5/16

U.S. Cl. 52—309.17

10 Claims



1. A spacer for positioning reinforcements, said spacer comprising:
  - a body made of polymer concrete consisting of a cured plastic material having aggregates in the form of grains integrated in and dispersed throughout said plastic material, said body being adapted to be embedded in cementitious material for positioning said reinforcements within and in spaced relation to the exterior surface of said cementitious material;
  - a predetermined surface of said body being characterized by a portion of cured plastic material having been detached from the exterior of said body whereby portions of random ones of said grains are exposed and project from said cured plastic material and whereby random craters are formed in said surface to interlock with said cementitious material and to form a moisture sealed bond.

5,410,851

# SLOTTED FLOOR SLAB FOR THE TWO-STAGE CONSTRUCTION OF LEVEL CONCRETE PLATES

Jose M. Restrepo, Fibril Ltda., A.A. 88745, Santafe de Bogota, D.C., Colombia

Continuation of Ser. No. 888,070, May 26, 1992, abandoned.

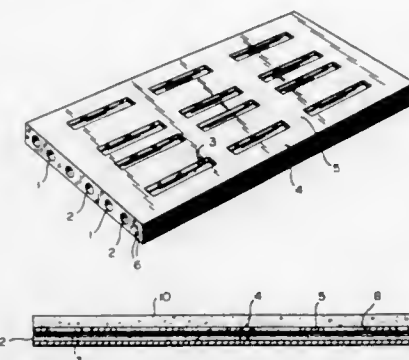
This application Jan. 14, 1994, Ser. No. 181,441

Claims priority, application Argentina, May 28, 1991, 319790

Int. Cl.<sup>6</sup> E04B 1/16

U.S. Cl. 52—381

12 Claims



1. A monolithic floor structure having a plurality of floor slabs and a poured concrete deck over said floor slabs, each of said floor slabs comprising:
  - a thin rectangular concrete body,
  - said rectangular body having an upper face, a lower face, and side walls,
  - end walls engaged between said upper face and said lower face,
  - a plurality of more than two parallel longitudinal tubular passages passing through a full length of said body and opening on said end walls,
  - a periphery of each of said plurality of more than two parallel longitudinal tubular passages spaced internally from said upper face, said lower face said side walls over said full length of said body,
  - said passages located below said upper face of said body, each of at least two passages of said plurality of longitudinal tubular passages having a plurality of slots communicating with said upper face of said body, and
  - each of said plurality of slots being spaced apart from said end walls and each other over a length of said body, the remainder of said plurality of parallel longitudinal tubular passages extending said full length of said body without communicating with said upper face of said body, wherein said poured concrete deck of said monolithic structure is bonded to said plurality of said slabs when a selected amount of concrete is poured on said plurality of said slabs through said plurality of slots into an entire length of each of said at least two of said plurality of more than two parallel longitudinal tubular passages and over said upper face of each of said plurality of said slabs.

5,410,852

# EXTERIOR INSULATION AND FINISH SYSTEM

John R. S. Edgar, Toronto, and Kenneth P. Wesley, Mississauga, both of Canada, assignors to STO Aktiengesellschaft, Stuhlingen, Germany

Filed Jul. 23, 1993, Ser. No. 95,373

Claims priority, application United Kingdom, Jul. 28, 1992, 9216029

Int. Cl.<sup>6</sup> E04B 5/00

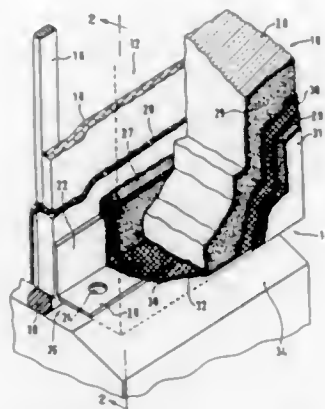
U.S. Cl. 52—408

13 Claims

1. An exterior insulation and finish system for application to a wall of a building comprising:
  - an air barrier having a pair of oppositely directed surfaces, one of which contacts said wall and a second of which is directed outwardly from said wall;



an insulation material having first and second oppositely directed faces, said first face abutting said second surface of said barrier to cover a predetermined area of said wall; said insulation material being permeable and having peripheral edges extending between said first and second faces and delimiting the area to be covered by said exterior insulation; and



an exterior finish applied to said second face, at least one of said peripheral edges and at least part of one other of said edges to inhibit ingress of said moisture into said insulation, so that at least a portion of said one other of said peripheral edges remains uncovered by said exterior finish to permit air to flow into said insulation and equalize pressure across said exterior finish.

5,410,853

## CEILING LINING

Karl-Heinz Hartlef, Rellingen, Germany, assignor to Hartlef Metalldecken GmbH, Hockenheim, Germany

PCT No. PCT/EP88/00736, § 371 Date May 23, 1989, § 102(e) Date May 23, 1989, PCT Pub. No. WO89/01552, PCT Pub. Date Feb. 23, 1989

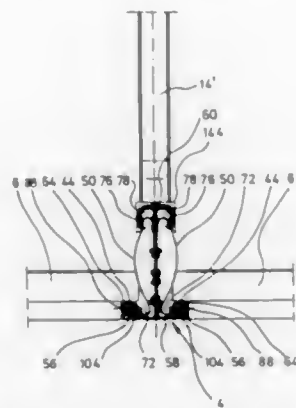
PCT Filed Aug. 17, 1988, Ser. No. 348,491

Claims priority, application Germany, Aug. 18, 1987, 8711244 U

Int. Cl.<sup>6</sup> E06B 3/54

U.S. Cl. 52—773

19 Claims



1. Ceiling lining of metal, comprising a supporting grid and cassettes arranged in grid compartments of the supporting grid which is composed of longitudinal struts and of transverse struts connected to said longitudinal struts, each longitudinal strut and each transverse strut having substantially horizontal projections which are arranged on either side at the lower ends of said struts, extending in the longitudinal directions thereof, and provided on their top sides with tube-like seals upon which the cassettes sealingly lie, characterized in that on the top side

of the projection there is arranged a web which extends upward and along said projection and upon which the cassette rests, the seal being disposed between the web and a side wall of the longitudinal strut and of the transverse strut, respectively, thereby defining a reliable flush, sealing arrangement between the longitudinal struts, the transverse strut, and the cassettes, the seal having, in an unloaded condition, a height which is greater than the height of the web.

5,410,854

## CONNECTOR BRACKETS

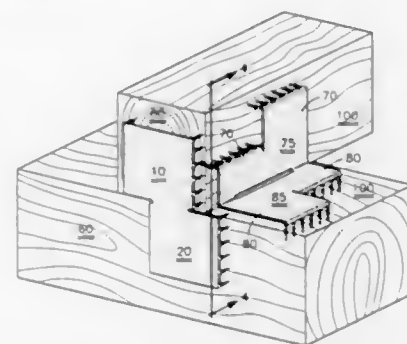
Bruce A. Kimmell, 8722 Lamar Ave., O'Dessa, Tex. 79765, and Jerry W. Gebrosky, 2852 Seville Cir., Antioch, Calif. 94509

Filed Nov. 9, 1993, Ser. No. 149,462

Int. Cl.<sup>6</sup> E04B 1/38

U.S. Cl. 52—712

6 Claims



1. A one piece construction connector bracket comprising a structural plate having a plurality of contiguous portions in a common plane and positioned in mutually staggered alignment, each of the portions having a pair of bent-over opposing edges, with each of the edges extending in a common direction, away from the plate as a linear series of spikes arranged in parallel alignment, the staggered alignment of the portions resulting in a staggered alignment of the series of spikes on one of the portions relative to the series of spikes on the other of the portions, whereby the spikes, when driven into a pair of adjoining coplanar surfaces, hold the surfaces in a mutually fixed position, the staggered alignment of the spikes reducing the probability of splitting of the surfaces.

5,410,855

## METHOD OF JOINING STRUCTURAL MEMBERS, PROFILE MEMBER AND STRUCTURAL UNIT COMPRISING A PLURALITY OF PROFILE MEMBERS

Edvin L. Clausen, Tønder, and Peter Gundlach, Bylderup Bov, both of Denmark, assignors to Norsk Hydro a.s., Oslo, Norway

PCT No. PCT/NO92/00018, § 371 Date Jul. 23, 1993, § 102(e) Date Jul. 23, 1993, PCT Pub. No. WO92/14006, PCT Pub. Date Aug. 20, 1992

PCT Filed Jan. 29, 1992, Ser. No. 90,167

Claims priority, application Norway, Jan. 31, 1991, 910381

Int. Cl.<sup>6</sup> E04B 1/60

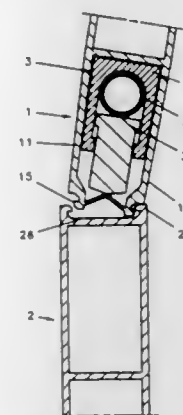
U.S. Cl. 52—747

7 Claims

1. A method of joining structural members, said method comprising the steps of:

providing a first member having an edge portion comprising two substantially parallel extending ribs provided outwardly with respective laterally undercut recesses and adjacent projecting tabs, said tabs being interconnected by a unitary transversely extending inwardly arcuate web, providing a second member having an edge portion of transverse cross-sectional configuration complementarily shaped with locking tabs projecting into a slot defined by a transverse wall and opposite lateral side walls to engage said ribs of said first member, inserting said ribs into said slot, and

permanently deforming said arcuate web by depressing said web to be flush with or below a transverse plane between opposite lateral edges of said web by means of a deforma-



tion tool employing said first member itself as a dolly, and thus forcing said outwardly projecting tabs laterally into a wedged frictional engagement with said slot of said second member.

5,410,856

## DECORATIVE ASSEMBLY FOR A FLORAL GROUPING

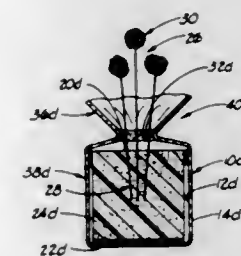
Donald E. Weder, Highland, and William E. Straeter, Breese, both of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 934,832, Aug. 24, 1992, which is a continuation of Ser. No. 819,311, Jan. 9, 1992, abandoned, which is a continuation of Ser. No. 765,416, Sep. 26, 1991, Pat. No. 5,105,599, which is a continuation of Ser. No. 530,491, May 29, 1990, abandoned, which is a continuation of Ser. No. 315,169, Feb. 24, 1989, abandoned, continuation-in-part of Ser. No. 940,930, Sep. 4, 1992, Pat. No. 5,361,482, which is a continuation-in-part of Ser. No. 926,098, Aug. 5, 1992, which is a continuation-in-part of Ser. No. 803,318, Dec. 4, 1991, Pat. No. 5,344,016, continuation-in-part of Ser. No. 965,585, Oct. 23, 1992, which is a continuation of Ser. No. 893,586, Jun. 2, 1992, Pat. No. 5,181,364, which is a continuation of Ser. No. 707,417, May 28, 1991, abandoned, which is a continuation of Ser. No. 502,358, Mar. 29, 1990, abandoned, which is a continuation-in-part of Ser. No. 391,463, Aug. 9, 1989, abandoned, which is a continuation-in-part of Ser. No. 249,761, Sep. 26, 1988, abandoned. This application Sep. 8, 1992, Ser. No. 941,992

Int. Cl.<sup>6</sup> B65B 11/02, 25/02

U.S. Cl. 53—397

67 Claims



37. A method for providing a decorative covering comprising:

providing a floral grouping having a bloom end and a stem end; providing a floral holding material having an upper end, a lower end and an outer peripheral surface, the floral holding material being constructed of a material capable of receiving a portion of the floral grouping and supporting the floral grouping without any pot means; providing a sheet of material having an upper surface, a

lower surface and an outer periphery, the sheet of material with a closure bonding material being disposed on a portion thereof;

disposing the stem end of the floral grouping in the floral holding material;

disposing the upper surface of the sheet of material near the outer peripheral surface of the floral holding material and extending the sheet of material about at least a portion of the outer peripheral surface of the floral holding material while leaving at least a portion of the upper end of the floral holding material uncovered, the upper surface of the sheet of material being disposed adjacent the outer peripheral surface of the floral holding material; and

crimping a portion of the sheet of material to form a crimped portion in the sheet of material with the crimped portion cooperating to hold the sheet of material in the position extended about the floral holding material to provide the decorative covering and wherein the step of forming the crimped portion further comprises:

crimping a portion of the sheet of material near the closure bonding material and forming overlapping portions of the sheet of material with the overlapping portions being substantially bonded via the closure bonding material to form the crimped portion.

5,410,857

## PROCESS FOR MAKING WINDOWED FORM, FILL AND SEAL BAGS

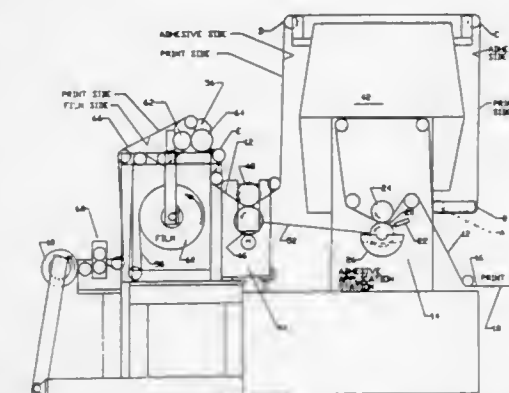
Wayne S. Utley, Portsmouth, Va., assignor to Vitex Packaging, Inc., Suffolk, Va.

Filed Apr. 20, 1994, Ser. No. 230,512

Int. Cl.<sup>6</sup> B65B 61/00, 43/04

U.S. Cl. 53—410

13 Claims



1. A process for making a composite endless form for, in turn, making flexible windowed, form, fill and seal bags containing perishable and/or nonperishable goods, said process comprising the steps of:

linearly conveying an endless strip of flexible, substantially opaque, paper-like material having a print side for receiving printed indicia and an adhesive side for receiving adhesive, said endless strip of flexible paper-like material comprising individual bag-forms attached side-to-side, each having a window area and each to be used for making a windowed bag;

applying at an adhesive-application station an adhesive to substantially said entire adhesive side, with an exception of the window area of each of said individual bag forms to which adhesive is not applied;

cutting at a synchronized window-cutting station having a cutter whose operation is synchronized to positions of the window areas a window blank at each window area so as to form a window opening therein;

laminating an endless strip of transparent heat-sealable film to said adhesive side of said endless strip of flexible paper-like material with said adhesive to thereby form said com-

posite endless form for being cut into said individual bag forms having edges and heat sealed at the edges for making individual, windowed, form, fill and seal bags.

5,410,858

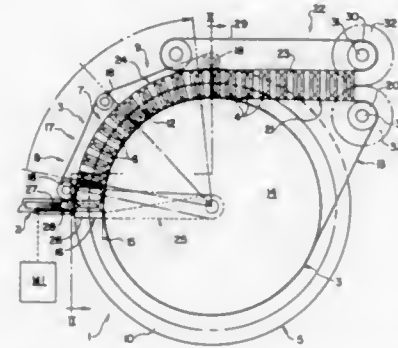
# DEVICE FOR SEALING WRAPPERS IN MACHINES FOR WRAPPING AND/OR OVERWRAPPING COMMODITIES, IN PARTICULAR PACKETS

Roberto Osti, Zola Predosa, and Antonio Gamberini, Bologna, both of Italy, assignors to G.D S.p.A., Bologna, Italy  
Continuation of Ser. No. 907,564, Jul. 2, 1992, abandoned. This application Dec. 13, 1993, Ser. No. 165,542

Claims priority, application Italy, Jul. 29, 1991, B091A0282  
Int. Cl.<sup>6</sup> B65B 51/10

U.S. Cl. 53—477

23 Claims



21. A method for heat-sealing wrappers around products comprising the steps of:

- moving products enveloped by heat-sealable wrappers along an infeed device at a first predetermined velocity toward a heat-sealing channel so that a predetermined number of products are received by said heat-sealing channel within a specified period of time;
- moving said products along said heat-sealing channel at a second predetermined velocity, said heat-sealing channel including a heat-sealing device for heat-sealing said heat-sealable wrappers;
- maintaining said heat-sealing device in compressive heat-sealing relation with said heat-sealable wrappers for a predetermined period of time as a function of said second predetermined velocity at which said products are moved along said heat-sealing channel so as to seal said heat-sealable wrappers; and
- setting said first and second predetermined velocities independently of one another and according to the predetermined number of products to be received by said heat-sealing channel within said specified period of time and at least one physical characteristic of said heat sealable wrappers respectively.

5,410,859

# APPARATUS FOR LOADING ARTICLES INTO A CONTAINER

Paul F. Kresak, Newmarket, and Shanky Lau, Etobicoke, both of Canada, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada

Filed Nov. 29, 1993, Ser. No. 158,703

Int. Cl.<sup>6</sup> B65B 35/30

U.S. Cl. 53—537

13 Claims

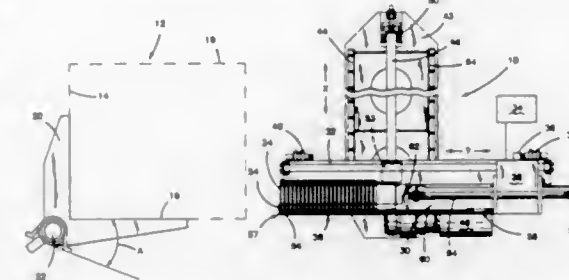
1. An apparatus for transferring articles into a holding means which comprises:

- a first holding means oriented at an angle from the horizontal for holding a predetermined number of articles, said first holding means having an end portion;
- a first retaining means mounted on said first holding means and adjacent the end portion of the first holding means having a closed position to secure said articles on the first

holding means and an open position to enable removal of the articles from the first holding means;

a second holding means oriented at an angle from the horizontal having an open end to be filled with the articles spaced from the first holding means, with the open end facing the articles;

means for moving the first holding means into and out of the second holding means, wherein said means for moving the first holding means is operative to move the first holding



means into the second holding means with the articles thereon and with the first retaining means in the closed position; and

a second retaining means in movable spaced relationship to the first holding means for holding the articles in the second holding means while moving the first holding means away from the second holding means means to move said first retaining means to the open and closed positions independently of movement of said articles on the first holding means.

5,410,860

# INSERTING DEVICE FOR INSERTING DOCUMENTS INTO AN ENVELOPE

Gérard Coudray, Andrésey, and Hervé Baumann, Paris, both of France, assignors to Secap, France

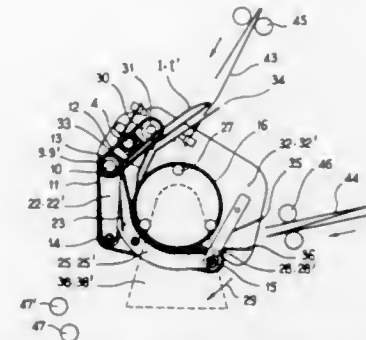
Filed Sep. 16, 1994, Ser. No. 308,072

Claims priority, application France, Sep. 22, 1993, 93 11273

Int. Cl.<sup>6</sup> B65B 43/26, 43/34

U.S. Cl. 53—569

5 Claims



1. An apparatus for inserting a document into an envelope, cooperating with document delivering means for delivering documents to the apparatus, envelope delivering means for delivering envelopes to the apparatus and envelope collecting means for collecting envelopes from the apparatus, the apparatus further comprising:

- a rotating assembly displaceable between an envelope receiving position and an envelope discharging position, said rotating assembly comprising an envelope receiving station and a document receiving station as well as a transferring means for transferring a document between said document receiving station and said envelope receiving station,
- said envelope receiving station and said document receiving station being located respectively in front of the envelope

delivering means and the document delivering means when said rotating assembly is in said envelope receiving position,

said envelope receiving station being located in front of the envelope collecting means when said rotating assembly is in said envelope discharging position,

control means being provided for achieving the following operation cycle:

- a) said rotating assembly being in said envelope receiving position, the document delivering means and envelope delivering means are actuated, as well as said document transferring means between said document receiving station and said envelope receiving station,
- b) said rotating assembly rotates from said envelope receiving position to said envelope discharging position, while said transferring means is still operated,
- c) said rotating assembly being in the envelope discharging position, the envelope collecting means is operated,
- d) said rotating assembly is brought back to said envelope receiving position.

5,410,861

# APPARATUS FOR BANDING BUNCHED ARTICLES

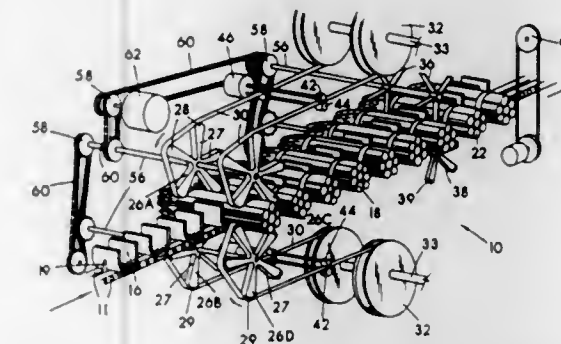
Harold G. Medlock, Box 7514 U.S. Highway 85, Fort Lupton, Colo. 80621-8824

Filed Apr. 13, 1993, Ser. No. 46,222

Int. Cl.<sup>6</sup> B65B 13/04, 27/10

U.S. Cl. 53—586

2 Claims



1. An apparatus for sequentially and tightly banding pluralities of elongated separate items into groups of items; comprising,

- a powered endless loop conveyor means,
- a plurality of item carriers in spaced relationship with one another along said conveyor means and attached to said conveyor means for movement by said conveyor means, said carriers each structured to hold a plurality of items to be banded into a single group, said carriers sized and shaped for holding the items with a portion of a group of items within each carrier exposed circumferentially so as to provide an exposed area for banding to be applied around each group of items,
- at least a first spoked wheel and a second spoked wheel, each spoked wheel having a plurality of radially extending spokes attached to a center hub of each spoked wheel, the spokes of said spoked wheels each having exposed spoke tips, said spoked wheels each connected to powering means for causing synchronized rotation in each of said spoked wheels with the synchronization of rotation being between both said first and second spoked wheels and additionally between movement in said conveyor means and said carriers attached to said conveyor means; said first spoked wheel positioned adjacent to and generally above said conveyor means, said second spoked wheel positioned adjacent to and generally below said conveyor means and offset across from said first spoked wheel, said spoked wheels positioned relative to each other so that with said synchronized rotation a spoke tip of said first

spoked wheel is brought into contact with a spoke tip of said second spoked wheel followed by contact of the tips being broken and two adjacent spoke tips being brought into contact in a repetitious cycle with continued synchronized rotation of said first and second spoked wheels,

said spokes of said first spoked wheel being sized and spaced from one another so as to provide a spaced distance between each of the spoke tips, with said spaced distance being sufficiently wide as to allow for at least the partial spanning by two adjacent spokes of said first spoked wheel over a group of elongated items held within a carrier wherein the group of elongated items recesses at least to a degree in between the two adjacent spokes of said first spoked wheel and upward toward the spoked wheel hub,

said spokes of said second spoked wheel being sized and spaced from one another so as to provide a spaced distance between each of the spoke tips, with said spaced distance being sufficiently wide as to allow for at least the partial spanning by two adjacent spokes of said second spoked wheel over a group of elongated items held within a carrier wherein the group of elongated items recesses at least to a degree in between the two adjacent spokes of said second spoked wheel and upward toward the spoked wheel hub;

said carriers affixed on said conveyor means so as to be positioned for holding elongated items lengthwise transversely relative to said spoked wheels so that the exposed portion of a group of items held within a carrier may be conveyed in between spokes of said spoked wheels in synchronized rotation,

a first bulk supply of flexible first banding material for supplying banding to said first spoked wheel, said first banding material extending from said first bulk supply and contacting and spanning simultaneously across the tips of a plurality of the spokes of said first spoked wheel and in part wrapping around said spoked wheel wherein said first banding material approaches in movement toward said first spoked wheel from one direction and is wrapped sufficiently to leave said first spoked wheel in a generally opposite direction of movement of its approach,

tensioning means in communication with said first banding material for maintaining the banding material taut across the spoke tips,

a second bulk supply of flexible second banding material for supplying banding to said second spoked wheel, said second banding material extending from said second bulk supply and contacting and spanning simultaneously across the tips of a plurality of the spokes of said second spoked wheel and in part wrapping around said spoked wheel wherein said second banding material approaches in movement toward said second spoked wheel from one direction and is wrapped sufficiently to leave said second spoked wheel in a generally opposite direction of movement of its approach,

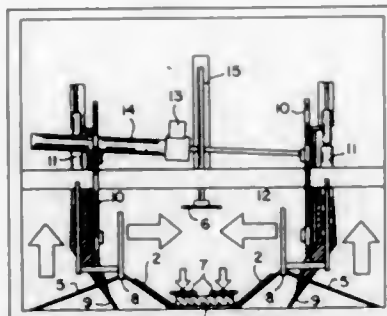
tensioning means in communication with said second banding material for maintaining the banding material taut across the spoke tips,

means for affixing said first banding material to said second banding material when rotation in said first and second spoked wheels has contacted the banding materials adjacent the exposed area of a group of items within a carrier as the carrier passes through the spokes of said first and second spoked wheels one said carrier at a time wherein said first and second bandings are applied,

means for severing at the affixment locations of said first and second banding materials to one another so as to leave a loop of banding material separate from said first and second banding material on said first and second spoked wheels respectively.



5,410,862  
**PACKAGING MACHINE FOR WRAPPING BOOKS OR THE LIKE**  
 Veikko Janhonen, Helsinki, Finland, assignor to Pussikeskus Oy, Helsinki, Finland  
 Filed Jun. 3, 1994, Ser. No. 253,957  
 Claims priority, application Finland, Jun. 14, 1993, 932730  
 Int. Cl.<sup>6</sup> B65B 11/00, 13/14  
 U.S. Cl. 53—590 13 Claims

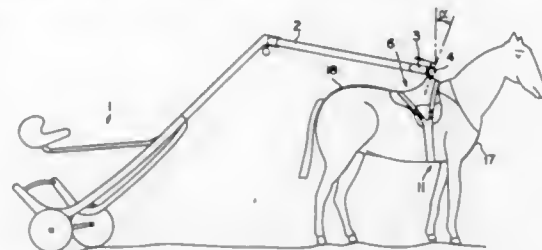


1. A packaging machine for wrapping books or the like for postal deliveries by using a package blank (2, 4), including a rectangularly shaped outer cardboard (2), said machine comprising a conveyor track (1), an adhesive application station (3) alongside the conveyor track upstream of a wrapping station, a wrapping station which includes folding elements (5, 8) on either side of the conveyor track for folding said outer cardboard from a flat condition to a tube surrounding the four sides of a book, and a press element (6) operable in vertical direction above the conveyor track for pressing the overlapped ends of the outer cardboard against the top surface of a book in view of fastening the ends to each other by means of an adhesive applied therebetween, characterized in that the wrapping station is further provided with second press elements (7, 18-21), including a horizontal press plate (7) which has one unsupported end and is operable both in vertical direction and in the direction of the conveyor track by means of individually controlled power units (19, 21), and that said folding elements include transverse belts (5) which extend through sliding slots included in the bottom edge of guides (8), said guides (8) being adapted to be operable in vertical and horizontal plane by means of power units (11, 14), whose automatic control moves the guides (8) first upwards, then towards each other, and then alternately downwards in such a manner that the belts are first elevated from the level of the conveyor track (1) as said second press elements (7) press the top side of the package blank, whereby said belts fold the end sections of the outer cardboard (2) first upwards and then alternately on top of each other in an overlapping fashion while said second press elements (7) travel in the direction of the conveyor track for retracting said press plate from underneath the folded end sections of the outer cardboard.

5,410,863  
**SINGLE SHAFT HARNESS DEVICE FOR HORSE-DRAWN VEHICLE**  
 Alain Mouzon, 41, Grande Rue, 60460 Blaincourt Les Precy, France  
 Filed Jan. 21, 1994, Ser. No. 184,035  
 Int. Cl.<sup>6</sup> B68B 1/00 6 Claims

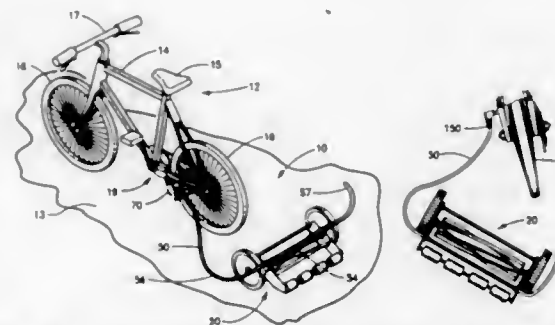
1. Harness device for horse-drawn vehicles, comprising in combination a saddle bow (6) having a pommel (15) and a cantle (16) and a length between the pommel and the cantle of at least about 350 mm, extending forwardly of each side of the withers (19) of a horse and comprising padding over all the surface bearing on the back of the horse, two pairs of lateral straps (9, 10) adjustable as to length mounted on the flanks of the saddle bow and connected to a belly band (11), a spherical ball (4) fixedly secured to the pommel of the saddle bow, and

projecting upwardly, a shaft (2) for drawing a said vehicle, the shaft having a forward end bearing a socket (3) of a shape



matting with that of the spherical ball and the socket enclosing the ball and being adapted to incline in all directions on the ball.

5,410,864  
**MOWING APPARATUS ADAPTED TO BE TOWED BY A PEDAL-OPERATED VEHICLE AND THE LIKE**  
 Thomas C. Lacy, P.O. Box 185, and Kenneth L. Shackles, Jr., P.O. Box 111, both of Silverthorne, Colo. 80498  
 Filed Oct. 8, 1993, Ser. No. 134,418  
 Int. Cl.<sup>6</sup> A01D 34/07 29 Claims



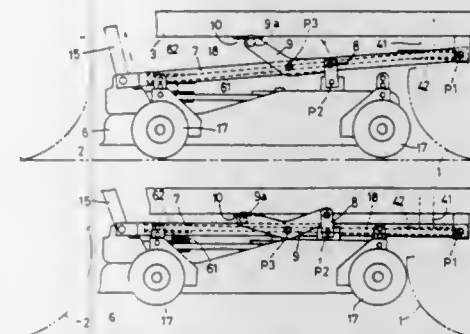
29. A mowing apparatus adapted to mount to a frame member of a vehicle in order to be advanced by the vehicle along a line of travel on a support surface and operative to cut vegetation such as in a user's lawn, comprising:

- (a) a mower assembly including cutting elements which act to cut vegetation when in an active state;
- (b) a connector operative to releasably mount onto a frame member of said vehicle; and
- (c) a draw-bar interconnecting said connector and said mower assembly at a point rearward of said cutting elements, said draw-bar being arcuate in shape and terminating opposite said connector in a curved guard portion extending forwardly of said cutting elements.

5,410,865  
**MID-MOUNT TYPE RIDING LAWN TRACTOR**  
 Kazuaki Kurohara, and Hiroyuki Ogasawara, both of Sakai, Japan, assignors to Kubota Corporation, Japan  
 Filed May 20, 1994, Ser. No. 246,818  
 Claims priority, application Japan, Sep. 30, 1993, 5-244042  
 Int. Cl.<sup>6</sup> A01D 34/64, 34/74, 67/00 12 Claims

1. A mid-mount type tiding lawn tractor comprising: tractor frames; a mower unit disposed under said tractor frames; and connection means for vertically movably connecting said mower unit to said tractor frames, said connection means including: support arms extending substantially longitudinally of said tractor frames, each of said support arms being pivot-

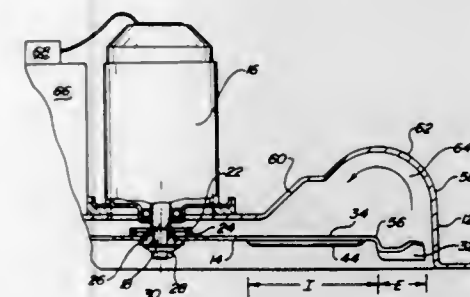
ally connected at one end thereof to a lower position of one of said tractor frames, and at the other end to a portion of said mower unit; interlocking links each pivotally connected at one end thereof to a position of said mower unit closer than said portion of said mower unit to the position of connection between said support arm and said tractor frame, each of said interlocking links having a free end; and scissor arms each having: an intermediate connecting portion pivotally connected



to an intermediate position of one of said support arms; a first arm portion extending in one direction from said intermediate connecting portion, said first arm portion being pivotally connected at a distal end thereof to said free end of said interlocking link; and a second arm portion extending in a different direction to said first arm portion from said intermediate connecting portion, said second arm portion having a contact for contacting one of said tractor frames from below.

5,410,866  
**MULCHING LAWN MOWER BLADE AND HOUSING ASSEMBLY**  
 Charles K. Long, Seneca, S.C., assignor to Ryobi Motor Products Corp., Easley, S.C.  
 Continuation of Ser. No. 920,140, Jul. 24, 1992, Pat. No. 5,299,414. This application Mar. 29, 1994, Ser. No. 219,134  
 The portion of the term of this patent subsequent to Apr. 5, 2011, has been disclaimed.

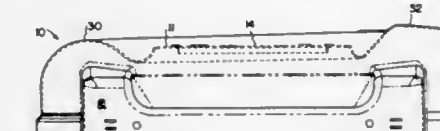
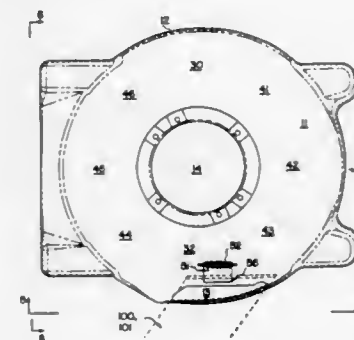
Int. Cl.<sup>6</sup> A01D 34/08, 34/73, 34/78, 69/00  
 U.S. Cl. 56—17.4 8 Claims



1. A battery powered lawn mower comprising: an electric motor including a drive shaft having an axis of rotation generally perpendicular to a lawn surface to be cut; a battery power source for energizing said electric motor; a housing for supporting said electric motor and said battery power source, said housing having an upwardly extending circumferential outer wall, a downwardly extending circumferential inner wall located radially inboard of the

outer wall and an arcuate top section extending therebetween defining an internal annular cutting chamber; and a cutting blade affixed to said drive shaft and oriented within said internal cutting chamber, said blade having an end portion including a leading edge for cutting grass upon rotation of the cutting blade, a trailing edge and an upwardly inclined region therebetween for generating an upward flow of air directing said cut grass in a generally upward direction away from said blade end portion along the housing circumferential outer wall and into the arcuate top section and circumferential inner wall, said cut grass directed down toward said lawn surface past said cutting blade, thereby mulching said cut grass.

5,410,867  
**MOWER DECK**  
 Gerhard Plamper, Valley City, and Nick E. Ciavarella, Cleveland, both of Ohio, assignors to MTD Products Inc., Cleveland, Ohio  
 Filed Sep. 29, 1993, Ser. No. 129,457  
 Int. Cl.<sup>6</sup> A01D 34/68, 34/73, 34/82 11 Claims



1. An improved shape for a mower deck having a top surface with a front 180° section and an aft 180° section and a side wall for use with a rotating blade, the improvement comprising the top surface of the mower deck being symmetrically angled in both the front 180° section and the aft 180° section from a low area on one lateral side of the mower deck to a high area on the other lateral side of the mower deck, said low area being located on the side of the mower deck that has forward blade rotation.

9. An improved plug for a mower deck having a hole in the side walls thereof, said plug including an inner section having a trailing edge, the hole in the mower deck having a trailing edge, the side wall of the mower deck being displaced outwardly behind said trailing edge of the hole, and means to mount said plug to the mower deck covering the hole with said trailing edge of said inner section extending inwardly of the side wall of the mower deck.

5,410,868

## TIRE CORD AND TIRE

Yutaka Sakon, Akashi, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Division of Ser. No. 26,596, Mar. 5, 1993, Pat. No. 5,327,713.

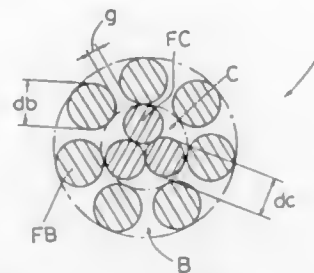
This application Mar. 21, 1994, Ser. No. 215,417

Claims priority, application Japan, Mar. 9, 1992, 4-86496

Int. Cl.<sup>6</sup> D07B 1/06

U.S. Cl. 57-213

2 Claims



1. A tire having tire cords comprising three inner steel monofilaments having a first diameter (dc) and being twisted together to form a core, and seven outer steel monofilaments having a second diameter (db) and being twisted around the core, the direction of the twist of the inner steel monofilaments being the same as that of the outer steel monofilaments, the pitch of the twist of the inner steel monofilaments being differed from that of the outer steel monofilaments, said second diameter (db) being larger than said first diameter (dc), said first diameter (dc) and said second diameter (db) being in the range of 0.15 to 0.28 mm, the adjacent outer steel monofilaments being provided therebetween with a gap whose average is at least 0.03 mm.

5,410,869

## METHOD OF OPERATING A COMBINATION POWER PLANT BY COAL OR OIL GASIFICATION

Peter Muller, Otelfingen, Switzerland, assignor to ABB Management AG, Baden, Switzerland

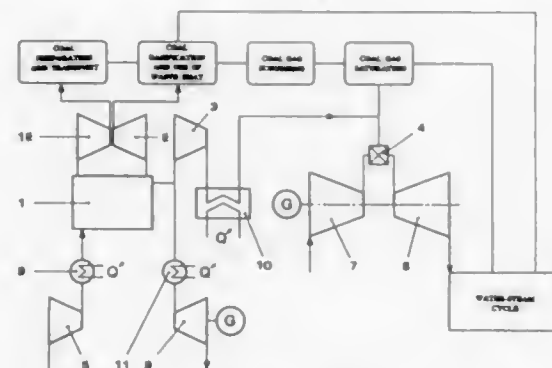
Filed Jan. 18, 1994, Ser. No. 182,346

Claims priority, application Germany, Jan. 18, 1993, 43 011 00.4

Int. Cl.<sup>6</sup> F02C 3/28

U.S. Cl. 60-39.02

11 Claims



1. A method for operating a combined cycle power plant with coal or oil gasification, comprising the steps of: compressing the air required for an air separation plant in a first compressor; cooling the compressed air in a heat exchanger prior to the compressed air being supplied to the air separation plant; operating the air separation plant to produce oxygen required for gasification;

compressing the oxygen in a second compressor; supplying the compressed oxygen to gasification reactor; compressing a portion of an amount of nitrogen generated in the air separation plant in a third compressor to a pressure level of a gas turbine combustion chamber; and mixing the compressed nitrogen with synthetic gas produced in the gasification reactor and supplying the mixture to the gas turbine combustion chamber, wherein the portion of nitrogen supplied to the gas turbine combustion chamber is not more than a surge limit of the third compressor permits, and wherein a remaining portion of the nitrogen not compressed and supplied to the gas turbine combustion chamber is expanded to ambient pressure in an expander after it exits the air separation installation.

5,410,870

## AIRCRAFT ENGINE LAYOUT

Michel G. R. Brault, Boussy St Antoine; Georges Mazeaud, Yerres; Jean-Marie N. Pincemin, Crosne, and Pascal C. Wurnlesky, Savigny le Temple, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA", Paris, France

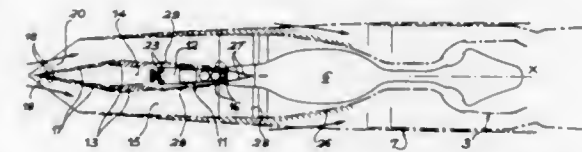
Filed Nov. 29, 1993, Ser. No. 158,266

Claims priority, application France, Dec. 9, 1992, 92 14815

Int. Cl.<sup>6</sup> F02C 7/04, 7/12

U.S. Cl. 60-39.33

3 Claims



1. Aircraft engine having an air intake duct and a gas generator, which comprises: a compressor; an exhaust nozzle located on a common axis with said compressor; ancillary equipment for regulating the gas generator and supplying the generator with fuel and lubricant, the ancillary equipment being located in a compartment of the air intake duct adjacent to the gas generator and defined by an envelope isolating the compartment from a peripheral zone of the duct used for air circulation to the generator, wherein the envelope comprises a pair of substantially parallel, longitudinal flaps, wherein the flaps are pivotable about axes located at the junction of the duct and the generator in order to widen or narrow the peripheral zones wherein the air intake duct has a second pair of flaps which are pivotable about axes located to the front of the duct, wherein end portions of the first and second pair of flaps are respectively substantially contiguous ends and wherein the flaps of the second pair of flaps are directed substantially longitudinally while being close at the axes.

5,410,871

## EMISSION CONTROL DEVICE AND METHOD

Ben F. Masters, Gastonia, N.C., and James M. Self, Taylors, S.C., assignors to Unlited Technologies, Inc., Lowell, N.C.

Filed Mar. 29, 1993, Ser. No. 38,475

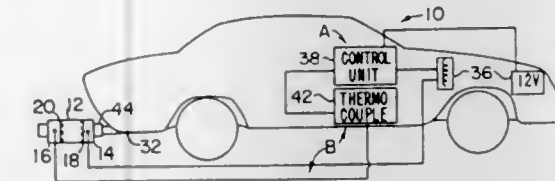
Int. Cl.<sup>6</sup> F01N 3/20

U.S. Cl. 60-274

26 Claims

1. A system for treating exhaust gases for reducing pollutants therein, said system comprising: a treatment chamber, said chamber having an intake end and an exhaust end; a first metal screen operatively disposed within said treatment chamber substantially perpendicular to the axis of said chamber generally nearer said intake end so that an

incoming exhaust stream entering said treatment chamber first passes through said first metal screen; a second metal screen operatively disposed within said treatment chamber substantially perpendicular to the axis of said chamber at a predetermined distance downstream from said first metal screen; an electrode disposed directly adjacent said first metal screen at a distance therefrom so that upon applying a voltage to said electrode sparks are generated between said electrode and said first metal screen;



means for generating sparks from said electrode to said first metal screen at a predetermined frequency to maximize reduction of exhaust pollutants within said treatment chamber, said spark generating means further comprising a voltage source operatively connected to said electrode; and a pulsing mechanism operatively configured with said voltage source to cause the voltage supplied to said electrode from said voltage source to be pulsed at said predetermined frequency.

5,410,872

## AUTOMOTIVE ENGINE HAVING CATALYTIC EXHAUST AFTERTREATMENT DEVICE AND SECONDARY AIR INJECTION CONTROL SYSTEM FOR MINIMUM CATALYST LIGHT-OFF TIME

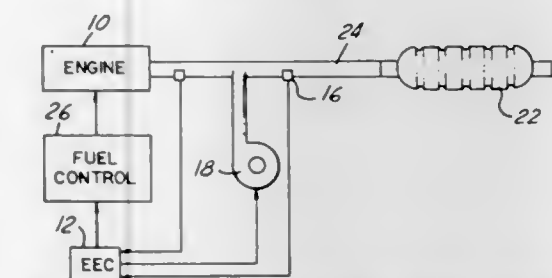
Andrew A. Adamczyk, Jr.; Clifford N. Montreuil, and Scott C. Williams, all of Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 4, 1993, Ser. No. 131,222

Int. Cl.<sup>6</sup> F01N 3/20

U.S. Cl. 60-274

13 Claims



11. A method for treating the engine exhaust of an automotive vehicle equipped with an internal combustion engine having an exhaust system with an exhaust treatment catalyst, comprising the steps of:

operating an air supply device so as to inject air into the engine exhaust system upstream of the catalyst; measuring the amount of oxygen in the exhaust stream flowing into the catalyst; and adjusting the amount of air injected into the exhaust system such that the amount of oxygen in the gas stream entering the catalyst exceeds the stoichiometric amount by approximately 0.5 to 1.5 percent.

5,410,873

## APPARATUS FOR DIMINISHING NITROGEN OXIDES

Yoshihisa Tashiro, Kamakura, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

PCT No. PCT/JP92/00708, § 371 Date Nov. 9, 1993, § 102(e) Date Nov. 9, 1993, PCT Pub. No. WO92/21871, PCT Pub. Date Dec. 10, 1992

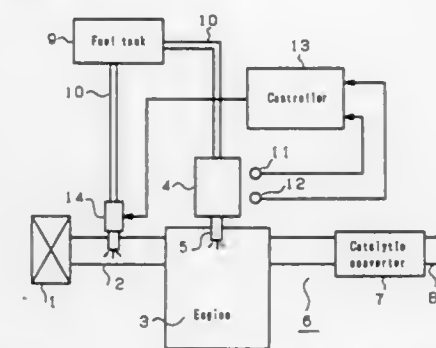
PCT Filed Jun. 1, 1992, Ser. No. 146,097

Claims priority, application Japan, Jun. 3, 1991, 3-160088; Jun. 5, 1991, 3-161027; Jun. 5, 1991, 3-161028

Int. Cl.<sup>6</sup> F01N 3/20

U.S. Cl. 60-276

9 Claims



1. In an apparatus for diminishing the amount of nitrogen oxides in the exhaust gases of an engine of the type having fuel injected into its cylinders, the improvement which comprises an injector associated with the intake system of the engine for injecting fuel into said intake system; means for determining said amount of nitrogen oxides from the number of revolutions of the engine and the angle of a control lever; and means for controlling the amount of fuel injection by said injector in accordance with the load of the engine and said amount of nitrogen oxides as determined.

5,410,874

## METHOD AND APPARATUS FOR INCREASING COMBUSTION CHAMBER PRESSURE IN A HIGH PRESSURE EXPANDER CYCLE ROCKET ENGINE

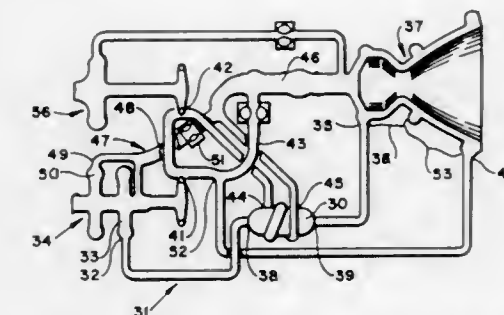
Charles D. Limerick, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 19, 1990, Ser. No. 617,332

Int. Cl.<sup>6</sup> F02K 9/00, 11/00

U.S. Cl. 60-267

3 Claims



3. A method of increasing chamber pressure in an expander cycle rocket engine having a combustion chamber with a cooling liner attached to an inner surface thereof, a cooled tubular nozzle attached to the combustion chamber forming a combustion chamber/nozzle assembly, and means for driving oxidizer and fuel pumps to supply oxidizer and fuel to the combustion chamber, the method comprising: splitting fuel flowing from one stage of the fuel pump into a first portion and a second portion; pumping the first portion to a higher pressure by passing it through a second stage of the fuel pump;



splitting the first portion into a first part and a second part; preheating the first part of the first portion by passing the first part through a regenerator; heating the first part in the tubular nozzle; heating the second part of the first portion in the cooling liner; recombining the first and second parts of the first portion; directing some of the first portion through the drive means of at least one of the pumps to drive the one pump; transferring heat from the part of the first portion to the regenerator; and, recombining the first and second portions prior to introducing the portions into the combustion chamber/nozzle assembly.

5,410,875

**EXHAUST-GAS PURIFICATION DEVICE FOR AN INTERNAL COMBUSTION ENGINE OR THE LIKE**  
Masakazu Tanaka, Okazaki; Hiroshi Mori, Ichinomiya, and Mamoru Mabuchi, Kariya, all of Japan, assignors to Nippon-denso Co., Ltd., Kariya, Japan

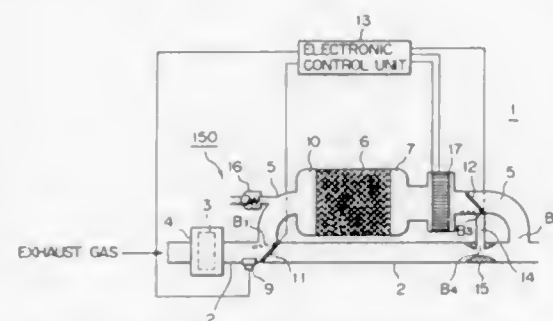
Filed Aug. 20, 1993, Ser. No. 109,500

Claims priority, application Japan, Aug. 21, 1992, 4-222887; Aug. 25, 1992, 4-226120

Int. Cl.<sup>6</sup> F01N 3/20

U.S. Cl. 60—288

11 Claims



1. An exhaust-gas purification device for an internal combustion engine or the like, comprising:

- a first purification-treatment section carrying a catalyst therewith and being provided in a main exhaust passage;
- a bypass passage placed downstream from said first purification-treatment section, said bypass passage diverging from said main exhaust passage and later returning to said main exhaust passage at a certain distance;
- a second purification-treatment section placed in said bypass passage and carrying an absorbent therein for absorbing hydrocarbon contained in an exhaust gas emitted from said internal combustion engine or the like;
- a first passage selector means for changing a main direction of an exhaust gas stream to either one of said main exhaust passage or said bypass passage;
- a third purification-treatment section placed downstream from said second purification-treatment section which is provided in said bypass passage, said third purification-treatment section carrying a catalyst and a heating means for heating said catalyst therewith; and
- a control means for controlling said first passage selector means so that when a temperature of said exhaust gas is below a predetermined temperature, said main direction of an exhaust gas stream is set at a direction corresponding to said bypass passage while when a temperature of said exhaust gas exceeds said predetermined temperature, said main direction of an exhaust gas stream is set at a direction corresponding to said main exhaust passage, and for controlling said heating means provided in said second purification-treatment section so that when said hydrocarbon absorbed in said second purification-treatment section is desorbed from said absorbent, said heating means provided in said third purification-treatment section is heated

to thereby purify said hydrocarbon absorbed in said second purification-treatment section.

5,410,876

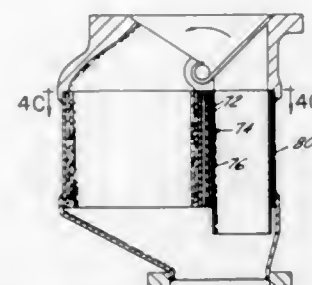
**CATALYTIC CONVERTER ASSEMBLY WITH BYPASS**  
Aladar O. Simko, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 17, 1993, Ser. No. 123,123

Int. Cl.<sup>6</sup> F01N 3/20

U.S. Cl. 60—288

13 Claims



1. A compact catalytic converter assembly adapted to be inserted in alignment with and between portions of the exhaust pipe of an automotive type vehicle for receiving exhaust gases therefrom and redirecting exhaust gases thereto, including an outer hollow shell essentially oval in cross-section having an essentially circular exhaust gas inlet opening at one side, means dividing the opening into first and second exhaust gas tracts, first and second passages in parallel side-by-side relationship connected respectively to the tracts for the passage of exhaust gases therethrough, a discharge plenum connected to the opposite ends of the passages adapted to be connected to the exhaust pipe, the first passage containing a catalyst bed, the second passage constituting a bypass passage for passing the exhaust gases through the assembly bypassing the catalyst bed, selectively movable valve means in the inlet movable to positions alternately directing flow of exhaust gases through the first or second tract while blocking the other tract, and means to insulate the bed from the hot exhaust gases passing through the bypass passage including divider means between the passages providing a dead air gap therebetween.

5,410,877

**MANIFOLD CONVERTER**

Yuji Shimada, Yoichi Takahashi, and Koji Noda, all of Tokyo, Japan, assignors to Calsonic Corporation, Tokyo, Japan

Filed Sep. 13, 1993, Ser. No. 120,072

Claims priority, application Japan, Sep. 21, 1992, 4-065653 U

Int. Cl.<sup>6</sup> F01N 3/15

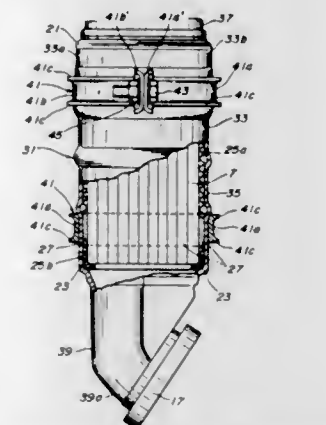
U.S. Cl. 60—302

22 Claims

1. A manifold converter for use with an exhaust manifold of an internal combustion engine, comprising:

- a housing constructed of two metal shells welded at their mating edges, said housing having gas inlet and outlet ports at longitudinally opposed portions;
- a catalyser carrier unit installed in said housing in a manner to define a longitudinally extending clearance therebetween, said clearance surrounding said catalyser carrier unit;
- a foamed sealing mat intimately disposed in said given space so that a hermetical sealing is achieved between said catalyser carrier unit and said housing; and

a binding structure binding a given portion of said housing in a manner to prevent a thermal expansion of said housing,



said given portion being the portion where said sealing mat is located.

5,410,878

**AUTOMATIC WARMING-UP APPARATUS AND METHOD THEREOF IN HYDRAULIC SYSTEM**

Chang-Soo Lee, Changwon; Jang-Wook Cho, Chungmoo, and Book-Ho Sin, Sahah, all of Rep. of Korea, assignors to Samsung Heavy Industry Co., Ltd., Seoul, Rep. of Korea

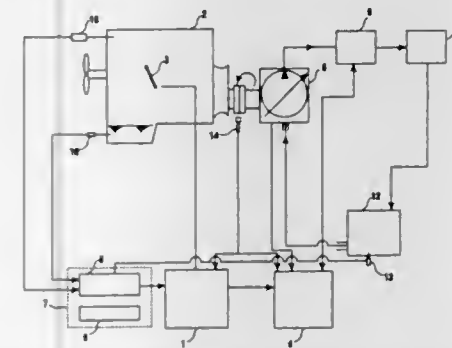
Filed Apr. 28, 1994, Ser. No. 234,226

Claims priority, application Rep. of Korea, Jun. 30, 1993, 1993-12149

Int. Cl.<sup>6</sup> F16D 31/00; F04B 49/00

U.S. Cl. 60—327

4 Claims



1. An automatic warming-up apparatus in a hydraulic system, comprising:

- an engine;
  - a hydraulic pump driven by said engine;
  - at least one hydraulic actuator operated by an oil discharged from said hydraulic pump;
  - a controller controlling the rotation speed of said engine and the discharge oil amount and pressure of said hydraulic pump;
  - a first temperature sensor detecting the temperature of a lubricant oil of said engine;
  - a second temperature sensor detecting the temperature of a cooling water of said engine;
  - a third temperature sensor detecting the temperature of a pressurized oil of said hydraulic system;
  - an input/output unit sending to said controller the temperature signals received from said sensors; and
  - said controller controlling the rotation speed of said engine and the discharge oil amount and pressure until said temperature signals reach predetermined values.
3. A method for an automatic warming-up in a hydraulic system comprising an engine, a hydraulic pump driven by said engine, at least one hydraulic actuator operated by an oil dis-

charged from said hydraulic pump, and a controller controlling the rotation speed of said engine and the discharge oil amount and pressure of said hydraulic pump, comprising the steps of:

- detecting the temperature of a lubricant oil of said engine, the temperature of a cooling water of said engine and the temperature of a pressurized oil of said hydraulic system;
- sending the temperature signals to said controller;
- determining whether or not a warming-up is performed by comparing said temperature signals with predetermined temperature values;
- performing either a normal operation in case said temperature signals are above said predetermined values or a warming-up operation in case said temperature signals are below said predetermined values by controlling the rotation speed of said engine and the discharge oil amount and pressure of said hydraulic pump.

5,410,879

**DEVICE FOR THE CONTROLLING OF A VARIABLE-MOMENT VIBRATOR**

Christian Houze, Paris, France, assignor to Procédés Techniques de Construction, France

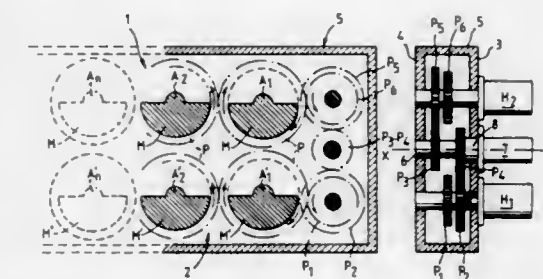
Filed Jun. 4, 1993, Ser. No. 71,635

Claims priority, application France, Jun. 19, 1992, 92 07555

Int. Cl.<sup>6</sup> F16D 31/02; F16H 61/00

U.S. Cl. 60—469

27 Claims



1. A device for the controlling of a variable-moment vibrator of the type comprising at least two off-center rotating feeders rotatably driven at a same speed and a phase shifter capable of generating an angular displacement between these feeders while they are rotating so as to generate a vibrator moment having a variable amplitude, the phase shifter being controlled by means of a dual-effect hydraulic acting element having a determined volumetric displacement and comprising a rephasing chamber and a phase shifting chamber separated by a piston, this acting element being supplied with pressurized fluid discharged by a pump via a hydraulic circuit comprising a distributor having at least:

- an idle position in which it interrupts the supply of pressurized fluid to one or other or to both the chambers of said acting element, and
- a working position in which the distributor orientates said pressurized fluid to one of the above-mentioned chambers, via a first distributing circuit, wherein said first distributing circuit comprises a first limiting means enabling, by way of a control mechanism, the pressure it applies to one of said two chambers to be varied within a predetermined range, and wherein the other chamber is connected to a second distributing circuit comprising a means enabling the pressure it applies to said second chamber to be modulated according to an appropriate counterprofile, so that said acting element applies a motive force to said phase shifter in keeping with a tractive resistance resulting from the amplitude of the vibrator movement and that a predetermined amplitude of the vibrations thus corresponds to each value displayed on the said control mechanism.

5,410,880

**ACTUATOR UNIT FOR MOTOR VEHICLE BRAKES**

Peter Schlüter, Kammerforst, Germany, assignor to Lucas Industries public limited company, Birmingham, England  
PCT No. PCT/EP93/00143, § 371 Date Apr. 7, 1994, § 102(e)  
Date Apr. 7, 1994, PCT Pub. No. WO93/14964, PCT Pub. Date Aug. 5, 1993

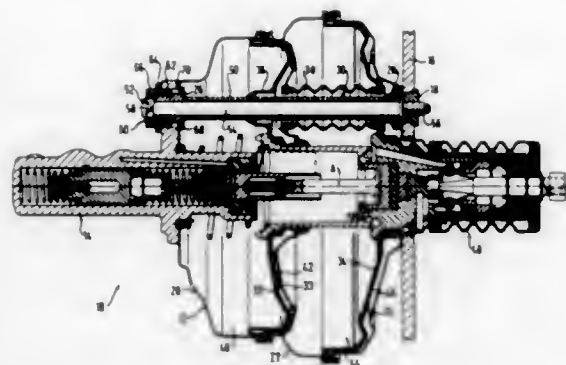
PCT Filed Jan. 22, 1993, Ser. No. 211,423

Claims priority, application Germany, Jan. 31, 1992, 42 02 820.5

Int. Cl.<sup>6</sup> B60T 13/563; F01B 11/02

U.S. Cl. 60—547.1

8 Claims



1. An actuator unit (10) for motor vehicle brakes, comprising a brake pressure booster (12) which comprises front and rear housing parts (20, 24) and includes at least one movable partition (32, 34) at which differential pressure can be generated, a master cylinder (14) which includes a flange (70) fastened to the front housing part (20) and having at least one through hole (68), and at least one bolt (50) which comprises a shaft (54) extending through the hole (68) in the flange (70) and through the two housing parts (20, 24) as well as the movable partition (32, 34) of the booster (12), a head (52) disposed in front of the front housing part (20), and a threaded portion (56) projecting out of the rear housing part (24) and adapted to be screwed into a stationary thread presented in a dividing wall (16) of a motor vehicle, characterized in that a hollow, inner threaded member (26) having a front face (58) is fastened to the front housing part (20), the shaft (54) of the bolt (50) passes through the inner threaded member (26) and the head (52) of the bolt rests on the front face (58) thereof, the flange (70) is clamped between the inner threaded member (26) and a hollow, outer threaded member (60) whose inner diameter is greater than the outer diameter of the head (52) of the bolt (50), and the outer threaded member (60) includes a sleeve-like extension (62) which engages in the hole (68) formed in the flange (70) and is screw connected to the inner threaded member (26).

5,410,881

**UNIVERSAL ONE MAN BRAKE BLEEDING APPARATUS**

Martin J. Ellis, 517 Westwood Ave., Brunswick, Ohio 44212  
Filed Jan. 24, 1994, Ser. No. 185,267

Int. Cl.<sup>6</sup> B60T 11/30; F15B 7/10

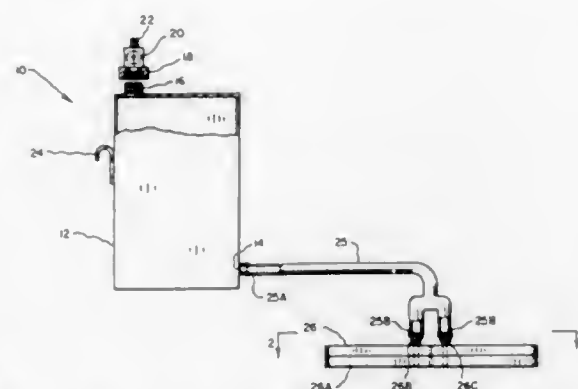
U.S. Cl. 60—584

10 Claims

1. A portable brake bleeder apparatus, for changing brake fluid in brake systems of vehicles using a hydraulic brake activated by pressure on and release of the brake pedal, brake fluid and having a brake fluid reservoir, brake lines and bleeder valves, the apparatus comprising:

a holding container for the fresh brake fluid;

- an adjustable fluid distribution device adapted to sealingly clamp to the brake fluid reservoir;  
a first tubing section sealingly interconnecting said holding container and the fluid distribution device;  
a fluid collection container;  
a second tubing section sealingly interconnecting the collection container and one of said bleeder valves;  
a means for maintaining lowered pressure in the collection container, said lowered pressured created by pressure on the vehicle brake pedal, to draw new brake fluid from the holding container into the brake system, to force used brake fluid and contaminants out of the bleeder valve, and to prevent backflow of used brake fluid into the bleeder valve;



- said distributing device having a plurality of distribution ports adapted for sealing attachment to variously sized master cylinder brake reservoirs for fluid flow from said distribution device into said reservoir;  
wherein said means for maintaining lowered pressure comprises a one-way check valve associated with the holding container for input of air only to said holding container and a one-way check valve in said collection container for output of air only from said collection container, such that as brake pressure forces air from, and lowers pressure in, the collection container, backflow of used brake fluid from the collection container into the bleeder valve is prevented.

5,410,882

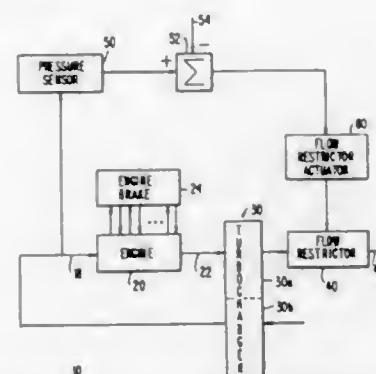
**COMPRESSION RELEASE ENGINE BRAKING SYSTEMS**  
Gregory T. H. Davies, Suffield, and Dennis R. Custer, West Granby, both of Conn., assignors to Jacobs Brake Technology Corporation, Wilmington, Del.

Filed Aug. 26, 1993, Ser. No. 112,769

Int. Cl.<sup>6</sup> F02B 37/00

U.S. Cl. 60—602

7 Claims



1. In the operation of a compression release engine braking system which includes a turbocharged internal combustion engine and a selectively operable compression release engine

brake for opening at least one exhaust valve in the engine near top dead center of the compression stroke of the engine piston in the engine cylinder served by that exhaust valve during operation of said engine brake, the method of reducing the pressure of the gas in said cylinder against which said engine brake must open said exhaust valve when said engine is turning at relatively high speed during operation of said engine brake in order to reduce the force that the engine brake must apply to said engine to open said exhaust valve during operation of said engine brake at said high engine speed, said method comprising the steps of:

- monitoring a characteristic of the engine which is indicative of engine speed during operation of said engine brake in order to produce a monitored value of said characteristic; comparing said monitored value to a predetermined value of said characteristic which corresponds to an engine speed above which the pressure of the gas in said cylinder against which said engine brake must open said exhaust valve tends to become undesirably high and the force which said engine brake must exert on said engine to open said exhaust valve also tends to become undesirably high in order to produce an output indication when said monitored value exceeds said predetermined value during operation of said engine brake; and reducing the exhaust gas pressure gradient across the turbocharger by operating on the exhaust gas exiting from said engine during production of said output indication, the reduction in exhaust gas pressure gradient across the turbocharger decreasing turbocharger speed and thereby decreasing the pressure of the gas in said cylinder against which said engine brake must open said exhaust valve during operation of said engine brake and the force which said engine brake must exert on said engine to open said exhaust valve.

5,410,883

**CONTROL SYSTEM FOR PLANT**

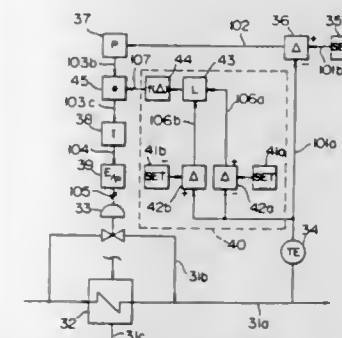
Selitsu Nigawara; Shigeaki Namba, and Hiroshi Kohmoto, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Sep. 8, 1992, Ser. No. 941,897

Claims priority, application Japan, Sep. 5, 1991, 3-225614

Int. Cl.<sup>6</sup> F01K 13/00

U.S. Cl. 60—646

8 Claims



1. A plant control system comprising: an object to be controlled and having a control device for effecting control; a detector for detecting a process variable of said object to be controlled; a setting device for setting a target value of said process variable; and an adjuster for controlling said control device of said object in accordance with a difference between an output of said setting device and an output of said detector, wherein said plant control system further comprises storage means for storing a limit value established for said process variable for a purpose of protecting said object to be controlled, difference determining means for determining a difference between said limit value and a detected said process variable, and means for correcting a characteristic

of said adjuster in accordance with an output of said difference determining means.

5,410,884

**COMBUSTOR FOR GAS TURBINES WITH DIVERGING PILOT NOZZLE CONE**

Ichiro Fukue; Shigemi Mandai; Katsunori Tanaka; Hitoshi Kawabata; Nobuo Sato; Hiroyuki Nishida, and Tetsuo Gora, all of Takasago, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

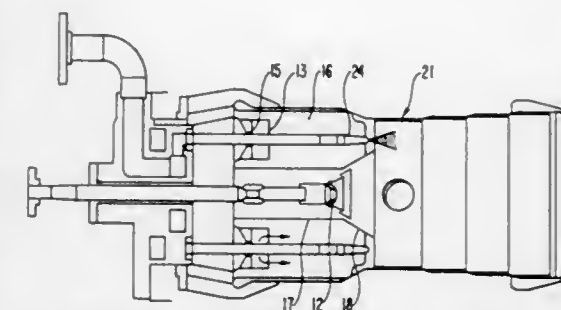
Filed Oct. 18, 1993, Ser. No. 137,343

Claims priority, application Japan, Oct. 19, 1992, 4-304442; Feb. 12, 1993, 5-047227

Int. Cl.<sup>6</sup> F02C 1/00

U.S. Cl. 60—747

6 Claims



1. A gas turbine combustor comprising: a combustion chamber; a pilot nozzle disposed on the axial centerline of the gas turbine combustor upstream of said combustion chamber, said pilot nozzle having an injection port; a cone projecting from the vicinity of the injection port of said pilot nozzle, the cone having a diverged base end adjacent the combustion chamber; a plurality of main nozzles disposed around said pilot nozzle, each of said main nozzles having a fuel injection portion defining an injection port and a respective primary mixing chamber wall surrounding the fuel injection portion to form a primary mixing chamber in the main nozzle; and a secondary mixing chamber, located between the primary mixing chamber wall of each of said main nozzles and said end of the cone, in which air and a fuel/air mixture from said main nozzles are mixed before passing to the combustion chamber, said secondary chamber being delimited and throttled by said end of the cone.

5,410,885

**CRYOGENIC RECTIFICATION SYSTEM FOR LOWER PRESSURE OPERATION**

James Smolarek, 6730 Liebler Rd., Boston, N.Y. 14025, and Kevin J. Potempa, 740 Robin Rd., Amherst, N.Y. 14228

Filed Aug. 6, 1993, Ser. No. 103,616

Int. Cl.<sup>6</sup> F25J 3/02

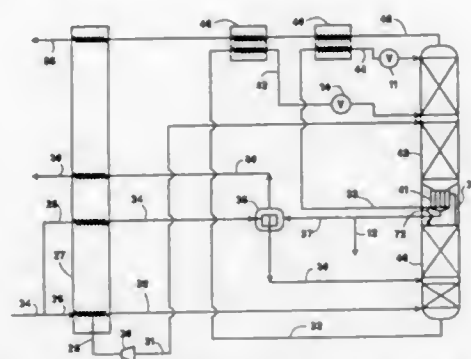
U.S. Cl. 62—25

13 Claims

1. A process for the cryogenic rectification of feed air comprising:
  - (A) providing feed air into the higher pressure column of a double column and separating the feed air by cryogenic rectification within the higher pressure column into nitrogen-enriched vapor and oxygen-enriched liquid;
  - (B) passing oxygen-enriched liquid into the lower pressure column of the double column and producing by cryogenic rectification oxygen-rich liquid within the lower pressure column;
  - (C) passing oxygen-rich liquid into the upper portion of a downflow reflux condenser and vaporizing a portion of the liquid flowing down the downflow reflux condenser by indirect heat exchange with nitrogen-enriched vapor to produce oxygen-rich vapor;
  - (D) passing oxygen-rich vapor in countercurrent direct contact flow with downflowing oxygen-rich liquid within



the downflow reflux condenser to produce oxygen-rich liquid; and  
(E) withdrawing oxygen-rich liquid from the lower portion of the downflow reflux condenser having an oxygen concentration which exceeds that of the oxygen-rich liquid passed into the upper portion of the downflow reflux condenser.



tion of the downflow reflux condenser having an oxygen concentration which exceeds that of the oxygen-rich liquid passed into the upper portion of the downflow reflux condenser.

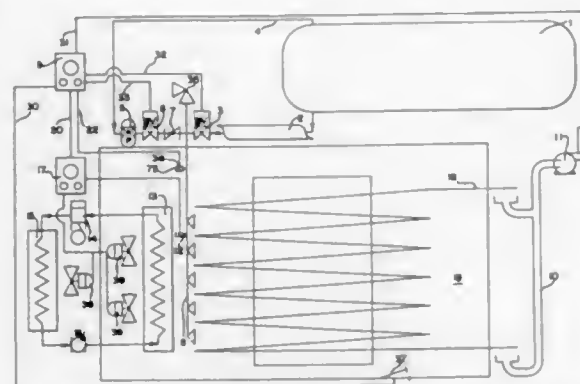
5,410,886

**METHOD AND APPARATUS FOR SUPPLEMENTING MECHANICAL REFRIGERATION BY THE CONTROLLED INTRODUCTION OF A CRYOGEN**  
David E. Wallace, Oregon, Wis., and Jeffrey P. Schulte, Somerset, N.J., assignors to American Cryogas Industries, Inc., Pennsauken, N.J.

Filed Dec. 8, 1992, Ser. No. 987,217  
Int. Cl.<sup>6</sup> F25D 13/06

U.S. Cl. 62—63

14 Claims



1. A method of increasing the refrigeration capacity of a mechanical refrigeration system in a continuous production spiral food freezer comprising the steps of:

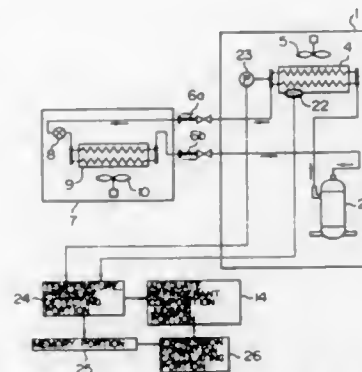
- determining the presence of heat load conditions in a refrigerated space which exceed the refrigeration capacity of the mechanical refrigeration system used to cool the refrigerated space; and
- introducing a cryogen into the mechanically refrigerated space during periods in which the heat load conditions inside the refrigerated space exceed the refrigeration capacity of the mechanical refrigeration system, the introduction of the cryogen being controlled by a cryogen system control adapted to coordinate the introduction of the cryogen with the continuous operation of the mechanical refrigeration system.

5,410,887

**APPARATUS FOR DETECTING COMPOSITION OF REFRIGERANT AND METHOD THEREFOR**  
Kazumoto Urata, Shizuoka; Kensaku Oguni, Shimizu; Kyuhei Ishibane, Shimizu, and Naoto Katsumata, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Sep. 30, 1993, Ser. No. 129,351  
Claims priority, application Japan, Oct. 1, 1992, 4-263385  
Int. Cl.<sup>6</sup> F25B 49/02

U.S. Cl. 62—129

2 Claims



1. A refrigerant composition detecting apparatus having a mixed-refrigerant comprising a high-boiling-point refrigerant and a low-boiling-point refrigerant enclosed in a refrigerating cycle having a compressor, a condenser, a pressure reducing device and an evaporator, wherein said apparatus comprising: temperature detecting means and pressure detecting means disposed in a gas-liquid phase portion of said refrigerating cycle; saturated refrigerant composition judging means for judging the composition of said mixed-refrigerant in a saturated condition circulating in said refrigerating cycle in accordance with output signals from said temperature detecting means and said pressure detecting means; memory means for storing an output signal from said saturated refrigerant composition judging means at a time when said refrigerant is correctly enclosed in the cycle; composition-change calculating means for calculating a difference between a composition value realized after a predetermined time has passed and obtained by said saturated refrigerant composition judging means and a composition value stored in said memory portion and realized at the time of correctly enclosed; and adequate composition judging means for judging whether or not the composition of said mixed-refrigerant circulating in said refrigerating cycle is in an adequate state in accordance with an output signal from said composition change calculating means.

5,410,888

**DISPENSER FOR SOFT-SERVE FROZEN DESSERT MACHINE**

Lawrence R. Kaiser, Crestwood, Ky.; Kenneth R. Shipley, Memphis, Ind., and Robert Z. Whipple, Prospect, Ky., assignors to Food Systems Partnership, Ltd., Louisville, Ky.

Filed Dec. 1, 1993, Ser. No. 160,479  
Int. Cl.<sup>6</sup> A23G 9/20

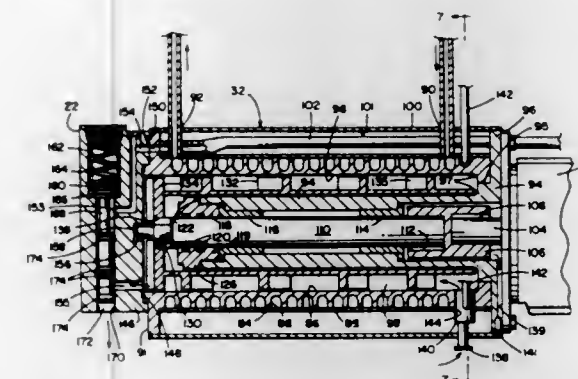
U.S. Cl. 62—136

14 Claims

1. A frozen dessert machine, comprising: a freezing chamber; and an automated dispensing valve at the front of said freezing chamber for dispensing product from said freezing chamber; said automated dispensing valve including a dispenser tube; a shaft movable inside said tube between an open and a closed position; a control fluid inlet to said tube; a frozen dessert inlet to said tube; and a frozen dessert outlet from said tube; such that, when control fluid enters said tube, it

causes said shaft to move relative to said tube, and, when frozen dessert enters said tube and said valve is in the open position, said valve provides an open path through which the frozen dessert can flow from the frozen dessert inlet to the frozen dessert outlet;

said frozen dessert machine also including a control fluid



line, and a face plate, wherein said dispensing valve is on the face plate and the face plate is mounted on the frozen dessert machine such that, when said face plate is mounted on the front of said frozen dessert machine, the connection from the control fluid line to the control fluid inlet and the connection from the freezing chamber to the frozen dessert inlet are automatically made.

5,410,889

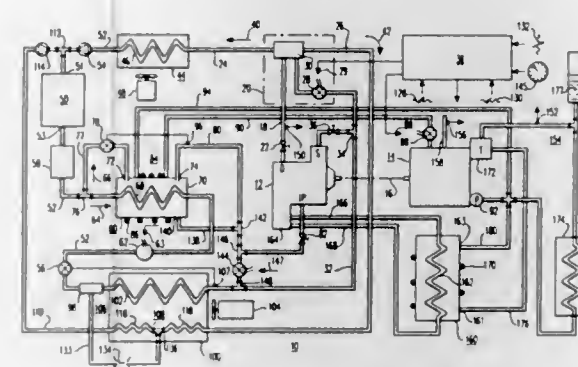
**METHODS AND APPARATUS FOR OPERATING A REFRIGERATION SYSTEM**

Lars I. Sjöholm, Burnsville; Lee J. Erickson, Eagan, and Peter W. Freund, Bloomington, all of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed Jan. 14, 1994, Ser. No. 182,318  
Int. Cl.<sup>6</sup> F25B 13/00

U.S. Cl. 62—160

16 Claims



1. A method of operating a refrigeration system which achieves and holds a predetermined set point temperature in a conditioned space via cooling and heating cycles, with the refrigeration system including a refrigerant compressor which includes a suction port, an intermediate pressure port, and a discharge port, a compressor prime mover, a hot gas compressor discharge line, first and second hot gas lines, first controllable valve means having first and second positions which respectively connect the hot gas compressor discharge line to the first and second hot gas lines, a main condenser connected to the first hot gas line, an evaporator associated with the conditioned space, an evaporator expansion valve, an auxiliary condenser associated with the conditioned space which is connected to the second hot gas line, economizer heat exchanger means having first and second refrigerant flow paths, an economizer expansion valve which controls the rate of refrigerant flow through the second refrigerant flow path, a main liquid

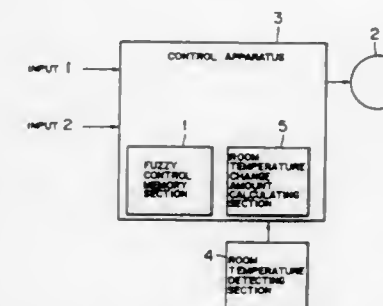
5,410,890

**CONTROL APPARATUS OF AIR-CONDITIONER**  
Takafumi Arima, Kawasaki, Japan, assignor to Fujitsu General Limited, Japan

Filed Jan. 27, 1994, Ser. No. 188,071  
Int. Cl.<sup>6</sup> F25B 1/00; G05B 13/02

U.S. Cl. 62—228.4

1 Claim



1. In a control apparatus of an air-conditioner in which when an indoor fan, an outdoor fan, and a compressor constructing a refrigerating cycle are controlled on the basis of at least an indoor temperature and a set temperature and a cool wind or a hot wind is blown out into the room and a temperature in the room is controlled, a temperature difference between the detected indoor temperature and the set temperature is set to an input 1, a change amount of the indoor temperature is set to an input 2, fuzzy arithmetic operations are executed by using preset control rules and membership functions on the basis of said inputs 1 and 2, and a switching amount of an operating frequency of said compressor is controlled at every predetermined interval on the basis of the results of said fuzzy arithmetic operations,

the improvement in which during the operation of the air-conditioner, the temperature in the room is detected and the change amount of said indoor temperature is calculated, and when the calculated change amount exceeds a predetermined value, the switching amount of the operating frequency of the compressor is controlled.

5,410,891

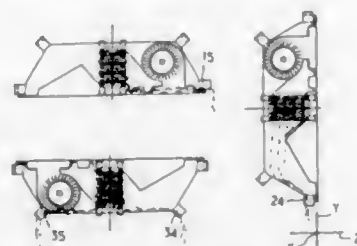
# UNIVERSALLY-MOUNTABLE AIR COOLER APPARATUS INCLUDING MEANS FOR COLLECTING AND EVACUATING CONDENSATES

Michel E. Ripert, Lorient, France, assignor to Societe Anonyme: Thermofroid, Lorient, France  
PCT No. PCT/FR92/00742, § 371 Date Feb. 1, 1994, § 102(e) Date Feb. 1, 1994, PCT Pub. No. WO93/03317, PCT Pub. Date Feb. 18, 1993

PCT Filed Jul. 29, 1992, Ser. No. 190,076  
Claims priority, application France, Aug. 2, 1991, 91 10110  
Int. Cl.<sup>6</sup> R25D 21/14

U.S. Cl. 62—286

9 Claims



1. Cooler apparatus designed to be mounted on an enclosure (2) and comprising a housing (3) in which at least one fan (6, 6') and a heat exchanger (5) are mounted, the fan (6, 6') serving to cause air to circulate between a suction inlet (8) for air to be treated and a delivery outlet (9) for treated air, the apparatus being associated, in particular, with means for collecting and evacuating the condensates that result from air passing through the heat exchanger,

wherein the housing (3) is provided internally with fixed means for collecting (12, 22, 26, 37, 39) and evacuating (15, 24, 34, 35) condensates in all positions in which the cooler apparatus may be mounted, said collecting and evacuating means including:

a chassis (12):

lying in a plan substantially parallel to a mounting axis (X);

having the heat exchanger extending therefrom: organized to include a network of condensate recovery channels (14) opening out to at least one condensate evacuation orifice (15) referred to as a "horizontal position" orifice; and

provided with a condensate deflector (22) extending in sloping manner towards the inside of the housing, between the heat exchanger and the suction inlet;

and a sloping roll (28):

projecting from the chassis to a height that is not less than the height of the heat exchanger and in the opposite direction to the deflector (22); and

fitted at the chassis with an evacuation orifice (24) referred to as a "vertical position" orifice.

5,410,892

# HORIZONTAL WET TREATMENT MACHINES FOR TEXTILES AND TEXTILE MATERIAL CARRIERS THEREFOR

Robert L. Catoe; Matthew A. Meeker; James K. Turner, and Thomas W. Van Seyoc, all of Stanley, N.C., assignors to Gaston County Dyeing Machine Company, Stanley, N.C.

Filed Apr. 19, 1993, Ser. No. 49,835

Int. Cl.<sup>6</sup> D06B 5/18

U.S. Cl. 68—189

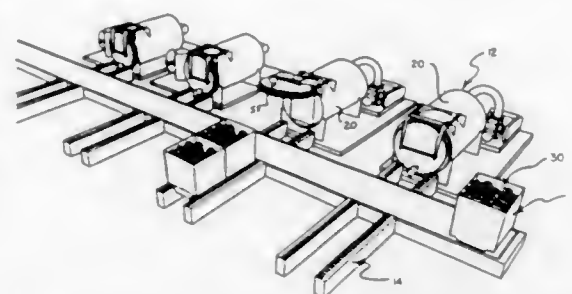
18 Claims

1. A carrier for supporting textile material in a horizontal wet treatment machine of the type having a cylindrical vessel into which carriers supporting textile material for treatment are transported horizontally, the carrier comprising:

a base for supporting textile material thereon;

a substantially vertically oriented wall mounted on and extending upwardly from the periphery of said base and fixed in a noncontacting closely adjacent relationship with

textile material supported therein and forming with said base an enclosure for confining therewithin treating liquid for treating textile material supported therein by providing the free flow of treating liquid therearound; and



a liquid flow assembly for receiving and discharging treating liquid for circulation into and out of said carrier.

5,410,893

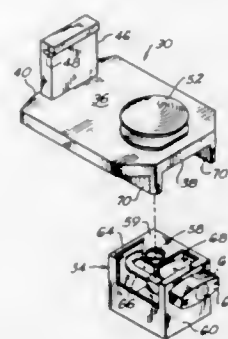
# LOCKPIN HITCH LOCK

Doris E. Easterwood, 2517 Stageland, Duncan, Okla. 73533  
Filed Oct. 28, 1993, Ser. No. 142,566

Int. Cl.<sup>6</sup> B60D 1/60; B60R 25/00

U.S. Cl. 70—14

6 Claims



1. A locking device for a trailer hitch coupling having an arcuate downwardly converging wall forming a downwardly open hitch ball receiving socket and having a toggle link shoe moveable at one end portion into and out of the socket, the locking device comprising:

a platen for longitudinally underlying the coupling and closing the socket;

a lockpin extending through said platen into the socket;

a disk-like flange axially secured to the inward end of said lockpin for overlying an inner surface portion of said converging wall and an adjacent end portion of the shoe, said lockpin having an annular groove normally disposed adjacent the platen opposite the flange; and,

a housing substantially surrounding a padlock and having an aperture in a first wall cooperatively receiving the end portion of said lockpin opposite the flange,

said housing having a second wall rigidly secured to a shackle opposite a lock body of said padlock for eccentrically moving the wall surface forming the first wall aperture in the lockpin annular groove in response to shackle movement into the lock body.

5,410,894

# GLADHAND SECURITY LOCK APPARATUS

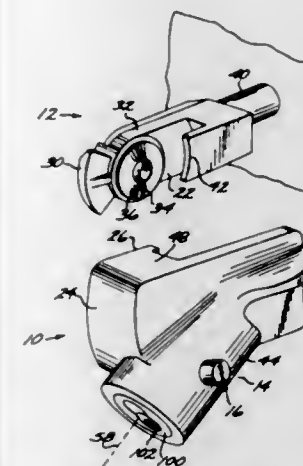
Robert Fox, Wilmington; Gary Rose, Anaheim, and Don Shirley, La Mirada, all of Calif., assignors to Norco Industries, Inc., Compton, Calif.

Filed Dec. 27, 1993, Ser. No. 173,119

Int. Cl.<sup>6</sup> B60R 25/00

U.S. Cl. 70—14

16 Claims U.S. Cl. 70—39



1. A gladhand security lock apparatus for coupling to a coupled position on a gladhand having a cylindrical body with a central port and a radially projecting tongue having first and second radially projecting ends, said apparatus comprising:

a body formed with an outwardly facing abutment surface for, when said body is mounted on said gladhand, overlying said port and a clevis wall projecting outwardly from one side of said abutment surface carrying on the distal end thereof a turned back retainer spaced from said abutment surface and cooperating therewith to form a tongue receiving bight for receipt of said tongue, an abutment wall at one end of said clevis wall to, when said apparatus is in said coupled position, engage said first radially projecting end of said tongue, said retainer including a keeper pad confronting said abutment surface and positioned to, when in said coupled position on said gladhand, be disposed adjacent to said radially projecting tongue, said body further being formed with a keeper bolt receiving bore opening in confronting relationship with said keeper pad, said body being further formed with a lock housing receiving bore orthogonal to and intersecting the axis of said keeper bolt receiving bore;

a saw resistant keeper bolt received freely rotatable in said keeper bolt receiving bore, said bolt being formed medially with an annular actuation groove and terminating on an end in an engagement tip aligned with said keeper pad;

a lock housing received in said lock housing bore, said housing including a lock cylinder rotatable within said housing and having one end disposed in confronting relation with said bolt, said lock cylinder including an eccentric lobe carried on said one end, a drive pin projecting axially from said lobe to be engaged in said actuation groove, said lock cylinder in said housing engaged with said lobe to, upon rotation thereof in one direction, orbit said lobe in said one direction to drive said bolt in one direction toward said keeper pad to a locked position engaging said tip with said keeper pad to hold said tongue captive between said bolt and said abutment wall and upon rotation of said lobe in the opposite direction to an unlocked position retracted clear of said tongue, said bolt being freely rotatable in said bolt receiving bore and said abutment surface and relative to said drive pin.

5,410,895

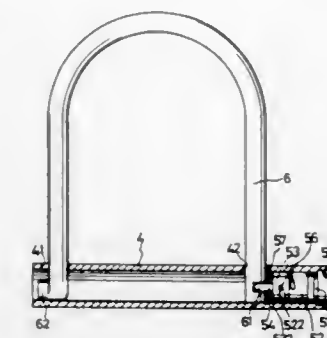
# U-SHAPED LOCK

Chung-Hung Hsu, No. 158, Kung Yuan North Road, and Yung-Ta Lin, No. 67, Lane 77, Sec. 1, An Ho Road, both of Tainan, Taiwan, Prov. of China

Filed Dec. 22, 1993, Ser. No. 171,686

Int. Cl.<sup>6</sup> E05B 67/24

1 Claim



1. A U-shaped lock comprising:

a housing defined by a tubular steel tube having two shackle holes formed in longitudinally spaced relation for receipt of opposing first and second ends of a shackle and two pin holes formed therein for receipt of a respective pair of first pins for coupling said housing with a locking unit; said locking unit being disposed within said housing and comprising:

(a) a cylindrical block having a pin hole formed in an outer circumferential surface for receipt of a portion of one of said pair of first pins extending through a first of said two housing pin holes for coupling said cylindrical block with said housing, said cylindrical block including a lock cylinder rotatively coupled thereto, said lock cylinder having an actuating block projecting from a rear end surface thereof for engagement with a rectangular hole of a cylindrical member to rotate both said lock cylinder and said cylindrical member together responsive to rotation of a key disposed within a key hole of said lock cylinder;

(b) said cylindrical member having said rectangular hole formed in a front end surface, and having a helical guide groove formed through a cylindrical surface of said cylindrical member for receipt of a second pin to guide displacement of a dead bolt responsive to rotation of said cylindrical member;

(c) said dead bolt having a longitudinally extended cylindrical portion and a flat rectangular portion extending longitudinally from said cylindrical portion, said cylindrical portion having a pin hole formed therein for receipt of a portion of said second pin extending through said groove of said cylindrical member to displaceably combine said dead bolt with said cylindrical member, whereby rotation of said cylindrical member longitudinally displaces said dead bolt;

(d) a locating member having a cylindrical shape to fit in said housing for maintaining said cylindrical member and said dead bolt in place, said locating member having a pin hole formed therein for receipt of a portion of the other of said pair of first pins extending through a second of said two housing pin holes, said locating member having a slot formed therein for passing said flat rectangular portion of said dead bolt therethrough; and,

(e) a U-shaped shackle having a first end passing through a first of said two shackle holes, said first end of said shackle being provided with a notch formed therein for receipt of said flat rectangular portion of said dead bolt to engage said U-shaped shackle with said housing in locking relationship, said shackle having an opposing second end provided with a bent stopper to fit firmly in



a second of said two shackle holes of said housing and substantially prevent displacement therefrom when said notch of said U-shaped shackle is engaged by said dead bolt.

5,410,896

## GEAR SHIFT KNOB LOCKING DEVICE

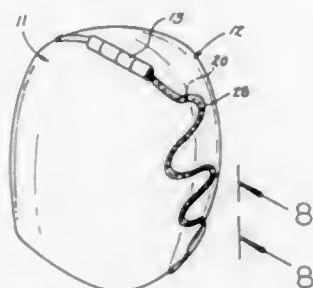
Donald A. Gleason, 226 Douglas Rd., Lowell, Mass. 01852

Filed Oct. 22, 1993, Ser. No. 139,769

Int. Cl.<sup>6</sup> B60R 25/06; E05G 1/10

U.S. Cl. 70—202

1 Claim



I. A gear shift knob locking device, comprising, a housing having a first shell and a second shell, with the first shell having a first shell top wall portion, the second shell having a second shell top wall portion, with a hinge mounted to the first shell top wall portion and the second shell top wall portion to pivotally mount the first shell relative to the second shell in a mirror image relationship, the first shell having a first shell convex arcuate first side wall extending from the first shell top wall portion, the second shell having a second shell arcuate convex second side wall extending from the second shell top wall portion, with the first shell having a first shell bottom wall portion extending from the first side wall, the second shell having a second shell bottom wall portion extending from the second side wall, with the first shell bottom wall portion and the second shell bottom wall portion arranged in a contiguous relationship relative to one another when the first shell and the second shell are in contiguous relation to one another, and

the first shell having a first shell bottom wall opening, the second shell having a second bottom wall opening, with the first shell bottom wall opening and the second shell bottom wall opening arranged in a facing relationship relative to one another to receive a gear shift knob shaft therethrough when the first shell and the second shell are secured together, and lock means secured to the first shell and the second shell for selectively securing the first shell and the second shell together,

the first shell having a first shell front wall portion, the second shell having a second shell front wall portion, and the first shell front wall portion and the second shell front wall portion defining a seam when the first shell and the second shell are secured together,

a frangible tube directed along the seam, with the frangible tube mounted onto the first shell to extend over the seam when the first shell and the second shell are secured together, and the frangible tube includes an indicator dye contained therewith.

5,410,897

## VEHICLE WHEEL LOCKING AND ANTI-THEFT DEVICE

Jack M. Edmondson, 2001 Cedar Chase La., Atlanta, Ga. 30324

Filed Jul. 13, 1993, Ser. No. 91,248

Int. Cl.<sup>6</sup> B60R 25/00

U.S. Cl. 70—226

31 Claims

1. A wheel-chock lock comprising:

a wheel chock assembly attachable to a lock rod having a plurality of sides between dihedral angles, a lock sleeve having an internal periphery with a plurality of

sides between dihedral angles matching the plurality of sides between dihedral angles of the lock rod, the lock rod being slidable telescopically in the lock sleeve, a lug-cover sleeve attached perpendicularly to the lock sleeve,

a lug-bolt plate having a lug-bolt orifice through which a lug bolt of a vehicle wheel is inserted through a bolt end of the lug-bolt plate,

lock-attachment walls juxtaposed to the lug-bolt orifice and extended perpendicularly from an attachment end of the lug-bolt plate,

a latch plate extended from a lock-attachment wall parallel to the lug-bolt plate,

a lug cover on a lug-cover end of the lug-cover sleeve, the lug cover being sized and shaped to encompass and to fit over a lug nut on the lug bolt, the lug-bolt plate, the lock-attachment walls and the latch plate,

a latch shaft positioned pivotally inside of the lug-cover sleeve and extended from proximate the lock sleeve to proximate the latch plate,

a cover latch extended perpendicularly from a lug end of the latch shaft at a position proximate an inside surface of the latch plate,

the latch shaft being rotatable to a latched position with the cover latch intermediate the lug-bolt plate and the latch

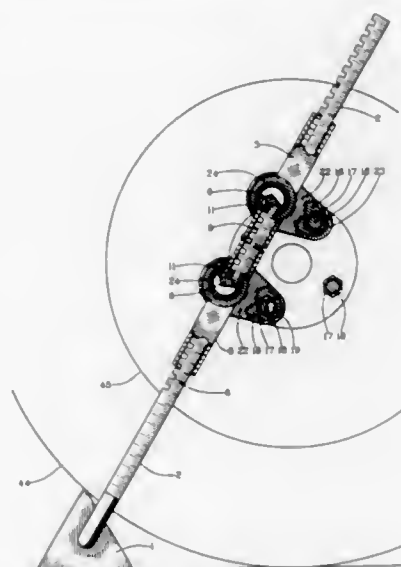


plate for attaching the lug-cover sleeve and the lug cover to the lug-bolt plate,

the latch shaft being rotatable to an unlatched position with the cover latch external to a position intermediate the lug-bolt plate and the latch plate,

a plurality of lock grooves in a common side of the lock rod, an offset latch shaft parallel to the latch shaft,

an internal offset appendage attached perpendicularly to a lock end of the latch shaft and attached perpendicularly to an internal end of the offset latch shaft,

an external offset appendage parallel to the internal offset appendage and attached perpendicularly to an external end of the offset latch shaft,

a lock shaft attached perpendicularly to the external offset appendage and extended concentrically to the latch shaft through a lock-shaft-bearing orifice in a lock housing that is attached to the lock sleeve,

the cover latch and the offset latch shaft being positioned radially in relation to the latch shaft at circumferential positions in which the cover latch is in a locking relationship intermediate the lug-bolt plate and the latch plate and the offset latch shaft is in locking relationship within a select one of the plurality of lock grooves in the lock rod

simultaneously at a select locking rotational positioning of the lock shaft, and the cover latch and the offset latch shaft being positioned radially in relation to the latch shaft at circumferential positions in which the cover latch is in an unlocked relationship at a position external to a position intermediate the lug-bolt plate and the latch plate and the offset latch shaft is in an unlocked relationship at a position external to the plurality of lock grooves in the lock rod simultaneously at a select unlocking rotational positioning of the lock shaft.

5,410,898

## LOCK DEVICE CAPABLE OF ACTIVATING AN ELECTRICAL ANTI-THEFT SYSTEM

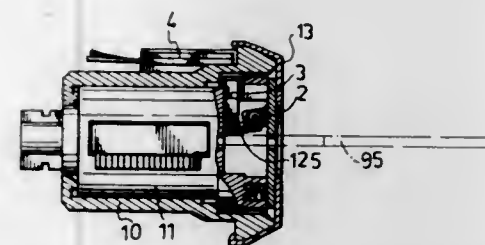
Gary Shieh, 9F-4, No. 106, Sec. 3, Hsin-I Rd., Taipei, Taiwan, Prov. of China

Filed Oct. 12, 1993, Ser. No. 135,773

Int. Cl.<sup>6</sup> E05B 17/14, 47/00

U.S. Cl. 70—276

4 Claims



1. A lock device capable of activating an electrical anti-theft system, said lock device comprising a lock body that includes an elongated hollow lock shell which has a front end and which confines a through-hole, a key plug received in said through-hole of said lock shell, said key plug having a front end which is formed with a recess that has an end wall which is formed with a keyhole, and an anti-dusting cover assembly which is secured on said front end of said key plug and which includes a cover plate with a key slot that is aligned with said keyhole and a rear wall surface, and an anti-dusting plate mounted pivotally to said rear wall surface of said cover plate, said anti-dusting plate covering said key slot of said cover plate and having a rear wall surface, said lock device further comprising:

- a magnet mounted on said rear wall surface of said anti-dusting plate;
- a magnetic conductor provided on said front end of said key plug in a pivoting direction of said anti-dusting plate;
- a magnetic reed switch provided on said lock shell and normally disposed adjacent to said magnetic conductor, said magnetic reed switch being activated by said magnet via said magnetic conductor when said anti-dusting plate pivots rearwardly to locate said magnet adjacent to said magnetic conductor due to insertion of an article into said keyhole of said key plug via said key slot of said cover plate so as to rotate said key plug relative to said lock shell; and
- a control circuit connected to said magnetic reed switch and activated when said magnetic reed switch is activated, said control circuit activating said electrical anti-theft system when rotation of said key plug relative to said lock shell in order to unlock said lock device and move said magnetic conductor away from said magnetic reed switch to deactivate said magnetic reed switch and said control circuit does not occur within a predetermined time period when said control circuit is activated.

5,410,899

## RETAINER CLIP FOR ESCUTCHEON ASSEMBLY

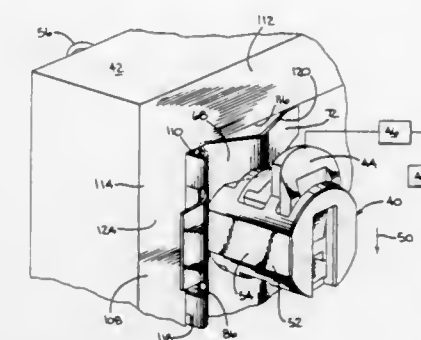
Kenneth L. McConnell, New Hampton, Iowa, assignor to Tri-Mark Corporation, New Hampton, Iowa

Filed Apr. 22, 1993, Ser. No. 52,246

Int. Cl.<sup>6</sup> E05B 9/08

U.S. Cl. 70—370

8 Claims



1. In combination:

- a) a lock unit comprising:
    - an escutcheon assembly to be mounted on a movable closure member; and
    - a retainer clip to maintain the escutcheon assembly in an operative position on a movable closure member, said escutcheon assembly defining a first shoulder and an axis,
    - said retainer clip having a biasing portion defining a second shoulder for bearing on the escutcheon assembly first shoulder and a third shoulder for bearing on a surface of a movable closure member on which the escutcheon assembly is mounted with the escutcheon assembly in its operative position and the retainer clip and escutcheon assembly in assembled relationship,
    - said biasing portion being in compression between the second and third shoulders to positively maintain the escutcheon assembly in its operative position on a closure member,
    - wherein the retainer clip has a base and first and second legs that project away from the base and define a U-shape with the base opening in one direction,
    - said first and second legs straddling the escutcheon assembly with the retainer clip and escutcheon assembly in assembled relationship,
    - wherein at least one of the retainer clip legs is V-shaped opening in a first direction and the base of the retainer clip has a U-shaped portion opening in the first direction,
    - said U-shaped portion defined by third and fourth legs with the third leg connecting to one of the first and second legs and the fourth leg defining a surface facing in a direction different from the one direction and a free edge facing in the first direction; and
  - b) a closure member to be mounted on a frame for movement between open and closed positions,
- there being means cooperating between the closure member, retainer clip and escutcheon assembly to allow the retainer clip to be removably pressed into assembled relationship with the escutcheon assembly with the escutcheon assembly in an operative position on the closure member such that the surface on the fourth leg abuts the closure member to limit rotation of the retainer clip around the axis of the escutcheon assembly.

5,410,900

## SECURITY LOCK ASSEMBLY

William E. Mattingly, 1731 Thames Dr., Clarksville, Ind. 47129

Filed May 4, 1993, Ser. No. 57,749

Int. Cl.<sup>6</sup> E05B 39/04

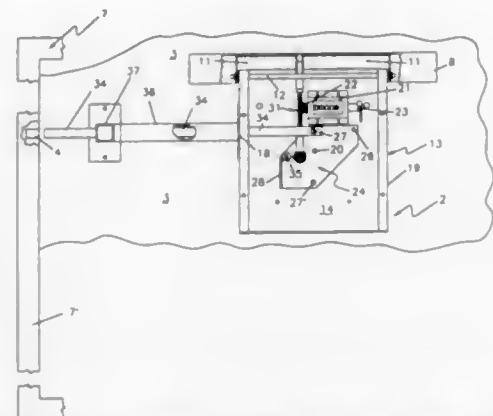
U.S. Cl. 70—436

15 Claims

1. A security lock assembly for mounting on a door, said

lock assembly being readily adaptable to be selectively positioned to cooperate with at least one slot associated with either one of two opposed sides of a door frame for said door with the other side of said door frame having a door hinge assembly for said door comprising:

- a pivotal handle means adapted to be pivotally mounted on a face of said door;
- reversible longitudinally extending locking bar means adapted and sized to be movably mounted for selective positioning on said door face of said door so as to be in aligned locking and unlocking relation with said selected slot associated with one of said two door frame sides;
- mechanical linkage means adapted to be mounted to said



door face to readily accommodate said reversible locking bar means in either selected position without change and to connect said pivotally mounted handle means with said reversible locking bar means when so selectively positioned whereby pivotal movement of said handle means actuates said mechanical linkage means to cause said locking bar means to engage and disengage in locking and unlocking relation with said one selected slot associated with either side of said door frame; and counter means cooperatively activated with said mechanical linkage means and said locking bar means movement to register the locking-unlocking, engagement-disengagement with either of said selected door frame side associated slot.

5,410,901

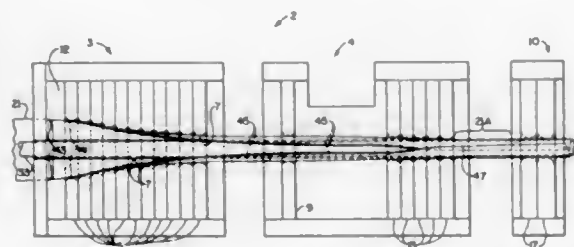
#### METHOD AND APPARATUS FOR FORMING OVERLAPPED TAPE

John J. Robblee, Raleigh, N.C.; William D. Bohannon, Jr., Lawrenceville, Ga., and Kevin C. Ewing, Hickory, N.C., assignors to Sumitomo Electric Lightwave Corp., Research Triangle Park, N.C.

Filed Aug. 6, 1993, Ser. No. 103,192  
Int. Cl.<sup>6</sup> B21D 39/02, 49/00; H01B 13/22

U.S. Cl. 72—176

17 Claims



1. A method of forming a metallic tape into a substantially cylindrical configuration having a longitudinal overlapped seam, said method comprising the steps of:

- moving successive increments of a generally flat metallic

tape into engagement with a breaking means to cause the successive increments to have at least a partially curved configuration, the metallic tape having two longitudinal edges whereby via the curved configuration the longitudinal edges of the successive increments approach becoming adjacent each other;

moving the successive increments having the at least partially curved configuration through a plurality of adjacent forming apertures, said forming apertures being of a generally circular cross-section and having sequentially decreasing diameters, to cause the metallic tape to have a generally U-shaped configuration and then a generally C-shaped configuration that is approaching a generally circular configuration as the two longitudinal edges become increasingly adjacent each other;

moving the successive increments through a guider aperture, said guider aperture being of generally circular cross-section having a U-shaped notch in one quadrant thereof, said U-shaped notch having a first side and a second side, whereby one longitudinal edge of the metallic tape engages the first side of the U-shaped notch and the other longitudinal edge of the metallic tape engages the second side of the U-shaped notch, thereby maintaining the metallic tape in alignment;

moving the successive increments of the aligned metallic tape through a plurality of adjacent overlap apertures, said overlap apertures being of sequentially decreasing diameter, and each of said overlap apertures being of a generally circular cross-section having a step in one quadrant thereof, whereby the diameter of each overlap aperture increases in that quadrant so that one longitudinal edge of the metallic tape engages the step, whereby as the successive increments of the metallic tape pass through the overlap apertures, the longitudinal edge of the metallic tape in engagement with the step becomes an overlapping longitudinal edge which overlaps the other underlapping longitudinal edge of the metallic tape;

directing the overlapping longitudinal edge into substantially continuous engagement with the underlapping longitudinal edge to cause the metallic tape to become a generally cylindrical tube of generally circular cross-section, with the overlap apertures performing only on the side of the metallic tape that becomes the outside of the generally cylindrical tube; and

then moving successive increments of the cylindrical tube through two adjacent finish apertures of generally circular cross-section, said finish apertures being of sequentially decreasing diameter, the finish apertures forcing the overlapped edge onto the underlapped edge on the side of the metallic tape that becomes the outside of the generally cylindrical tube in order to maintain the engagement thereof as a longitudinal overlapped seam.

5,410,902

#### METHOD OF PRODUCING A CAGE FOR A CONSTANT VELOCITY UNIVERSAL JOINT

Werner Jacob, Frankfurt am Main, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach am Main, Germany

Filed Apr. 2, 1993, Ser. No. 42,259

Int. Cl.<sup>6</sup> B21D 53/12

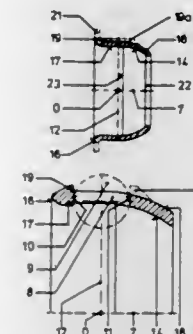
U.S. Cl. 72—334

5 Claims

1. A method of producing a cage for a constant velocity universal joint, comprising:

- providing a circular plate metal blank;
- deep-drawing said blank into a dish with a rim;
- forming circumferentially distributed projections along the inner and/or outer circumference of the dish to be formed in accordance with windows, said projections being directed inwardly to and/or outwardly away from the longitudinal axis of the dish and which, starting from the dish opening, said projections extending over a distance which is greater than the width of the to be formed windows, wherein the width of the to be formed windows is

defined by a distance in which to be formed window walls are spaced relative to each other along the longitudinal axis of the dish between the rim and the base; punching out the base of the dish and the rim and wherein projections are formed along the outer circumference of



the dish, leaving parts for forming said projections at the outer circumference; profile stamping said parts left in the rim to form their finished condition; and punching out the windows.

5,410,903

#### CLAMP GUN CRIMP HEAD

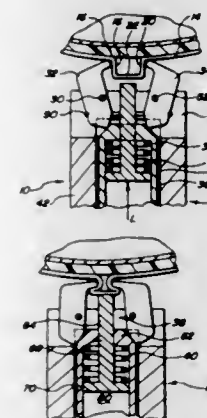
Dean J. Schneider, Highland, Mich., assignor to GKN Automotive, Inc., Auburn Hills, Mich.

Filed Jan. 10, 1994, Ser. No. 179,515

Int. Cl.<sup>6</sup> B21D 39/04; B23P 11/00

U.S. Cl. 72—399

12 Claims



1. A crimp head for crimping a clamp, said crimp head comprising:

- a housing;
- at least one jaw member rotatably supported by said housing, said jaw member being movable between an open and a closed position, said jaw member being operable to plastically deform said clamp in a first direction when moved from said open to said closed position;
- means for moving said jaw member between said open and said closed position, wherein said means for moving said jaw member includes an external plunger mounted for longitudinal movement with respect to said housing, said external plunger defining a driving cam surface and said jaw member defining a driven cam surface, said longitudinal movement of said external plunger moving said jaw member between said open and said closed positions due to the interaction of said driving and driven cam surfaces; and
- means for plastically deforming said clamp in a second direction generally perpendicular to said first direction, said deforming means plastically deforming said clamp when said deforming means is moved between a first position

5,410,904

#### BENDING PRESS HAVING DIE STORAGE SECTION

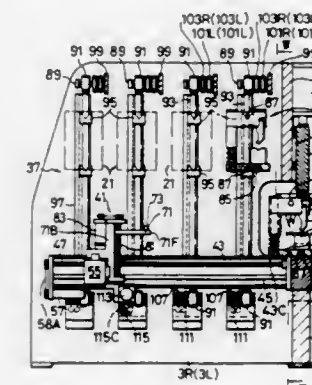
Tadasbi Hirata, Atsugi, and Masayoshi Yanagisawa, Isehara, both of Japan, assignors to Amada Company, Limited, Japan  
PCT No. PCT/JP92/00332, § 371 Date Nov. 19, 1992, § 102(e)  
Date Nov. 19, 1992, PCT Pub. No. WO92/16318, PCT Pub. Date Oct. 1, 1992

PCT Filed Mar. 19, 1992, Ser. No. 946,368

Claims priority, application Japan, Mar. 22, 1991, 3-059022  
Int. Cl.<sup>6</sup> B21J 13/08

U.S. Cl. 72—446

4 Claims



1. A bending press comprising:
  - left and right side frames;
  - upper and lower tables supported by the side frames, one of the upper and lower tables serving as a vertically movable ram;
  - means for moving the movable ram;
  - dies disposed in a processing zone between the upper and lower tables, for processing a metal sheet, the dies having longitudinal axes that are parallel to each other;
  - a die storage section for storing dies to be introduced into said processing zone, said die storage section provided at a position behind the upper table;
  - a back gauge unit provided behind the upper and lower tables, the back gauge unit being movable along an axis that is perpendicular to the longitudinal axes of the dies, for positioning a metal sheet relative to the dies; and
  - supporting means provided on the back gauge unit, for supporting and transferring said dies to be introduced into said processing zone.

5,410,905

#### METER FOR COMPARING IMPACT HAMMERS

Ron R. Karani, 33799 S. Woodland, Chagrin Falls, Ohio 44022, and Daniel E. Tyrrell, 2813 Work Rd., Ravenna, Ohio 44266

Filed Aug. 12, 1993, Ser. No. 105,053

Int. Cl.<sup>6</sup> G01L 5/00

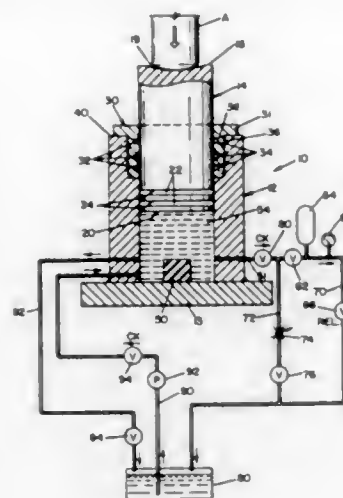
U.S. Cl. 73—11.03

43 Claims

1. An apparatus for measuring the impact force caused by an impact machine to determine the operating impact force



parameters of the impact machine, said apparatus comprising a vessel containing a fluid, a vessel piston which moves into said vessel in a substantially frictionless manner upon impact by said impact machine to create a pressure on said fluid in said vessel,



said vessel piston being in a pressure tight relationship with said vessel, and measuring means for measuring said pressure on said fluid when said impact machine impacts said vessel piston and moves said vessel piston into said vessel, said measuring means include flow rate detection means.

5,410,906

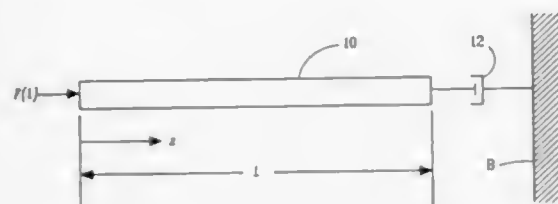
#### METHOD FOR DETERMINING DAMPING COEFFICIENTS

Stephen A. Austin, Amston; Andrew J. Hull, New London; David A. Hurd, Old Saybrook, and Kent D. Kasper, Old Lyme, all of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 27, 1993, Ser. No. 152,635  
Int. Cl.<sup>6</sup> G01M 19/00, 17/04

U.S. Cl. 73—11.04

3 Claims



1. A method for determining damping coefficients of viscous dampers, said method comprising the steps of: providing a damper assembly including a bar of known length ( $L$ , in m), cross-sectional area ( $A$ , in  $m^2$ ), density ( $\rho$ , in  $kg/m^3$ ), and modulus of elasticity ( $E$ , in  $N/m^2$ ), and a viscous damper, wherein a first end of said bar is mounted in said viscous damper while a second end of said bar is free; applying a known force ( $F$ , in N) to said second end of said bar in a direction toward said first end of said bar; measuring a frequency response function of the assembly, the frequency response function comprising the ratio of the bar acceleration to the applied force; determining eigenvalues of said response function; and computing the damping coefficient ( $c$ , in N-sec/m) of said viscous damper in accordance with the formula:

$$c = \frac{AE}{s} \left( \frac{1 - \exp\left(-\frac{2L}{s} Re(\lambda_n)\right)}{1 + \exp\left(-\frac{2L}{s} Re(\lambda_n)\right)} \right)$$

wherein  $s$  is the longitudinal wave speed in the bar (m/s) and  $\lambda_n$  is one of the eigenvalue.

5,410,907

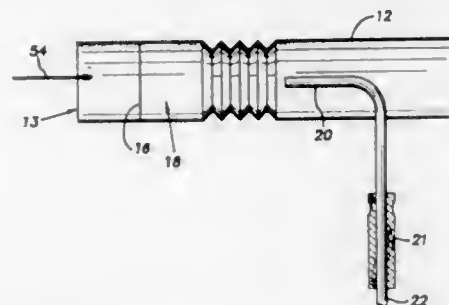
#### GAS SAMPLING METHOD AND DILUTION TUNNEL THEREFOR

Hans Ström, Bräcke 14003, 44260 Kode; Roy Ekdahl, Tranbärs-vägen 65, 44800 Floda, both of Sweden, and Edwin S. Harbuck, 104 Carrollton Ave., Shreveport, La. 71105

Filed Aug. 25, 1993, Ser. No. 111,843  
Int. Cl.<sup>6</sup> G01N 1/22

U.S. Cl. 73—23.31

20 Claims



1. A device for testing gaseous emissions from a gas exit, comprising: a dilution tunnel comprising an elongated, hollow tube having an inlet and an outlet; means for spacing said inlet of the tube inline from the gas exit so as to admit emissions and surrounding air into the dilution tunnel through the inlet; and means for analyzing the emissions in the tunnel.

5,410,908

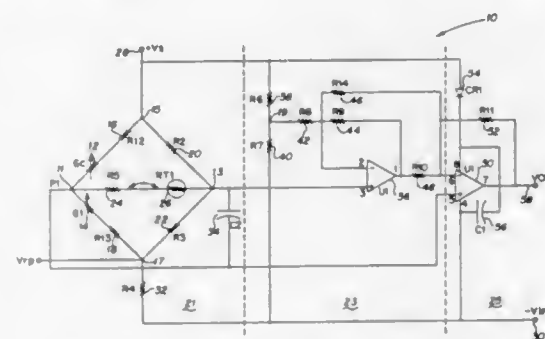
#### MEASURING THE QUANTITY OF A GAS IN A TANK

Herman W. Erichsen, Holliston, Mass., assignor to Data Instruments, Inc., Acton, Mass.

Filed Dec. 20, 1993, Ser. No. 170,399  
Int. Cl.<sup>6</sup> G01M 3/26; G01N 27/12

U.S. Cl. 73—31.05

44 Claims



1. A sensing circuit, comprising a passive electrical network having a first electrical property responsive to a pressure in a fluid and having a second electrical property responsive to a temperature in the fluid, the passive network having an electrical network output responsive to the first and second electrical properties to a first and second extent respectively, the first and

second extents being related to each other in the same manner as a physical property of the fluid, other than the pressure in the fluid or the temperature in the fluid, relates to the pressure in the fluid and the temperature in the fluid, said physical property of the fluid varying both in response to changes in the temperature in the fluid and to changes in the pressure in the fluid.

5,410,909

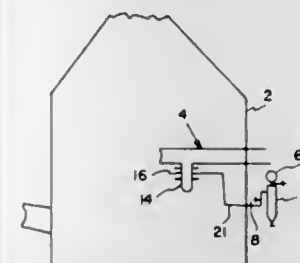
#### PLUG PROOF SIMPLE DEVICE TO MEASURE LIQUID FLOW IN FLUE GAS DESULFURIZATION SYSTEMS USING NOZZLE PRESSURE AS AN INPUT

Wadie F. Gohara, Barberton; David A. Forrester, Canal Fulton, and Steve Feeney, Norton, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Jun. 1, 1994, Ser. No. 252,023  
Int. Cl.<sup>6</sup> G01F 1/42, 15/00

U.S. Cl. 73—198

17 Claims



1. An arrangement for measuring a liquid flow through a spray nozzle which is provided with the liquid from header means for spraying the liquid within an absorber vessel, the arrangement comprising:

a spool having an inlet connected to the header means and a first outlet connected to the nozzle, said spool having an opening axially therethrough for channeling the liquid from the header means to the nozzle for being sprayed in the absorber vessel by the nozzle, said spool further having a second outlet for permitting a portion of the liquid to be channeled out of the spool; conduit means connected to the second outlet of the spool for channeling the liquid from the second outlet to the exterior of the absorber vessel; measuring means remotely located outside the absorber vessel, said measuring means being operatively connected to the conduit means and receiving the liquid from the second outlet for determining a liquid flow for the nozzle based on pressure of the liquid channeled through the conduit means; and flushing means operatively connected to the conduit means for channeling a flushing liquid through the conduit means for cleaning the conduit means.

5,410,910

#### CRYOGENIC ATOMIC FORCE MICROSCOPE

Andrew P. Somlyo; Zhifeng Shao; Jianxun Mou; Jie Yang, all of Charlottesville, Va., assignor to University of Virginia Patent Foundation, Charlottesville, Va.

Filed Dec. 22, 1993, Ser. No. 171,839

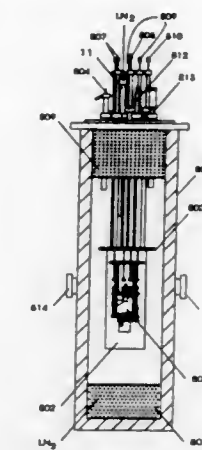
Int. Cl.<sup>6</sup> G01B 5/28; G01N 23/00; H01J 37/252

U.S. Cl. 73—105

22 Claims

1. A low temperature atomic force microscope comprising, a thermally insulated low temperature chamber, a cryogenic

gas within said chamber, said atomic force microscope having a head, said head being within said chamber and in thermal



contact with said cryogenic gas, said chamber being at least about ambient pressure.

5,410,911

#### LOAD CELL AND A BRAKE ARRANGEMENT PROVIDED THEREWITH

Lars M. Severinsson, Hishult, Sweden, assignor to Sab Wabco Holdings BV, Netherlands

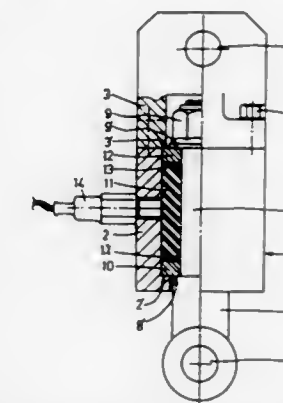
PCT No. PCT/SE92/00096, § 371 Date Aug. 2, 1993, § 102(e) Date Aug. 2, 1993, PCT Pub. No. WO92/15000, PCT Pub. Date Sep. 3, 1992

PCT Filed Feb. 17, 1992, Ser. No. 94,190

Claims priority, application Sweden, Feb. 18, 1991, 9100470  
Int. Cl.<sup>6</sup> G01L 5/28

U.S. Cl. 73—128

6 Claims



1. In a load cell system for transmitting a signal indicating an exerted force, comprising a housing, a rod which extends into said housing, an elastic element disposed between the housing and rod, means for applying a force between the rod and housing to compress the elastic element, and a sensor for indicating an applied force signal, the improvement comprising in combination; said elastic element comprising an annular rubber body; an annular compartment for receiving the annular body formed by an annular recess in the housing and a mating annular recess in the rod; a shoulder respectively located on both the housing and the rod to limit axially opposite end positions of the rubber body disposed within said recesses; contact rings arranged between the respective ends of the rubber body and the housing and the rod shoulders respectively with the rubber body confined within the recesses in the housing and rod; thereby to convert forces in the opposite axial directions between the rod and housing to compression forces in the rubber body, and said sensor comprising a pressure responsive device

in contact with the rubber body for sensing said compressive forces as a signal depending on the force.

5,410,912

## MASS FLOW SENSOR

Isao Suzuki, Tokyo, Japan, assignor to MKS Japan, Inc., Tokyo, Japan

Continuation of Ser. No. 897,798, Jun. 12, 1992, abandoned.

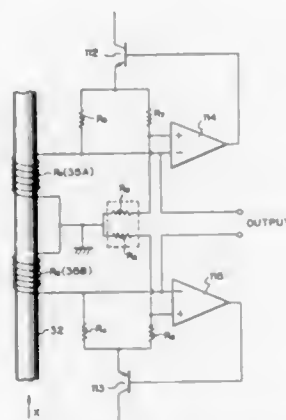
This application Apr. 15, 1994, Ser. No. 227,983

Claims priority, application Japan, Jun. 13, 1991, 3-057048 U; Jun. 13, 1991, 3-181514; Jun. 13, 1991, 3-181515

Int. Cl.<sup>6</sup> G01F 1/68

U.S. Cl. 73—204.15

8 Claims



1. A mass flow sensor comprising a first heating resistor and a second heating resistor disposed on the upstream side and the downstream side, respectively, of a fluid pipe with respect to the flow of a fluid within the fluid pipe, for detecting a mass flow thereof, characterized in that said mass flow sensor further comprises:

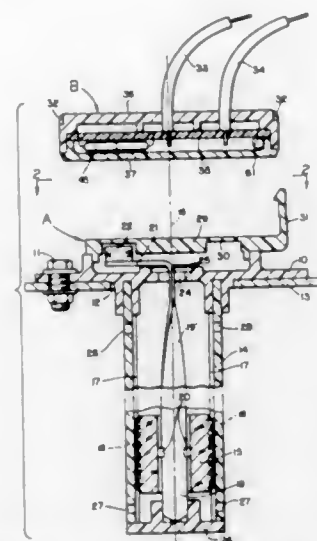
- a first bridge circuit having first and second bridge routes each defining separate current paths and including said first heating resistor in said first bridge route;
- a second bridge circuit having third and fourth bridge routes each defining separate current paths and including said second heating resistor in said third bridge route;
- a control circuit for supplying an electric current to each of said first and second bridge circuits so as to bring each of said first and second bridge circuits into a balanced state; and

first and second temperature sensitive resistances which are responsive to ambient temperature changes and have equal temperature coefficients and which are respectively disposed in said second bridge route of said first bridge circuit and said fourth bridge route of said second bridge circuit;

wherein said first and second heating resistors are disposed on a ceramic tube fitted over the fluid pipe and said first and second temperature sensitive resistances are formed of a tubular substrate having an inside diameter which is fitted over the fluid pipe, said first and second heating resistors and said tubular substrate being spaced apart along a length of said fluid pipe, and

wherein said fluid pipe has a first branch pipe and a second branch pipe branched therefrom between an inlet and outlet of said fluid pipe, and said first and second heating resistors and said first and second temperature sensitive resistances are disposed around said first branch pipe and said second branch pipe, respectively.

5,410,913  
REMOTE INDICATING LIQUID LEVEL SENSOR  
David A. Blackburn, Wakefield, R.I., assignor to Thomas G. Faria Corporation, Uncasville, Conn.  
Filed Dec. 15, 1993, Ser. No. 167,766  
Int. Cl.<sup>6</sup> G01F 23/72  
U.S. Cl. 73—313 20 Claims



18. In combination, a tank for liquid containment and having an upper opening, and liquid-level sensor means mounted to said tank and closing said opening;

said sensor means comprising a first level-responsive subassembly of non-electrical components mounted to said tank and including components extending into and contained within said tank, said non-electrical components including a float for producing mechanical displacement of a magnetic element as a function of sensed liquid level;

a second subassembly of electrical components having means responsive to the instantaneous displaced position of said magnetic element and adapted to produce an output for remote transmission of a signal from said electrical components; and

cooperating means on said first and second subassemblies for external mounting of said second subassembly to said first subassembly, whereby all electrical components are external to the closure of the tank.

5,410,914  
MEASURING DEVICE FOR DENSITY OF LIQUID OR HIGH-TEMPERATURE MELT WITHOUT INFLUENCE OF SURFACE TENSION

Hitoshi Sasaki, #A-101 Pakusaidokawamura, 42-2, Kasuga 2-chome, Tukuba-shi, Ibaragi-ken, Japan 305; Elji Tokizaki, Ibaragi, Japan, and Kazutaka Terashima, 206-3, Nakano, Ebina-shi, Kanagawa-ken, Japan 243-04, assignors to Research Development Corporation of Japan, Tokyo; Hitoshi Sasaki, Tukuba and Kazutaka Terashima, Ebina, all of Japan  
Filed Oct. 19, 1993, Ser. No. 137,764

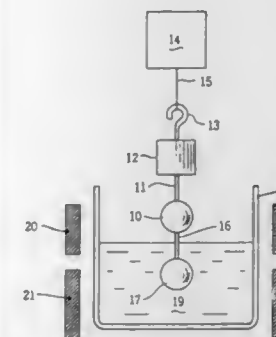
Claims priority, application Japan, Nov. 2, 1992, 4-317900  
Int. Cl.<sup>6</sup> G01N 9/10

U.S. Cl. 73—437

10 Claims

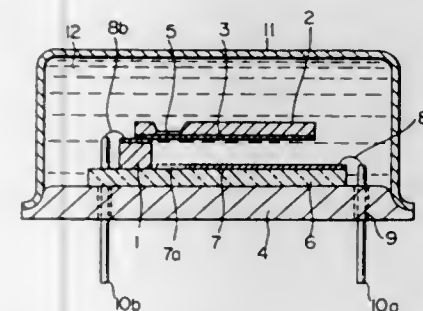
1. A device for measuring the density of a high-temperature melt, comprising

a weight having a hook to be hung from a suspensor thread extending downwards from a balance,



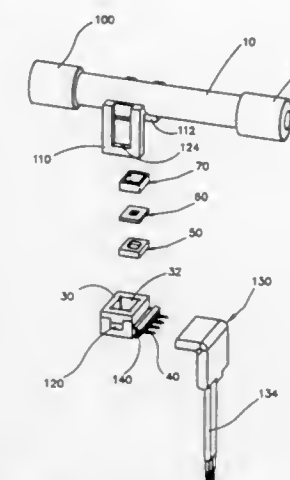
a rigid connector extending downwards from said weight, and  
a bob provided at the lower end of said rigid connector.

5,410,915  
CAPACITIVE ACCELERATION DETECTOR  
Masahiro Yamamoto, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 14, 1993, Ser. No. 45,726  
Claims priority, application Japan, Dec. 16, 1992, 4-336096  
Int. Cl.<sup>6</sup> G01P 15/125  
U.S. Cl. 73—517 R 4 Claims



1. A capacitive acceleration detector comprising:  
an acceleration detecting beam including opposed first and second ends and a thinner flexing portion intermediate the first and second ends;  
a first electrode disposed on said acceleration detecting beam and extending from the first end to the second end;  
a pedestal supporting said acceleration detecting beam at the first end, the second end being free to move in response to an acceleration, flexing the thinner flexing portion of said acceleration detecting beam;  
a supporting substrate supporting said pedestal;  
a fixed electrode disposed on said supporting substrate opposite and spaced from said first electrode, said fixed electrode extending from a position opposite the second end of said acceleration detecting beam toward a position opposite the thinner flexing portion of said acceleration detecting beam and ending before reaching a position opposite the thinner flexing portion of said acceleration detecting beam;  
a base substrate on which said supporting substrate is mounted; and  
first and second lead pins electrically connected to said first electrode and said fixed electrode, respectively, for conducting signals from said first and fixed electrodes.

5,410,916  
FLOWTHROUGH PRESSURE SENSOR  
James D. Cook, Freeport, Ill., assignor to Honeywell Inc., Minneapolis, Minn.  
Filed Jun. 24, 1994, Ser. No. 265,472  
Int. Cl.<sup>6</sup> G01L 9/04  
U.S. Cl. 73—706 17 Claims



17. A pressure sensor, comprising:  
a first conduit having a first central axis;  
a boss portion formed on said first conduit, said boss portion having a first surface formed thereon;  
a second conduit formed through said boss portion and said first surface, said second conduit being disposed in fluid communication with said first conduit;  
a housing having an opening formed therein, said opening having a second surface therein;  
a plurality of electrically conductive leads extending through a portion of said housing, portions of said leads being exposed within said opening formed in said housing;  
a pressure sensing element disposed within said opening;  
a first compressible seal disposed between said second surface and said pressure sensing element, said first compressible seal having a central opening extending therethrough, said first compressible seal being selectively conductive through its thickness to dispose said portions of said leads in electrical communication with conductive portions of said pressure sensing element;  
a second compressible seal disposed in contact with said pressure sensing element, said second compressible seal having a central opening extending therethrough, said pressure sensing element being disposed between said first and second compressible seals, said second compressible seal being disposed between said pressure sensitive element and said first surface;  
a clamp for forcing said housing in a direction toward said boss portion and compressing said first compressible seal, said second compressible seal and said pressure sensing element being compressed between said first and second surfaces, said first conduit being disposed in fluid communication with said pressure sensing element through said second conduit, said opening of said second compressible seal;  
a third opening extending through said housing from said central opening of said first compressible seal to a region external to said housing, the combined length of the fluid path extending from said first conduit to said pressure sensing element being less than twice the magnitude of the diameter of said second conduit, said pressure sensing element comprising a deformable diaphragm having a plurality of piezoresistive elements disposed thereon, said clamp comprising a pair of latches, each of said pair of latches comprising a protrusion on said housing and an associated extension member attached to said first conduit.



said extension member having an opening shaped to receive said protrusion therein, said first compressible seal being made of an elastomeric material, said second compressible seal being made of an elastomeric material, said first conduit comprises first and second ends, said first and second ends being formed into a cylindrical shape, said cylindrical shape having a diameter that is larger than the outside diameter of said first conduit and said first conduit is generally cylindrical;

an outer cover structure disposed around said housing and said boss portion, said first conduit extending from said outer cover structure; and

an insulative coating disposed on a surface of said pressure sensitive element, said coating being disposed between said pressure sensitive element and said second compressible seal.

5,410,917

# OPTICAL FORCE SENSOR FOR HIGH DENSITY PLANAR ELECTRICAL INTERCONNECTS

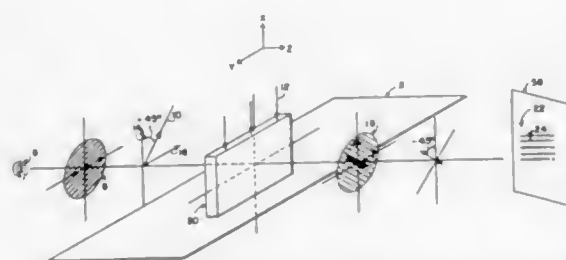
Terri Giverson, Beverly, Mass.; Mark Stratton, Ottawa, and Nile F. Hartman, Stone Mountain, Ga., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 1, 1993, Ser. No. 86,527

Int. Cl.<sup>6</sup> G01L 1/24

U.S. Cl. 73—800

9 Claims



1. A method of determining the magnitude of force exerted on a high density planar interconnect at points of contact comprising:

establishing a pressing relationship between a photoelastic material and the high density interconnect by positioning a photoelastic material in a force transferring relationship with the points of contact of the interconnect, the photoelastic material having a coating of metal on a surface touching the points of contact of the high density interconnect and on a surface opposite to the touching surface, the photoelastic material further having a coating of metal on a surface opposite the surface through which polarized light is coupled to the photoelastic material, wherein the polarized light coupled into the photoelastic material is reflected back by the metal coating and exits the stressed photoelastic material through the same surface of the photoelastic material as the surface through which the polarized light enters the photoelastic material;

coupling polarized light into the photoelastic material stressed as a result of the pressing relationship with the high density interconnect, coupling of the polarized light being at 45 degrees with the direction of pressing;

capturing an image of the fringe pattern of the plane polarized light exiting the stressed photoelastic material, the fringe pattern comprising of fringes wherein the number of fringes varies with the magnitude of the pressing force;

counting the number of fringes produced to determine the magnitude of force exerted on the photoelastic material.

5,410,918

# AMBIENT AIR SAMPLER

Patrick R. Zimmerman, Boulder, Colo., assignor to University Corporation for Atmospheric Research, Boulder, Colo.

Filed Aug. 13, 1992, Ser. No. 930,157

Int. Cl.<sup>6</sup> G01N 1/24

U.S. Cl. 73—864

16 Claims



1. An ambient air sampler including a balloon attached to a tether line, comprising:

attachment means including first connection means fixedly connected to said tether line and second connection means rotatably connected to said first connection means;

wherein said first connection means includes an axle about which said tether line is wound, said axle having a first end and a second end, each of said ends of said axle having means associated therewith for securing said tether line relative to said axle.

5,410,919

# REMOTELY CONTROLLED SAMPLING DEVICE HAVING A VENT PASSAGE CONNECTING AN INTERNAL CHAMBER TO THE ENVIRONMENT THROUGH AN UPPER OUTLET

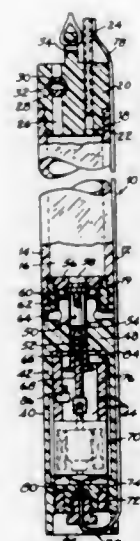
Robert E. Carpenter, Nutley; Scott Santora, Hammon, and Stephen A. Borgiani, Mount Holly, all of N.J., assignors to Norton Company, Worcester, Mass.

Filed Sep. 3, 1992, Ser. No. 940,414

Int. Cl.<sup>6</sup> G01N 1/12

U.S. Cl. 73—864.63

9 Claims



1. A remotely actuated sampling device for retrieving a

sample from a predetermined depth in a body of fluid comprising:

an elongated tubular body having:

an outer sidewall extending around an internal chamber and between a lower inlet end portion and an upper outlet end portion of the tubular body; an outlet end cap sealingly connected to and extending from the upper outlet end portion of the tubular body and having a vent passage extending therethrough and connected to the internal chamber;

a tubular conduit having a lower end portion sealingly connected to the vent passage and the outlet end cap and of sufficient length to extend upwardly and position an upper end thereof above the body of fluid;

a sealed housing sealingly connected to and extending from the lower end portion of the tubular body and having an outer wall extending around a lower sealed power chamber and an upper valve chamber separated by an upper end wall of the sealed power chamber;

remotely actuated power means sealed within the power chamber including a movable drive shaft; power conductors sealingly connected to the housing and of sufficient length to extend from the power means to a source of energy situated above the body of fluid;

a valve seat including a valve passage therein sealingly connected to an upper end portion of the housing above the upper valve chamber and a fluid passage in the outer sidewall of the housing around the upper valve chamber;

an axially movable valve stem connected to and movable by the drive shaft into and out of engagement with the valve seat, and said valve stem extending through and sealed relative to the internal surfaces of a bore in the upper end wall of the housing.

5,410,920

# APPARATUS FOR INSERTING AND REMOVING A SENSING ELEMENT FROM A FLUID PIPELINE

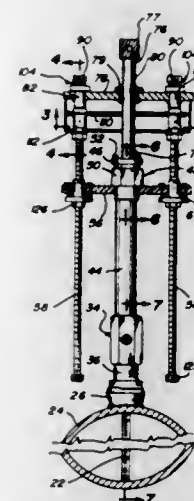
Todd G. Westwick, Boulder, Colo., assignor to Veris, Inc., Boulder, Colo.

Filed Jan. 28, 1994, Ser. No. 188,538

Int. Cl.<sup>6</sup> G01F 15/00

U.S. Cl. 73—866.5

12 Claims



1. An apparatus for inserting and withdrawing a sensor into a fluid conveying pipeline through an access valve connected by a coupling to said pipeline providing an unobstructed opening therethrough into said pipeline when the valve is in an open position, said apparatus comprising in, in combination, an elongated access tube having first and second ends and defining an inner bore, said tube connected at its first end to said access valve, a packing gland connected to said

access tube at its second end and adapted for sealing against a cylindrical member inserted therein;

an elongated cylindrical sensor tube housing said sensor with said sensor extending from one end thereof, said sensor tube slidably extending coaxially through said access tube and said packing gland;

a pair of spaced apart parallel threaded rotatable drive rods each operatively connected between said access tube and said sensor tube;

a mounting plate secured to said access tube and defining first and second openings therethrough for receiving said drive rods; and

a threaded sleeve loosely mounted in each of said openings and each receiving one of said drive rods, each threaded sleeve being movable within said opening to accommodate variations in alignment of said drive rods.

5,410,921

# UNIVERSAL WINDOW-ACTUATOR DRIVE UNIT

Rolf Deynet, Würzburg; Wolfram Knappe, Kitzingen, and Peter Michel, Kleinrinderfeld, all of Germany, assignors to Siemens Aktiengesellschaft, Germany

Filed Jul. 23, 1993, Ser. No. 97,344

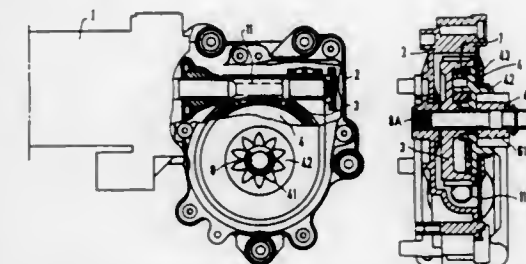
Claims priority, application Germany, Jul. 23, 1992, 9209929

U

Int. Cl.<sup>6</sup> F16H 1/16

U.S. Cl. 74—89.14

8 Claims



1. A window-actuator drive unit comprising a gear housing, a worm gear, a driving motor with a worm shaft driving said worm gear, a gear housing shaft rigidly connected to said gear housing on which said worm gear is rotatably supported, and a coaxial driving disk having an actuator shaft collar protruding axially from the side of said driving disk opposite said worm gear, said actuator shaft collar concentrically surrounding said gear housing shaft and having an inner grooved toothing for concentrically and attachably mating with a coupling portion of a window-actuator.

5,410,922

# LOCATING TABLE APPARATUS

Masayuki Katahira, Gunma, Japan, assignor to NSK Ltd., Tokyo, Japan

Filed Mar. 30, 1993, Ser. No. 40,019

Claims priority, application Japan, Mar. 31, 1992, 4-077675

Int. Cl.<sup>6</sup> F16H 25/20

U.S. Cl. 74—89.15

14 Claims

1. A locating table apparatus employed in a clean room, comprising:

a housing for housing the locating table apparatus in the clean room;

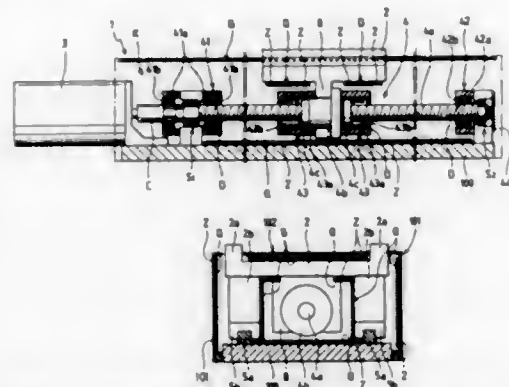
a based member fixed in said housing;

a table mounted in said housing so as to freely move in a longitudinal direction;

driving means disposed in said housing and located on said base member for supporting and driving said table; and

a plurality of electrostatic dust absorbing members arranged at respective predetermined positions in said housing via respective electrical insulative members, wherein each of said electrostatic dust absorbing members comprises a parallel plate-shaped condenser.

2. The locating table apparatus of claim 1, wherein said driving means comprises a motor, a bracket member, a ball screw member linked to said motor and having a screw shaft,



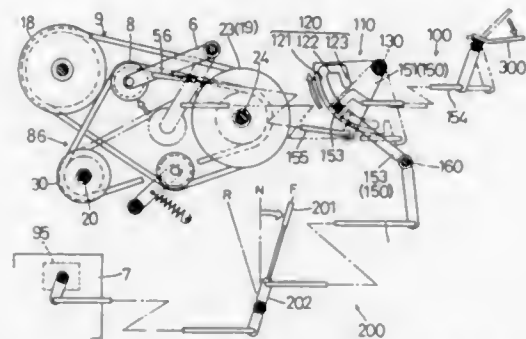
and a ball screw nut movably fitted to said screw shaft of said ball screw member in a direction along said screw shaft, and a lower surface of said table is threadably engaged with said ball screw nut via said bracket member at a central part thereof.

5,410,923

# SHIFT CONTROL SYSTEM FOR A VEHICLE TRANSMISSION HAVING A BACKWARD/FORWARD DRIVE CHANGEOVER DEVICE AND A STEPLESS CHANGE SPEED DEVICE

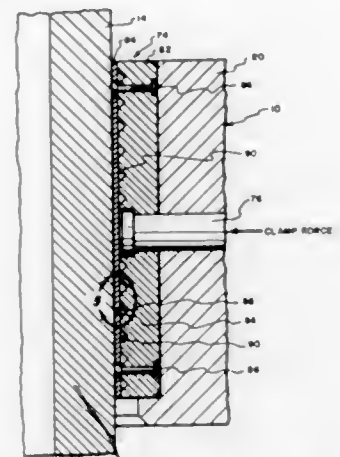
Nobuyuki Yamashita, Ryozi Imanishi, and Katsuhiko Uemura, all of Sakai, Japan, assignors to Kubota Corporation, Japan  
Filed Sep. 7, 1993, Ser. No. 117,908

Claims priority, application Japan, Aug. 9, 1992, 4-239454  
Int. Cl.<sup>6</sup> B60K 41/22; F16H 63/36; G05G 1/14  
U.S. Cl. 74-474 8 Claims



1. A shift control system for a mower transmission having a backward/forward drive changeover device, a stepless change speed device, and a working said system comprising:  
shift means for controlling said change speed device;  
first interlock means for transmitting a shift of said shift means to said change speed device, said first interlock means including shift adjusting means for adjusting said shift transmitted from said shift means to said change speed device;  
switch means for controlling said backward/forward drive changeover device; and  
second interlock means for transmitting a shift of said switch means as an amount of control to said shift adjusting means;  
wherein said shift adjusting means is operable, in response to a shift to a backward drive position of said switch means, to limit to a predetermined range said shift transmitted from said shift means to said change speed device.

5,410,924  
**SHEAR GRIPPING APPARATUS AND METHOD**  
Igor Krasnov, 6835 Oakwood Trace Ct., Houston, Tex. 77040  
Continuation-in-part of Ser. No. 893,400, Jun. 4, 1992, abandoned. This application Dec. 29, 1993, Ser. No. 174,986  
Int. Cl.<sup>6</sup> B25B 13/50  
U.S. Cl. 81-57.33 18 Claims

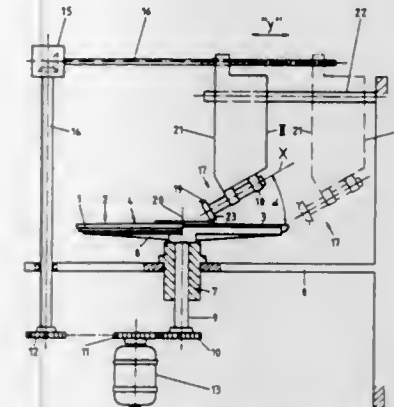


1. In a torque transfer apparatus for transferring torque to a pipe including jaws which are operated to provide a clamping force on a pipe and which are rotated to transfer torque to the pipe to rotate the same, the improvement comprising  
a gripping assembly on said jaws which includes:  
a metallic insert means mounted on said jaw and having a gripping surface and,  
a metallic insert face material therefor so as to be disposed between said insert means and a pipe when said gripping assembly is clamped to the pipe, said face material having a pipe-side surface and a jaw-side surface, said insert face material being a ductile material with a high shear capability and softer than said insert means, and softer than the pipe to which torque is applied by said apparatus, thereby to provide a keyed bond between the pipe and the pipe-side surface of the said metallic insert face material by the flow of the insert face material into imperfections in the surface of the pipe upon application of clamping force to the jaws, which force is maintained during rotation of the jaws for the transfer of torque to the pipe, and  
whereby the torque capable of being transferred by the jaws to the pipe is a function of the said shear capability of the insert face material, which, if exceeded, will cause relative slippage between the said insert face material and the pipe sought to be rotated, thereby preferentially galling the pipe-side surface of said insert face material, whereby the surface of the pipe sought to be rotated is left undamaged notwithstanding the rotational torque applied to the jaws.

5,410,925  
**METHOD OF MAKING AN AERATOR MEMBRANE**  
Konrad Mueller, Uster, Switzerland, assignor to Huber + Auhner AG, Pfaffikon, Switzerland  
Filed Sep. 10, 1993, Ser. No. 118,621  
Claims priority, application Germany, Sep. 22, 1992, 42 31 696.0  
Int. Cl.<sup>6</sup> B26F 1/24 6 Claims

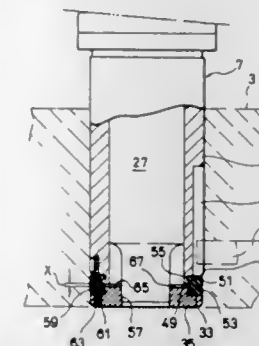
1. A method of manufacturing a membrane for a surface type aerator with an approximately disc shaped aeration field made from a flexible membrane, said method comprising a step of

displacing a rotating perforating device with a plurality of perforating tools over a surface of the membrane along at



least one spirally shaped path, relative to the membrane, to form a series of perforations in the membrane.

5,410,926  
**UPPER TOOL FOR A PRESS**  
Hiroshi Saito, Odawara, Japan, assignor to Amada Metreco Company, Limited, Japan  
Filed Jul. 28, 1993, Ser. No. 98,030  
Int. Cl.<sup>6</sup> B26D 7/06  
U.S. Cl. 83-136 1 Claim

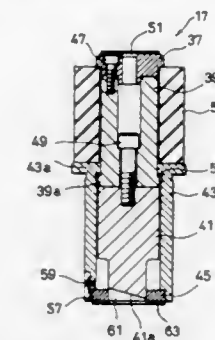


1. An upper tool for a punch press which includes an upper tool holding member, comprising:  
a punch guide adapted to be mounted on the upper tool holding member so as to be movable up and down, the punch guide having a lower end portion;  
a shock damping member mounted on the lower end portion of the punch guide; and  
a stripper plate mounted on the shock damping member, wherein the punch guide and the stripper plate are formed with outer engage projections, respectively, and the shock damping member is formed with upper and lower inner projection portions, and the outer engage projections of the punch guide and the stripper plate are adapted to engage with the upper and lower inner projections, respectively.

5,410,927  
**LOW NOISE PUNCH TOOL**  
Hitoshi Omata, and Oriya Fujita, both of Kanagawa, Japan, assignors to Amada Company, Limited and Amada Meirecs Company, Limited, both of Kanagawa, Japan  
Filed Jul. 16, 1993, Ser. No. 92,468  
Int. Cl.<sup>6</sup> B26F 1/14 5 Claims

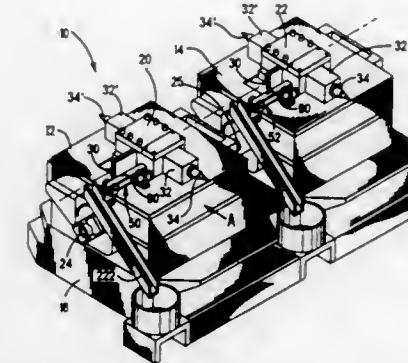
1. A low noise punch tool comprising:  
an upper surface pad formed of a low noise material and

disposed on an upper surface of a punch head, said upper surface pad being struck by a striker of a punch press;  
an elastic member formed of said low noise material and interposed between the punch head and a punch guide;  
a lower surface pad formed of said low noise material and attached to a lower surface of a stripper plate provided at a lower end of the punch guide; and



a ring formed of said low noise material, the ring being interposed between an upper surface of a stepped portion of the punch body and a lower surface of a flange portion of the punch guide to reduce noise generated when the punch body is brought into contact with the punch guide during an upward movement of the punch body.

5,410,928  
**SCRAP REMOVAL SYSTEM FOR A STAMPING AND FORMING MACHINE**  
Johannes C. W. Bakermans, and Daniel E. Poplaski, both of Harrisburg, Pa., assignors to The Whitaker Corporation, Wilmington, Del.  
Filed Oct. 27, 1993, Ser. No. 144,770  
Int. Cl.<sup>6</sup> B26F 1/14 12 Claims



1. In a stamping and forming machine of the type including a punch assembly having punches and a mating die assembly, each of said assemblies being arranged to undergo reciprocating horizontal motion toward and away from each other for performing a stamping and forming operation on a workpiece disposed therebetween, wherein said die assembly includes a die plate having die openings extending through opposite major surfaces, each die opening in alignment with a corresponding one of said punches, a backup plate adjacent said die plate having a scrap exit opening in alignment with a corresponding one of said die openings, and a ram for effecting said reciprocating horizontal motion of said die assembly, a scrap removal system comprising:  
(a) an adapter plate between said backup plate and said ram arranged to reciprocate therewith and having a first face in engagement with a major surface of said backup plate opposite said die plate and a second face opposite said first face in engagement with said ram;



- (b) first openings spaced apart in said first face of said adapter plate in communication with said scrap exit openings, said first openings extending substantially horizontally in a direction somewhat parallel with said horizontal reciprocating motion;
- (c) second openings in a bottom surface of said adapter plate, each said second openings extending substantially vertically from said bottom surface into intersection with a first opening; and
- (d) a conveyor disposed vertically under and in alignment with said second openings,
- said first and second openings and said conveyor arranged so that when one of said punches blanks through said work-piece forcing a scrap slug into its corresponding die opening another scrap slug previously blanked is urged through a corresponding scrap exit opening in said backup plate and into and through a corresponding first opening where it falls by gravity through said intersecting second opening to said conveyor and is moved thereby to a position outside of said machine.

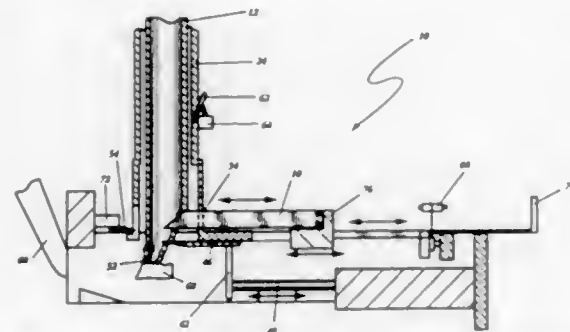
5,410,929

**DEVICE FOR RECYCLING A TUBE SUCH AS A CORE**  
 Marcus T. Wallace, Smyrna, Tenn., assignor to Fibercore Recycle Systems, Inc., Smyrna, Tenn.

Filed May 19, 1993, Ser. No. 64,820  
 Int. Cl.<sup>6</sup> B26D 1/09

U.S. Cl. 83—160

28 Claims



18. A device for cutting a tubular core having a proximal and distal end into pieces, said device comprising:
- a housing;
  - means attached to said housing for receiving said distal end of said tubular core;
  - means attached to said housing for splitting said tubular core proximate said distal end;
  - first means attached to said housing for cutting said distal end of said tubular core aligned approximately perpendicularly to said means for splitting said distal end of said tubular core;
  - second means attached to said housing for cutting said tubular core proximate said distal end aligned in approximate parallel alignment to said first means for cutting said distal end of said tubular core;
  - means attached to said housing for sequentially moving said first means attached for cutting said distal end of said tubular core and said means for splitting said distal end of said tubular core into said tubular core and then moving said means for receiving said distal end of said tubular core and said distal end of said tubular core into said second means for cutting said tubular core;
  - means attached to said housing for storing said pieces of said tubular core;
  - means attached to said housing for discharging said stored pieces;
  - means attached to said housing for pushing said stored pieces toward said means for discharging said stored pieces;
  - said device being powered by electricity;
  - means attached to said means for receiving said distal end

- of said tubular core for turning on said electricity only when a core in said means for receiving said distal end of said tubular core; and
1. means for preventing back flow of said stored pieces away from said means for discharging said stored pieces attached to said means for storing said pieces of said tubular core.

5,410,930

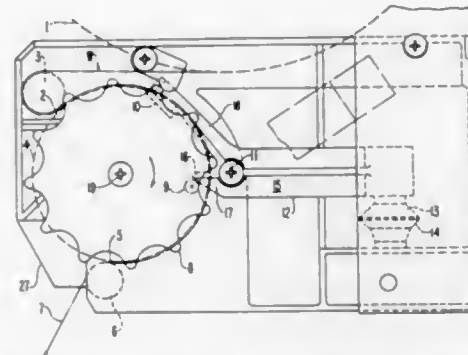
**LOW OPERATING FORCE STOP MECHANISM AND DISPENSING METHOD FOR ROLLED WEB DISPENSERS**

Raymond F. DeLuca, Stamford, Conn., and John S. Forman, Marietta, Ga., assignors to Georgia Pacific Corporation, Atlanta, Ga.

Continuation of Ser. No. 742,476, Aug. 5, 1991, abandoned. This application May 24, 1993, Ser. No. 65,358  
 Int. Cl.<sup>6</sup> A47K 10/36; B65H 35/08

U.S. Cl. 83—335

11 Claims



1. A dispenser for rolled web material, said dispenser comprising:
- a dispenser cabinet having means in said cabinet for mounting a roll of web material;
  - a feed roller rotatably mounted on a shaft in said cabinet to guide said web from the roll to the exterior of said cabinet, so that said web may be grasped by a user and pulled out of said dispenser;
  - camming pin means rotatable with said feed roller and spaced radially from the feed roller axis for providing a camming action;
  - a cutter mechanism associated with said feed roller to transversely perforate said web as it passes over said feed roller;
  - a stop mechanism for stopping the operation of said feed roller and said cutter mechanism to arrest the movement of said web for a predetermined period of time after a predetermined length of said web has been withdrawn from said dispenser, said stop mechanism including lever means mounted to pivot in a plane normal to the axis of said feed roller for activating said stop mechanism, said lever means having a first engagement arm, a second engagement arm and an actuating arm, a first end of said arms terminating at the pivot point of said lever means, said first engagement arm being adapted to engage said camming pin means to raise said first engagement arm to a high level and said actuating arm to a low level as said feed roller rotates, said second engagement arm being adapted to engage said camming pin means after said first engagement arm has been raised, said second engagement arm holding said camming pin and preventing said feed roller from rotating for a predetermined period of time, wherein a feed wheel is fixedly secured to said shaft means and said camming pin means is carried by said feed wheel, said camming pin means is formed of a cam portion and a shank portion, said shank portion extending along a side of said feed wheel to a center portion of said feed wheel, said

shank portion being attached to said feed wheel at said center position.

5,410,931

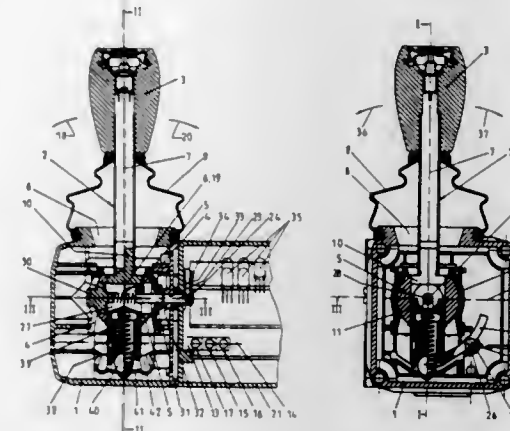
**MECHANICAL SHIFTING DEVICE**

Hendrik Peccu, Oostnieuwkerke, Belgium, assignor to Clark Equipment Belgium, N.V., Brugge, Belgium  
 Continuation of Ser. No. 104,240, Aug. 9, 1993, abandoned, which is a continuation of Ser. No. 917,068, Sep. 29, 1992, abandoned. This application Mar. 28, 1994, Ser. No. 218,462  
 Claims priority, application Germany, Nov. 30, 1990, 40 38 278.8

Int. Cl.<sup>6</sup> G05G 9/02; F16H 59/02

U.S. Cl. 74—473 P

21 Claims



1. A mechanical shifting apparatus for effecting shifting of a multigear transmission by movement of first and second transmission elements, said apparatus comprising:

- a housing;
- a retainer structure within said housing configured for mounting a ball for rotation;
- a ball mounted in said retainer structure;
- a control lever mounted on said ball to facilitate rotation of said ball by an operator; and
- apparatus coupling said first and second transmission elements to said ball and being responsive to rotative movement of said ball for imparting rotational movement only to said first transmission element in response to rotative motion of said ball about a first axis, and for imparting longitudinal movement only to said second transmission element in response to rotative movement of said ball about a second axis.

5,410,932

**BALL LOCK PUNCH RETAINER**

David J. Moellering, 22644 Shadowglen, Farmington Hills, Mich. 48355

Continuation-in-part of Ser. No. 923,152, Jul. 29, 1992, Pat. No. D. 351,395, and Ser. No. 981,779, Nov. 25, 1992, Pat. No. 5,357,835. This application Apr. 29, 1994, Ser. No. 235,090  
 The portion of the term of this patent subsequent to Oct. 25, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B26D 7/26

U.S. Cl. 83—698.31

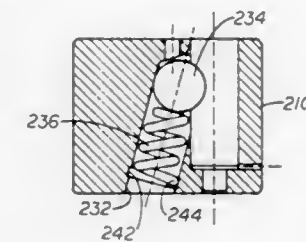
13 Claims

10. A punch retainer comprising a single piece solid body of through hardened tool steel,
- a flat surface on the body for engagement with a punch press platen and circumferential sidewalls on the body,
  - at least one hole in the body for means to attach the retainer to the press platen,
  - at least one dowel pin hole in the body and intersecting the flat surface,
  - at least one punch hole having a sidewall within the body for

receipt of a punch and punch retention means extendable into the punch hole,

the improvement comprising a flat bottom terminating the punch hole within the body, and

a relief groove formed in the punch hole sidewall adjacent the flat bottom,



and wherein the punch retention means include a hole intersecting the punch hole and a spring in the intersecting hole, the intersecting hole including an undercut and the spring including means to engage the undercut.

5,410,933

**FRET-SAW MACHINE**

Kouichi Miyamoto, and Sboji Takahashi, both of Tokyo, Japan, assignors to Ryobi Limited, Tokyo, Japan

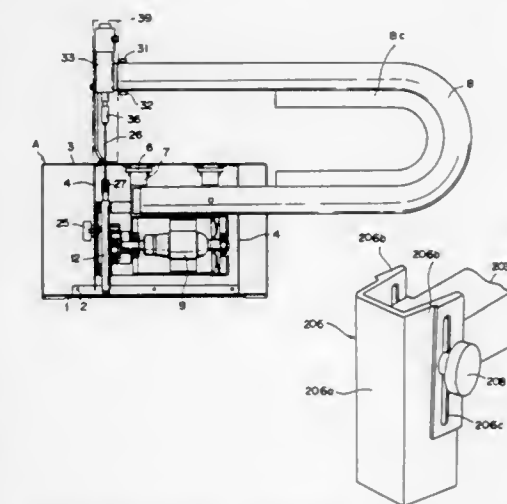
Division of Ser. No. 931,588, Aug. 18, 1992, Pat. No. 5,267,498, and Ser. No. 88,517, Jul. 7, 1993, Pat. No. 5,345,849. This application Jul. 21, 1994, Ser. No. 278,400

Claims priority, application Japan, Aug. 20, 1991, 3-65730; Aug. 20, 1991, 3-208014; Aug. 21, 1991, 3-66163; Aug. 21, 1991, 3-66164; Aug. 26, 1991, 3-213359; Sep. 2, 1991, 3-70017; Sep. 18, 1991, 3-74964

Int. Cl.<sup>6</sup> B27B 3/10

U.S. Cl. 83—783

2 Claims



1. A fret-saw machine, comprising:
- a base unit having a table including a surface on which a workpiece to be cut is placed;
  - a frame member disposed in the base unit and secured to the table;
  - a U-shaped arm member having one end portion secured to the frame member and another end portion disposed above the table;
  - blade holder means having first and second slide holder units and first and second blade holder units secured to corresponding first and second slide holder units, the first slide holder unit and the first blade holder unit being disposed in the base unit and secured to the frame member and the second slide holder unit and the second blade holding unit

being secured to said another end portion of the arm member;

a blade supported at both ends thereof by the first and second blade holder units;

a drive means supported in the base unit by the frame member and connected to the first slide holder unit to drive the blade; and

means secured to said blade holder means for covering said blade, said blade covering means comprising a front plate and side plates integrally formed with the front plate so as to provide a substantially rectangular box-shaped structure, said side plates respectively having free ends adjustably spaced from the surface of the table on which a workpiece is placed to retain the workpiece against the surface of the table when the workpiece is cut, wherein said second slide holder unit has a projected portion with which said blade covering means is engaged in which the projected portion is fitted to an opening formed by the side plates to the blade covering means so that the projected portion abuts against inner surfaces of the side plates, the second slide holder unit and the blade covering means are fastening by a fastening means to be rotatable about the fastening means, at least one of the surfaces of the projected portion abutting against the side plates is formed so as to provide a taper shape corresponding to the surface of the side plate.

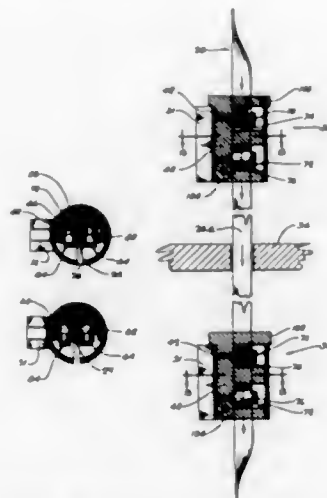
5,410,934

**SWIVELABLE GUIDE HEAD FOR BAND SAW ADAPTABLE FOR WIDE AND NARROW SAW BLADES**  
 Jacob Krippelz, Oswego, Ill., assignor to Jake's Machining & Rebuilding Service, Inc., Aurora, Ill.  
 Continuation of Ser. No. 35,407, Mar. 23, 1993, abandoned. This application Feb. 28, 1994, Ser. No. 203,703

Int. Cl.<sup>6</sup> B26D 1/54; B27B 13/10

U.S. Cl. 83—820

6 Claims



1. A guide for relatively wide and narrow width endless band saw blades, each blade having a vertically downwardly moveable cutting strand with cutting teeth along a front cutting edge and a parallel non-cutting back edge comprising:

an elongated rigid casing having a lengthwise extending, open ended, cylindrical bore and a lengthwise extending blade-receiving slit through a wall thereof, said slit openly communicating with said bore; an external lug on said casing for mounting the same in a vertical operating position such that the casing surrounds the vertical movement path of the blade's cutting strand; and manually actuated spring loaded means mounted on said casing for movement radially into and out of said bore;

a unitary plug having a cylindrical body axially coextensive with and rotatably journaled in said bore and a radially extending flange abutting an upper end of said casing; said

plug having a lengthwise, radially inwardly extending groove which is registeringly alignable with said slit to afford entry of said cutting strand into said plug for free passage in and along said groove;

manually engageable means on said flange for gripping said plug to rotatably move said plug relative to said casing; said body having a plurality of circumferentially spaced depressions in its periphery which are aligned to cooperate with said manually actuated means in response to selective rotation of said plug to lock said plug in predetermined indexed positions relative to said casing, said body also having a pair of transverse recesses extending laterally with respect to a longitudinal axis of said body and formed in one side thereof such that the recesses are vertically spaced along said longitudinal axis and extend horizontally when said casing is in said operating position; plural, parallel, fixed, pintles secured to said body within said recesses; said pintles extending in cantilever fashion wherein each recess has at least two pintles spaced from one another so that they extend along opposite sides of and parallel to said cutting strand which is in said groove, a side guide roller rotatably journaled on and axially secured to each of said pintles, each said roller comprising two coaxially aligned cylindrical end portions, one of which portions is of distinctly larger diameter than the other and presents a cylindrical blade engaging exterior surface of sufficient diameter and axial extent to laterally engage and guide a substantial width of the saw blade's cutting strand measured from immediately behind the teeth along the front cutting edge thereof to the back edge thereof.

5,410,935

**BAND SAW BLADE**

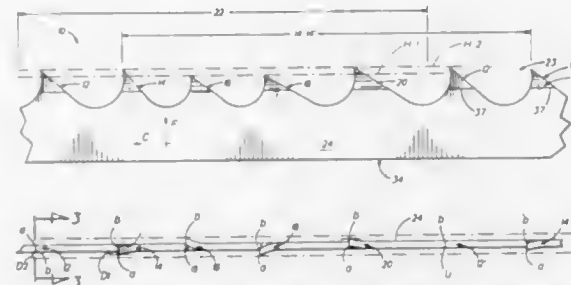
James R. Holston, Orange, Mass., and William B. Korb, Melrose, Conn., assignors to American Saw & Mfg. Company, East Longmeadow, Mass.

Filed Nov. 1, 1993, Ser. No. 144,349

Int. Cl.<sup>6</sup> B27B 33/06

U.S. Cl. 83—851

6 Claims



1. A saw blade construction comprising a steel band having generally planar opposite side surfaces, a cutting edge for cutting a workpiece when the blade is moved in a cutting direction thereto and a backing edge, the cutting edge being defined by saw teeth formed along said band, the improvement comprising said teeth being formed in redundant groups along said cutting edge of the blade, each of said groups comprising at least one unset leading tooth having a predetermined height and a plurality of other teeth trailing said unset tooth, in said cutting direction, said plurality consisting of two sets of trailing teeth each set consisting of two teeth, with one set thereof being generally the same height, in an unset condition, as the unset tooth and being set alternately outward of said opposite side surfaces of the band, the other set of trailing teeth being substantially lower in height than the unset tooth, said one set of teeth having a lateral set extending a given distance outwardly of said opposite side surfaces of said band, each of the teeth of said other set having a wider set than that of the one set so that the shorter of the trailing teeth extend outwardly of said opposite side surfaces a distance greater than said given

distance and the shorter teeth of wider set being disposed consecutively in interposed relation between the teeth of said one set.

5,410,936

**MUSICAL INSTRUMENT BRIDGE**

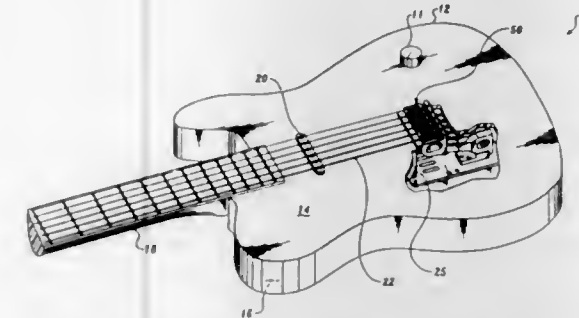
Lynn K. Ellsworth, Federal Way, and John D. Shaneyfelt, Auburn, both of Wash., assignors to The 2TEK Corporation, Kent, Wash.

Filed May 27, 1993, Ser. No. 68,541

Int. Cl.<sup>6</sup> G10D 3/04

U.S. Cl. 84—298

16 Claims



1. A musical instrument bridge for supporting a set of strings above a generally planar front face of a musical instrument, said front face extending in a direction generally parallel to the set of strings supported by the bridge, the bridge comprising:

a plate;

means for securing the plate to the musical instrument in a plane extending in a same direction as the plane of the front face of the musical instrument; and

a plurality of elongated fingers cantilevered from the plate, each of the plurality of fingers including means for anchoring a string of the set of strings such that the fingers extend in a direction generally lengthwise of the set of strings.

5,410,937

**SUPPORTING MECHANISM FOR A SOUND GENERATOR OF A MUSICAL INSTRUMENT**

Tomio Okamoto, and Junji Fujii, both of Shizuoka, Japan, assignors to Yamaha Corporation, Shizuoka, Japan

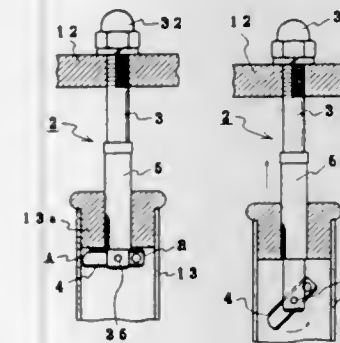
Filed Nov. 12, 1993, Ser. No. 151,530

Claims priority, application Japan, Nov. 13, 1992, 4-304165

Int. Cl.<sup>6</sup> G10D 13/08

U.S. Cl. 84—403

2 Claims



1. A supporting mechanism for a sound generator of a musical instrument comprising

a holder shaft having an upper section adapted for mounting to a stand of said musical instrument and a lower section adapted for downward insertion into an axial bore of said sound generator,

a lock bar pivoted, at a position off its own center of gravity, to a lower end of said holder shaft, and

a stopper axially, slidably coupled to said holder shaft in an arrangement able to hold said lock bar at a prescribed angular position about its point of pivot.

5,410,938

**DRUM EMPLOYING A DOUBLE TYPE SCREW UNIT FOR DRUM HEAD TENSION**

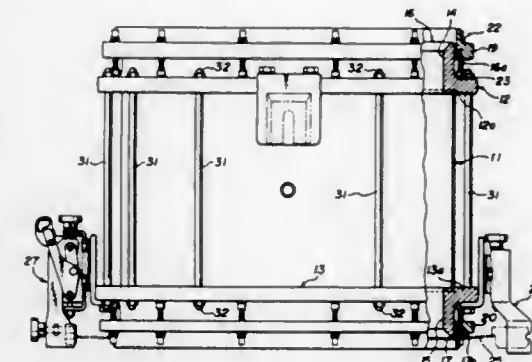
Makoto Kurosaki, and Mitsumasa Gotoh, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Shizuoka, Japan  
 Continuation of Ser. No. 25,178, Mar. 2, 1993, abandoned. This application Jun. 29, 1994, Ser. No. 268,194

Claims priority, application Japan, Mar. 3, 1992, 4-081547; Mar. 3, 1992, 4-081548; Apr. 22, 1992, 4-129441; Apr. 22, 1992, 4-129442

Int. Cl.<sup>6</sup> G10D 13/02

U.S. Cl. 84—411 R

4 Claims



1. A drum comprising

a tubular kettle open at both longitudinal ends, first and second suspension rings fixed to respective ones of said open ends of said kettle, said first suspension ring having a peripheral extension,

a first drum head set in tension to said first suspension ring, the first drum head having a periphery,

a first counterhoop in engagement with said periphery of said first drum head, said first counterhoop having a periphery,

a first screw unit for fastening said first counterhoop to said first suspension ring,

said first screw unit including first lug nuts mounted to said peripheral extension of said first suspension ring, and first fastener bolts each having a first and a second end, each of said first fastener bolts being mounted to the periphery of the first counterhoop near said first end and mounted to a corresponding one of said lug nuts near said second end;

a second drum head set in tension to said second suspension ring, the second drum head having a periphery;

a second counterhoop in engagement with said periphery of said second drum head, said second counterhoop having a periphery; and

a second screw unit for fastening said second counterhoop to said second suspension ring,

said second screw unit including second lug nuts mounted to a peripheral extension of said second suspension ring, and second fastener bolts each having a first and a second end, each of said second fastener bolts being mounted to the periphery of the second counterhoop near said first end and mounted to a corresponding one of said second lug nuts near said second end.



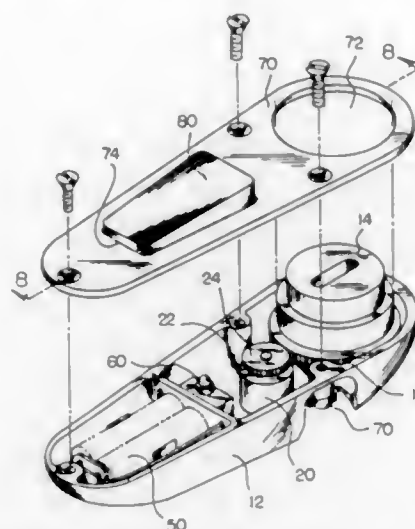
5,410,939

**MUSICAL INSTRUMENT STRING WINDING DEVICE**  
 Brian S. Matamoros, 14403 Mansel Ave., Lawndale, Calif. 90260, and Aaron A. Grodin, 4818 Reese Rd., Torrance, Calif. 90505

Filed Mar. 21, 1994, Ser. No. 210,424  
 Int. Cl.<sup>6</sup> G10G 7/00

U.S. Cl. 84—458

2 Claims



1. A musical instrument string winding device for winding the strings on a stringed musical instrument comprising, in combination:

- a hollow housing having an opening for allowing access therein;
- an essentially cylindrical and transparent chuck disposed within the housing, the chuck having an upper end with a socket formed thereon adapted to receive a key of a musical instrument and a lower end having a gear formed therearound;
- a motor disposed within the housing, the motor having a fixed stator with a rotatable rotor extending therefrom and coupled with the gear for imparting rotational movement to the chuck;
- a lamp disposed within the housing and positioned under the gear of the chuck;
- a concave reflector coupled about the lamp for reflecting light from the lamp for illuminating the chuck;
- a power source disposed within the housing for energizing the motor and the lamp;
- primary switch means coupled between the power source, the motor, and the lamp, the primary switch means operable in one orientation for activating both the motor and the lamp, whereby simultaneously allowing a key placed in the socket of the chuck to be illuminated and a string coupled to the key to be wound, and operable in another orientation for deactivating the motor and the lamp;
- secondary switch means coupled between the power source and the lamp, the secondary switch means operable in one orientation for activating only the lamp, whereby providing light through the chuck for illuminating nearby objects for viewing, and operable in another orientation for deactivating the lamp;
- a lid coupled over the opening of the housing for sealing the power source, motor, primary and secondary switch means, and lamp within the housing, the lid having a first aperture and second aperture disposed thereon with the first aperture axially aligned about the chuck near the gear; and
- a hand grip coupled within the second aperture of the lid and projected therefrom for placing the primary switch means in the operable orientation when the grip is compressed by hand.

5,410,940

**APPARATUS AND METHOD FOR IDENTIFYING MUSICAL CHORDS**

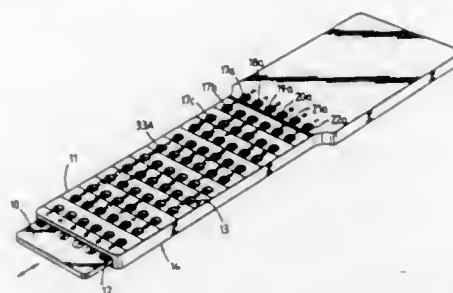
Janos Havas, Brisbane, Australia, assignor to Perfect Products Pty. Ltd., Capalaba, Australia  
 PCT No. PCT/AU91/00324, § 371 Date Mar. 1, 1993, § 102(e)  
 Date Mar. 1, 1993, PCT Pub. No. WO91/02011, PCT Pub. Date Feb. 6, 1992

PCT Filed Jul. 23, 1991, Ser. No. 961,693

Claims priority, application Australia, Jul. 24, 1990, PK1325  
 Int. Cl.<sup>6</sup> G09B 15/02

U.S. Cl. 84—473

23 Claims



1. An apparatus for determining finger placement on a finger board to play musical chords on a multi-stringed musical instrument containing a finger board, the apparatus comprising an inner base member having a number of columns of spaced indicia, the number of columns corresponding at least to the number of strings on the musical instrument, an outer slide member comprising a pair of opposed side walls defining a slot therebetween having six columns of spaced viewing ports, located on both side walls of the slide member wherein each said column comprises twelve spaced viewing ports in linear alignment, the number of columns corresponding to the number of columns of spaced indicia on the base member, said base member and slide member being slidably movable relative to each other, within said slot, and a chord selector to allow a particular chord to be selected by said apparatus, the construction and arrangement being such that upon selection of a desired chord by said chord selector, said base member and said slide member are moved relative to each other to a particularly position whereby the finger placement on the finger board to play the selected chord can be determined by the indicia visible through said viewing ports.

5,410,941

**ELECTRONIC MUSICAL INSTRUMENT HAVING AN EXTERNAL MEMORY DEVICE**

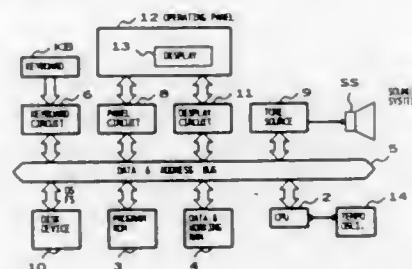
Harumichi Hotta; Akira Suzuki, and Akira Tozuka, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan  
 Continuation of Ser. No. 820,531, Jan. 14, 1992, abandoned. This application Sep. 7, 1994, Ser. No. 301,721

Claims priority, application Japan, Jan. 17, 1991, 3-17144

Int. Cl.<sup>6</sup> G09B 15/04; G10H 1/18

U.S. Cl. 84—601

17 Claims



1. An electronic musical instrument operable in plural opera-

tion modes each corresponding to respective data stored in plural external memory media, comprising:

- reading means capable of having one external memory medium removably attached thereto, said reading means for reading out data stored in the memory medium;
- operation mode determining means for determining an operation mode from among said plural operation modes based on the data read out from said attached memory medium; and
- operation mode setting means for automatically setting said determined operation mode so that the data read out by said reading means can be utilized under said determined operation mode.

5,410,943

**PRESSURE REGULATION DEVICE FOR HYDRAULIC SYSTEM**

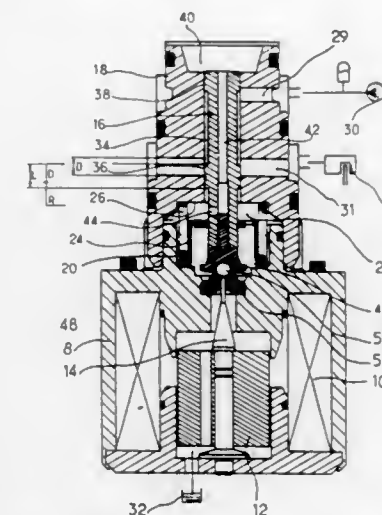
Gilbert Kervagoret, Argenteuil, France, assignor to AlliedSignal Europe Services Techniques, Drancy, France  
 PCT No. PCT/FR92/00927, § 371 Date May 4, 1993, § 102(e)  
 Date May 4, 1993, PCT Pub. No. WO93/09484, PCT Pub. Date May 13, 1993

PCT Filed Oct. 7, 1992, Ser. No. 50,201

Claims priority, application France, Oct. 31, 1991, 91 13482  
 Int. Cl.<sup>6</sup> F15B 13/044

U.S. Cl. 91—459

4 Claims



1. A pressure regulation device for a hydraulic system comprising at least one generator of fluid under pressure, a brake actuator and a reservoir of fluid under low pressure, and including a proportional electrovalve controlled by a computer, the electrovalve being connected via a duct to the generator of fluid under pressure and via a duct to the brake actuator, and comprising in a casing an electrical coil and a sliding magnetic core controlling a slide valve sliding in a bore provided in a body, the slide valve determining two chambers arranged on either side of the slide valve and having a valve with ball co-operating with a seating formed at the casing, the slide valve having a groove delimited by two bearing surfaces, one of the bearing surfaces co-operating with the duct for connection with the brake actuator and having a length greater than the diameter of the duct by a length representing a functional overlap.

5,410,944

**TELESCOPING ROBOT ARM WITH SPHERICAL JOINTS**

William B. Cushman, 1315 Finley Dr., Pensacola, Fla. 32514  
 Filed Jun. 3, 1993, Ser. No. 70,774

Int. Cl.<sup>6</sup> F15B 11/00; F01C 9/00; G05G 11/00

U.S. Cl. 91—520

9 Claims

1. A fluid pressure operated spherical joint comprising:

- a movable platform;
- a central sphere;
- an attachment means rigidly attached to the movable platform and the central sphere, whereby the movable platform, the central sphere, and the attachment means form a tiltable member of the joint;
- a hollow spherical casing rigidly attached to a spherical base;
- a plurality of first arcuate vane guides spaced from each other and rigidly attached to the tiltable member;
- a plurality of second arcuate vane guides spaced from each other, arranged about the central sphere, and attached to the spherical casing or base;

5,410,942

**PERCUSSION IGNITION DEVICE FOR A MORTAR OR THE LIKE AND A MORTAR COMPRISING SUCH A DEVICE**

Michel Begneu, Bourges, France, assignor to Giat Industries, Versailles, France

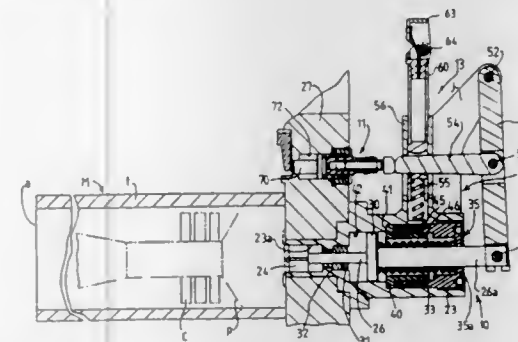
PCT No. PCT/FR92/00100, § 371 Date May 11, 1993, § 102(e)  
 Date May 11, 1993, PCT Pub. No. WO93/16347, PCT Pub. Date Aug. 19, 1993

PCT Filed Feb. 5, 1992, Ser. No. 987,289

Int. Cl.<sup>6</sup> F41A 19/59, 19/29

U.S. Cl. 89—27.14

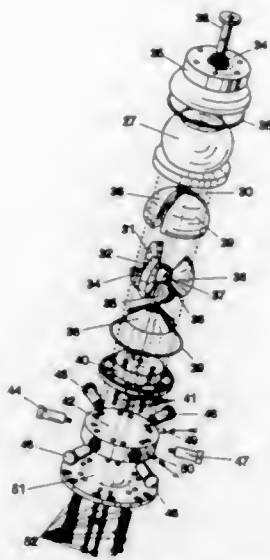
12 Claims



11. A mortar having a percussion firing mechanism, the percussion firing mechanism comprising:

- a housing;
- a percussion assembly disposed within said housing and comprising a firing-pin actuatable between a pre-actuated position and an actuated position relative to said housing, said housing being fixable to a baseplate, said firing-pin being urged by an urging device disposed within said housing to achieve position;
- a trigger unit;
- a deflecting mechanism adapted to be moved between a first position and a second position by said trigger unit;
- a movable stop assembly fixable to said baseplate; and
- a rigid bar member in actuatable engagement with said firing-pin, a pivotable arm being attached to said rigid bar member, said pivotable arm engaging said deflecting mechanism and said movable stop assembly, wherein said pivotable arm engaging said movable stop assembly maintains said firing-pin in said pre-actuated position.

a plurality of first arcuate vanes movable within slots formed between the first arcuate vane guides;  
a plurality of second arcuate vanes movable within slots formed between the second arcuate vane guides;  
whereby a fluid pressure introduced to the spherical joint produces a first pressure which forces the first and second



arcuate vanes to abut against the second and first arcuate vane guides, respectively, forming a seal therebetween and produces a second pressure, lower than the first pressure, within selected pressure chambers formed between the first and second arcuate vanes, the second pressure resulting in a pivoting and/or tilting movement of the tiltable member.

5,410,945

## PRESSURE CONTROL DEVICE

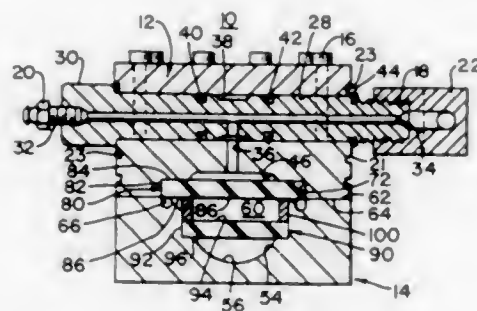
Richard Schops, 3 Farmington La., Melville, N.Y. 11747, and Robert Waggoner, Sulphur Spring, Tex., assignors to Richard Schops, Melville, N.Y.

Filed Aug. 17, 1993, Ser. No. 108,818

Int. Cl.<sup>6</sup> F01B 19/00; B60T 17/04

U.S. Cl. 92—48

11 Claims



1. A pressure control device for hydraulic brake systems, comprising:

- (A) a housing having a brake fluid port and a cavity communicating with said port; and  
(B) a staged series of resilient elements disposed within said cavity for nullifying hydraulic brake fluid pulsations over a wide range of pressures.

5,410,946

## HYDRAULIC ACTUATOR

Hideo Hoshi, Nagoya, Japan, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Germany

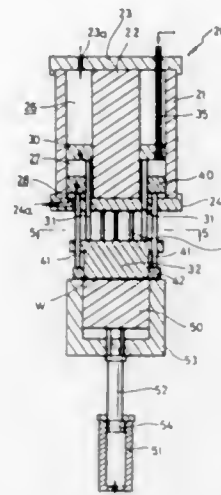
Filed Oct. 21, 1992, Ser. No. 964,014

Claims priority, application Japan, Oct. 28, 1991, 3-335803

Int. Cl.<sup>6</sup> B30B 1/08; F01B 7/10; F16J 15/18

U.S. Cl. 092—65

32 Claims



1. A hydraulic press machine, comprising:  
a cylinder body;  
a pressure chamber in said cylinder body;  
a first piston with a piston rod and a second piston with a piston rod which are independently movably inserted in said pressure chamber;  
a first working member secured to the first piston rod;  
a second working member secured to the second piston rod; pressurized fluid inlet and outlet ports provided in the cylinder body to be connected with the pressure chamber;  
an opposing member located proximate said first working member such that a work piece can be pressed between said first working member and said opposing member; and  
wherein said first piston rod is comprised of a plurality of first rod elements.

5,410,947

## VOLUME-COMPENSATED LOW-WEAR RECIPROCATING SEAL ASSEMBLIES

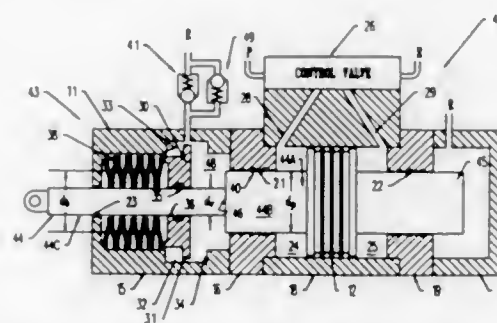
Kenneth D. Garnjost, Buffalo, N.Y., assignor to Moog Inc., East Aurora, N.Y.

Filed Sep. 17, 1993, Ser. No. 123,526

Int. Cl.<sup>6</sup> F15B 21/04

U.S. Cl. 92—80

12 Claims



1. In a fluid-powered actuator having a body and a rod, said body having a portion configured as an end wall provided with a through-opening, said rod having an inner portion arranged

on one side of said end wall in a pressurizable working chamber of said actuator, having a penetrant portion passing through said end wall opening, and having an outer portion arranged on the other side of said end wall, said actuator also including a seal assembly for containing fluid leaking from said actuator chamber between said rod penetrant portion and said wall opening, said seal assembly having a sliding-seal member engaging said rod outer portion for sealed movement therewith and for sealed sliding movement therealong toward and away from said rod penetrant portion, and a flexible closure joining said body and said sliding-seal member and defining between said body, said sliding-seal member and said rod, a leakage chamber surrounding said end wall opening, the improvement which comprises:

said rod being configured such that the transverse cross-sectional area of said penetrant portion is greater than the transverse cross-sectional area of said outer portion so as to define an annular surface therebetween; and  
wherein said rod and said flexible closure are so dimensioned, configured and arranged relative to one another such that equal small-amplitude movements of said rod and said sliding-seal member relative to said body will not substantially change the volume of said leakage chamber; whereby said seal assembly may accommodate such small-amplitude movements of said rod relative to said body without causing said sliding-seal member to move relative to said rod.

9. In a fluid-powered actuator having a body and a rod, said body having a portion configured as an end wall provided with a through-opening, said rod having an inner portion arranged on one side of said end wall in a pressurizable working chamber of said actuator, having a penetrant portion passing through said opening, and having an outer portion arranged on the other side of said end wall, the improvement which comprises:

a seal assembly for containing fluid leaking from said actuator chamber between said rod penetrant portion and said end wall opening, said seal assembly including:  
a sliding-seal member engaging said rod outer portion for sealed movement therewith and for sealed sliding movement therealong; and  
a flexible closure having one end connected to said body and having another end connected to said sliding-seal member to define between said body, said sliding-seal member and said rod a sealed chamber communicating with said end wall opening, said flexible closure being movable relative to said body within a displacement range; and  
wherein said rod has an annular surface and is so configured, dimensioned and arranged relative to said flexible closure that the pressure in said sealed chamber remains substantially constant within said displacement range during small-amplitude motion of said rod relative to said body.

5,410,948

## COOKING GRILLS WITH AUTOMATICALLY ROTATABLE FOOD SUPPORTING RACKS

Bryon G. Eickmeyer, 611 E. Benton St., Mount Olive, Ill. 62069

Filed Mar. 21, 1994, Ser. No. 215,105

Int. Cl.<sup>6</sup> A47J 37/04, 43/18

U.S. Cl. 99—335

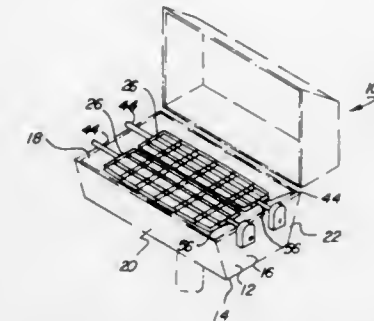
3 Claims

1. A new and improved cooking grill with automatically rotatable food supporting racks comprising, in combination:

- a container adapted to provide heat to food supported thereabove, the container including an essentially closed lower horizontal plate, generally vertical disposed plates extending upwardly from the periphery of the lower plate and an open upper edge with peripheral walls;  
a pair of support racks adapted to be supported by the peripheral wall of the container in a generally horizontal orientation, each of the racks being comprised of a lower apertured plate of open mesh upon which the food to be cooked may be placed, an upper apertured plate of open mesh adapted to be positioned over the food to be cooked located on the lower apertured plate, the upper and lower

plates each having long longitudinal edges and short lateral edges therebetween, hinge means coupling the upper and lower plates along adjacent longitudinal edges thereof, and a releasable clamp to couple together the upper and lower plates with the food to be cooked therebetween;

support means coupling the lateral edges of each of the racks for rotatable movement of each of the racks independent of the movement of the other of the racks, the support means including rods extending outwardly and secured at their interior ends to the lower racks and having exterior ends supported in bearing assemblies and also including a tubular support surrounding each of the rods, the tubular



supports being secured to the upper edge of the peripheral wall of the container to allow rotation of the racks within the tubes for rotating the racks and food supported therein;

drive means including a motor with a drive shaft and a bevel gear assembly for coupling the drive shaft of the motor with one rod whereby activation of the motor will rotate the shaft to turn over the food to be cooked; and

control means coupled to the drive means and including a power source in the form of batteries, an off/on switch and a timer and timer control coupled to the motor whereby the motor may be energized for a preselected time at preselected intervals for automatically turning the rack and the foods to be cooked.

5,410,949

## AUTOMATIC BREADMAKING MACHINE

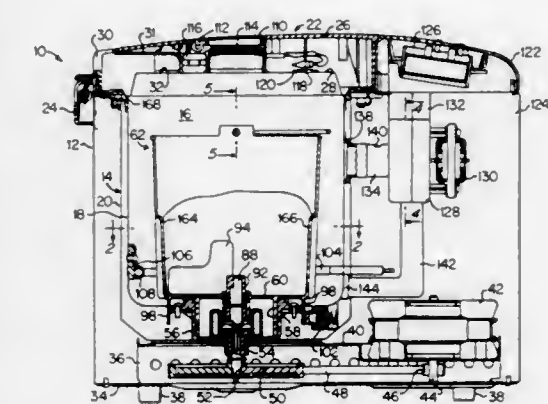
Siu Y. Yung, Taiwan, Hong Kong, assignor to Chiaphua Industries Limited, Hong Kong

Filed Dec. 20, 1993, Ser. No. 169,385

Int. Cl.<sup>6</sup> A47J 27/00

U.S. Cl. 99—348

30 Claims



1. In an automatic breadmaking appliance including a housing having a bottom wall, upwardly extending sidewalls and an open top, an oven chamber having a bottom, sidewalls and an



open top located in the housing in spaced relation to said housing bottom wall and sidewalls, a hinged cover mounted on the housing and movable between a closed position closing the housing and the oven chamber and an open position, an open-topped bread mold removably mounted in the oven chamber with the open top of the bread mold spaced below the top of the oven chamber, a mixing and kneading paddle removably mounted in the mold, a drive motor connected with the paddle for mixing and kneading dough in the mold, a heater located in the lower region of the oven chamber externally of the mold, and a process controller for controlling operation of the drive motor and the heater, an improved ventilating system comprising:

a motor driven blower mounted in said housing outside of said oven chamber, said blower having an inlet connected to the oven chamber through the sidewall thereof and an outlet,

first and second duct means each having one end connected to said outlet, said first duct means having its other end open to the atmosphere and said second duct means having its other end connected to said oven chamber adjacent the bottom thereof, and

valve means movable between a ventilating position closing said second duct means and opening said first duct means for directing the blower outlet to the atmosphere and a second position closing said first duct means and opening said second duct means for recirculating air from the blower outlet to the bottom portion of the oven chamber said process controller including means for controlling operation of the ventilation blower and said valve means in coordination with said drive motor and said heater.

5,410,950

## ADJUSTABLE ROTISSERIE

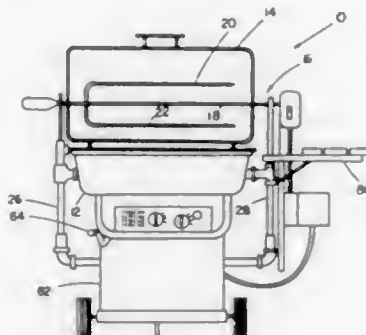
Wilbur Rone, 212 Rock Hill Rd., Asheville, N.C. 28803

Filed May 26, 1993, Ser. No. 67,668

Int. Cl.<sup>6</sup> A47J 37/04

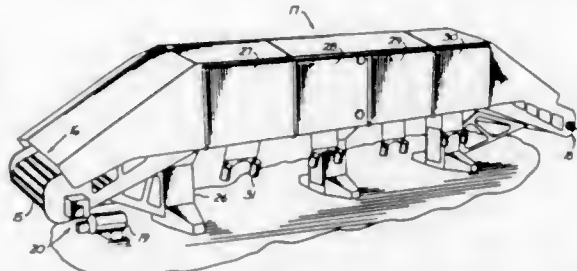
U.S. Cl. 99—421 HV

7 Claims



1. An adjustable rotisserie comprising: a fire bowl for containing a heat source; an elongated rotatable shaft; at least one prong attached to said shaft for holding food to be cooked; a frame; said frame contacting said shaft; at least one guide member attached to said fire bowl; a portion of said frame slidably received by said guide member; a motor for rotating said shaft; said motor attached to said frame; a mechanism for raising and lowering simultaneously said frame, said shaft and said motor identical distances so that the distance between said shaft and said motor remains constant, whereby said shaft may be raised and lowered with respect to said fire bowl while continuously rotating; said mechanism for raising and lowering including a jack; said mechanism for raising and lowering further includes a plurality of gears.

5,410,951  
APPARATUS AND METHOD FOR CONTINUOUS  
HIGH-VOLUME STEAM COOKING  
Brent A. Ledet, and David A. Johnson, both of Metairie, La.,  
assignors to The Laitram Corporation, Harahan, La.  
Continuation-in-part of Ser. No. 14,713, Feb. 8, 1993, which is a  
continuation-in-part of Ser. No. 887,832, May 26, 1992, Pat. No.  
5,184,538. This application Nov. 2, 1993, Ser. No. 145,813  
Int. Cl.<sup>6</sup> A23L 3/00; A23N 12/00; A47J 27/16  
U.S. Cl. 99—443 C 14 Claims



1. A method for uniformly cooking thick layers of food product in an oxygen-free, saturated-steam environment, comprising the steps of:

- a) conveying, by means of a foraminous conveyor belt, a thick layer of food product continuously up into, through, and out of an upper region of a cooking chamber, the bottom of the upper region being at or above the levels of entrance and exit ports for the conveyor belt at each end of the cooking chamber;
- b) releasing jets of saturated steam formed by restricted openings in steam outlets, the jets of steam being directed upwardly through and substantially uniformly across the width of the foraminous conveyor belt as it traverses the upper region of the cooking chamber, the jets of steam being released from positions slightly below the conveyor belt on the carryway path and above the return path of the belt at a velocity sufficient to penetrate the thick layer of food product carried thereon; and
- c) controlling the rate of release of saturated steam to maintain an oxygen-free, saturated steam environment at substantially atmospheric pressure within the upper region of the cooking chamber by replenishing saturated steam lost through condensation.

5,410,952

## APPARATUS FOR MAKING A NOODLE WITH STUFFING

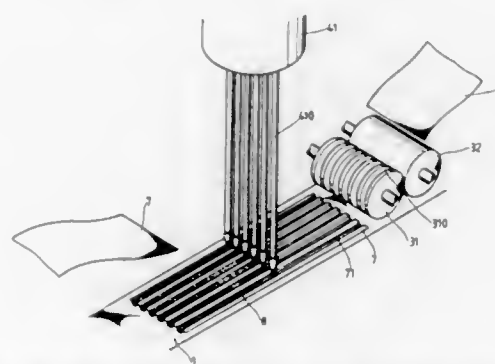
David Liou, P.O. 82-144, Taipei City, Taiwan, Prov. of China

Filed Mar. 10, 1994, Ser. No. 208,564

Int. Cl.<sup>6</sup> A21C 9/00; A23P 1/00

U.S. Cl. 99—450.6

1 Claim



1. An apparatus for making noodle with stuffing comprising: a platform provided with a belt conveyor thereon;

a dough press mounted on said platform and provided with a funnel having two rollers for making dough sheets; a shaping tool mounted beside said dough press on said platform and having a first roller with smooth surface and a second roller with a plurality of parallel grooves so that when a first dough sheet passes therethrough, the dough sheet will be formed with a plurality of parallel grooves; a stuffing feeder arranged on said platform and beside said shaping tool for filling stuffing in the grooves of said first dough sheet; a joining device installed beside said stuffing feeder on said platform and having two rollers for attaching a second dough sheet on said first dough sheet to form a sandwiched dough sheet; and a severing device disposed beside said joining device on said platform and provided with two rolling cutters for cutting said sandwiched dough sheet into a plurality of noodles with stuffing.

5,410,953

## TRACK APPARATUS FOR EGG BREAKING MECHANISMS

Tsuyoshi Yamashita, Tsuyama, Japan, assignor to Kyowa Machinery Co., Ltd., Okayama, Japan

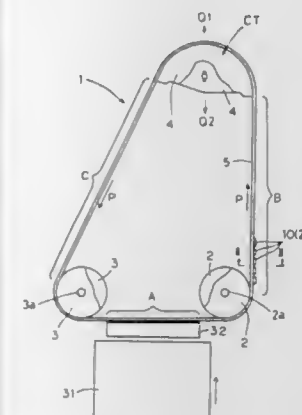
Filed Mar. 10, 1994, Ser. No. 208,274

Claims priority, application Japan, Mar. 26, 1993, 5-091989

Int. Cl.<sup>6</sup> A23J 1/09; A47J 43/14

U.S. Cl. 99—500

15 Claims



1. A track apparatus for egg breaking mechanisms comprising: an endless chain conveyor extending along an endless moving path and carrying the egg breaking mechanisms; a drive sprocket assembly held in driving engagement with the chain conveyor and serving as a direction change assembly for changing an extending direction of the moving path; and at least two additional direction change assemblies contacting the chain conveyor for further changing the extending direction of the moving path; wherein the additional direction change assemblies comprise a nonrotatable chain tensioning mechanism for slidably guiding the chain conveyor.

5,410,954

## THREE DIMENSIONAL AUTOMATIC FOOD SLICER

Garold L. Wygal, Durham; Dennis Z. Rush, Warrenton; Peter D. Johnson, Seaside, and Paul S. Anderson, Astoria, all of Oreg., assignors to Carruthers Equipment Co., Warrenton, Oreg.

Continuation-in-part of Ser. No. 876,123, Apr. 29, 1992, Pat. No. 5,271,304. This application May 17, 1993, Ser. No. 63,402

Int. Cl.<sup>6</sup> B26D 3/18

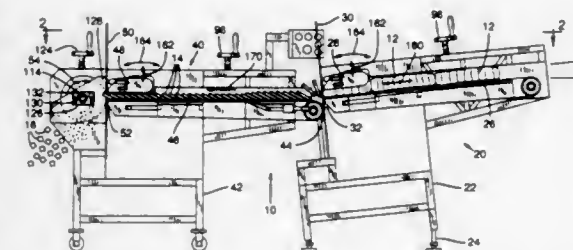
U.S. Cl. 99—537

11 Claims

1. An automatic food slicing apparatus wherein the food

product to be sliced is in the form of loaves and said loaves are to be sliced in three dimensions including length, height and width, to produce cubes, said food slicing apparatus comprising:

a first slicing station, a second slicing station, a first conveyor conveying food product loaves into the first slicing station whereat the food product loaves are sliced into slabs, and a second conveyor adjacent the first slicing station conveying the slabs from said first slicing station into the second slicing station whereat the slabs are sliced into cubes;



said first slicing station including a first cutoff knife that slices the loaves into slabs of a specified length, and further including apparatus for laying the slabs over onto the second conveyor with the specified length of the slabs as cut off by the first cutoff knife converted to the height dimension of the slabs as oriented on the second conveyor; and

said second slicing station including an arrangement of gang blades for cutting the slabs into specified widths and a second cutoff knife for cutting the slabs into specified lengths.

5,410,955

## PEAR PROCESSING METHOD AND APPARATUS

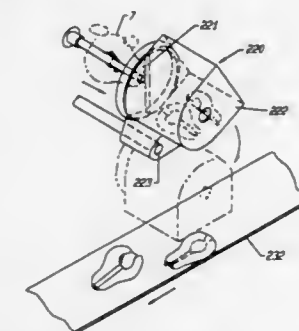
Douglas F. Paterson, Colorado Springs, Colo.; Konrad Meissner, Lafayette, Calif.; William V. Redd, Broomfield, Colo.; Anthony D. Oliver, Rye, Colo.; Michael S. Lipford, Pueblo, Colo.; Don A. Perry, Manitou Springs, Colo., and C. Richard Schoner, Palm Desert, Calif., assignors to Atlas Pacific Engineering Company, Pueblo, Colo.

Division of Ser. No. 35,667, Mar. 23, 1993. This application May 5, 1994, Ser. No. 238,522

Int. Cl.<sup>6</sup> A23N 4/22

U.S. Cl. 99—543

2 Claims



1. In an automatic pear processing apparatus wherein whole pears are impaled on a coring tube and are peeled, stem trimmed, cored and seed celled in a first time interval while so impaled, and wherein the usable, fleshy body of said whole pear is knocked off said coring tube in a second time interval, and wherein said peel, stem, core and seed cell of each pear are considered waste to be separated from the usable fleshy body of each pear, the improvement comprising:

a generally U-shaped container positioned adjacent said

coring tube, said container having an open end formed by two parallel wall portions of said U-shape and a closed end formed by a bottom curved wall portion of said U-shape,

a blade carried by said U-shaped container,  
a first conveyor located below said coring tube for receiving waste product,  
a second conveyor located adjacent said first conveyor for receiving said usable portions of said processed pears, and  
an inclined chute located above said second conveyor, said chute having side walls, said side walls having top portions of which define an upper opening of said chute, said U-shaped container having a first position during said first time interval wherein the closed end of said U-shaped container is disposed above said open end and wherein the open end of said U-shaped container is positioned above and surrounds the upper opening of said chute and having a second position during said second time interval wherein the open end of said U-shaped container is disposed above said closed end and said U-shaped container is horizontally aligned with said coring tube, so that as said pear is knocked off said coring tube, said pear is forced through said blade into said U-shaped container.

5,410,956

# VACUUM HOT PLATEN PRESS WITH AIRTIGHT COVERS IN SLIDING CONTACT WITH TENSILE STRENGTH MEMBERS

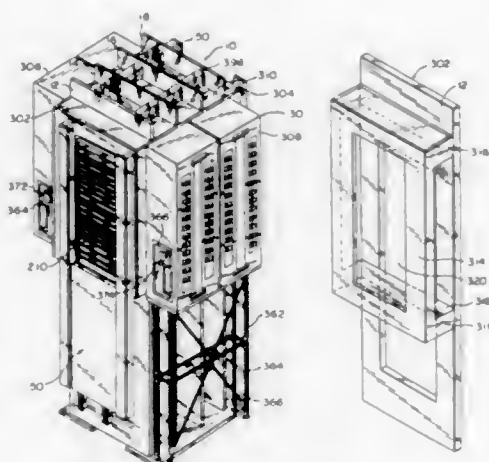
Masahiko Ogawa, Nagoya; Kouichi Isobe, Tokai, and Takayuki Kouno, Owariasahi, all of Japan, assignors to Meiki Co., Ltd., Ohbu, Japan

Filed Jun. 29, 1993, Ser. No. 83,175

Claims priority, application Japan, Jun. 30, 1992, 4-196099  
Int. Cl.<sup>6</sup> B30B 15/34, 7/02

U.S. Cl. 100—90

2 Claims



1. A vacuum hot platen press comprising:  
at least one tensile strength member having a first end and a second end;  
a stationary platen fixed to the first end of the tensile strength member;  
at least one pressing cylinder for exerting longitudinal force, the cylinder having a stationary end and a moving end, the stationary end being coupled to the second end of the tensile strength member;  
a movable platen coupled to the moving end of the cylinder, the movable platen and the stationary platen jointly defining a process chamber therebetween;  
at least one heating platen disposed within the process chamber;  
at least one seal cover disposed about the process chamber; and

sliding seal between the seal cover and the tensile strength member for air sealing of the process chamber; whereby distortion of the seal cover and the tensile strength member is prevented.

5,410,957

# SCREEN PRINTING APPARATUS

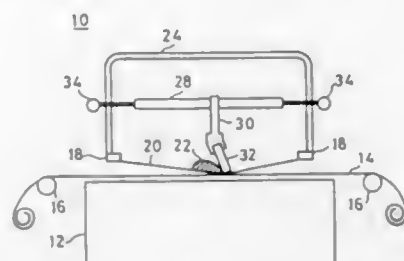
Yukio Tanaka; Kenichi Yamada, and Taketsugu Ogura, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

Filed Aug. 26, 1993, Ser. No. 112,567

Claims priority, application Japan, Aug. 28, 1992, 4-229597  
Int. Cl.<sup>6</sup> B05C 17/06; B41F 15/00

U.S. Cl. 101—127

6 Claims



1. An electrode printing apparatus for printing an electrode comprising an electrode paste including metallic powder and volatile solvent on a ceramic green-sheet, the apparatus comprising:

a support for supporting a ceramic green-sheet;  
a screen frame disposed above the support;  
a screen held by the screen frame for receiving electrode paste;  
a cover attached to the screen frame, the interior of the cover being substantially airtight such that vapor from the volatile solvent can become saturated in the interior; and  
a squeegee mounted within the interior of the cover and movable along an upper surface of the screen for applying electrode paste through the screen to the ceramic green-sheet without reducing said substantial airtightness of the cover.

5,410,958

# FABRIC PRINTING PROCESS AND APPARATUS

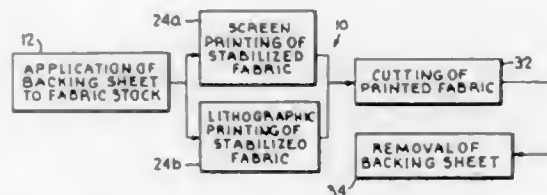
Gary D. Sharpe, 2235 Breckenridge Dr., Lawrence, Kans. 66047

Filed Jun. 25, 1993, Ser. No. 86,174

Int. Cl.<sup>6</sup> B41M 1/10

U.S. Cl. 101—170

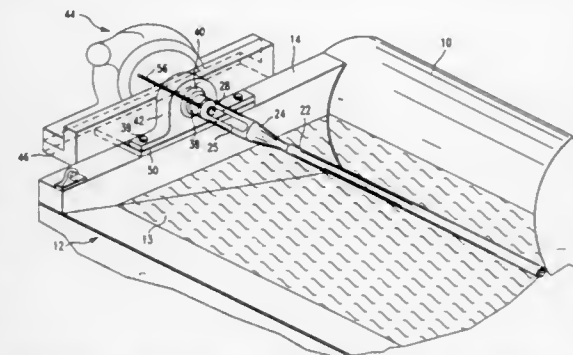
12 Claims



1. A process comprising the steps of:  
providing a fabric material which is subject to deformation along an axis lying in a plane defined by the fabric material;  
providing a backing sheet and releasably applying the backing sheet to the fabric material to stabilize the fabric material by increasing the resistance of the fabric material to deformation along the axis lying in a plane defined by the fabric material;  
feeding the fabric material and backing sheet through a lithographic printing apparatus in the direction of said axis to print a multi-colored pattern on a side of the fabric material opposite from the backing sheet lithographic

printing apparatus having printing plates wrapped around rotating cylinders; and  
cutting the fabric material following said step of printing a multi-colored pattern on the fabric material.

element for vibrating the ink, wherein the element is for placement in the ink, wherein the element is a rod, wherein the rod



5,410,959

# PRINTING SWITCHING APPARATUS FOR SHEET-FED ROTARY PRESS WITH REVERSING MECHANISM

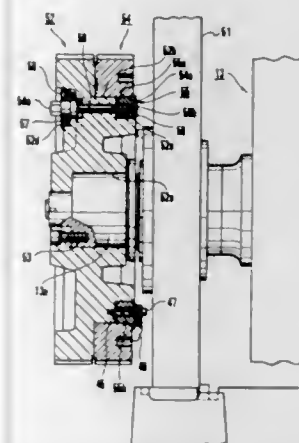
Hiroyuki Sugiyama, and Yutaka Yuasa, both of Ibaragi, Japan, assignors to Komori Corporation, Japan

Filed Jul. 1, 1994, Ser. No. 270,148

Claims priority, application Japan, Jul. 5, 1993, 5-190978  
Int. Cl.<sup>6</sup> B41F 21/10

U.S. Cl. 101—230

11 Claims



1. A printing switching apparatus for a sheet-fed rotary press with a reversing mechanism, comprising:

a fixed gear fixed to a shaft of a cylinder;  
a rotary gear, coaxial with said fixed gear, coupled to be driven with a cylinder adjacent to said cylinder, and phase-adjustable with respect to said fixed gear in a circumferential direction;  
a first inclined surface formed on said rotary gear;  
an engaging member, movable with respect to said fixed gear and having a second inclined surface pressed against said first inclined surface of said rotary gear; and  
actuating means for moving said engaging means in a direction to be separated from or come close to said fixed gear, pressing or releasing said first inclined surface of said rotary gear and said second inclined surface of said engaging member against or from each other, and connecting or disconnecting rotational transmission between said fixed gear and said rotary gear.

is mounted on an arm, wherein the rod is also mounted on a second arm.

5,410,961

# FOUNTAIN ASSEMBLY

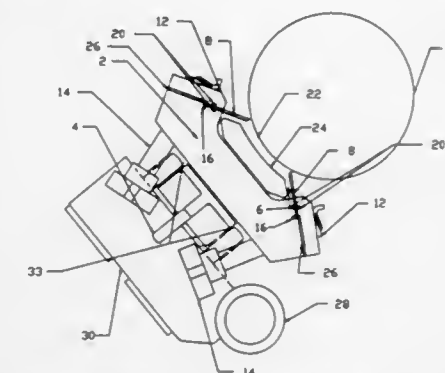
Christian DeNicola, Hampton, and Alessandro Martino, Roselle Park, both of N.J., assignors to FIT Group, Inc., Quakertown, Pa.

Filed Dec. 30, 1992, Ser. No. 998,732

Int. Cl.<sup>6</sup> B41F 31/04, 31/06, 31/08

U.S. Cl. 101—363

25 Claims



1. A fountain assembly for applying a fluid composition uniformly to the circumferential surface of a rotating transfer roller comprising:

(a) an elongated frame having a concave channel formed on one side of said frame along the length thereof, said frame comprising a substantially inert, resilient, light weight, polymeric plastic material; and  
(b) a rigid, reinforcing brace fixed along substantially the entire length of said frame on an outer side thereof opposite said channel; and  
(c) a pair of doctor blades removably attached by clamping means on opposite sides of said channel and extending the length of said channel, said blades being positionable to contact the circumferential surface of the transfer roller; and  
(d) a pair of radial surface seals secured to said frame at opposite ends of said channel, said radial surface seals being positioned to form a resilient bulkhead with the ends of said doctor blades, said radial surface seals having a complementary curved edge for forming a sealing engagement with the circumferential surface of the transfer roller; and  
(e) said radial surface seals, doctor blades and concave channel forming a closed chamber when positioned against the transfer roller; and  
(f) pivoting support means bearing said frame, said support

5,410,960

# INK VIBRATOR

Willie Adsett, Marlboro, N.Y., assignor to Joseph B. Taphorn, Poughkeepsie, N.Y., a part interest

Filed Aug. 20, 1990, Ser. No. 571,164

Int. Cl.<sup>6</sup> B41J 31/06

U.S. Cl. 101—363

8 Claims

1. An anti-setting device for stiff printing inks, comprising an



means being capable of alternately swiveling said doctor blades toward and away from said transfer roller; and (g) means for providing a supply of a fluid composition into said channel.

5,410,962

**SPECIAL EFFECTS ROTATING RUBBER STAMP**

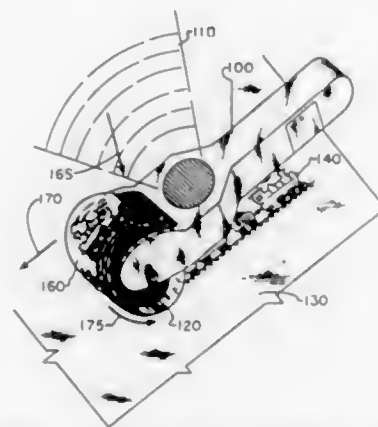
Harry B. Collier, 1356 E. Goldsmith Dr., Highlands Ranch, Colo. 80126

Continuation-in-part of Ser. No. 701,486, May 16, 1991, Pat. No. 5,178,067. This application Nov. 16, 1992, Ser. No. 977,225. The portion of the term of this patent subsequent to Jan. 12, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> B41F 13/10

U.S. Cl. 101—375

13 Claims



1. A rotatable image transfer device capable of generating an imprinted reproduction of at least one image to a target object comprising:

- an image mount,
- a housing having a formed interior region,
- means to rotatably attach said image mount to said housing,
- means affixed to said rotatably attached image mount for transferring said imprinted reproduction of said at least one image to said target object responsive to contact with said target object; and
- means, disposed substantially within said formed interior of said housing, responsive to said contact between said transferring means and said target object, for generating at least one non-imprinted message in response to said transfer of said at least one image to said target object, said at least one non-imprinted message specifically associated with said at least one image,
- means in said generating means and in said formed interior for storing said at least one non-imprinted message.

5,410,963

**BACKING BLANKET FOR PRINTING PLATES**

Glynn R. Steadman, Chicago, Ill., assignor to Squarmount, Inc., Chicago, Ill.

Filed May 3, 1994, Ser. No. 237,383

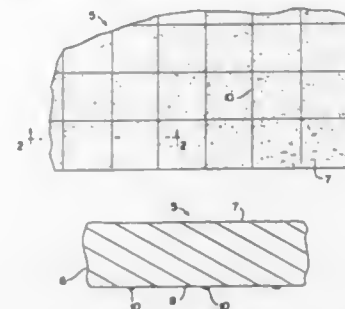
Int. Cl.<sup>6</sup> B41F 13/10

U.S. Cl. 101—376

2 Claims

1. A unitary backing blanket for a resilient rubber-like printing plate which consists of a flexible semi-rigid translucent or transparent plastic sheet having a smooth underside surface

with a grid pattern thereon and a matted or embossed top surface to which a resilient rubber-like printing plate may be



adhesively secured, said grid pattern being viewable through said matted top surface.

5,410,964

**LEAD EDGE STRIP**

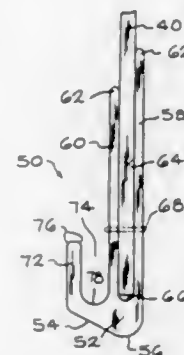
Kevin W. Koelsch, Toledo, Ohio, assignor to Dynamic Dies, Inc., Holland, Ohio

Filed Nov. 19, 1993, Ser. No. 154,496

Int. Cl.<sup>6</sup> B41F 27/06

U.S. Cl. 101—378

20 Claims



1. A edge strip for disposition upon a sheet comprising, in combination,
- a generally triangular base portion having a middle, two opposed edge regions and an end surface extending obliquely between said two edge regions,
  - a pair of parallel walls extending generally from said middle and one of said edge regions of said base portion, said parallel walls defining a first slot therebetween for receiving a sheet, and
  - a projection extending from the other of said edge regions of said base portion, said projection being shorter and thicker than either of said pair of walls and spaced from a more proximate one of said pair of parallel walls to define a second slot wider than said first slot.

5,410,965

**BLANKET FOR A MAGNETIC CYLINDER**

David G. DeVries, Lisle, Ill., assignor to R. R. Donnelley & Sons Company, Lisle, Ill.

Filed Dec. 3, 1992, Ser. No. 985,030

Int. Cl.<sup>6</sup> B41F 27/00

U.S. Cl. 101—389.1

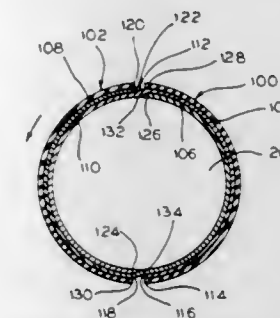
18 Claims

1. A printing blanket for use on a magnetic cylinder in a web offset press, the cylinder having a select circumference, comprising:

- an elongate carrier means of magnetic material comprising one or more carrier plates having a combined length greater than the select circumference of the cylinder;
- an elongate blanket means comprising one or more blanket

sheets, one for each carrier plate, having a combined length substantially equal to the select circumference of the cylinder; and

means securing each blanket sheet to an outer surface of one of the carrier plates with a trailing edge of the blanket



sheet immediately adjacent a trailing edge of the carrier plate so that in use mounted to the cylinder at least a portion of a trailing end of each carrier plate overlaps a leading edge of the one or another of the one or more carrier plates.

5,410,966

**HIGH RELIABILITY MODEL ROCKET ENGINE IGNITER SYSTEM**

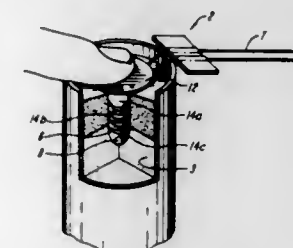
Michael K. Dorffler, Canon City, and Ronald L. McClaren, Pueblo, both of Colo., assignors to Centuri Corporation, Penrose, Colo.

Continuation of Ser. No. 973,769, Nov. 9, 1992, abandoned, which is a continuation-in-part of Ser. No. 858,109, Mar. 26, 1992, abandoned. This application Mar. 7, 1994, Ser. No. 207,893

Int. Cl.<sup>6</sup> F42C 19/12

U.S. Cl. 102—202

12 Claims



1. An igniter holder for a solid propellant model rocket engine fitted with an igniter having a pair of lead wires having low electrical resistance and bridged by a wire of high electrical resistance, wherein the engine has a solid propellant grain section defining an igniter cavity connected to the exterior of the engine by a throat, said igniter holder comprising

- a semi-flexible article having an axis, a flat, disk-like end substantially perpendicular to said axis, and a stem projecting from the disk-like end along the axis of said igniter holder, wherein said stem terminates in a blunted positioning end,

wherein said stem of said igniter holder is adapted for insertion into the throat of said model rocket engine fitted with said igniter, such that said positioning end of said igniter holder is interposed between the lead wires and said stem temporarily secures the igniter in the throat of the engine with a slight interference fit between said stem of said igniter holder and said throat of said model rocket engine, and

wherein said igniter holder is adapted to be expelled from the engine following ignition.

5,410,967

**TARGET CAMOUFLAGING CHAFF DISPENSER WITH EJECTABLE CLOSURE**

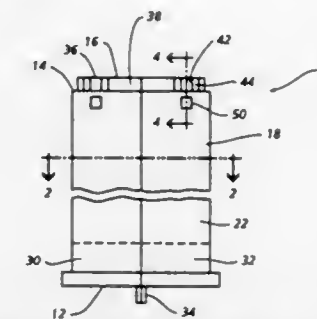
Harvey L. Peritt, Beltsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 1, 1993, Ser. No. 69,815

Int. Cl.<sup>6</sup> F42B 5/00

U.S. Cl. 102—439

2 Claims



1. In combination with a rigid container enclosing a body of material to be dispersed under a predetermined ejection pressure, propellant means for producing said predetermined ejection pressure within said container, closure means for retaining said body of material within the container under a retention force prior to dispersal thereof, comprising: a rim formation on the container defining an opening from which the body of material is ejected under said predetermined ejection pressure, a cap having a sealing cover portion abutting the rim formation in a retention position of the closure means and a relatively rigid guide portion extending from the cover portion into said opening in the container, a plurality of lock means projecting from the guide portion of the cap for elastic deformation in response to engagement with the rim formation during insertion of the cap into the container through said opening under an insertion force less than said retention force each locking means comprises a flexure element having a root end portion of minimum rupture resisting strength attached to said guide portion and a plurality of anchor means on the container receiving the plurality of lock means in said retention position of the closure means for relieving stress induced in the plurality of lock means by said insertion of the cap, said plurality of said anchor means being located in spaced adjacency to the rim formation each anchor means comprising a through hole having an edge engaged by one of the lock means causing rupture thereof in response to said predetermined ejection pressure exerted on the cap.

5,410,968

**LIGHTWEIGHT FATIGUE RESISTANT RAILCAR TRUCK SIDEFRAME WITH TAPERING I-BEAM CONSTRUCTION**

V. Terrey Hawthorne, Lisle; Donald J. Marlborough, Libertyville, and Rami V. Nassar, Chicago, all of Ill., assignors to Amsted Industries Incorporated, Chicago, Ill.

Filed Oct. 4, 1993, Ser. No. 131,143

Int. Cl.<sup>6</sup> B61F 5/52

U.S. Cl. 105—206.1

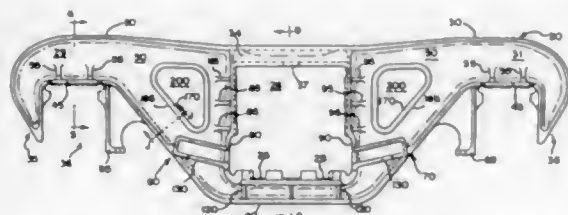
4 Claims

1. An improved railcar truck sideframe of relatively light weight and open construction for carrying a railcar payload, said sideframe having a longitudinal axis, a front end, a back end and a midsection therebetween, comprising:

- a longitudinally elongate solid upper compression member having a first end and a second end, each of said ends including a downwardly projecting pedestal jaw depending therefrom;
- a longitudinally elongate solid lower tension member having a front section, a back section and a central section therebetween, said central section generally parallel to said upper compression member, said front section comprising

an upwardly extending solid diagonal section and defining a first bend point, said back section comprising an upwardly extending solid diagonal section and defining a second bend point, each of said diagonal sections extending to and connecting with said respective upper compression member ends at a respective pedestal jaw;

a substantially solid vertical web having a pair of sides, said web including an open portion at said sideframe midsection which defines a front vertical column and a rear vertical column and a bolster opening therebetween; wherein said entire sideframe is of a generally solid, I-beam cross-sectional shape, said I-beam cross-sectional shape defined by a solid, horizontally disposed top flange corresponding to said solid upper compression member, a solid, horizontally disposed bottom flange corresponding to said solid lower tension member, and said substantially solid vertical web interconnecting said upper flange to said lower flange such that an open, I-beam shaped, lightweight sideframe is formed, said top flange, said bottom flange, and said vertical web each having a constant cross sectional thickness between said front and rear vertical columns and a continuously tapering cross sectional thickness from a respective said vertical column to a respective said pedestal jaw, said cross sectional thickness of said vertical web and said bottom flange substantially equal,



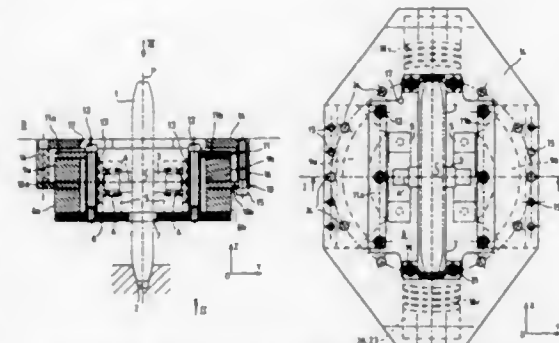
and said cross sectional thickness of said top flange relatively smaller than said cross sectional thickness of said bottom flange,

said top and bottom flanges each having a respective dimensional width of substantially equal extent, wherein said width of each said flange is constant between said front and rear vertical columns and continuously tapers from a respective said vertical column to a respective said vertical jaw, said top and bottom flange width between said vertical columns about twice the width as at said pedestal jaws,

said top and bottom flanges also including simple radii curves of fillet material where said respective flange joins said vertical web, said vertical web also includes simple radii curves of fillet material where each respective said vertical column joins said vertical web, said sideframe further including means for reinforcing said vertical web in order to prevent twisting of said web, said reinforcing means vertically attached to each said side of said web at each said pedestal jaw and between said first and second bend points,

said vertical web including at least two spaced lightener openings, one of said openings longitudinally disposed an extent forward of said bolster opening and the other of said openings disposed a substantially equal longitudinal extent rearward of said bolster opening.

5,410,969  
STEERING DEVICE FOR A VEHICLE BOGEY FITTED WITH WHEELS HAVING PNEUMATIC TIRES  
René Senes, Merignac, and Sylvain Thuet, Roderen, both of France, assignors to Techlam, Cernay, France  
Filed Aug. 6, 1993, Ser. No. 103,397  
Claims priority, application France, Aug. 11, 1992, 92 09913  
Int. Cl.<sup>6</sup> B61B 13/00  
U.S. Cl. 105—215.1 15 Claims



1. A steering device for a vehicle bogey fitted with wheels having pneumatic tires that run on a pair of runways forming a track along which the vehicle travels, the track defining a travel axis, said device comprising:

a steering caster whose mean plane is substantially parallel to planes defined by the wheels of the bogey and which is capable of rotating about a caster axis orthogonal to the caster mean plane and passing through the center of the caster, said caster engaging in a guide groove formed between the runways of the track preceding a track branch point, said caster being carried by a frame of the body via resilient link elements; and

said resilient link elements comprise laminated blocks formed by stacks of alternating bonded layers of rigid material and of flexible material, said resilient link elements disposed on a frame of said vehicle bogey and conferring to the caster and relative to the bogey:

a first degree of freedom in rotation about a first axis passing through a center of the caster and perpendicular to a plane defined by the track,

a first degree of freedom in translation parallel to the caster axis,

resistance to caster motion relative to the bogey in a longitudinal direction of the travel axis, and

resistance to caster motion relative to the bogey in a direction perpendicular to the plane of the track.

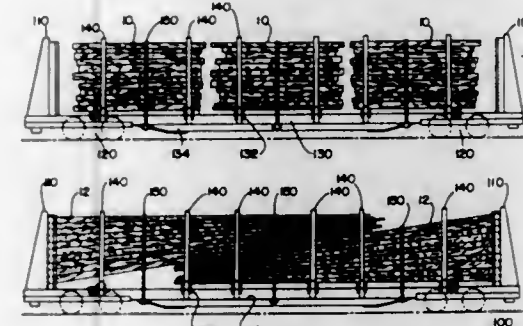
5,410,970  
RAILCAR ADAPTED FOR HAULING TREE LENGTH TIMBER AND LONG LOGS  
Everett H. Stephenson, Jr., 243 Suncrest Blvd., Savannah, Ga. 31410  
Division of Ser. No. 902,097, Jun. 22, 1992, Pat. No. 5,323,711, which is a continuation-in-part of Ser. No. 710,615, Jun. 5, 1991, abandoned, which is a continuation-in-part of Ser. No. 665,495, Mar. 6, 1991, abandoned. This application Feb. 17, 1994, Ser. No. 197,728  
Int. Cl.<sup>6</sup> B60D 1/00 2 Claims

1. A method of transporting timber in either tree length form or long log form by railway by using the same railroad car, comprising:

(a) loading two decks of tree length logs onto a bed of a railway car so that respective balance points of the two decks of tree length logs are each substantially centered between two adjacent stanchion pairs of the railway car;

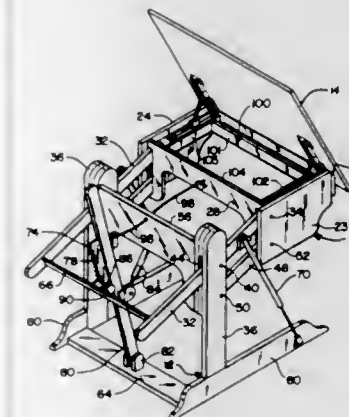
(b) transporting the tree length logs to a destination by railway;

(c) unloading the tree length logs from the railcar;  
(d) loading three stacks of long logs onto the bed of the railroad car so that the respective center portion of each stack of long logs is substantially centered between two adjacent stanchion pairs of the railway car; and



(e) transporting the long logs to a destination by railway, whereby the cost and logistical problems created by having different railway cars for long logs and tree length logs are eliminated.

5,410,971  
ADJUSTABLE WORK STATION FOR THE HANDICAPPED  
Jo-Ann Golden, Lake Worth; Angelo Squatrito, Juno Beach; Thomas J. Brown, Wellington; Lawrence J. Yates, Lake Worth, and Kenneth Elfman, Boynton Beach, all of Fla., assignors to Jeff Industries, Inc., Hypoluxo, Fla.  
Filed Oct. 15, 1992, Ser. No. 961,226  
Int. Cl.<sup>6</sup> A47F 5/12 5 Claims  
U.S. Cl. 108—6



1. An adjustable work station for the handicapped, comprising:

work surface structure;  
support structure, said work surface structure being mounted to said support structure by at least one pivot arm, said work surface structure being provided substantially at an end of said pivot arm distal to the support structure, whereby pivotal movement of said pivot arm will result in substantially vertical movement of said work surface structure;

first biasing structure operable to urge said work surface structure upward in relation to said support structure;

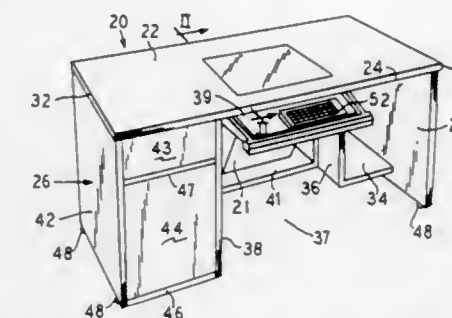
engagement structure for securing said work surface structure in a plurality of positions relative to said support structure;

release structure for disengaging said engagement structure and permitting upward movement of said work surface structure;

said engagement structure further comprising first engagement structure operatively connected to said work surface

structure, and second engagement structure operatively connected to said support structure, said first and second engagement structure capable of inter-engaging to prevent upward movement of said work surface structure, said release structure being adapted to move at least one of said first and second engagement structure so as to disengage said engagement structure and to permit upward and downward movement of said work surface structure;  
second biasing structure for moving at least one of said engagement structure into engagement with said at least one other engagement structure; and wherein at least one of said engagement structure comprises a latch bar and at least one other of said engagement structure comprises a latch plate, said latch plate having a plurality of recesses capable of engaging said latch bar to retain said work surface structure in a desired position.

5,410,972  
ADJUSTABLE MONITOR SUSPENDING ASSEMBLY  
Edward C. Schairbaum, Fort Worth, Tex., assignor to Nova Manufacturing & Assembly, Inc., Effingham, Ill.  
Filed May 19, 1992, Ser. No. 885,570  
Int. Cl.<sup>6</sup> A47B 35/00 3 Claims  
U.S. Cl. 108—50



1. A monitor suspending assembly for mounting within a desk-like structure that has a top surface member with a transparent portion through which the screen of a monitor that is suspended by said monitor suspending assembly is viewable, said monitor suspending assembly comprising:

(a) fastening means for association with each of the forward upper region of a monitor and the rearward upper region of said monitor; and

(b) suspending means associated with said fastening means and including mounting means for connecting said suspending means with the underside of said top surface member, said suspending means including adjustment means for regulating the tilt angle of said monitor relative to said transparent portion about a laterally extending axis; said fastening means comprising:

elongated rod means having a forward end portion located over said forward upper region, and a rearward opposite end portion located over said rearward upper region,

a first hook means for engaging said forward upper region, said first hook means being associated with said forward end portion,

a second hook means for engaging said rearward upper region, said second hook means being associated with said rearward opposite end portion,

one of said hook means being slidable relative to said rod means while the other of said hook means is locally retainable in a predetermined location relative to said rod means,

one end portion of said rod means being threaded and threadably associated with first nut means that is longitudinally, relative to said rod, adjacent to said slidable hook means,

so that, when said first nut means is rotated and tightened



against said one hook means, said forward upper region and said rearward upper region are clamped together and fastened to said rod means; and

said suspending means comprising:

bracket means associatable with said top surface underside,

clamp means located beneath said bracket means and circumferentially engagable about a selected portion of said rod means whereby the height of said monitor relative to said bracket means is adjustable, and

a pair of mutually engagable locking washer members, one of said locking washer members being fixed to said bracket means, the other of said locking washer members being fixed to said clamp means, and including a second nut and associatable bolt means for releasably holding said locking washer members together,

so that, when said second nut means is rotated and tightened about said bolt means, said monitor is suspendable at a predetermined said tilt angle.

5,410,973

# PROCESS AND APPARATUS FOR THE INCINERATION OF SEWAGE SLUDGE AND REFUSE

Hans Künstler, Uitikon; Erwin Wachter, Zürich; Peter Nüesch, Biskon, and Kurt Scholl, Zofinger, all of Switzerland, assignors to Noell Abfall- und Energietechnik GmbH, Neuss, Germany

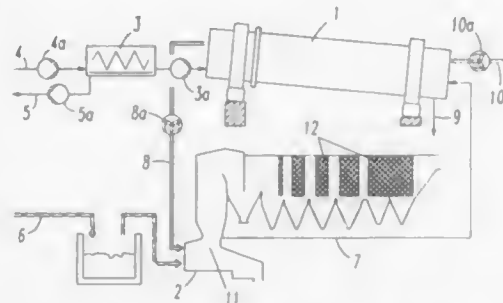
Filed Feb. 26, 1993, Ser. No. 24,161

Claims priority, application Germany, Jun. 28, 1991, 41 21 968

Int. Cl.<sup>6</sup> F23G 5/06

U.S. Cl. 110—246

20 Claims



1. A process for incinerating sewage sludge in a first incineration apparatus, said first incineration apparatus comprising a separate and integral incineration apparatus, said first incineration apparatus comprising means for incineration of sewage sludge at a temperature sufficient for incineration of sewage sludge, said process comprising the steps of:

conducting sewage sludge to said first incineration apparatus, said first incineration apparatus having a loading end, a discharge end, and an incineration chamber therebetween;

loading sewage sludge into the loading end of said first incineration apparatus;

combusting the sewage sludge in said incineration chamber to produce combusted sewage sludge and exhaust;

at least partially heating the sewage sludge in said first incineration apparatus with heated flue gas from a second incineration apparatus to provide at least a portion of the heat for the combustion of the sewage sludge, said second incineration apparatus comprising a separate and integral incineration apparatus, said second incineration apparatus comprising means for incineration of refuse at a temperature sufficient for incineration of refuse, and said first and second incineration apparatus being substantially non-integral with respect to one another, and said first incineration apparatus being separate and disposed away from said second incineration apparatus; and

removing the combusted sewage sludge from the discharge end of said first incineration apparatus.

5,410,974

# EMBROIDERY MACHINE WITH CENTER DRIVE

Jürg Henz, Amriswil; Hans Abegglen, Arbon, both of Switzerland, and Manfred Zesch, Fussach, Austria, assignors to Saurer Stickssysteme AG, Arbon, Switzerland

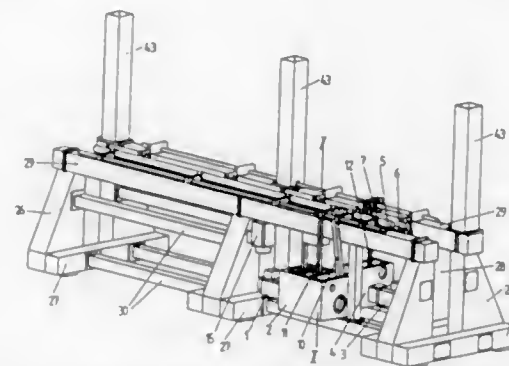
Filed Dec. 6, 1993, Ser. No. 161,606

Claims priority, application Germany, Dec. 8, 1992, 42 41 200.5

Int. Cl.<sup>6</sup> D05C 3/04

U.S. Cl. 112—83

8 Claims



1. An embroidery machine comprising a plurality of embroidery stations, each embroidery station being provided with embroidery tools, wherein said tools comprise a needle, a borer and a thread guide on one side of material being embroidered and a shuttle on an opposite side of the material being embroidered, said plurality of embroidery stations being arranged horizontally next to each other, said needles, borers, thread guides and shuttles of each embroidery station being driven by shafts corresponding to each of said tools, said shafts extending horizontally between all said embroidery stations, wherein each of said shafts is driven by its own drive unit wherein said drive units are arranged substantially in a center portion of the embroidery machine, along a length thereof.

5,410,975

# APPARATUS FOR SEWING FABRIC PIECES TO SLIDE FASTENER CHAIN

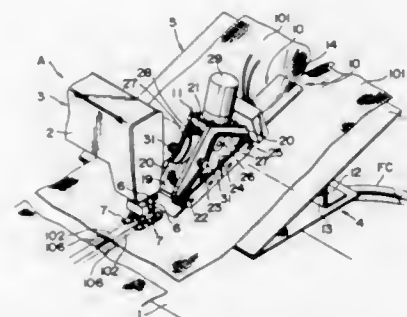
Chet Dudek, and Kichiro Ishikawa, both of Marietta, Ga., assignors to YKK Corporation, Tokyo, Japan

Filed Dec. 15, 1993, Ser. No. 166,839

Int. Cl.<sup>6</sup> D05B 3/22

U.S. Cl. 112—113

6 Claims



1. An apparatus for sewing the opposed longitudinal edges of a pair of fabric pieces to a pair of stringer tapes of a continuous slide fastener chain along the outer longitudinal edges of the stringer tapes, the slide fastener chain including a row of interengaged coupling elements, said apparatus comprising:

- (a) a sewing station having a pair of laterally spaced sewing needles providing a pair of longitudinally extending rows of stitches;
- (b) means disposed upstream of said sewing station for guiding the slide fastener chain longitudinally toward said sewing station; and
- (c) means disposed above said guiding means for delivering the fabric pieces toward said sewing station while holding the fabric pieces in parallel juxtaposition, said delivering means including
  - (i) a support plate for supporting thereon the fabric pieces in parallel juxtaposition while the fabric pieces are delivered to said sewing station,
  - (ii) a pair of parallel juxtaposed edge folders disposed longitudinally along a central portion of said support plate and extending downstream toward said sewing station for progressively folding over opposed longitudinal edges of the fabric pieces as the fabric pieces are advanced along the corresponding edge folders, and
  - (iii) an endless belt drive unit, disposed in confrontation with said edge folders across said support plate and having a pair of endless belts frictionally engageable with a pair of parallel spaced portions, respectively, of the fabric pieces extending parallel to said edge folders, for positively feeding the fabric pieces toward said sewing station.

5,410,976

# SEWING MACHINE HAVING AN EMBROIDERY FUNCTION

Kenji Matsubara, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

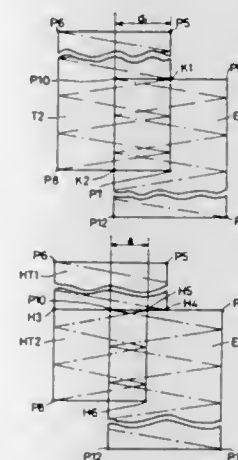
Filed Apr. 5, 1994, Ser. No. 223,226

Claims priority, application Japan, Apr. 12, 1993, 5-084377

Int. Cl.<sup>6</sup> D05B 21/00; D05C 9/06

U.S. Cl. 112—121.12

19 Claims



- 1. A sewing machine, comprising:
  - storing means for storing stitch data relating to a plurality of embroidery patterns;
  - selecting means coupled to the storing means for selecting desired ones of the patterns to be formed based on the stored stitch data;
  - arranging means coupled to the selecting means for arranging the selected patterns to at least partially overlap each other;
  - overlap detecting means coupled to the arranging means for detecting an overlapped portion between a first pattern of the overlapped patterns and a second pattern of the overlapped patterns;
  - correcting means coupled to the overlap detecting means for correcting the stitch data to reduce embroidery in the overlapped portion of the first pattern; and
  - pattern forming means coupled to the correcting means for forming the selected patterns by embroidering on a work-

piece according to the corrected stitch data, wherein the correcting means comprises a hardening determining means for determining a degree of hardening resulting from a tightening of threads applied to the workpiece from the overlapping portion and for correcting stitch data in one of the overlapping patterns to adjust the area of the overlapping portion based on the determined degree of hardening.

5,410,977

# RUDDERLESS SAILBOAT

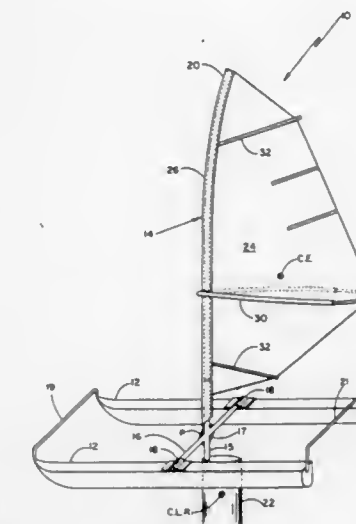
William B. Webb, 313 Park St., Lake City, Minn. 55041

Filed Apr. 8, 1994, Ser. No. 225,466

Int. Cl.<sup>6</sup> B63B 15/00

U.S. Cl. 114—91

12 Claims



1. A sailboat, comprising:

- (a) hull means having a bow and a stern;
- (b) an upwardly extending mast means having an upper end and a lower end, said lower end adjustably coupled to said hull means at a pivot point such that said mast means can rotate fore or aft toward said bow and said stern, respectively;
- (c) a sail coupled to said mast means;
- (d) keel means coupled to said mast lower end and rotatable either fore and aft as said mast means is rotated about said pivot point; and
- (e) said mast means including a pair of opposing members each extending laterally from a lower midsection of said mast means to a respective distal end, each said member distal end being coupled to and adjustably positionable with respect to said hull means.

5,410,978

# FLOW-THROUGH ELASTOMERIC LAUNCH SYSTEM FOR SUBMARINES

Ronald E. Wacławik, Fairhaven, Mass., and Scott D. Boyd, Portsmouth, R.I., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 22, 1994, Ser. No. 294,457

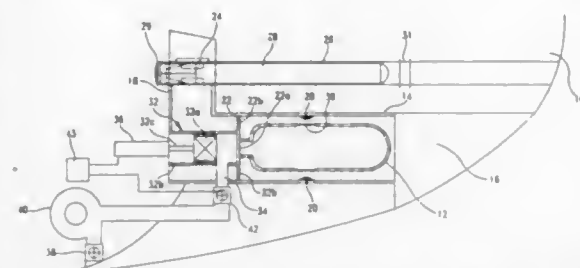
Int. Cl.<sup>6</sup> B63B 1/00

U.S. Cl. 114—238

11 Claims

- 1. A flow through elastomeric bladder apparatus for providing pressurized fluid to a destination comprising:
  - a cylindrical bypass tube having a forward end, an aft end and at least one annular sealing ring disposed between said forward end and said aft end on the inner surface of said bypass tube, said forward end of said bypass tube being in communication with a low pressure liquid medium, and

said aft end of said bypass tube being in hydraulic communication with said destination; and  
an elastomeric bladder fixed centrally within said bypass tube having a forward end, an aft end, and a wall portion,



said forward end being sealed, said aft end having a mouth joined to communicate hydraulically with said destination, and said wall portion having an annular thinned portion positioned to correspond with said annular sealing ring in said bypass tube.

5,410,979

# SMALL FIXED TEARDROP FAIRINGS FOR VORTEX INDUCED VIBRATION SUPPRESSION

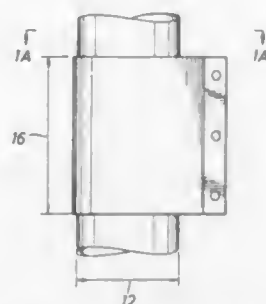
Donald W. Allen, Katy, and Dean L. Henning, Needville, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 28, 1994, Ser. No. 204,021

Int. Cl.<sup>6</sup> F15D 1/10

U.S. Cl. 114—243

8 Claims



1. A non-rotatable fairing for suppression of vortex-induced vibration of a marine tubular having a circular cross section and a centerline that is normal to the circular cross section, the fairing comprising:

- shaped sides that extend essentially tangentially from the outer surface of the tubular toward a point that is about a distance equal to the outside diameter of the tubular or less from the centerline of the tubular; and
- a means to fix the fairing to the tubular so that the fairing cannot rotate around the tubular, wherein the maximum length of the cross section of the combined fairing and tubular is between about 1.25 and about 1.5 times the outside diameter of the tubular, and the fairing is made from a flat sheet of material, wrapped around the tubular, and edges of the flat material connected at the centerline of the fairing.

5,410,980

# AMPHIBIOUS MOTOR VEHICLE CHASSIS AND VEHICLE INCLUDING SUCH A CHASSIS

Francois Wardavoir, Cellettes, France, assignor to Hobbycar, Thenay, France

Filed Sep. 30, 1993, Ser. No. 128,680

Claims priority, application France, Oct. 5, 1992, 92 11771

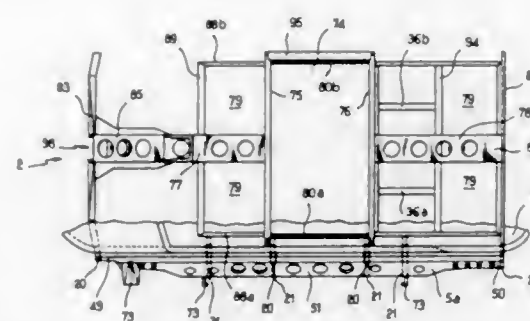
Int. Cl.<sup>6</sup> B63B 38/00

U.S. Cl. 114—270

21 Claims

1. An amphibious motor vehicle chassis which comprises a central box structure (74) defining therein a space for receiving

a motor unit and protecting the motor unit against front, rear and lateral shocks, this box being defined at least toward the front and toward the rear by two central transverse members (75, 76), the chassis comprising at least one front longitudinal member (77) and at least one rear longitudinal member (78) which extend in the median longitudinal vertical plane of the vehicle on either side of the central box structure and which



are respectively rigidly joined to each transverse member (75, 76) of the central box structure (74) to define two lateral spaces (79) for the reception therein of seat places on each side of each longitudinal member (77, 78) to the front and to the rear of the central box structure (74) to protect each said seat place against shocks from the sides of the corresponding transverse and longitudinal members.

5,410,981

# ANCHORING KIT FOR USE WITH A FLOTATION DEVICE

Jacqueline Gutstein, 11021 NW, 7th St., Apt. 201, Miami, Fla. 33172, and Omayra Leon, 255 W. 32 St., Hialeah, Fla. 33012

Filed Feb. 3, 1994, Ser. No. 190,854

Int. Cl.<sup>6</sup> B63B 21/24

U.S. Cl. 114—294

11 Claims



1. An anchoring kit for anchoring a user's body while floating on water, said anchoring kit comprising:

- an anchor including an outer casing and a dense granular filling captivated therein,
- an anchor line including a first end secured to said anchor, an opposite end zone including a second end, and a mid zone between said first end and said second end,
- body attachment means on said opposite end zone structured and disposed for attachment to a limb of the user and including a loop portion with a sliding pincher element fitted to said loop portion, said pincher element being movable to adjustably vary the size of said loop portion in

order to facilitate placement and removal from about the user's limb and to provide a secure, snug fit about the limb when being attached thereto,  
anchor line adjustment means for selectively adjusting a length of said anchor line between said weight means and said body attachment means,  
and a resilient, cushioned sleeve fitted at least partially about said loop portion for contact with the user's limb.

5,410,982

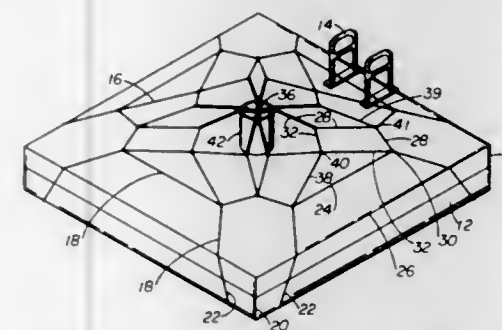
# ADJUSTABLE NET COVER FOR A RAFT

T. Sheridan Mann, 1432 Omega, Walled Lake, Mich. 48390  
Filed Feb. 17, 1994, Ser. No. 197,935

Int. Cl.<sup>6</sup> B63B 17/00

U.S. Cl. 114—343

13 Claims



1. An open net raft cover to discourage aquatic birds from roosting on the raft comprising,

- an open net having a plurality of lines extendable over the deck of the raft, a plurality of elastic loops extending from the net at spaced locations about the periphery of the net and adapted to temporarily attach about the periphery of the raft, and
- means attached to the net to elevate at least a portion of the net above the deck.

5,410,983

# DEVICE AND INSTALLATION FOR CRYSTAL GROWTH HAVING OBSERVATION MEANS

Christian Gamelin, Saint Aubin de Medco, France, assignor to Societe Anonyme dite: Aerospatiale Societe Nationale, Paris, France

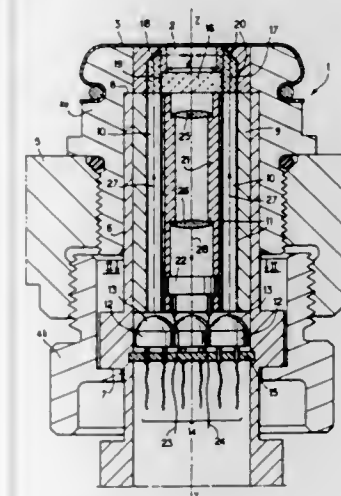
Filed Apr. 29, 1991, Ser. No. 693,319

Claims priority, application France, May 31, 1990, 90 06792

Int. Cl.<sup>6</sup> C30B 35/00

U.S. Cl. 117—202

12 Claims



1. Crystal growth device comprising a crucible having a

base which defines in part a cavity in which a crystallization reaction may take place, comprising:

- light generating means disposed outside said cavity, on the same side as the base of said crucible;
- light detection means disposed outside said cavity, also on the same side as the base of said crucible;
- first light transmission means disposed between said light generating means and the cavity of said crucible for introducing into said cavity a first light beam parallel to a first direction; and
- second light transmission means disposed between the cavity of said crucible and said light detection means for taking from said cavity a second light beam parallel to a second direction, which is transverse to said first direction, said second beam being light from said first beam which is diffused or diffracted by crystals present in said cavity.

5,410,984

# SYSTEM FOR POLYMER CRYSTALLIZATION

Ilya Pikus, Plymouth; Greg J. Kimball, Blaine, and Masayuki Inoue, Henn, all of Minn., assignors to Bepex Corporation, Minneapolis, Minn.

Filed Mar. 1, 1993, Ser. No. 24,404

Int. Cl.<sup>6</sup> C30B 35/00

U.S. Cl. 117—206

25 Claims

1. An apparatus for solid phase crystallization of polymers comprising a stationary housing, a rotor mounted for rotation within the housing, a plurality of spaced-apart hollow discs mounted along the length of said rotor, means for delivering heated fluid to the interior of the discs, material feed inlet means associated with said housing whereby the polymer material is adapted to engage the exterior surfaces of the discs for heating of the material, drive means for said rotor, the rotating discs operating to convey the material along the length of the housing, a material outlet means associated with said housing in spaced relationship to said inlet means, control means determining the speed of rotation of said rotor to influence agitation and conveying of material in said housing, and holdup means operating independently of said control means for fixing of residence time and for controlling the ratio of crystallized to uncrystallized material in the housing from 2 to 1 and 20 to 1.

5,410,985

# POULTRY INCUBATOR AND METHOD

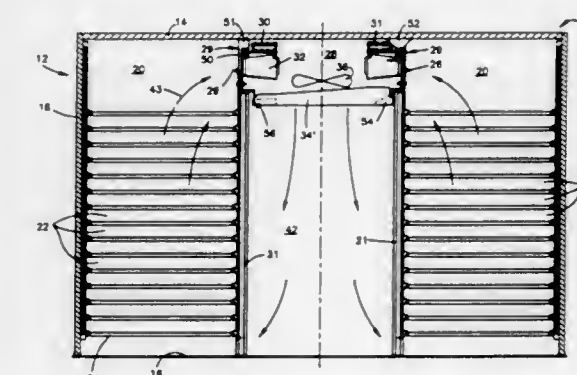
Bryan J. Schritz, Spencer, Ohio, assignor to Chick Master Incubator Company, Medina, Ohio

Filed Jan. 21, 1992, Ser. No. 823,192

Int. Cl.<sup>6</sup> A01K 41/00

U.S. Cl. 119—37

7 Claims



6. In a chicken incubator having a housing including roof and wall structure defining an incubation chamber, an improved environmental control circulation system comprising:

- a. a spaced pair of channels defining the sides of a generally



- centrally located environmental control section, the channels being spaced from the roof structure to delineate upper air inlet passages;
- b. an apertured panel delineating the bottom of said environmental control section, the panel being connected to the channels in spaced relationship to delineate lower air inlet passages;
- c. a circulating fan positioned within the section and located such that it draws inlet air through each of said inlet passages and directs air outwardly through a panel aperture; and
- d. said fan having sufficient capacity to direct outlet air downwardly into lower portions of the incubation chamber and laterally into incubation chamber portions on either side of said aperture whereby air is caused to flow into and upwardly through trays of incubating eggs positioned in the portions on either side laterally speaking of said aperture, the air being drawn upwardly over the eggs and thence, into and through each of the lower and upper inlet passages.

5,410,986

# BIRD FEEDER FORMED OF A PLURALITY OF INTERCONNECTED TUBULAR COLUMNS

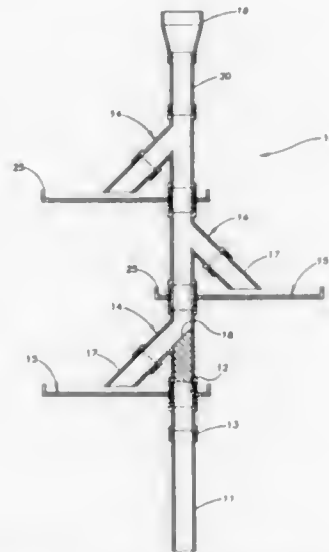
Larry W. Washam, P.O. Box 72, Lillie, La. 71256

Filed Jun. 30, 1994, Ser. No. 269,126

Int. Cl.<sup>6</sup> A01K 39/01

U.S. Cl. 119—52.2

3 Claims



1. An apparatus for feeding birds comprising:
- a vertical support column;
  - a tubular support cross-over column attached to an upper end of said support column;
  - a plurality of horizontally extending feeding platforms; each feeding platform including a link port;
  - a plurality of tubular male platform linking columns;
  - a plurality of tubular feed distribution chamber columns for distributing feed;
  - a filler cap assembly; and
  - a tubular filler cap assembly cross-over column;
- each of said tubular male platform linking columns extending through the link port of one of said feeding platforms and connected to a lower end of one of said tubular feed distribution chamber columns such that feed may flow from each tubular feed distribution chamber column to the feeding platform associated therewith; said tubular feed distribution chamber columns being arranged in a vertically stacked array having a feed passageway there-through; said tubular support cross-over column connected to the lowermost one of said tubular feed distribution chamber columns by the tubular male platform link-

ing column connected to the lower end thereof; each tubular feed distribution chamber column connected to the adjacent lower tubular feed distribution chamber column by the tubular male linking column connected to the lower end thereof; the uppermost one of said tubular feed distribution chamber columns connected to the filler cap assembly by said tubular filler cap assembly cross-over column, said tubular filler cap assembly cross-over column forming a passageway connecting said filler cap assembly to said feed passageway through the vertically stacked array of tubular feed distribution chamber columns.

5,410,987

# ANIMAL WASTE DISPOSAL APPARATUS

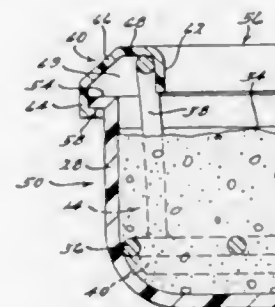
Harlan M. Simmons, 18658 George Washington Dr., Southfield, Mich. 48075

Filed Feb. 22, 1994, Ser. No. 199,560

Int. Cl.<sup>6</sup> A01K 1/01

U.S. Cl. 119—166

9 Claims



1. An apparatus for disposing of a waste from an animal, comprising:
- (a) a receptacle having a base and wall surrounding said base and projecting generally away from said base; and
  - (b) a sieve for removing a solid waste containing material from said receptacle, said sieve being adapted to rest in said receptacle and being capable of placement into said receptacle when said receptacle contains an animal litter material;
  - (c) said sieve including at least one handle secured thereto for allowing said sieve to be lifted out of said receptacle without requiring a hand to be placed within said animal litter material; and
  - (d) an annular waste-guiding member adapted to fit over said wall of said receptacle for defining an opening through which said animal deposits said waste; said waste-guiding member including an intermediate portion, an outwardly projecting portion depending from said intermediate portion, an upper portion extending from said intermediate portion and a downwardly projecting wall depending from said upper portion, said intermediate portion, said upper portion and said downwardly projecting wall forming a cavity within which a portion of said handle may be disposed when said waste-guiding member is disposed on said sieve.

5,410,988

# TUBULAR FURNACE AND METHOD OF CONTROLLING COMBUSTION THEREOF

Hiroshi Miyama, Yokosuka; Tetsuhiko Ohki, Tokyo; Hitoshi Kaji, Ryosuke Shimizu, both of Yokohama; Ryoichi Tanaka, Tokyo; Mamoru Matsuo, Zama; Masao Kawamoto, and Hirokuni Kikukawa, both of Yokohama, all of Japan, assignors to Nippon Furnace Kogyo Kabushiki Kaisha and Chiyoda Corporation, both of Kanagawa, Japan

Filed May 11, 1994, Ser. No. 241,015

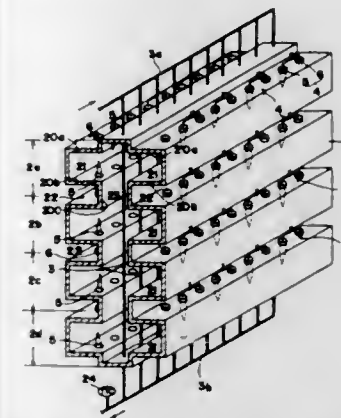
Int. Cl.<sup>6</sup> F22B 13/10

U.S. Cl. 122—250 R

8 Claims

U.S. Cl. 123—3

10 Claims



1. A tubular furnace having: a furnace body; coil paths composed of heating tubes provided in the furnace body to pass through a fluid to be heated; means of dividing the path into a plurality of zones; and at least one or more regenerative-heating-type alternate combustion systems provided for each of said zones; wherein the temperature in said furnace is independently controlled for each of said zones.

5,410,989

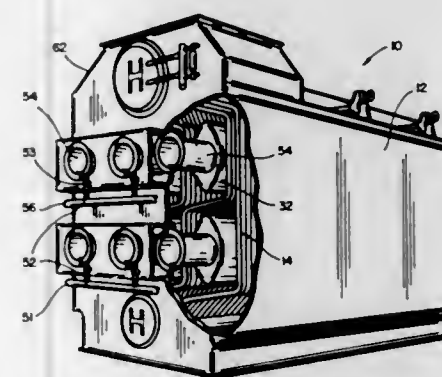
Robert M. Kendall, Sunnyvale; Richard L. Pam, Menlo Park; Andrew C. Minden; Nathan Saito, both of San Jose, and James A. Gotterba, Santa Clara, all of Calif., assignors to Alzeta Corporation, Santa Clara, Calif.

Filed Jun. 16, 1993, Ser. No. 78,552

Int. Cl.<sup>6</sup> F22B 23/06

U.S. Cl. 122—367.1

19 Claims



18. A method of operating a boiler for generating hot water or steam with improved thermal and exhaust emission performance comprising the steps of combusting premixed fuel and air on the outer surfaces of a plurality of radiant burners for generating radiant heat; directing water through coils of watertubes which form a heat exchange path in the boiler; positioning the watertubes along a series of runs in a plurality of heat cells; positioning within the heat cells only a single one of said burners; positioning in side-by-side relationship adjacent watertubes in each heat cell to form cell walls about the

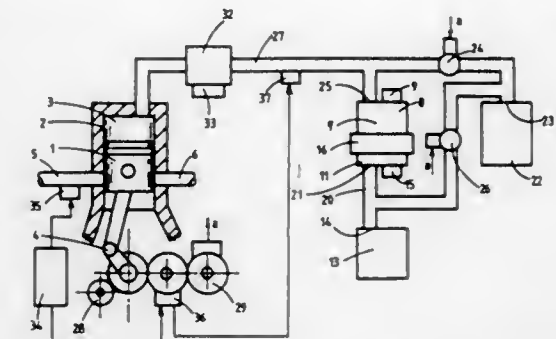
respective burner; and radiating heat from the burners to the cell walls to heat water in the watertubes.

5,410,990

# REVERSED DUAL THROUGHFLOW OF AIR FOR PRIMARY REACTORS OF CYCLIC CHAR BURNING ENGINES AND GASIFIERS

Joseph C. Firey, P.O. Box 15514, Seattle, Wash. 98115-0514

Filed Apr. 8, 1994, Ser. No. 224,723

Int. Cl.<sup>6</sup> F02B 43/08

1. In a cyclic char burning power reactor comprising: at least one combined means for compressing and expanding gases, each said combined means comprising: an internal combustion engine mechanism comprising a variable volume chamber for compressing and expanding gases, and drive means for driving said internal combustion engine mechanism and for varying the volume of said chamber through repeated cycles, each cycle comprising a compression time interval followed by an expansion time interval, each said combined means for compressing and expanding further comprising: intake means for admitting reactant gases into said variable volume chamber prior to each said compression time interval, exhaust means for removing reacted gases from said variable volume chamber after each said expansion time interval; each said combined means for compressing and expanding being connected to a separate primary reaction chamber, within a pressure vessel container, each said primary reaction chamber comprising: a refuel end with a refuel mechanism means for supplying fresh char fuel particles into said refuel end, an ash collection end, a char fuel direction of motion from said refuel end toward said ash removal end, each said primary reaction chamber further comprising, a char fuel preheat zone positioned toward said refuel end of said primary reaction chamber, an ash collection zone positioned toward said ash collection end of said primary reaction chamber, and a rapid reaction zone positioned between said char fuel preheat zone and said ash collection zone, each said primary reaction chamber further comprising at least one means for removing ashes; said char burning power reactor being connected to a source of supply of reactant gas containing appreciable oxygen gas for each said intake means for admitting reactant gases into said variable volume chamber; said char burning power reactor further comprising: means for preheating said char fuel within said primary reaction chamber to that temperature at which said char fuel reacts rapidly with oxygen in adjacent compressed reactant gases when said char burning power reactor is being started; means for cranking said internal combustion engine mechanism when said char burning power reactor is being started:

- an improvement comprising adding to each said primary reaction chamber:
- a product gas reservoir comprising a product gas reservoir gas flow opening;
- an expansion reactant gas reservoir comprising an expansion reactant gas reservoir gas flow opening;
- said primary reaction chamber comprising two separate gas

flow openings, a refuel end gas flow opening and an ash collection end gas flow opening;

a first fixed open gas flow connecting means for connecting between said variable volume chamber of said internal combustion engine mechanism and one of said two separate gas flow openings of said primary reaction chamber;

a first changeable gas flow connecting means for connecting between said expansion reactant gas reservoir gas flow opening and that one of said two separate gas flow openings of said primary reaction chamber to which said first fixed open gas flow connecting means from said variable volume chamber is connected, said first changeable gas flow connecting means comprising first drive means for opening and closing said first changeable gas flow connecting means while said cyclic char burning power reactor is running;

a second changeable gas flow connecting means for connecting between said expansion reactant gas reservoir gas flow opening and that other one of said two separate gas flow openings of said primary reaction chamber to which said first fixed open gas flow connecting means from said variable volume chamber is not connected, said second changeable gas flow connecting means comprising second drive means for opening and closing said second changeable gas flow connecting means while said cyclic char burning power reactor is running;

a second fixed open gas flow connecting means between said product gas reservoir gas flow opening and that other one of said two separate gas flow openings of said primary reaction chamber to which said first fixed open gas flow connecting means is not connected;

control means for controlling the opening and closing of said changeable gas flow connections, operative upon said means for opening and closing said changeable gas flow connections, and actuated by said internal combustion engine mechanism of said cyclic char burning power reactor; so that during all compression time intervals; said first changeable gas flow connecting means is open and said second changeable gas flow connecting means is closed; and so that during all expansion time intervals; said first changeable gas flow connecting means is closed and said second changeable gas flow connecting means is open.

5,410,991

#### COOLANT FILL HOUSING WITH INTEGRAL THERMOSTAT

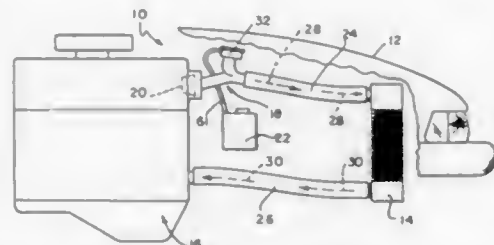
Edward R. Beaudry, Methuen, Mass.; Eric B. Thorstensen, Hampton Falls, N.H., and Wayne R. Duprez, Waltham, Mass., assignors to Standard-Thomson Corporation, Waltham, Mass.

Filed May 5, 1994, Ser. No. 238,648

Int. Cl.<sup>6</sup> F01P 7/16

U.S. Cl. 123—41.1

30 Claims



1. An apparatus for filling an engine cooling system with coolant fluid and for controlling fluid flow through the cooling system in response to changes of an engine cooling system temperature, the apparatus comprising:

a coolant fill housing including an inlet section, an outlet section, and a fill section configured to receive a cap thereon, the inlet section being formed to include a valve

seat and a flange for coupling the fill housing to an engine; and

a thermostat having a movable valve member for engaging the valve seat of the fill housing to block the flow of fluid past the valve member and into the inlet section, the thermostat including a retaining frame coupled to the flange for holding the thermostat within the inlet section beneath an outer surface of the flange, a spring extending between the retaining frame and the movable valve member for biasing the movable valve member to a normally closed position against the valve seat, a thermally responsive actuator coupled to the movable valve member for moving the movable valve member to an open position away from the valve seat when the ambient temperature exceeds a predetermined temperature to permit fluid flow from the engine into the inlet section of the fill housing.

5,410,992

#### COOLING SYSTEM FOR AUTOMOTIVE ENGINE

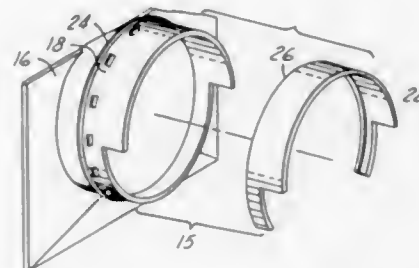
Charles S. Hunt, Plymouth; Robert W. Kay, Belleville; David T. Patrick, Dearborn; Robert L. Schmidt, Farmington Hills, and Ajit R. Shembekar, Dearborn, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 4, 1994, Ser. No. 222,055

Int. Cl.<sup>6</sup> F01P 7/10

U.S. Cl. 123—41.49

6 Claims



1. A variable geometry fan duct for an automotive engine cooling system having a fan-cooled, liquid-to-air radiator, said duct comprising:

a support structure for securing said fan duct to the radiator; a fixed barrel segment, attached to said support structure, for partially encircling an axial-flow cooling fan, with said barrel segment extending axially from said support structure such that the barrel segment shrouds the blade tips of a fan which is mounted so as to draw cooling air through said duct and the radiator; and

a movable barrel segment attached to said fixed segment, with said movable segment being rotatable from a first position in which it is nested with said fixed segment, to a second position in which said segments completely encircle and shroud the blade tips.

5,410,993

#### EXHAUST CONTROL VALVE FOR ENGINE

Tatsuyuki Masuda; Kousei Maebashi; Michihisa Nakamura, and Hidenori Suhara, all of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Dec. 23, 1993, Ser. No. 173,208

Claims priority, application Japan, Dec. 25, 1992, 4-357766

Int. Cl.<sup>6</sup> F02B 27/04

U.S. Cl. 123—65 PE

75 Claims

1. A two cycle internal combustion engine having a cylinder block having a cylinder bore, a piston reciprocating in said cylinder bore, an exhaust port formed in said cylinder block extending from said cylinder bore for exhausting combustion products from said cylinder bore, exhaust control valve means cooperable with said exhaust port and movable between at least a first position for delaying the closing of said exhaust port and a second position for advancing the closing of said

exhaust port, means for sensing the stopping of said engine, condition sensing means for sensing a condition of said engine, and cleaning means for operating said exhaust control valve

maintaining fluid pressure in the hydraulic means while the engine is in the non-operating state.

5,410,995

#### VALVE CROSSHEAD ASSEMBLY WITH WEAR-REDUCING CONTACT PAD

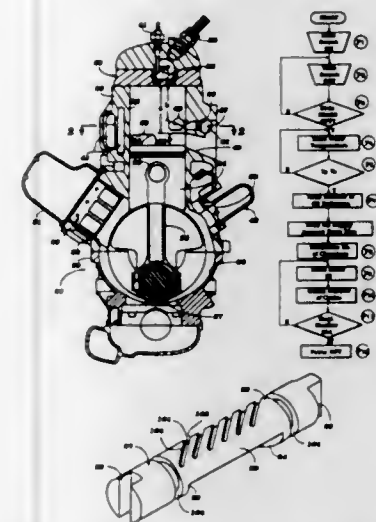
Joseph C. Bentz; John T. Carroll, III, both of Columbus, Ind., and Katsuhiko Shinosawa, Tokyo, Japan, assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Apr. 15, 1994, Ser. No. 228,342

Int. Cl.<sup>6</sup> F01L 1/26

U.S. Cl. 123—90.22

22 Claims



means through at least one cycle of movement between its positions upon stopping of said engine and if a certain condition of the engine is sensed.

5,410,994

#### FAST START HYDRAULIC SYSTEM FOR ELECTROHYDRAULIC VALVETRAIN

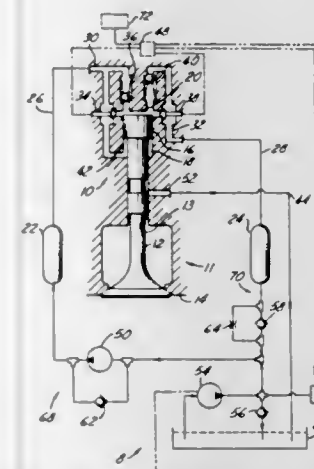
Michael M. Schechter, Farmington Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jun. 27, 1994, Ser. No. 266,066

Int. Cl.<sup>6</sup> F01L 9/02

U.S. Cl. 123—90.12

14 Claims



1. An internal combustion engine having an operating state and a non-operating state comprising:

a cylinder head; an electrohydraulic valvetrain including a plurality of engine valve assemblies mounted in the cylinder head; hydraulic means, having fluid operatively engaging the plurality of engine valves, for supplying pressurized fluid to the engine valve assemblies;

a control means for selectively supplying fluid to move the engine valves in timed relation to the engine in the operating state;

pump means, operatively engaging the hydraulic means, for pressurizing hydraulic fluid during the engine operating state; and

an auxiliary pump, connected to the hydraulic means, for

5,410,996

#### ROTARY VALVE ASSEMBLY USED WITH RECIPROCATING ENGINES

James W. Baird, 9442 Coronet Ave., Westminster, Calif. 92683

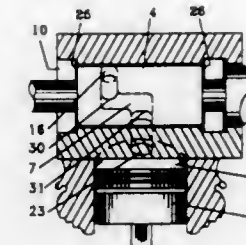
Continuation-in-part of Ser. No. 891,968, May 26, 1992,

abandoned. This application Aug. 9, 1993, Ser. No. 103,589

Int. Cl.<sup>6</sup> F01L 5/04

U.S. Cl. 123—190.2

2 Claims



1. A rotary valve assembly rotated by a drive mechanism comprising:

a. a reciprocating piston block assembly crankshaft and firing mechanism;

b. a head assembly that attaches to the block assembly; c. an exhaust rotary valve housed within the head assembly and having a plurality of channels that allow gases to flow from a combustion chamber above a piston to outside the engine assembly wherein the channels are offset in the exhaust rotary valve such that an exhaust rotor port and an exhaust rotor cylinder port of each channel for each piston are not in alignment in a plane perpendicular to the exhaust rotor valve axis and there is independent for each



channel an exhaust port and a cylinder exhaust port in the head assembly;

d. an intake rotary valve housed within the head assembly and having a plurality of channels that allow gases to be drawn into a combustion chamber above a piston wherein the channels are offset in the intake rotary valve such that an intake rotor port and an intake rotor cylinder port of each channel for each piston are not in alignment in a plane perpendicular to the intake rotor valve axis and there is independent for each channel an intake port and a cylinder intake port in the head assembly;

e. a drive mechanism that connects the crankshaft to the angular orientation of the intake rotary valve and exhaust rotary valve and when driven opens the intake rotary valve and exhaust rotary valve at alternate times; and

f. exhaust and intake seals that are shaped to conform to the exhaust or intake rotary valve and allow the gases to pass into the appropriate port and substantially reduce the gas passing around the intake or exhaust rotary shaft or head assembly.

5,410,997

# HIGH PERFORMANCE AUTOMOTIVE ENGINE GASKET AND METHOD OF SEALING A HIGH PERFORMANCE ENGINE

Gerald A. Rosenquist, Lake Zurich, Ill., assignor to Fel-Pro Incorporated, Skokie, Ill.

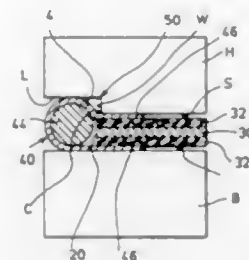
Continuation-in-part of Ser. No. 15,648, Feb. 9, 1993, Pat. No. 5,275,139. This application Jan. 3, 1994, Ser. No. 176,962

The portion of the term of this patent subsequent to Jan. 4, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> F16J 15/12

U.S. Cl. 123—193.3

9 Claims



1. A method of sealing a high performance internal combustion engine having a head and a block and a plurality of cylinders, each of said head and block having a main clamping surface, and an associated head gasket between said main clamping surfaces, the method comprising:

providing a gasket having a plurality of combustion openings and comprising a main body and a fire ring for each combustion opening, each said fire ring comprising a wire ring and an armor ensheathing said wire ring, said wire ring being oversized and having a thickness greater than the thickness of said main body;

providing a groove opening into and surrounding each cylinder, said groove being provided in one or both of said head and said block generally concentric with each said combustion opening, each said groove having a land area and a generally vertical wall which intersects with the main clamping surface of said head or block; and

positioning said gasket on said block relative to said head, so that when said head is torqued down, each said groove receives said fire ring to compress said wire ring to provide a primary seal therewith at said land area, the wall engages said armor to form a secondary seal, and said head and block main clamping surfaces clamp against said main body.

## 5,410,998 CONTINUOUS EXTERNAL HEAT ENGINE

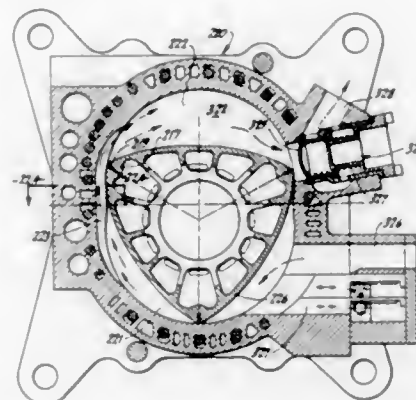
Marius A. Paul, and Ana Paul, both of 20410 Via Canarias, Yorba Linda, Calif. 92686

Continuation of Ser. No. 872,961, Apr. 22, 1992, which is a continuation-in-part of Ser. No. 704,293, May 21, 1991, Pat. No. 5,165,238. This application Jan. 22, 1993, Ser. No. 7,504

Int. Cl.<sup>6</sup> F04C 18/22; F02G 1/02, 1/04

U.S. Cl. 123—204

8 Claims



1. A Wankel-type, volumetric displacement mechanism comprising a housing having an internal, elongated, epitrochoidal cavity having two lobed cavity sections and a substantially triangular rotary piston with three symmetrically spaced apexes eccentrically rotatable in the cavity with the piston and housing forming variable volume chambers within the cavity as the piston rotates wherein the housing has a curved, perimeter wall with two opposed elongated wall segments forming opposite sides of the cavity with a first side of the elongated cavity having a first wall segment having a gas inlet and a gas outlet communicating with respective cavity sections of the cavity, and an opposite second side of the elongated cavity having a second wall segment with a central portion of the wall segment having an interconnecting channel means for allowing free and substantially unrestricted passage of gas from one cavity section to the other as delimited by the piston, wherein the channel means comprises a channel in the central portion of the wall segment on the second side of the cavity, wherein the channel has a length substantially equal to, but less than the distance between adjacent apexes of the piston, wherein an extended volumetric displacement occurs in a chamber formed in the cavity by the rotating piston and the wall of the housing.

5,410,999

## TWO-STROKE INTERNAL COMBUSTION ENGINE WITH IMPROVED AIR INTAKE SYSTEM

George T. Gillespie, Franklin, Wis.; Fletcher C. Belt, Woodstock, Ill., and H. Norman Petersen, Kenosha, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation-in-part of Ser. No. 954,492, Sep. 30, 1992, Pat. No. 5,273,016. This application Apr. 15, 1993, Ser. No. 48,380

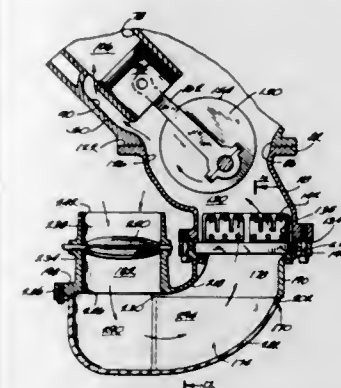
Int. Cl.<sup>6</sup> F02M 35/10

U.S. Cl. 123—403

20 Claims

1. A two-stroke internal combustion engine comprising a cylinder block including a generally planar crankcase mounting surface having therein a crankcase recess, a crankcase cover including a generally planar cylinder block mounting surface mating with said crankcase mounting surface and having therein a crankcase recess aligned with said crankcase recess in said cylinder block and defining therewith a crankcase, and air intake means for supplying a flow of air to said crankcase, said air intake means defining a U-shaped air intake

path having a downstream leg directed toward and generally perpendicular to said crankcase mounting surface and having



an upstream leg generally parallel to and directed opposite said downstream leg.

5,411,000

## IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Yukio Miyashita; Hiroshi Yatan, and Tatsuya Ito, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

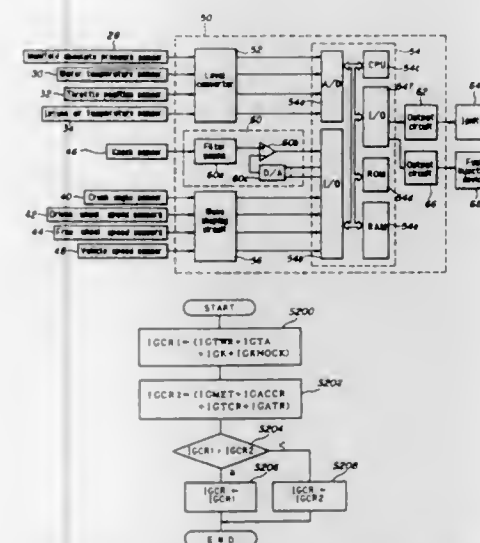
Filed Jan. 3, 1994, Ser. No. 176,444

Claims priority, application Japan, Jan. 13, 1993, 5-020498

Int. Cl.<sup>6</sup> F02P 5/152

U.S. Cl. 123—425

11 Claims



1. A system for controlling ignition timing of an internal combustion engine, comprising:

first means for detecting operating parameters of the engine; second means for determining a basic ignition timing on the basis of at least one of the detected operating parameters; third means for determining a first retard amount based on at least one of the detected operating parameters to prevent knock from occurring;

fourth means for determining a second retard amount based on at least one of the detected operating parameters to intentionally reduce output torque of the engine;

fifth means for comparing the first retard amount with the second retard amount;

sixth means for selecting one of the first and second retard amounts, which is greater in a retard direction, to correct the basic ignition timing; and

seventh means for finally determining a final ignition timing

to be supplied to the engine at least on the basis of the corrected basic ignition timing.

5,411,001

## FUEL LINE ARRANGEMENT IN THE CYLINDER HOUSING OF AN INTERNAL COMBUSTION ENGINE AND METHOD OF MAKING THE FUEL PASSAGES

Johannes Werner, Waiblingen; Ernst-Wilhelm Hufendick, Stuttgart, and Walter Kerschbaum, Fellbach, all of Germany, assignors to Mercedes-Benz A.G., Stuttgart, Germany

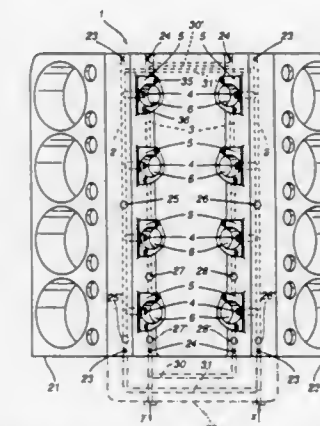
Filed Aug. 3, 1994, Ser. No. 285,502

Claims priority, application Germany, Aug. 4, 1993, 43 26 162.0

Int. Cl.<sup>6</sup> F02M 55/02, 39/02

U.S. Cl. 123—456

13 Claims



1. A fuel line arrangement in the cylinder housing of an internal combustion engine with cylinders arranged in line and upstanding mounting structures with support bores for the reception of plug-in fuel injection pumps formed on the sides of said cylinders, said cylinder housing including fuel supply and fuel return lines in communication with said plug-in fuel injection pumps in said support bores, comprising: a fuel return passage extending through the cylinder housing and intersecting the support bores for the reception of said fuel pumps, a longitudinal fuel supply passage extending alongside said cylinders through the cylinder housing parallel to, and essentially at the same level as, said fuel return passage, an oblique bore extending between each pump support bore and said longitudinal fuel supply passage for supplying fuel to the fuel pumps in said fuel support bores, said oblique bores being arranged in such a manner that their outward extensions are within the confines of said fuel pump support bores to facilitate drilling of said oblique bores.

5,411,002

## INTERNAL COMBUSTION ENGINE FUEL INJECTION APPARATUS AND SYSTEM

Marion L. Smitley, Birmingham, Mich., assignor to Walter Potoroka, Sr., Oakland, Mich.

Filed Feb. 28, 1991, Ser. No. 662,568

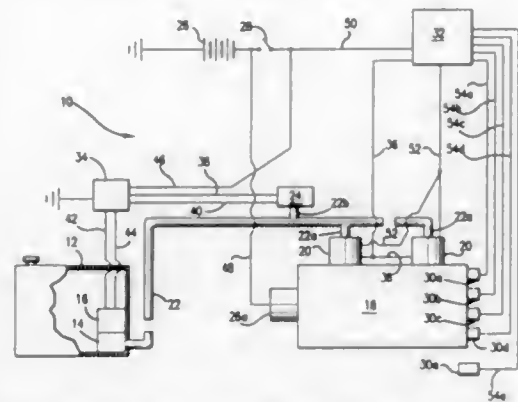
Int. Cl.<sup>6</sup> F02M 37/04

U.S. Cl. 123—497

7 Claims

1. A method of converting an existing by-pass type fuel injection system for an internal combustion engine having a fuel reservoir, wherein a d.c. variable speed electric motor-driven positive displacement fuel pump having an intake continuously supplies the maximum quantity of fuel that could be required under any engine/ambient operating condition and a fuel pressure regulator maintains the pumped fuel at a predetermined fuel pressure, the system including one or more sensors for sensing and producing electric signals representative of the instantaneous values of one or more selected engine/ambient parameters in accordance with which fuel is to be sup-

plied to the engine, means for receiving said parameter signals and producing an integrated electrical signal representative of the instantaneous quantity of fuel required for engine operation, a fuel injector constructed and arranged to receive said integrated signal and supply fuel in accordance therewith to the engine at the regulated pressure, and an excess fuel by-pass conduit to return pumped fuel not required for engine operation to the fuel reservoir or the pump intake to a system wherein the fuel pump continuously supplies not the maximum quantity of fuel that could be required by the engine, but only the correct amount of fuel required instantaneously by the



engine, thereby eliminating the disadvantages of pumping excess fuel, said method comprising the following steps:

- removing the existing system fuel pressure regulator;
- removing the existing excess fuel by-pass;
- providing a system fuel pressure sensor for continuously providing an electrical signal representative of system fuel pressure;
- varying the voltage applied to the d.c. pump motor so as to vary the speed of the motor, and thus the quantity of fuel pumped by the positive displacement pump, at the system fuel pressure.

5,411,003

#### VISCOSITY SENSITIVE AUXILIARY CIRCUIT FOR HYDROMECHANICAL CONTROL VALVE FOR TIMING CONTROL OF TAPPET SYSTEM

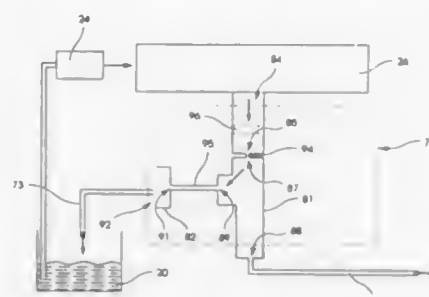
Walter W. Eberhard, Columbus, Ind.; John J. McCosby, Jamestown, N.Y.; Paul D. Free, Columbus, Ind.; Jerome M. Long, Northeast, Pa., and David A. Olson, Columbus, Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Apr. 5, 1994, Ser. No. 222,883

Int. Cl.<sup>6</sup> F02M 37/04; F16K 15/00

U.S. Cl. 123—502

16 Claims



1. An engine timing control tappet system of the type having at least one expansible tappet for controlling timing of a fuel injector using oil that is supplied by a pump to an engine lubrication circuit, wherein said system includes viscosity sensitive means that is coupled to the engine lubrication circuit for producing a simulated pressure which varies in correspondence with the effect of changes in the viscosity of oil received from the engine lubrication circuit and pressure regulating

means responsive to changes in said simulated pressure for adjusting the pressure of oil supplied through said engine lubrication system to said tappets from said pump, wherein said viscosity sensitive means is coupled to the engine lubrication circuit by an oil rifle connection, and comprises a viscosity orifice, a pressure chamber, a regulator connection, and an exit orifice; said viscosity orifice being connected between the rifle connection and the pressure chamber and having a flow through length and a cross-sectional area that produces a pressure drop from an upstream side to a downstream side thereof that is sensitive to changes in viscosity of oil passing therethrough; wherein said exit orifice has, in comparison to said viscosity orifice, a relatively short flow-through length and relatively small sensitivity to the viscosity of oil passing therethrough, said exit orifice being connected to a downstream side of the pressure chamber as a means for controlling the quantity of flow through said viscosity orifice; and wherein said regulator connection communicates said pressure regulating means with said pressure chamber, wherein the improvement comprising:

- a control valve disposed between said engine lubrication circuit and said one expansible tappet; and
- a pressure divider arrangement positioned within said engine timing control tappet system and arranged in flow communication between said engine lubrication circuit and said control valve for influencing the switch point of said control valve.

5,411,004

#### POSITIVE PRESSURE CANISTER PURGE SYSTEM INTEGRITY CONFIRMATION

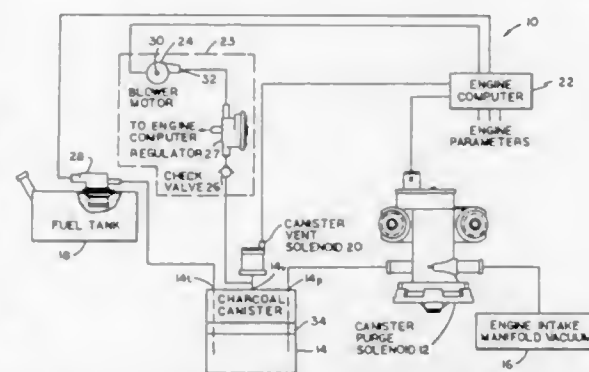
Murray F. Busato, and John E. Cook, both of Chatham, Canada, assignors to Siemens Automotive Limited, Chatham, Canada

Filed Feb. 3, 1993, Ser. No. 13,594

Int. Cl.<sup>6</sup> F02M 33/02

U.S. Cl. 123—520

15 Claims



1. A canister purge system comprising a collection canister for collecting volatile fuel vapors from a fuel tank, and means for selectively purging collected fuel vapors from said canister to an internal combustion engine's intake manifold for entrainment with a combustible mixture that passes from the intake manifold into combustion chamber space of the engine for combustion therein, said means including a purge flow path between said canister and intake manifold, characterized by an associated diagnostic system for detecting leakage from a portion of the canister purge system, which portion includes said canister and tank, said diagnostic system comprising pump means for delivering pumped air at a predetermined regulated pressure to build positive pressure in said portion during a diagnostic test, pressure sensing means for sensing pressure in said portion, timing means for measuring the length of time for the pressure in said portion to build from a first pressure measured at the beginning of the diagnostic test to a second higher pressure, and determining means for determining from the length of time measured by said timing means the extent of any leakage from said portion, in which said determining means

comprises means for utilizing a measurement of the fuel fill level in said tank in determining the extent of any leakage from said portion.

5,411,005

#### EMISSIONS AND FUEL CONTROL SYSTEM AND DEVICE

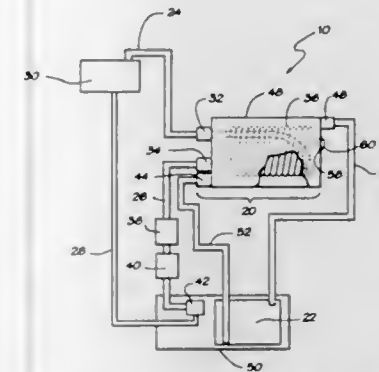
Michael E. Bohl, P.O. Box 606, Williamsburg, Ohio 45176, and Robert A. Glass, 2504 Jett Hill Rd., New Richmond, Ohio 45157

Filed Jun. 15, 1993, Ser. No. 78,004

Int. Cl.<sup>6</sup> F02M 31/00

U.S. Cl. 123—557

12 Claims



3. A heat exchanger for maximizing engine efficiency and reducing diesel engine particulate emissions, comprising:

- a container for holding heated coolant;
- a helical coil for passing fuel through said container, said coil located in said container and having a first end and a second end;
- a coolant inlet port for admitting heated coolant into said container from a coolant line, said coolant inlet port located on an end of said container;
- a coolant outlet port for transporting coolant out of said container and located opposite said coolant inlet port and at an elevation higher than said coolant inlet port;
- a fuel inlet port for admitting fuel into said coil from a fuel line, said fuel inlet port is located on an end of said container and connected to said first end of said coil; and
- a fuel outlet port for transporting heated fuel out of said container into said fuel line, said fuel outlet port is located on said end of said container and adjacent said fuel inlet port and is connected to said second end of said coil, wherein said fuel is heated to a maximum of 85° F.

5,411,006

#### ENGINE IGNITION AND CONTROL SYSTEM

Gardiner A. Noble, Farmington; Leonard Kafka, Ann Arbor, and Mark Ciuffetelli, Clarkston, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 8, 1993, Ser. No. 148,381

Int. Cl.<sup>6</sup> F02P 11/00

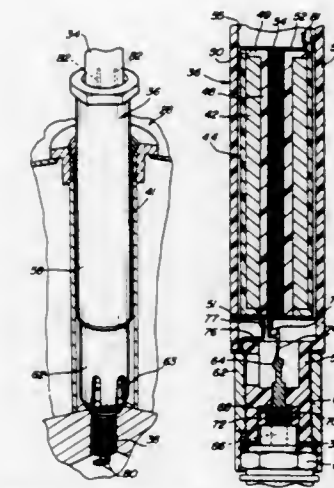
U.S. Cl. 123—634

27 Claims

1. An ignition and engine control system for an internal combustion engine having a spark plug and a piston located within a combustion chamber, said ignition and engine control system comprising:

- an ignition transformer adapted for mounting on the spark plug and being capable of firing the spark plug a multiple number of times during a combustion cycle, said transformer having a core, a primary winding and a secondary winding both located about said core, said secondary winding being electrically connected to the spark plug;
- circuit means for supplying a charging current to said primary winding of said ignition transformer, said charging current inducing a voltage potential in said secondary winding and being applied to the spark plug;
- control means for providing control signals to said circuit

means causing said charging current to be initiated in said primary winding at predetermined times during said combustion cycle inducing said voltage potential in said secondary winding and being applied to the spark plug, said control means adapted to cause initiation of combustion within said engine by inducing an ignition charging current and ignition voltage potential which is applied by said circuit means to the spark plug at a first predetermined position of the piston, said control means also adapted to perform at least one diagnostic function by inducing a diagnostic charging current and diagnostic voltage potential which is applied to the spark plug by said circuit means at a second predetermined position of the piston during the same combustion cycle but after said first predetermined position, said diagnostic charging current;



timing means for sensing the position of the piston in the combustion chamber and for providing a timing signal corresponding thereto to said control means; and detection means for detecting the occurrence of an inductive current discharge across the spark plug as a result of said diagnostic voltage potential in said secondary winding being applied to the spark plug and conditions then present within said combustion chamber, said detection means being coupled to said primary winding of said transformer and to said control means and thereby enabling said control means to determine if said electrical discharge occurred and to further determine if a predetermined condition exists in the combustion chamber thereby allowing said control means to take appropriate measures in response to the occurrence or non-occurrence of said predetermined condition.

5,411,007

#### AIR-FUEL RATIO CONTROL APPARATUS OF INTERNAL COMBUSTION ENGINE

Masaki Narita, Shizuoka, Japan, assignor to Suzuki Motor Corporation, Shizuoka, Japan

Filed Dec. 21, 1993, Ser. No. 171,065

Claims priority, application Japan, May 31, 1993, 5-152761; May 31, 1993, 5-152762; May 31, 1993, 5-152763

Int. Cl.<sup>6</sup> F02M 33/02

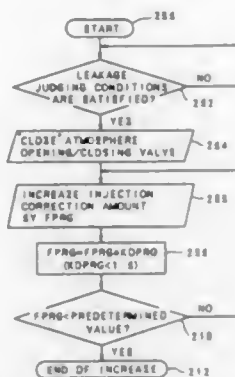
U.S. Cl. 123—690

5 Claims

1. In an air-fuel ratio control apparatus of an internal combustion engine in which a canister to adsorb and hold evaporated fuel is provided in a supply passage which communicates an intake passage of the internal combustion engine and a fuel tank, an atmosphere opening/closing valve is provided so as to open said canister to the atmosphere, a purge valve is provided in the supply passage between said intake passage and said canister, a pressure sensor communicates with the supply passage between the canister and the fuel tank, and a control that



closes said atmosphere opening/closing valve is closed when leakage is judged and reduces a pressure in the fuel tank to a predetermined negative pressure value, and thereafter closes said purge valve so that a leakage state of an evaporating system is discriminated, comprising the improvement wherein a fuel supply section is provided to supply the fuel to the



internal combustion engine, and the control includes a control section for controlling in a manner such that when leakage judging conditions are satisfied, a preset promising correction amount is added to a fuel supply amount from said fuel supply section synchronously with the closing operation of said atmosphere opening/closing valve to thereby reduce fluctuation of the air-fuel ratio when the leakage is judged.

5,411,008

## INDEXED LIMB BOLT ASSEMBLY FOR A RECURVE BOW

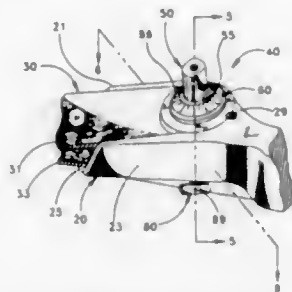
Gary Hsu, Canoga Park, Calif., assignor to Micro Inventions Technology Inc., West Hills, Calif.

Filed Dec. 29, 1993, Ser. No. 175,113

Int. Cl.<sup>6</sup> F41B 5/00

U.S. Cl. 124—23.1

20 Claims



13. A limb bolt assembly for a recurve bow, the recurve bow having an upper limb, a lower limb, and a center riser with an upper end and a lower end each having a slot for receiving a proximal end of a respective one of the upper and lower limbs, the limb bolt assembly comprising:

- an elongated threaded bolt mounted across said slot;
- means for indexing a rotational position of said bolt;
- a sleeve located inside said slot and threadably engageable with said elongated bolt, and further engaging with said proximal end of said respective one of said upper and lower limbs;
- means for preventing said sleeve from rotating inside said slot; and
- means for locking said bolt to prevent it from rotating after adjustment;
- whereby when said proximal end of said respective one of upper and lower limbs is received in said slot and fastened therein, said sleeve can be driven along said bolt by rotating said bolt to adjust the poundage and tiller of said recurve bow, where the desired adjustment can be in-

dexed by said index means, and said bolt can be locked to prevent it from becoming loosened.

5,411,009

## COMPOUND BOW ANTI VIBRATION AND NOISE DEVICE

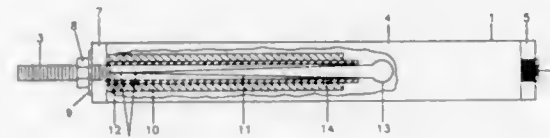
Myron P. Thompson, 101 Louisa Ave., Rosepine, La. 70659, and Cecil E. Thompson, Jr., Rte. 8 Box 911, Deridder, La. 70674

Filed Feb. 4, 1994, Ser. No. 192,058

Int. Cl.<sup>6</sup> F41B 5/00

U.S. Cl. 124—89

3 Claims



1. An apparatus to be mounted to a body of a compound bow for controlling noise and vibration comprising;

- means for housing said apparatus, said means further comprising an outer barrel, said outer barrel comprising a cylinder having a forward end and a rearward end, said forward end having a forward insert, said forward end being plugged by said forward insert, said forward insert further comprising a threaded hole, said hole being traversed by a threaded oil plug, said oil plug screwed into said hole, said rearward end having a rearward insert, said rearward insert having a center, said rearward end being plugged by said rearward insert, said outer barrel being mounted to said body of said bow in a horizontal, forward extending position;
- means for mounting said apparatus to said bow, said means further comprising a threaded mounting stud, said mounting stud having a forward end and rearward end, said stud being screwed into said body of said bow, said forward end traversing said center of said rearward insert; and
- means for transferring and absorbing said noise and vibration, said means further comprising an inner barrel, and a tuning wire, said inner barrel comprising a cylinder, said cylinder having a forward end and a rearward end, said rearward end of said cylinder being rigidly affixed to said rearward insert so as to horizontally position said inner barrel centrally within said outer barrel, said inner barrel extending from said rearward insert a portion of the distance toward said forward insert, said inner barrel being significantly shorter than said outer barrel, said outer barrel being filled with an energy absorbing fluid, said tuning wire comprising a "U" shaped loop of wire having a closed forward end and an open rearward end, said rearward end comprising two parallel legs, each of said legs having a terminal at its end, said terminals being rigidly affixed to said forward end of said mounting stud so as to be positioned within said inner barrel, said closed forward end extending just past said forward end of said inner barrel, said tuning wire and said inner barrel being immersed in said energy absorbing fluid so as to allow said energy absorbing fluid to absorb said vibrations as said vibrations travel from said bow down said tuning wire by way of said mounting stud and into said outer barrel.

5,411,010

## BASE BLADE OF FIBER-REINFORCED PLASTIC FOR CIRCULAR SAW BLADES AND/OR ABRASIVE CUTTING DISKS

Heinrich Mummenhoff, Am Hagen 20, D-42855 Remscheid, Germany

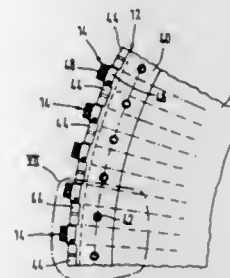
Filed Dec. 29, 1993, Ser. No. 175,157

Claims priority, application Germany, Dec. 30, 1992, 42 44 476.4

Int. Cl.<sup>6</sup> B28D 1/12; B24D 5/04, 5/10

U.S. Cl. 125—15

16 Claims



1. Base blade (1) for material working elements, said base blade (1) having a circular disk body (2) comprised at least partially of a plastic material (6) reinforced with embedded fibers (4), said fibers (4) being arranged in a plurality of fiber layers (16, 18) lying stacked upon one another and being plane, circular-disk shaped, and concentric to said disk body (2), whereby in a first type of fiber layer (16) the fibers (4) are arranged only straight-lined and in an at least approximately radial direction with respect to the disk body (2) and are arranged in an even distribution along the entire circumference of the disk body (2), and in a second type of fiber layer (18) the fibers (4) only run essentially concentrically to the disk body (2) in an at least approximately circular manner; whereby said two different types of fiber layers (16, 18) are stacked in said disk body (2) in a selected predetermined sequence of stacking as a function of the size of the disk body such that an optimal stability distribution can be obtained within the disk body (2); and whereby said fibers (4) are arranged next to one another so closely, that in the area of said fiber layers (16, 18), a high fiber density with a volume proportion of approximately 60 to 70 vol % is attained.

5,411,011

## OUTDOOR COOKING DEVICE

Jeffrey M. Teta, 78 Avenue C, Port Washington, N.Y. 11050

Filed Feb. 22, 1994, Ser. No. 199,743

Int. Cl.<sup>6</sup> F24C 5/00

U.S. Cl. 126—50

2 Claims

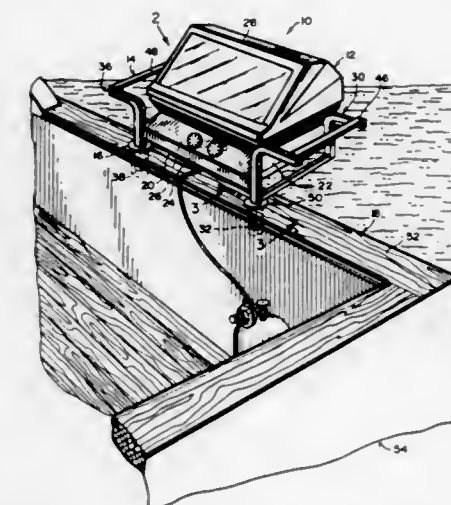
1. An improved outdoor cooking device which comprises:

- a barbeque grill, said barbeque grill including a bottom wall, a pair of opposing end walls extending upwardly from said bottom wall, and a pair of opposing side walls extending upwardly from said bottom wall, so as to form an interior cooking chamber, said barbeque grill further including a hood hinged thereto over said interior cooking chamber;

- means for supporting said barbeque grill, said supporting means including a first frame member having a first depending leg, means for attaching said first frame member to an underside of said bottom wall at a first side thereof, a second frame member having a second depending leg, and means for attaching said second frame member to the underside of said bottom wall at a second side thereof, so that said first depending leg and said second depending leg can engage with said mounting means, said first attaching means including a first pair of spaced apart upstanding studs on said first frame member, to extend into the underside of said bottom wall at the first side thereof, said second attaching means including a second pair of spaced apart upstanding studs on said second frame member to

extend into the underside of said bottom wall at the second side thereof, said supporting means further including said first frame member having a first handle thereon, and said second frame member having a second handle thereon, so that a person can grip said first handle and said second handle and carry said barbeque grill therefrom, allowing said first depending leg and said second depending leg to engage with said mounting means; and

- means for mounting said supporting means to a structure in a level stabilized manner, so that said barbeque grill cannot be knocked over when in use, said mounting means including a pair of top mount leg holders and the structure



being a gunwale of a boat having a pair of spaced apart wells to receive said top mount leg holders, so that said first depending leg and said second depending leg can enter and be retained by said pair of top mount leg holders, said mounting means including a pair of side mount leg holders and the structure being a vertical wall to receive said side mount leg holders, so that said first depending leg and said second depending leg can enter and be retained by said pair of side mount leg holders, each said side mount leg holder including a cup, a plurality of spaced apart transverse flat arm plates affixed to the back of said cup, and a plurality of fasteners to extend through said flat arm plates and into the vertical wall.

5,411,012

## COMBUSTION HEATER

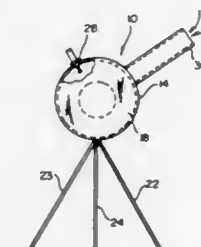
Larry D. Kellog, Turlock, Calif., assignor to Fred A. Tull and Rosa B. Tull, both of Prosser, Wash.

Filed Oct. 5, 1993, Ser. No. 132,033

Int. Cl.<sup>6</sup> A01G 13/06

U.S. Cl. 126—59.5

4 Claims



1. A combustion heater, comprising:

- a closed, cylindrical combustion chamber having a cylindrical surface portion and first and second opposing ends, the cylindrical surface portion having two upper and two lower circumferential quadrants;

an elongated exhaust tube extending from the first end of the combustion chamber;  
 a fuel inlet in the cylindrical surface portion near the second end of the combustion chamber for receiving vaporized fuel into the combustion chamber, the fuel inlet being located at a point which is in one of said two upper circumferential quadrants of the cylindrical surface portion, said fuel inlet point being approximately 10° to 40° circumferentially removed from a highest circumferential point on the cylindrical surface portion;  
 an ignition and air supply tube located near the second end of the combustion chamber in the other upper circumferential quadrant of the cylindrical surface portion, wherein the fuel inlet and the ignition and air supply tube are separated by an angle in the range of 80°-100°; and  
 a plurality of legs for support of the apparatus.

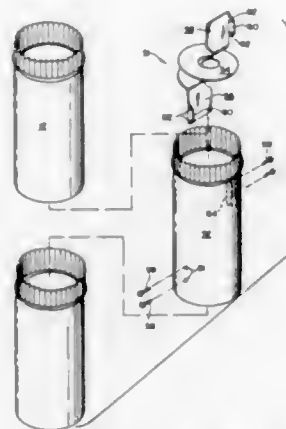
5,411,013

**FLUE INSERT TO CONTROL EXHAUST GASES**  
 Galus D. Kazen, 4304 172nd St., Stanwood, Wash. 98292  
 Continuation-in-part of Ser. No. 115,309, Aug. 31, 1993. This application Dec. 29, 1993, Ser. No. 175,289

Int. Cl.<sup>6</sup> F23J 11/00

U.S. Cl. 126-307 R

9 Claims



1. Apparatus for control of the flow of exhaust gases through a flue stack, the flue stack being connected to a furnace system and serving as a conduit through which gases are exhausted from the furnace system, said apparatus comprising:  
 a sleeve dimensioned to be coupled to the flue stack;  
 a helical vane disposed in said sleeve, said vane having first and second opposed ends; and  
 first and second attachment assemblies for securing said opposed ends of said vane to said sleeve, at least one of said first and second attachment assemblies being configured to secure at least one of said opposed ends of said vane to said sleeve in a plurality of positions of varying distance relative to the other end of said vane.

5,411,014

**RAPID HEATING COOKWARE**  
 Gerald T. Paul, Whitelaw, Wis., assignor to Anchor Hocking Corporation, Freeport, Ill.

Filed Dec. 30, 1993, Ser. No. 175,820

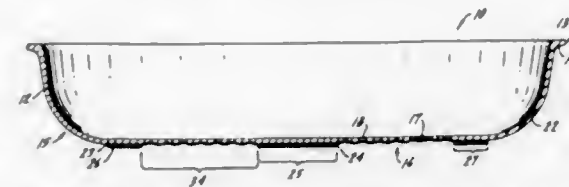
Int. Cl.<sup>6</sup> H47J 27/00

U.S. Cl. 126-390

9 Claims

1. A cookware vessel having rapid heat transfer through the major portion of its bottom, said cookware vessel including in combination  
 sidewall means,  
 a bottom assembly, and  
 a transition section joining the sidewall means to the bottom assembly,  
 said bottom assembly including a metal pan bottom,  
 said pan bottom having a flat circular central area and a flat

peripheral annular area located just inwardly from the junction of the transition section to the bottom assembly, said metal pan bottom further having a plurality of circular grooves between the central area and the peripheral area, said circular grooves being smooth and, in cross-section, section, substantially sinuous so as to eliminate sharp corners,  
 said bottom assembly further including a heat transfer coating, said heat transfer coating being a coating of enamel extending continuously from the central area to the transition section,  
 said bottom assembly further having friction areas,



said friction areas being located on a peripheral area lying just inside the transition section, and a central area, said friction areas being comprised of a coating of material having a high coefficient of friction so as to inhibit sliding action of the vessel over a support surface such as a burner,  
 the area between the peripheral area and the central area being covered by the heat transfer coating only so as to provide no impediment to the rapid transfer of heat from a heat source through the pan bottom and to the interior cooking surface.

5,411,015

**RADIATION COLLECTORS**

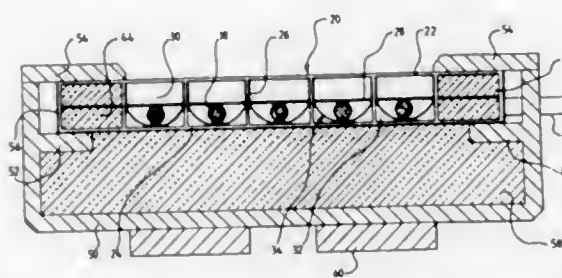
Peter E. Starnes, Penzance, England, assignor to Collins Starnes Associates Limited, Shropshire, England  
 Filed Sep. 3, 1993, Ser. No. 116,782

Claims priority, application United Kingdom, Sep. 7, 1992, 9219012; May 6, 1993, 9309333

Int. Cl.<sup>6</sup> F24J 3/02

U.S. Cl. 126-684

11 Claims



1. A solar panel for the collection and utilization of energy present in solar radiation comprising an array of side-by-side metal conduits through which a fluid to be heated by solar radiation may flow, each of said conduits being partially surrounded by a reflector; a fluid inlet to which one end of each said conduit is connected; and a fluid outlet to which the other end of each said conduit is connected whereby fluid may flow from said inlet through said conduits to said outlet wherein each said conduit has a surface which comprises a solar radiation absorber and wherein each said fluid-flow conduit is provided in a plastics matrix comprising a plurality of side-by-side hollow compartments.

5,411,016

**INTRAVASCULAR BALLOON CATHETER FOR USE IN COMBINATION WITH AN ANGIOSCOPE**

Stewart M. Kume, Plymouth; Trac Le, Columbia Heights, and Roger N. Hastings, Maple Grove, all of Minn., assignors to Scimed Life Systems, Inc., Maple Grove, Minn.

Filed Feb. 22, 1994, Ser. No. 200,122

Int. Cl.<sup>6</sup> A61B 1/06; A01M 25/00, 29/00

U.S. Cl. 128-6

8 Claims



1. A vascular balloon catheter, comprising:  
 an elongate shaft having a proximal portion, a distal portion, an inflation lumen extending therethrough, the distal portion of the shaft being optically transparent;  
 an inflatable balloon secured to the distal end of the elongate shaft, the balloon being in fluid communication with the inflation lumen;  
 a guide wire lumen extending through the elongate shaft;  
 an angioscope extending through the guide wire lumen such that the angioscope can visualize through the optically transparent shaft portion to an interior of a vascular lumen; and  
 a measuring index on the inflatable balloon.

5,411,017

**TWIN COLLAR PROTECTIVE ENCLOSURE**

Albert H. Wong, 948 Michaelorena, Los Angeles, Calif. 90026

Filed Dec. 17, 1993, Ser. No. 169,584

Int. Cl.<sup>6</sup> A62B 7/10

U.S. Cl. 128-201.25

8 Claims



1. A protective enclosure to be worn over the face of a wearer to provide a self-contained supply of air from which the wearer can breathe, said enclosure comprising a flexible, gas and smoke impervious body having first and opposite normally open ends, the first open end of said body sized to surround the wearer's head and the opposite open end of said body sized to surround the wearer's neck, a first elastic collar extending around said first end to close said first end and form an air-tight seal against the wearer's head to prevent fluid communication via said first end between the supply of air within said enclosure and the atmosphere outside said enclosure, and a second elastic collar extending around said opposite end to close said opposite end and form an air-tight seal against the wearer's neck to prevent fluid communication via said opposite end between the supply of air within said enclosure and the atmosphere outside said enclosure, said enclosure preventing said outside atmosphere from reaching the eyes, nose and ears of the wearer.

5,411,018

**UNDERWATER OXYGEN SUPPLY SYSTEM**

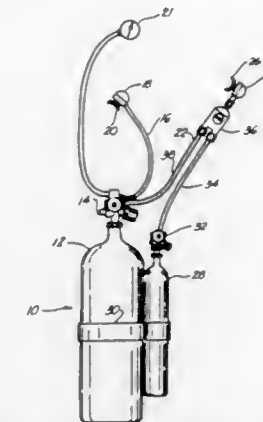
Laney T. Rinehart, P.O. Box 4706, Panama City, Fla. 32401-1450

Filed May 26, 1994, Ser. No. 249,468

Int. Cl.<sup>6</sup> A62B 18/10

U.S. Cl. 128-201.28

9 Claims



1. An underwater breathing apparatus having a pressurized air tank, a primary breathing apparatus, and a separate secondary breathing apparatus with mouthpiece wherein the improvement comprises:  
 (a) a pressurized oxygen tank secured to the air tank;  
 (b) a first conduit coupled to the air tank and a separate second conduit coupled to said oxygen tank;  
 (c) a gas mixing valve coupled to both said conduits intermediate the secondary breathing apparatus and said conduits, said gas mixing valve comprising:  
 i. selector switch means for selectively supplying either pressurized air from the air tank, pressurized oxygen from said oxygen tank, or a pressurized air/oxygen mixture to the secondary breathing apparatus;  
 ii. an internal mixing chamber for combining said pressurized air and said pressurized oxygen therein prior to delivering said pressurized air/oxygen mixture to the secondary breathing apparatus; and  
 iii. check valve means for preventing backflow through said gas mixing valve.

5,411,019

**INTEGRATED OXYGEN RATIO CONTROLLER**

Jay A. Smith, Harleysville, Pa., assignor to North American Drager, Telford, Pa.

Filed Nov. 3, 1993, Ser. No. 147,209

Int. Cl.<sup>6</sup> A61M 16/00

U.S. Cl. 128-203.25

13 Claims

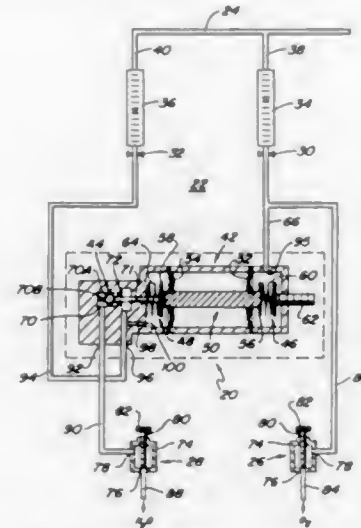
1. A gas controller for use with an anesthesia apparatus supplying a flow of oxygen through a first line into a manifold while supplying a flow of anesthesia gas through a second line into the manifold, the first line including first adjustable means for enabling the adjustment of the flow of oxygen through the first line in a first direction from upstream to downstream, the second line including second adjustable means for enabling the adjustment of the flow of anesthesia gas through the second line in the first direction, the first and second adjustable means being adjustable independently of each other, said gas controller comprising:

anesthesia gas flow control means coupled to the second line downstream of the second adjustable means to control the flow of anesthesia gas through the second line, said flow control means comprising valve means and plunger means coupled to said valve means;  
 differential pressure sensing means comprising a first expandable/contractible chamber responsive to oxygen pressure in the first line, a second expandable/contractible



chamber responsive to anesthesia gas pressure in the second line and being coupled to the second line downstream of the second adjustable means, and displaceable means coupled between said first expandable/contractible chamber and said second expandable/contractible chamber, said displaceable means being coupled to said plunger means to control said valve means;

said displaceable means being movable in response to a differential pressure exhibited between said first and second expandable/contractible chambers, whereupon whenever the ratio of the flow of oxygen to the flow of anesthesia gas is above a predetermined minimum threshold level said differential pressure causes said displaceable



means to move toward a first position to open said valve means permitting said gasses to flow into said manifold in the ratio established by said first and second adjustable means, whenever the ratio of the flow of oxygen to the flow of anesthesia gas falls toward said predetermined minimum threshold level said differential pressure causes said displaceable means to move to an intermediate position that causes said valve means to maintain said ratio of the flow of oxygen to the flow of anesthesia gas above said predetermined minimum threshold level, and whenever the flow of oxygen is cut off said differential pressure causes said displaceable means to move to a second position, closing said valve means.

#### 5,411,020 STRUCTURE OF THE DISTAL END PORTION OF AN ENDOSCOPE

Keiji Ito, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 797,978, Nov. 26, 1991, abandoned.

This application Aug. 30, 1993, Ser. No. 113,353

Claims priority, application Japan, Nov. 27, 1990, 2-126126 U

Int. Cl.<sup>6</sup> A61B 1/04

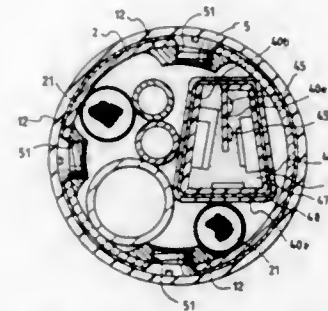
U.S. Cl. 128—4

5 Claims

1. An endoscope, comprising a bendable portion with a forward end, a distal end body having components therein, and a coupling tube having a first end coupled to said distal end body and a second end coupled to said bendable portion, said second end of said coupling tube being fitted inside said forward end of said bendable portion and fixed to said bendable portion at at least two fixing locations, an outer wall of said second end of said coupling tube being of a first thickness in regions proximate said fixing locations and having other regions which are disposed between each pair of said fixing locations, a sheathing tube covering said coupling tube;

wherein the inner diameter of said first end is at least as big as the outer diameter of said second end and said other regions have an aperture formed therein which extends

through said outer wall, said aperture extends over a substantial portion of an angular interval defined between



adjacent fixing locations and wherein each said angular interval is not more than 180 degrees.

#### 5,411,021 BREATHING MASK WITH SPEAKING DEVICE

Manfred Gdulla; Rüdiger Müller, and Thomas Neuber, all of Lübeck, Germany, assignors to Drägerwerk AG, Lübeck, Germany

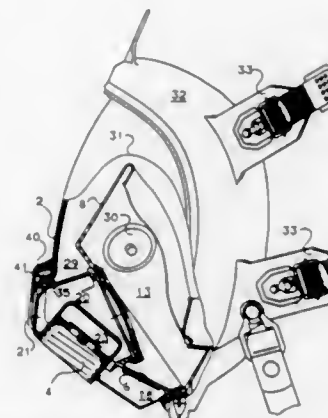
Filed Jun. 23, 1993, Ser. No. 81,564

Claims priority, application Germany, Jun. 25, 1992, 42 20 780.0

Int. Cl.<sup>6</sup> A62B 18/02, 23/02

U.S. Cl. 128—206.28

18 Claims



1. A breathing mask, comprising:  
a mask body defining a mask interior and a mask exterior, the mask body defining an opening with a shaped fixed support;  
a chamber housing fastened to said mask body, said chamber housing being provided with a plug-type connection piece, said shaped fixed support corresponding to said plug-type connection piece, said chamber housing having accommodated therein at least one breathing connection, an exhalation valve, a speaking diaphragm above the exhalation valve, a holder carrying the breathing connection with a fresh air duct, and a connection chamber defined by the speaking diaphragm and the exhalation valve, as well as by the mask exterior; and  
snap-in member means for detachably connecting said plug-type connection piece to said shaped fixed support.

#### 5,411,022 CONTINUOUS PH MONITORING SYSTEM AND METHOD OF USING SAME

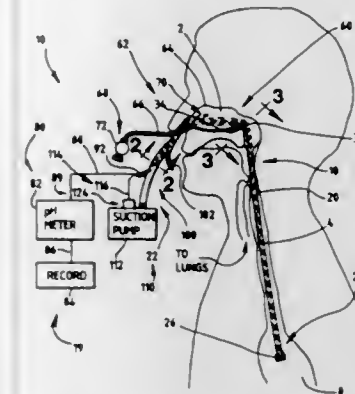
Michael McCue, 6015 Camino De La Acosta; Sam Z. Malhas, 6135 Waverly Ave., both of La Jolla, Calif. 92037; Don J. Cretzler, 3712 Del Mar Ave., San Diego, Calif. 92106, and Richard A. Roshon, 2760 Loe Jack Rd., Olivenhaim, Calif. 92024

Filed Jul. 1, 1993, Ser. No. 85,769

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—632

10 Claims



1. A monitoring system for use with a pH meter means for monitoring the pH levels in a stomach of a patient and suction means for facilitating withdrawing stomach fluids from the stomach of the patient, comprising:

a tube device defining at least one internal passageway, having a proximal end and a distal end;  
electrical detecting means disposed at the distal end of said tube device for sensing pH levels in a patient's stomach fluids;  
electrical pressure sensing means disposed at the distal end of said tube device for detecting pressure within a patient's stomach;  
pH meter conductor means disposed within said at least one passageway, for extending from said detecting means to said pH meter means, for carrying pH information to said pH meter means; and  
pressure sensing conductor means disposed within said at least one passageway for extending from said pressure sensing means to the suction means, for conveying a deactivating signal to the suction means for deactivating the suction means when the pressure within the stomach decreases below a predetermined pressure.

#### 5,411,023 OPTICAL SENSOR SYSTEM

G. Ronald Morris, Sr.; G. Ronald Morris, Jr., both of Bay Shore, N.Y., and Charles E. McMillen, Versailles, Ky., assignors to The Shielding Corporation, Wilmington, Del.

Filed Nov. 24, 1993, Ser. No. 158,621

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—633

7 Claims

1. An optical sensor system for use on a patient in an electrical field, said system including one of the following subsystems:

(A) a light input subsystem comprising:  
(i) a first control module;  
(ii) an electrically powered light source;  
(iii) an input electrical cable connecting said first control module to said light source;  
(iv) an input fiber optic cable having a first end connected to said light source for the transmission of analog optical signals and having a second end adapted to be disposed at a point adjacent the patient;  
said input fiber optic cable having a sufficient length such that, when said input fiber optic cable second

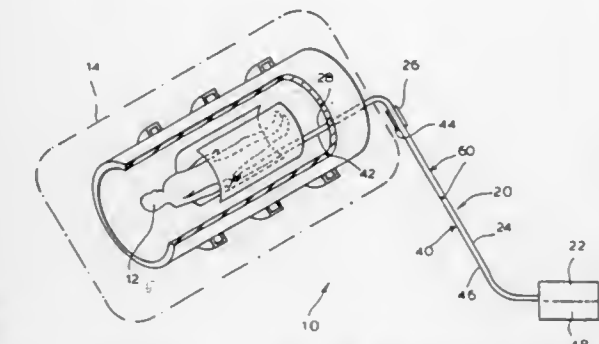
end is disposed at the point adjacent the patient, said light source is disposed closely adjacent, but outside of the electrical field;

said input electrical cable having a sufficient length such that, when said light source is disposed closely adjacent, but outside of the electrical field, said first control module is disposed remotely outside of the electrical field; and

said length of said input electrical cable being longer than said length of said input fiber optic cable;

(B) a light output subsystem comprising:

(i) a second control module;  
(ii) a light detector;  
(iii) an output electrical cable connecting said second control module to said light detector;



(iv) an output fiber optic cable having a first end adapted to be disposed at a point adjacent the patient and a second end connected to said light detector for the transmission of analog optical signals;

said output fiber optic cable having a sufficient length such that, when said output fiber optic cable first end is disposed at the point adjacent the patient, said light detector is disposed closely adjacent, but outside of the electrical field;

said output electrical cable having a sufficient length such that, when said light detector is disposed closely adjacent, but outside of the electrical field, said second control module is disposed remotely outside of the electrical field; and

said length of said output electrical cable being longer than said length of said output fiber optic cable;

(C) a combination of said light input and output subsystems.

#### 5,411,024 FETAL PULSE OXIMETRY SENSOR

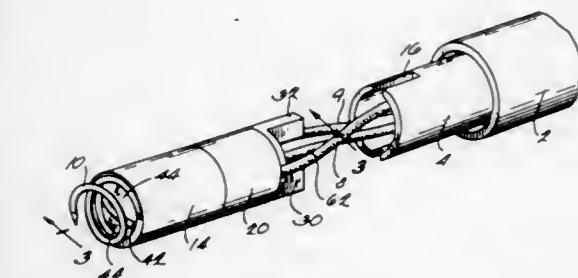
Simon W. H. Thomas, New Haven, and William R. Pruehsner, Meriden, both of Conn., assignors to Corometrics Medical Systems, Inc., Wallingford, Conn.

Filed Dec. 15, 1993, Ser. No. 167,334

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—634

23 Claims



1. A fetal pulse oximetry device, comprising:  
a holder having distal and proximal ends;

attaching means on said holder for attaching said device to a fetus;  
 a pulse oximetry sensor including light emitting means and light detecting means; and  
 means supporting at least one of said light emitting means and light detecting means for distal and proximal movement relative to said holder.

5,411,025

**CARDIOVASCULAR CATHETER WITH LATERALLY STABLE BASKET-SHAPED ELECTRODE ARRAY**  
 Wilton W. Webster, Jr., Altadena, Calif., assignor to Cordis Webster, Inc., Baldwin Park, Calif.  
 Filed Jun. 30, 1992, Ser. No. 906,546  
 Int. Cl.<sup>6</sup> A61B 5/0402

U.S. Cl. 128—642

21 Claims



1. A catheter for cardiac mapping comprising:
  - (a) an elongated outer catheter tube;
  - (b) an elongated inner catheter disposed within the outer catheter tube, said inner catheter comprising:
    - (i) a tubular catheter shaft having a proximal end and a distal end and a central lumen;
    - (ii) a plurality of flexible arms having distal and proximal ends said arms being connected at their proximal ends to the distal end of the catheter shaft, each arm carrying at least one electrode and wherein each arm comprises a reinforcing spine, an electrode lead wire electrically connected to each electrode carried on the arm and a tubular sheath surrounding the reinforcing spine and lead wires;
    - (iii) a proximal fitting rigidly fixing the proximal ends of the arms together, the proximal fitting being fixed to the distal end of the catheter shaft and comprising a central aperture through which the lead wires extend; and
    - (iv) a distal fitting fixing the distal ends of the arms together,
  - (c) wherein the inner catheter is movable longitudinally within the outer catheter tube between a retracted position wherein the arms are disposed within the outer catheter tube and an extended position wherein the arms extend out of the distal end of the outer catheter tube and wherein the arms, in the extended position, bow outwardly to form a predetermined basket shape.

5,411,026

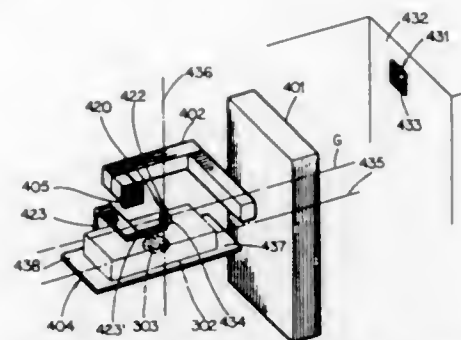
**METHOD AND APPARATUS FOR LESION POSITION VERIFICATION**  
 Mark P. Carol, Milford, N.Y., assignor to NOMOS Corporation, Sewickley, Pa.  
 Filed Oct. 8, 1993, Ser. No. 134,168  
 Int. Cl.<sup>6</sup> A61B 8/00

U.S. Cl. 128—660.03

20 Claims

1. A lesion position verification system for use in a radiation therapy plan, for use with a radiation therapy device, for treating a lesion within a body of a patient, comprising:
  - (a) a means for generating at least one ultrasound image of the lesion in the patient's body; and
  - (b) a means for indicating the position, with respect to the radiation therapy device, of the means for generating the

at least one ultrasound image when the ultrasound image is generated, whereby the position of the lesion in the



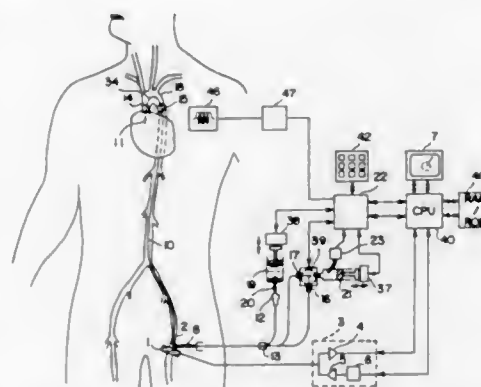
ultrasound image can be compared with a position of the lesion in the radiation therapy plan.

5,411,027

# **EQUIPMENT AND METHOD FOR TREATING CIRCULATORY ARREST**

Lars Wiklund, Sveavägen 2, S-752 36 Uppsala, and Bertil Hök, Flottiljgatan 55, S-721 31 Västerås, both of Sweden  
 PCT No. PCT/SE93/00608, § 371 Date Mar. 8, 1994, § 102(e)  
 Date Mar. 8, 1994, PCT Pub. No. WO94/01163, PCT Pub. Date Jan. 20, 1994  
 PCT Filed May 27, 1994, Ser. No. 199,306  
 Claims priority, application Sweden, Jul. 3, 1992, 9202062  
 Int. Cl.<sup>6</sup> A61B 8/00; A61M 29/02  
 U.S. Cl. 128—660.03

10 Claims



1. An apparatus for treating circulatory arrest or other acute conditions affecting the heart and brain of a patient which comprises:
  - a tubular cannula having a sharp tip which can be inserted into an artery of said patient, said cannula having a diameter smaller than a diameter of the artery into which it is inserted,
  - a probe means for emitting ultrasound waves toward the skin of said patient and for receiving echoes of said ultrasound waves so as to locate the artery into which said tubular cannula is inserted,
  - an electronic unit connected to said probe and containing drive and detection circuits and sweeping and modulation circuits for conversion of said echoes onto a display screen,
  - catheter means including a tube having a proximal end and a distal end for passage through said tubular cannula into said artery and along said artery until said distal end thereof reaches a descending aorta of said patient, said catheter means including a first annular elastic balloon located between 20 and 250 mm from said distal end of said tube and inflatable to form a tight seal against an inner wall of said descending aorta, and defibrillation electrode

means attached to said tube less than 200 mm from said distal end of said tube for internal defibrillation of a patient's heart, and  
 electronic drive means for sending voltage pulses of adjustable energy to said defibrillation electrode means.

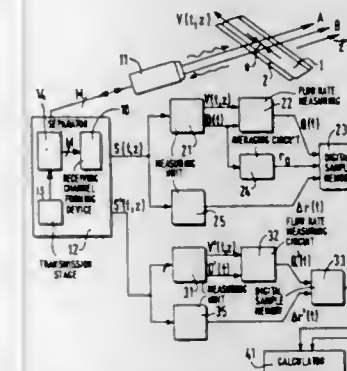
5,411,028

# **DEVICE AND METHOD FOR MEASURING THE ELASTICITY OF AN ARTERY BY ULTRASONIC ECHOGRAPHY**

Odile Bonnefous, Nogent-sur-Marne, France, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed Dec. 21, 1993, Ser. No. 173,330  
 Claims priority, application France, Dec. 22, 1992, 92 15506  
 Int. Cl.<sup>6</sup> A61B 8/00

U.S. Cl. 128—661.08

9 Claims



1. A device for measuring physiological parameters of an artery containing flowing blood having an instantaneous pressure  $P(t)$ , said device comprising, in an ultrasonic echograph used in profilometer mode (M mode) and provided with transmission/receiving means including a device for forming channels in a receiving mode, a first assembly for measuring and forming at outputs of the first assembly a first set of signals representing an instantaneous blood flow rate  $Q(t)$  within the artery, an instantaneous radius variation  $\Delta r(t)$  of the artery, and a mean radius  $r_0$  of the artery along a first excitation line A, characterized in that it also comprises, for the determination of elasticity  $\gamma(t)$  of said artery and the pressure  $P(t)$  of the flowing blood within the artery, a second assembly for measuring, by ultrasonic echography, and forming at its outputs a second set of signals representing an instantaneous blood flow rate  $Q'(t)$  and an instantaneous radius variation  $\Delta r'(t)$  along a second excitation line B neighbouring the first excitation line A, the second excitation line B being situated at a distance  $e$  from the first excitation line A, which distance is small in comparison with the systolic propagation wavelength  $\lambda$  along the artery, the two excitation lines A and B traversing the artery according to one of its meridian planes, the distance  $e$  being taken in the direction of the axis of the artery, first and second storage means connected to the respective outputs of said first and second assemblies for storing digital samples of said respective first and second sets of signals and calculation means coupled to said first and second storage means for operating on said stored digital samples to calculate physiological parameters of said artery.

5,411,029

**BIOLOGICAL SIGNAL MEASURING DEVICE**  
 Masaaki Hirai, Tokyo, Japan, assignor to Nihon Kohden Corporation, Tokyo, Japan

Filed Mar. 15, 1994, Ser. No. 212,923

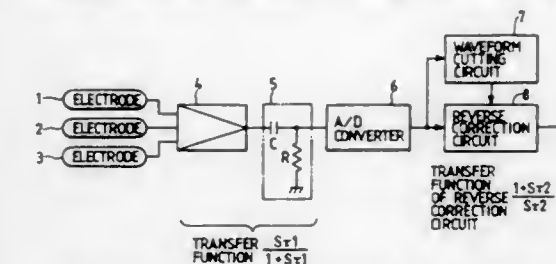
Claims priority, application Japan, Mar. 15, 1993, 5-053784  
 Int. Cl.<sup>6</sup> A61B 5/04

U.S. Cl. 128—696

3 Claims

1. A biological signal measuring device comprises:
  - a waveform leading circuit, having a predetermined transfer

function, for filtering a biological signal waveform detected from an object under examination; and  
 a reverse correction circuit for correcting the biological signal waveform outputted by the waveform leading



circuit with a transfer function opposite in characteristic to the transfer function of the waveform leading circuit, to reproduce the original waveform of the biological signal waveform.

5,411,030

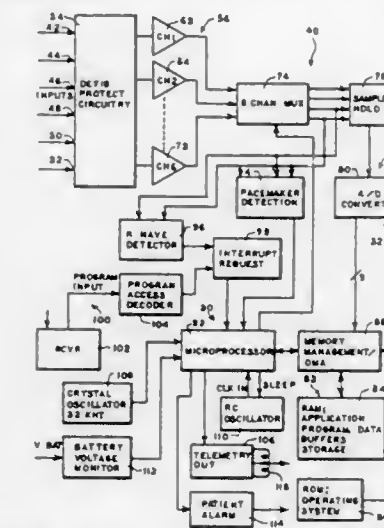
Patent Not Issued For This Number

5,411,031

**IMPLANTABLE CARDIAC PATIENT MONITOR**  
 Barry M. Yomtov, Issaquah, Wash., assignor to InControl, Inc., Redmond, Wash.  
 Filed Nov. 24, 1993, Ser. No. 157,605  
 Int. Cl.<sup>6</sup> A61B 5/04

U.S. Cl. 128—706

26 Claims



1. A cardiac monitor for monitoring heart rate variability of a human heart, said monitor being fully implantable beneath the skin of a patient and comprising:
  - electrode means for establishing electrical contact with the heart;
  - timing means for timing a heart monitoring period;
  - sensing means coupled to said electrode means for generating an electrocardiogram of each heartbeat of the heart occurring during said heart monitoring period;
  - time interval determining means responsive to said electrocardiograms for determining time intervals between adjacent heartbeats;
  - heart rate data generating means responsive to said time intervals for generating heart rate digital data;
  - memory means for storing said heart rate digital data;
  - factor generating means responsive to said timing means and said stored heart rate digital data for generating a digital heart rate variability factor at the end of said heart monitoring period;
  - said memory means for storing said digital heart rate variability factor; and
  - telemetry means for transmitting said digital heart rate variability factor.



ability factor stored in said memory means to a nonimplanted external receiver.

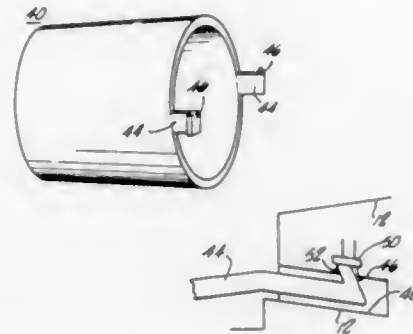
5,411,032

**ELECTRONIC THERMOMETER PROBE COVER**  
George J. Esseff, Camarillo, and Earl Stelker, Los Angeles, both of Calif., assignors to Infra-Temp Inc., Camarillo, Calif.

Filed Jun. 18, 1993, Ser. No. 79,185  
Int. Cl.<sup>6</sup> A61B 1/22

U.S. Cl. 128—736

8 Claims



1. An electronic thermometer and probe cover combination for measuring a patient's temperature by infrared measurement through an ear canal comprising:

a probe cover having extensions adapted to mate with a switch located in a recess in the thermometer, the recess in the thermometer being adapted to receive the portions of the probe cover bearing the extensions, and a switch within the recess to coact with said extensions to indicate the presence or absence of the probe cover.

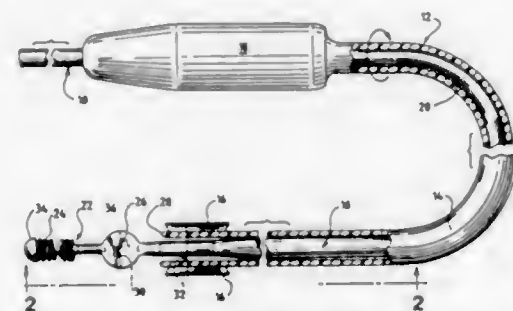
5,411,033

**ATHERECTOMY GUIDEWIRE**  
Fernando M. Viera, Hialeah, Fla., assignor to Cordis Corporation, Miami Lakes, Fla.

Filed Dec. 14, 1993, Ser. No. 166,693  
Int. Cl.<sup>6</sup> A61B 6/00

U.S. Cl. 128—772

13 Claims



1. A guidewire for guiding a catheter having an internal diameter, said guidewire being adapted for insertion into the vascular system of a patient, said guidewire comprising:

a main wire body having a distal tip portion including a coil;  
an intermediate portion positioned proximally of said distal tip portion;  
said intermediate portion defining a transversely enlarged guidewire portion proximally of the coil of a size that is greater than said internal diameter, to prevent substantial distal advancement, beyond said intermediate portion, of the catheter.

5,411,034

**AIR SENSITIVE RUPTURE INDICATING CONDOM**  
R. Bruce Beck, and M. Angela Beck, both of 124 Huntzinger Rd., P.O. Box 151, Wernersville, Pa. 19565

Filed Aug. 12, 1994, Ser. No. 289,392  
Int. Cl.<sup>6</sup> A61F 6/04

U.S. Cl. 128—844

7 Claims



1. A condom comprising three layers, first and third layers which are of elastomeric material with a second layer sandwiched between the first and third layers including a colorless, air sensitive material, wherein when said colorless, air sensitive material is exposed to air because of a rupture in said first or third layers of said condom, said colorless, air sensitive material changes color to alert the user that the integrity of the condom is compromised.

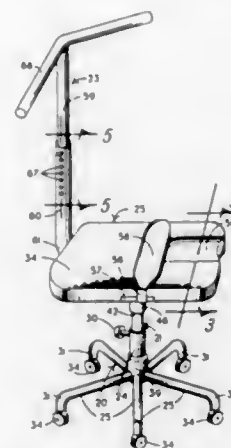
5,411,035

**ORTHOPEDIC WHEELED LEG SUPPORT**  
Heather E. Stone, 567 Scenic Dr., Cheney, Wash. 99004  
Continuation-in-part of Ser. No. 6,931, Jan. 21, 1993, abandoned. This application Dec. 2, 1993, Ser. No. 162,427

Int. Cl.<sup>6</sup> A61H 3/04

U.S. Cl. 128—845

4 Claims



1. A wheeled orthopedic support for a lower disabled leg bent at the knee, to allow user locomotion comprising in combination:

a wheeled base having a central hub defining a vertically oriented medial channel and supported by plural radially extending wheel legs having depending caster wheels with vertical mounting shafts in their outer portions with at least one caster wheel being irrotatable about its vertical mounting shaft to aid steering and said hub having means for fastening a support shaft in vertically adjustable relationship;

a support shaft carried in the medial channel of the hub in a vertically upstanding orientation, said support shaft carrying in its upper portion a fastening plate with means to interconnect a horizontal support on the fastening plate; an elongate, horizontal support carried on the fastening plate of the support shaft, said horizontal support having a

lower rigid base defining a medial indentation extending parallel its longer dimension to receive the knee portion of a bent leg of a user in a conformable fit, and supporting a resiliently deformable padding element thereabove with peripheral covering extending about the rigid base and padding element;

a fastening strap with an enlarged medial knee pad to limit the forward extension of a supported knee portion of a lower leg of a user, said fastening strap being releasably and adjustably attachable to the medial portion of each opposed longer side of the horizontal support to extend thereof; and

handlebar assembly having a compound support extending vertically upwardly from structural support at the medial portion of a shorter forward side of the horizontal support, said support having means for adjustment of vertical extension and carrying in its upper portion an elongate handlebar.

5,411,037

**ELASTIC KNEE-JOINT BANDAGE**

Heinrich Hess, Saarlouis; Wolfgang Krause, Kassel, and Hans B. Bauerfeind, Kempen, all of Germany, assignors to Bauerfeind GmbH & Co., Kempen, Germany

PCT No. PCT/DE89/00713, § 371 Date Jul. 20, 1990, § 102(e) Date Jul. 20, 1990, PCT Pub. No. WO90/05510, PCT Pub. Date May 31, 1990

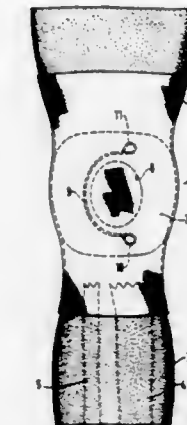
Continuation of Ser. No. 536,618, Jul. 20, 1990, abandoned. This PCT application Nov. 14, 1989, Ser. No. 81,852

Claims priority, application Germany, Nov. 14, 1988, 38 38 576.7

Int. Cl.<sup>6</sup> A61F 5/37, 5/00

U.S. Cl. 128—882

6 Claims



1. Elastic knee-joint bandage (6) in tubular form with an elastic profile insert (7) encircling the knee cap (12) in an opening (8), characterized by the fact that a flexible, non-stretchable tension member (9) is wholly and fixedly embedded as an integral part of the profile insert (7) in permanent connection to it, said tension member (9) connecting the areas of the profile insert (7) adjacent to the poles (13, 14) of the knee cap (12) in a curve around the knee cap (12) on the side of the fibula (5) in such a way that when the distance between these areas is increased by flexing the knee joint (3) the distance of the curve from the line joining the poles (13, 14) of the knee cap is reduced and the edge of the opening (8) of the profile insert (7) on the adjacent of the knee cap (12) presses the knee cap (12) medially with a shifting and centering effect.

5,411,038

**METHOD OF USING A CERVICAL ORTHOSIS**

Joseph C. Mollendorf, Amherst; Robert M. Catipovic, Grand Island, and Lillian A. Pascale, Niagara Falls, all of N.Y., assignors to The Research Foundation of Suny, Albany, N.Y. Continuation-in-part of Ser. No. 990,160, Dec. 14, 1992, Pat. No. 5,320,596. This application Apr. 15, 1994, Ser. No. 227,952

Int. Cl.<sup>6</sup> A61F 5/00

U.S. Cl. 128—898

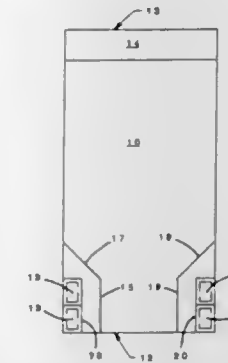
12 Claims

1. A method of controlling the position of the body of a patient in the area of the patient's head, neck, and spine, comprising the steps of:

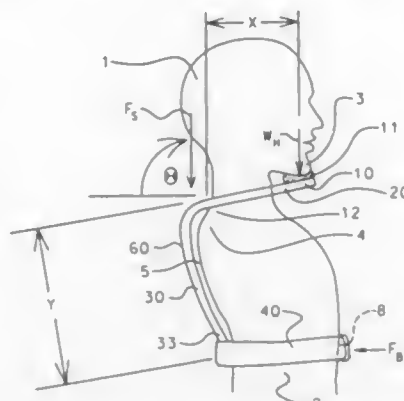
- providing a cervical orthosis which comprises:
  - a chin support having a chin supporting surface;
  - at least one rigid transverse member extending rearward from said chin support, and being adapted to reach to and make contact with the wearer's shoulder;
  - at least one rigid vertical member extending downward from the rearward end of said transverse member; and
  - a belt, capable of being securely fastened about the torso of the wearer, disposed at the lower end of said vertical member; and,
- placing said orthosis upon the body of said patient such

1. A cover for a surgical instrument Mayo Stand of the type which includes a horizontally disposed tray cantilevered off a vertical support which comprises:

an elongated flexible flattened plastic bag comprised of a front panel and a back panel, and having an open end and a closed end, the internal size of said bag being large enough to allow said bag to be slipped over said instrument tray and said vertical support without binding; and means adjacent the closed end of said bag for laterally reducing the internal size of said bag for a distance from the closed end of said bag whereby said bag will be automatically centered with respect to the width of said bag, said distance being less than the length of said tray, said means including means for holding said front panel to said back panel at one or more points inboard of the edges of said panels.



that said patient's chin rests upon said chin support and said belt is fastened about said patient's torso, said orthosis



thereby acting as a lever pivoted at said patient's shoulders.

5,411,039

# APPARATUS FOR AUTOMATICALLY TAKING IN SMOKE OF ROLLED TOBACCOS AND ANALYZING THE SAME

Yuzuru Sakuma; Keisuke Minami, and Hiroyoshi Suda, all of Hiratsuka, Japan, assignors to Japan Tobacco Inc., Tokyo, Japan

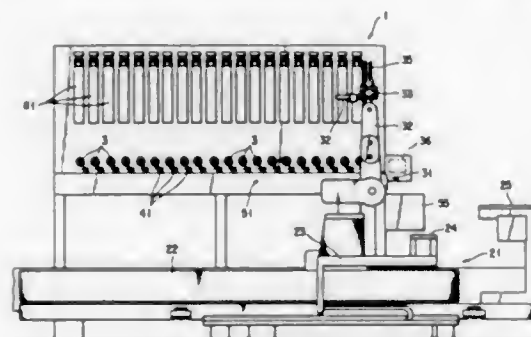
Filed Jul. 30, 1993, Ser. No. 99,577

Claims priority, application Japan, Jul. 31, 1992, 4-205671; Jul. 31, 1992, 4-205672; Jul. 31, 1992, 4-205673; Jul. 31, 1992, 4-205674; Jul. 31, 1992, 4-205675

Int. Cl.<sup>6</sup> A24C 5/32

U.S. Cl. 131—330

10 Claims



1. An apparatus for automatically taking in smoke of rolled tobaccos and automatically analyzing the smoke, comprising: a main body having a plurality of smoke inlets having rolled tobaccos mounted therein, for taking in smoke generated by said rolled tobaccos and analyzing chemical contents of said smoke; mounting and demounting means, each provided at a respective one of said smoke inlets, for mounting one of said rolled tobaccos in said one of said smoke inlets and demounting said one of said rolled tobaccos from said one of said smoke inlets; end position detecting means for detecting tip positions of said rolled tobaccos mounted in said smoke inlets; extinguishing position detecting means for detecting extinguishing positions of said rolled tobaccos which are burning in said smoke inlets; lighting means for lighting tips of said rolled tobaccos mounted in said smoke inlets; cutting-off means for cutting off burnt portions from said rolled tobaccos at said extinguishing positions and extinguishing said rolled tobaccos; and wherein said lighting means moves to said tips of said rolled

tobaccos which have been detected by said end position detecting means so as to light said tips of said rolled tobaccos, said extinguishing position detecting means detect said extinguishing positions, and said cutting-off means cuts off said burnt portions.

5,411,040

# ONE-PIECE CLOTH HAIR CURLER AND METHOD OF USING

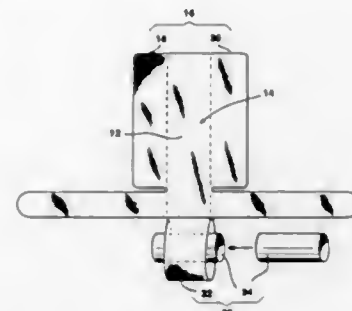
Melody L. Forrest, 8392 Eldorado Dr., Powell, Ohio 43065

Filed Jun. 25, 1993, Ser. No. 83,090

Int. Cl.<sup>6</sup> A45D 7/00, 2/14

U.S. Cl. 132—211

9 Claims



1. A fabric hair curler comprising: a fabric body defining a receiving area for hair between opposite side edges; means for restraining laterally a portion of hair placed in the receiving area; first and second unreinforced fabric tie strips positioned below said means for restraining laterally, extending laterally from the opposite side edges of said body, and having sufficient length to be in tied relationship when hair restrained in the receiving area is rolled longitudinally with said body into a curl; wherein said body, means for restraining laterally, and tie strips are made as a one-piece curler including one or more portions of fabric sewn together; means for producing curls of different sizes, comprising a dowel loop extending downward from said body to receive a separable dowel, wherein the means for producing curls of different sizes further includes at least one separable dowel slidably insertable in said dowel loop forming a shape around which hair restrained in the receiving area is rolled longitudinally to form a curl having a diameter generally related to the dowel diameter, said dowel slidably removable after forming said curl.

5,411,041

# APPARATUS FOR REMOVING DEBRIS FROM BETWEEN AND AROUND TEETH

Charles H. Ritter, P.O. Box 12126, Tallahassee, Fla. 32317

Filed Nov. 24, 1993, Ser. No. 156,765

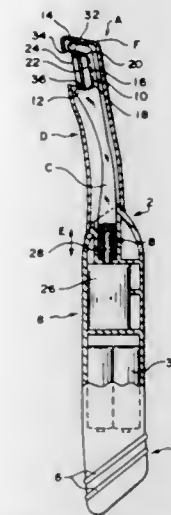
Int. Cl.<sup>6</sup> A61C 15/00

U.S. Cl. 132—322

19 Claims

1. An apparatus for removing debris from between and around teeth, comprising: a) a main body member; b) a flossing implement connected to said main body member, said flossing implement having an exterior surface and an opening formed therein; c) said flossing implement including a pair of tines, said opening being disposed between said pair of tines; d) a removable floss support member being positioned in said flossing implement, said opening in said exterior surface being of sufficient size to permit said removable floss

support member to be inserted in and removed from said flossing implement; and,



e) said removable floss support member including a piece of floss material.

5,411,042

# DISH WASHING MACHINE

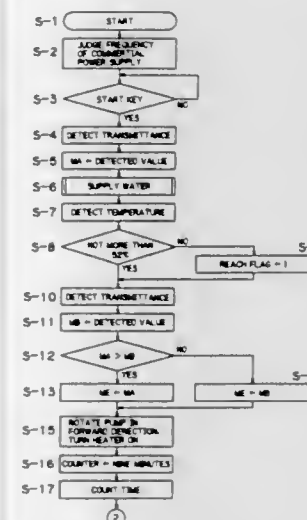
Hajime Suzuki; Kousaku Kataoka, both of Otsu, and Katsuji Oonishi, Kyoto, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Aug. 20, 1993, Ser. No. 109,505

Int. Cl.<sup>6</sup> A47L 15/46

U.S. Cl. 134—57 D

20 Claims



1. A dish washing machine comprising: a cavity for containing dishes; water supplying means for supplying wash water to said cavity; heating means for heating the wash water supplied to said cavity; a nozzle for spraying the wash water on said dishes; water feeding means for feeding into said nozzle the wash water supplied to said cavity to spray the wash water from the nozzle; transmittance detecting means for detecting light transmittance of the wash water supplied to said cavity; and control means for controlling, on the basis of the light transmittance of the wash water detected by said transmittance detecting means, said control being based on

a first transmittance detected before said water feeding means is operated to start the washing operation, a second transmittance detected when a predetermined time period has elapsed after the start of the washing operation, and a third transmittance detected at a predetermined time after an elapse of said predetermined time period during the washing operation, wherein a sequence of washing and rinsing is determined after detecting the third transmittance.

5,411,043

# ARTICULATED ANNULAR SLUDGE LANCE

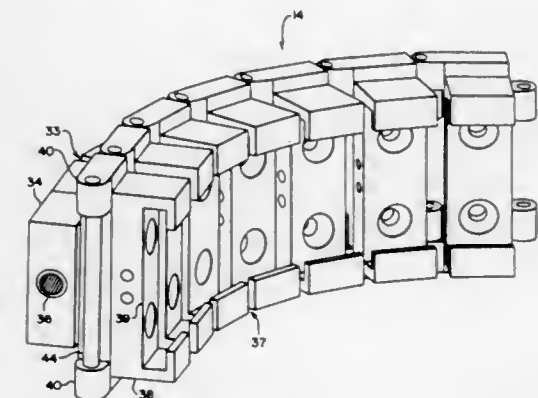
Frank Kamler, Kitchener, Canada, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Sep. 24, 1993, Ser. No. 126,453

Int. Cl.<sup>6</sup> B08B 9/00

U.S. Cl. 134—167 R

11 Claims



1. A lance for removing sludge located between tubes within a steam generator, comprising: a plurality of track members pivotally connected to each other to form a flexible and extendable manipulator belt, each of said track members having a substantially rectangular cross section and having one side being C-shaped, together said C-shaped side of said plurality of track members forming a channel, said plurality of track members being constructed to extend into and around an annular chamber of a steam generator; a fluid distribution member engaged by said channel and constructed to advance in and through said channel out from the annular chamber between tubes in the steam generator for injecting a fluid to remove sludge; means for manipulating said plurality of track members to extend into and around the annular chamber of the steam generator; a manipulator head movably attached to a last track member for receiving and directing said fluid distribution member at a selected angle out from said channel formed by said plurality of track members in the annular chamber and into the steam generator between tubes of a tube bundle; and means for positioning said manipulator head in the annular chamber.

5,411,044

# PATIENT TRANSFER WALKER

Alexander S. Andolfi, 17 Sharon Ave., East Setauket, N.Y. 11733

Filed Apr. 12, 1994, Ser. No. 226,506

Int. Cl.<sup>6</sup> A45B 3/00

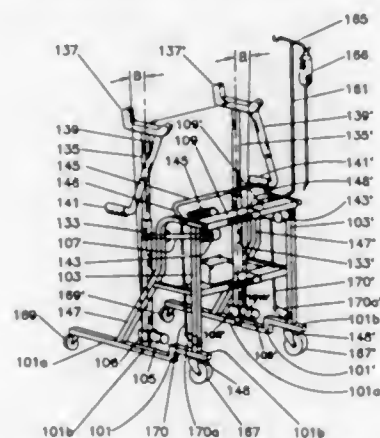
U.S. Cl. 135—66

16 Claims

1. A transfer walker for a handicapped person, comprising in combination a pair of base rails juxtaposed, and generally running in parallel with one another along a normally horizontal



- direction, each of said base rails having a front and a rear end,
- a pair of first posts normally extending upwardly, and in parallel with one another in a direction generally at right angles with a respective base rail direction, each of said pair of first posts being attached to a respective of said rails near respective front ends thereof,
  - a pair of second posts normally extending upwardly, and in parallel with one another in a direction generally at right angles with a respective base rail direction, each of said pair of second posts being pivotally attached to a respective of said rails near respective rear ends thereof, so as to be tiltable,
  - two pairs of length-adjustable and rotatably energizable gear reduction means, and rotatable and tiltable coupling means combined therewith, respectively, each of said length-adjustable and rotatably energizable gear reduction means and rotatable and tiltable coupling means combined therewith having respective output shafts,
  - said output shafts of a first pair of said length-adjustable and rotatably energizable gear reduction means and rotatable and tiltable coupling means combined therewith running generally in parallel with one another, and being upright in an inoperative rest position thereof, and
  - a pair of crutch supports having undersides, and being in operative contact with said output shafts of said first pair of said length-adjustable and rotatably energizable gear



- reduction and rotatable and tiltable coupling means combined therewith, respectively, on said undersides, being spaced at an adjustable distance from one another, and adapted to fit under the armpits of the handicapped person,
- a pair of length-adjustable levers extending outwardly and generally downwardly from locations near respective ends of said pair of crutch supports, said pair of levers being bent rearwardly near lower ends thereof, and a pair of easily grippable handles being attached thereto, and extending rearwardly from said lower ends of said levers, respectively,
  - a second pair of said length-adjustable and rotatably energizable gear reduction means and rotatable and tiltable couplings means combined therewith being pivotally coupled near first ends thereof to top ends of said pair of first posts, respectively, and
  - being pivotally and slidably coupled with the other ends thereof to said pair of hollow second posts, respectively, so as to be operative upon length adjustment thereof to effect a change of respective of said pairs of hollow second posts in a rearward direction, and back therefrom, up to a range of inclination of about 30° from the vertical, and operator-handlable switch means connected to respective of said first and second pairs of said length-adjustable and rotatably energizable gear reduction means and rotatable and tiltable coupling means combined therewith for separate adjustment of the height and inclination of said second pair of posts respectively, by selective choice of

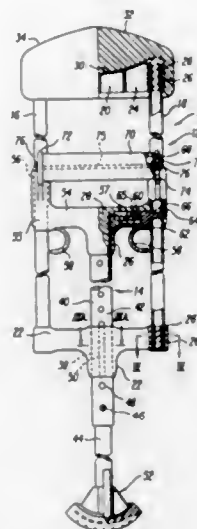
sense-of-rotation and time-duration of each of said pairs of length-adjustable and rotatably energizable gear reduction means and rotatable and tilting means combined therewith, whereby the handicapped person can move between sitting and upright positions.

#### 5,411,045 CRUTCH

Richard C. Davis, Palm Harbor, Fla., assignor to Trek Medical Corporation, Tampa, Fla.  
Filed Nov. 16, 1993, Ser. No. 152,500  
Int. Cl. 6 A45B 09/04

U.S. Cl. 135—83

4 Claims



1. An improved radial crutch tip assembly comprising:
  - a crutch tip base having outwardly and downwardly tapered front and rear surfaces, side surfaces and a convex base bottom surface forming an approximate arc which curves in a direction of elongation, said base further including a lip protruding laterally outwardly adjacent said base bottom surface;
  - a resilient boot defining the shape of a rocker, said resilient boot defining a mounting cavity for receiving said base bottom surface and said lip for holding said boot on said base, said boot further having a sole forming a bottom wall thereof, said sole having a sole top surface in said cavity directed toward said base bottom surface;
  - wherein is further included at least one fluid-evacuation, drain passage in said boot for draining fluids from said boot.

#### 5,411,046 TENT

Tak M. Wan, Kowloon, Hong Kong, assignor to Arrow Link Industries Limited, Kowloon, Hong Kong  
Filed Feb. 2, 1993, Ser. No. 17,070  
Claims priority, application United Kingdom, Feb. 3, 1992, 9202243

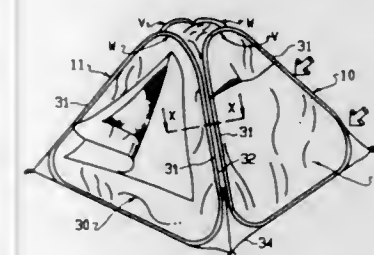
Int. Cl. 6 E04H 15/40

U.S. Cl. 135—126

14 Claims

1. A foldable tent, having a top, which can be transformed from a fully collapsed configuration to a self supporting expanded configuration and vice versa, the tent comprising three or more joined together wall members, each wall member having a flexible frame formed of a single loop of coilable material when expanded and overlapping loops when collapsed and a wall panel of foldable material having a peripheral channel for constraining the frame into a generally triangular or rectangular shape with two sides and a base for each wall member with the sides extending from the top of the tent to

said base when the wall panel is expanded, in which the sides of each wall member are securely and hingably joined to the adjacent sides of adjacent wall members from said top to said



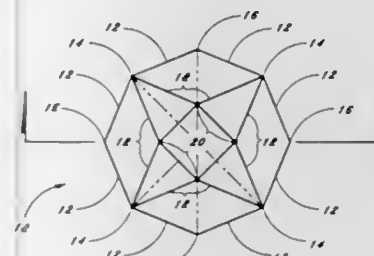
base so that the adjacent sides are held at least generally parallel to one another when the tent is in its expanded configuration.

#### 5,411,047 MODULAR STRUCTURAL ELEMENTS

Robert M. Reilly, 810 Barry St., Miami, Fla. 33140  
Filed May 22, 1992, Ser. No. 888,355  
Int. Cl. 6 E04H 15/44

U.S. Cl. 135—127

1 Claim



1. A geodesic tent, comprising:
  - a first group of four apical coupling points disposed in coplanar relationship, and adapted to rest on a support surface;
  - a second group of four apical coupling points disposed in coplanar relationship an elevated distance above said first group of apical coupling points;
  - a third group of four apical coupling points disposed coplanar with said second group of apical coupling points, said third group of four apical coupling points defining a square area bounded by a group of four elongated support members of equal length;
  - a first group of eight elongated support members of equal length, each of which extending from each of said first group of apical coupling points to each of said second group of apical coupling points;
  - a second group of eight elongated support members of equal length, two of each extending upwardly from each of said first group of apical coupling points to adjacent apical coupling points in said third group; and
  - a covering fabric suspended between said apical coupling points and drawn into a plurality of curved sections.

#### 5,411,048

#### FLUID CONTROL VALVE WITH LATCHING HANDLE ASSEMBLY

Roger G. Massey, Portsmouth, N.H., assignor to Parker & Harper Companies, Inc., Raymond, N.H.  
Filed Sep. 19, 1994, Ser. No. 308,847

Int. Cl. 6 F16K 35/02, 35/06

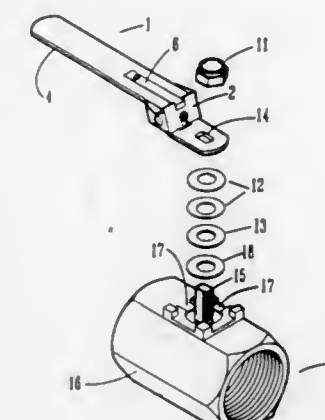
U.S. Cl. 137—15

8 Claims

7. A method of assembling a fluid control valve with a latching handle assembly comprising a quarter-turn valve having a valve body and valve stem and a handle defining an opening shaped to engage a corresponding shape of the valve

stem to preclude relative rotation therebetween, said method comprising the steps

- (a) providing a first and second detent on the valve body;
- (b) selecting one of i) a right chamfered tang latching slider for camming engagement along said first detent to permit free clockwise rotation of said handle and for latching engagement within said second detent at the end of said clockwise rotation, said slider being manually slidably releasable from said second detent to permit counterclockwise rotation of said handle only to initially rotate said handle, thereafter during further rotation of said handle the manual sliding releasable movement is returned toward its original position until engagement with said first detent, ii) a left chamfered tang latching slider for camming engagement along said second detent to permit free counterclockwise rotation of said handle and for latching engagement within said first detent at the end of said counterclockwise rotation, said slider being manually



- slidably releasable from said first detent to permit clockwise rotation of said handle only to initially rotate said handle, thereafter during further rotation of said handle the manual sliding releasable movement is returned toward its original position until engagement with said second detent, and iii) a straight tang latching slider for latching engagement within said first and second detents at the end of each both clockwise and counterclockwise rotation, said slider being manually slidably releasable from said detents to permit both clockwise and counterclockwise rotation of said handle only to initially rotate said handle, thereafter during further rotation of said handle the manual sliding releasable movement is returned toward its original position until engagement with said first detent;
- (c) slidably mounting said selected latching slider on said handle thereby forming an assembly; and,
  - (d) securing said assembly on the valve stem of the valve.

#### 5,411,049 VALVE

R. Lee Colvard, Spring, Tex., assignor to Weatherford U.S., Inc., Houston, Tex.

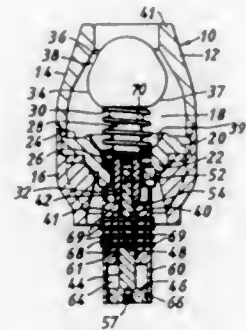
Filed Mar. 18, 1994, Ser. No. 215,095  
Int. Cl. 6 F16K 15/04

U.S. Cl. 137—71

10 Claims

1. A valve for controlling flow of a fluid in a conduit in which the valve is emplaced, the valve comprising a body with a first end and a second end and a hollow central fluid flow channel therethrough, and an inner body sealing surface at the first end thereof,
- a plunger with a stem movably disposed in the body for movement with respect thereto, the stem having a first end and a second end,
- a sealing head on a first end of the stem of the plunger for restricting fluid flow through a top of the body's hollow

central fluid flow channel and for sealingly contacting the inner body sealing surface to prevent fluid flow through the valve,  
 a piston with a first piston end and a second piston end, the first piston end secured to the stem,  
 a piston housing in which the piston is movably mounted, a portion of the second piston end movably mounted in the piston housing,  
 the piston housing having a first housing end and a second housing end, the first piston end projecting from the first housing end,  
 at least one holding member releasably preventing piston movement until it is broken or degraded,



the second housing end having a sealed fluid chamber therein,  
 the second piston end having a piston plate across and sealingly closing off the fluid chamber,  
 the fluid chamber having a fluid therein compressible by forced movement of the piston plate, and  
 the piston plate having an exterior exposed to a hydrostatic head of fluid exterior to the valve such that the hydrostatic head of fluid, upon reaching sufficient force, moves the piston plate to compress the fluid, thereby moving the sealing head to restrict flow through the valve.

5,411,050

## CAPACITY FUSE VALVE

Eric J. Saville, Alta Loma, Calif., assignor to Pneu-Draulics, Inc., Rancho Cucamonga, Calif.

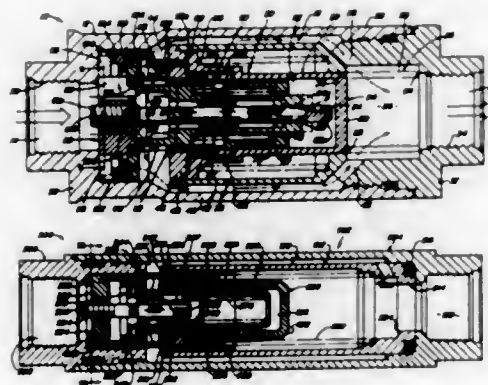
Division of Ser. No. 714,931, Jun. 13, 1991, Pat. No. 5,225,700, which is a continuation-in-part of Ser. No. 470,867, Jan. 26, 1990, abandoned, which is a continuation-in-part of Ser. No. 229,848, Aug. 8, 1988, abandoned. This application Oct. 25, 1993, Ser. No. 142,795

The portion of the term of this patent subsequent to Oct. 26, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> F16K 17/30

U.S. Cl. 137—101

24 Claims



1. A capacity fuse valve comprising:  
 a valve body having a fluid inlet and a fluid outlet,

a fixed valve sleeve fixed in said body,  
 a movable valve sleeve axially movable in said fixed valve sleeve from a normal position to a limiting position relative to said fixed valve sleeve by the pressure of fluid entering said inlet,  
 means urging said movable valve sleeve toward said normal position, whereby the movable valve sleeve assumes a position wherein the opposing forces on the movable valve sleeve are balanced,  
 a valve rod,  
 means securing said valve rod to said valve body with the valve rod extending axially through said valve sleeves through an axial opening in said movable valve sleeve, and said movable valve sleeve having a boundary edge surrounding said rod,  
 means communicating said inlet to said outlet for main fluid flow from said inlet to said outlet including coacting means on said valve sleeves forming main flow port means through which main fluid flow occurs from said inlet to said outlet and which port means are substantially closed in said normal position of the movable valve sleeve and are progressively enlarged by movement of the movable valve sleeve toward its limiting position,  
 a shutoff valve member within a chamber in said valve body movable by fluid pressure in the chamber portion at one side of the valve member from an open position wherein said valve member permits main fluid flow through the valve to a closed position wherein the valve member blocks main fluid flow through the valve, and  
 means communicating said inlet to said chamber portion for control fluid flow from said inlet to said chamber portion including coacting means on said valve rod and said movable valve sleeve forming control flow orifice means through which control flow occurs from said inlet to said chamber portion and which orifice means are substantially closed in said normal position of said movable valve sleeve and progressively enlarged by movement of the movable valve sleeve toward its limiting position to maintain a substantially fixed ratio between the main flow port means and control flow orifice areas.

5,411,051

## BISTABLE VALVE

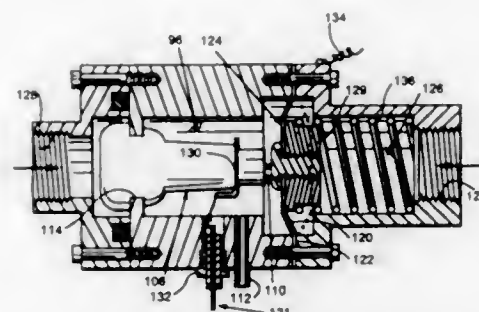
Ross D. Olney, West Hills, and John W. Reeds, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 793,762, Nov. 18, 1991, Pat. No. 5,293,919. This application Nov. 9, 1993, Ser. No. 149,261

Int. Cl.<sup>6</sup> F16K 15/20, 31/365

U.S. Cl. 137—225

5 Claims



1. A bistable valve that is actuated in response to a variable pressure falling below a first pressure set point and is deactivated in response to said variable pressure rising above a second pressure set point that is greater than said first set point, comprising:

an air flow passageway,  
 a reference pressure source, and  
 a bistable diaphragm for receiving said reference and variable pressures on opposite sides of the diaphragm, said

diaphragm having first and second stable positions first opening and then closing said air flow passageway in response to said variable pressure first falling below said first pressure set point, and then increasing above said second pressure set point,  
 said bistable diaphragm comprising a prestressed diaphragm oriented about a central plane and having stable positions on opposite sides of said central plane,  
 said reference source comprising a high pressure reservoir and a pressure regulator for providing said reference pressure from said high pressure reservoir at a predetermined regulated pressure.

5,411,052

## LIQUID SUPPLY APPARATUS

Charles G. Murray, Auckland, New Zealand, assignor to Fisher & Paykel Limited, Auckland, New Zealand

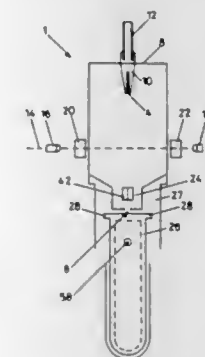
Filed Apr. 15, 1993, Ser. No. 47,792

Claims priority, application New Zealand, Apr. 15, 1992, 242372

Int. Cl.<sup>6</sup> A61M 5/172; F16K 31/02

U.S. Cl. 137—392

24 Claims



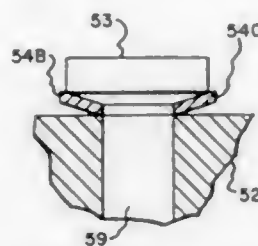


wherein said first sealing means provides a fluid tight seal to the intermediate chamber allowing an equilibrium to develop between pressure at the outlet port, acting through the holes in the stem of said piston on the piston face and against the spring, such that adjusting said coupling means to increase the distance between the stem face and the inlet port will increase the cut-off pressure and decreasing the distance will decrease the cut-off pressure.

5,411,054

**POSITIVE DISPLACEMENT COMPRESSOR**

Norbert W. Overfield, 20029 S. Center St., Corry, Pa. 16407  
Division of Ser. No. 973,210, Nov. 6, 1992, Pat. No. 5,311,902, which is a continuation-in-part of Ser. No. 731,154, Jul. 2, 1991, abandoned. This application May 16, 1994, Ser. No. 243,265  
Int. Cl.<sup>6</sup> F04B 53/10  
U.S. Cl. 137—512.1 13 Claims



1. A positive displacement compressor means having pressure actuated suction and/or discharge valve means, which comprises:

- (a) a valve seat means having a first passage for fluid flow;
- (b) a flow control means having a blocking face defined by at least one surrounding edge thereof, wherein the flow control means is movable towards the valve seat means to block the first fluid passage when the valve means is in a closed position;
- (c) housing means having a second fluid passage and being adapted to confine the flow control means in alignment with the first passage of the valve seat means; and
- (d) seal means confined in alignment with the flow control means by the housing means and having a frusto-conical shape providing a convex side facing the valve seat and a concave side extending between an inner and an outer enclosing side wall, the concave side facing both the housing means and the blocking face of the flow control means wherein when the valve means is open the at least one surrounding edge of the flow control means is aligned spaced from and intermediate the inner and outer side walls of the seal means such that the flow control means is movable towards the valve seat means to first contact the seal means at the intermediate position and then leverage the seal means into a flattened condition when the fluid pressure directed against a downstream side of the valve means is greater than the fluid pressure directed against an upstream side of the valve means with the valve means in a closed position to shut off fluid flow communication between the first and second fluid passages.

5,411,055

**FLOW LIMITING THROTTLE ELEMENT**

Brian Kane, Budenheim, Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Germany  
Filed Nov. 23, 1993, Ser. No. 156,078  
Claims priority, application Germany, Nov. 24, 1992, 42 40 669.2

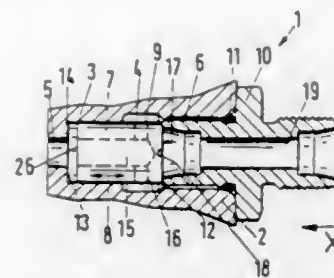
Int. Cl.<sup>6</sup> F16K 15/02

U.S. Cl. 137—513.5

12 Claims

1. A flow limiting throttle element for restricting the flow of a fluid guided in a delivery line, comprising:
- a pressure-tight housing having a first bore hole portion, a

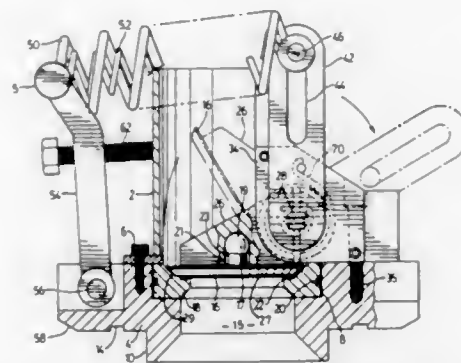
second bore hole portion adjoining the first bore hole portion and two coaxially arranged working connections; a piston arranged in the first bore hole portion of the housing so as to be freely axially displaceable therein, the first bore hole portion having a length that is at least 50% of the piston length, the second bore hole portion of the housing having a cylindrical recess which transits into a first one of the working connections, the first working connection having an inner diameter smaller than that of the second bore hole portion; and



a connection nipple sealingly arranged in the first working connection, the connection nipple having an annular end face which is situated in the housing so as to project into a region of the cylindrical recess and form a sealing fit with a first end face of the piston which faces the nipple end face, a first continuous slot being arranged on the first end face of the piston so as to continuously communicate with the cylindrical recess of the second bore hole portion without regard to axial position of the piston.

5,411,056<sup>EP</sup>**PRESSURE RELIEF VALVE**

Alberto Solaroli, Newcastle, Canada, assignor to 432583 B.C. Ltd., Vancouver, Canada  
Filed Dec. 9, 1993, Ser. No. 164,446  
Int. Cl.<sup>6</sup> F16K 15/03  
U.S. Cl. 137—527.4 4 Claims



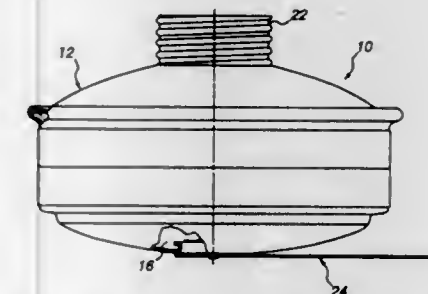
1. An emergency pressure relief valve for a vessel containing pressurized fluid comprising a valve body defining a valve passage through the body from a first end communicating with the interior of the vessel to a second end communicating with the ambient atmosphere, a valve seat within and surrounding the passage, a flap valve, a shaft supporting the flap valve through an arm for rotation about an axis perpendicular to a longitudinal axis of the passage between a first position closing the passage and in fluid tight engagement with the valve seat and a second position within the body in which it does not substantially obstruct the passage, and spring means acting between the shaft and the body to urge the flap valve into said first position with a torque sufficient to retain the flap valve in said first position when the pressure difference between the first and second ends of the passage is less than a predetermined value, wherein said flap valve and said arm are sepa-

rately formed, and a universal joint connects the flap valve and the arm such as to permit limited pivotal motion of the flap valve relative to the arm, the flap valve and the valve seat have complementary frustoconical valve surfaces which mate in said first position, a sealing ring is positioned to act between the valve seat and the flap valve in said first position to establish a gas tight seal, and the valve seat is located by an O-ring within a bore in the valve passage of the relief valve having a diameter slightly greater than an external diameter of the valve seat whereby to permit a limited degree of movement of the valve seat in its own plane.

5,411,057

**DETACHABLE INHALATION VALVE DEVICE FOR A RESPIRATOR FILTER ASSEMBLY**

Thomas D. Ponchot, Gibsonsia, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.  
Filed Nov. 21, 1991, Ser. No. 796,708  
Int. Cl.<sup>6</sup> A62B 7/10, 23/02  
U.S. Cl. 137—550 20 Claims



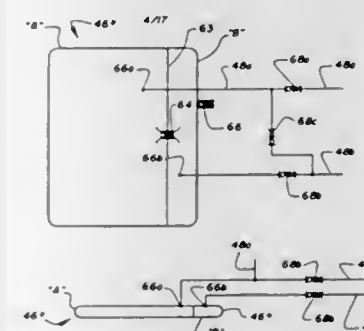
1. A valve device adapted for use with a respirator filter cartridge comprising a filter within a housing, said housing having an outlet opening and a particulate matter retaining forepart including an inlet opening, said valve device comprising:

- a valve support member including a securing means for detachably connecting said support member to said inlet opening; and
- a valve element carried by said valve support member for regulating air flow into said inlet opening.

5,411,058

**METHOD AND APPARATUS FOR UTILIZING GASEOUS AND LIQUID FUELS IN AN INTERNAL COMBUSTION DEVICE**

James W. Welsh, 75 Templar Way, Summit, N.J. 07901, and Jonathan W. Welsh, 15B Coles Ave., Hackensack, N.J. 07601  
Filed Dec. 22, 1992, Ser. No. 994,652  
Int. Cl.<sup>6</sup> B67C 3/06  
U.S. Cl. 137—572 7 Claims



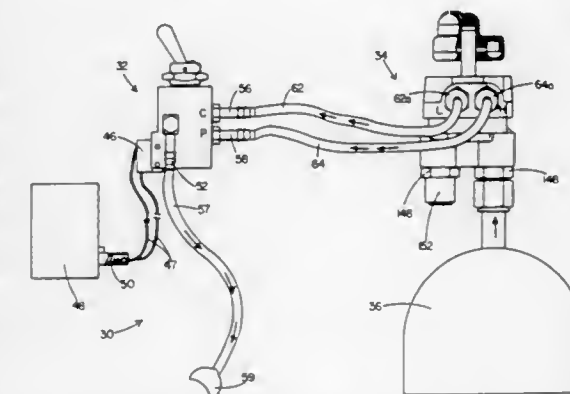
1. A storage reservoir for gaseous fuel comprising:
- a primary compartment and a secondary compartment substantially smaller than said primary compartment, each of

said primary and said secondary compartments having separate outlets,  
means for filling said primary compartment with gaseous fuel,  
a spring loaded relief valve operatively connected between said primary compartment and said secondary expansion compartment and adapted to permit flow only from said primary compartment to said secondary compartment and when a minimum differential pressure exists across said spring loaded relief valve,  
a first spring loaded check valve operatively connected between said primary compartment and said output conduit and adapted to permit only outflow from the output of said primary compartment and only when at least a first minimum differential pressure exists across said first spring loaded check valve,  
a second spring loaded check valve operatively connected between said secondary compartment and said output conduit and adapted to permit only outflow from the output of said secondary compartment and only when at least a second minimum differential pressure exists across said second spring loaded check valve, said second minimum differential pressure being less than said first minimum differential pressure so that outflow from said secondary compartment will be favored over outflow from said primary compartment.

5,411,059

**MULTIPLE FLOW RATE FLUID CONTROL VALVE ASSEMBLY**

Robert E. Sever, Florissant, and Randolph E. Scharfenberg, Manchester, both of Mo., assignors to Essex Industries, Inc., St. Louis, Mo.  
Filed Feb. 1, 1994, Ser. No. 189,909  
Int. Cl.<sup>6</sup> A62B 9/02  
U.S. Cl. 137—599 23 Claims



1. A multiple flow rate fluid control valve assembly in which the mode of fluid flow is interfaced with the rate of fluid flow, the assembly comprising:

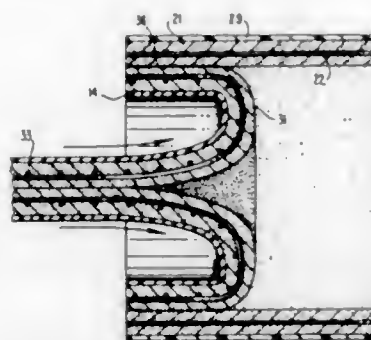
- a first valve having a plurality of selectable flow modes including a continuous fluid flow mode and a pulse fluid flow mode, and a switch for selectively setting the valve to one of the plurality of selectable flow modes, and
- a second valve connected to the first valve having structure to permit selectively controlling the rate of fluid flow from a source of fluid through the second valve to the first valve, thereby to provide fluid from the source of fluid to the first valve at a rate which is appropriate for the mode of fluid delivery selected and the particular fluid use.

# 5,411,060 COMPOSITE PIPE

Brian Chandler, 8933 St. Gallen 60, Steiermark, Austria  
Continuation-in-part of Ser. No. 863,563, Apr. 3, 1992,  
abandoned. This application May 5, 1992, Ser. No. 878,660  
Int. Cl.<sup>6</sup> F16L 11/08

U.S. Cl. 138—98

9 Claims



1. A pipe which can be fabricated in sufficiently long lengths suitable for use in advanced gas distribution systems and sufficiently flexible for storage prior to installation and curing, comprising:

- a first outer fibrous carrier tube of a first dimension impregnated with a cured impact resistant flexible elastomeric resin, the fibrous carrier reinforced with first longitudinal reinforcing means for limiting longitudinal stretch of the pipe;
- a second inner fibrous carrier tube of a second dimension impregnated with an uncured elastomeric resin which is more rigid, when cured, than the resin in the first tube; the second tube having a nominal outer diameter greater than the nominal inner diameter of the outer tube, the second tube positioned within the first tube;
- the second tube reinforced in the longitudinal and radial directions with second reinforcing means for limiting elongation and radial expansion of the second tube, the second tube coated on at least the inside surface away from the outer tube with a gas impermeable and styrene resistant synthetic resin layer.

# 5,411,061

## HEDDLE FRAME ASSEMBLY WITH RELEASABLE END BRACES

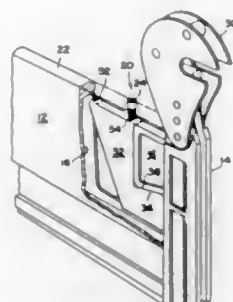
Gene E. Faase, Taylors, S.C., assignor to Steel Heddle Mfg. Co., Greenville, S.C.

Filed Dec. 16, 1993, Ser. No. 168,754

Int. Cl.<sup>6</sup> D03C 9/06

U.S. Cl. 139—91

26 Claims



1. A heddle frame having a pair of laterally extending slats and a pair of end braces connected to said slats to form a generally rectangular frame, wherein each of the connections between said slats and said end braces comprises:

- an elongated opening defined within the end of said slats;
- an inwardly directed extension foot configured on and extending essentially perpendicular from said end brace, said

extension foot having a width so as to be slidable within said elongated opening of said slat; and

a single releasable locking member operably configured to lock said extension foot within said slat in a locked position and to release said end brace from said slat in a released position, said locking member disposed through an outward edge of said slat and extending into said elongated opening of said slat, said extension foot comprising a hole defined therein for receiving said locking member and further comprising an insert carried therein, said locking member extending through said hole into said insert for locking engagement with said insert.

# 5,411,062

## PAPERMAKERS FABRIC WITH ORTHOGONAL MACHINE DIRECTION YARN SEAMING LOOPS

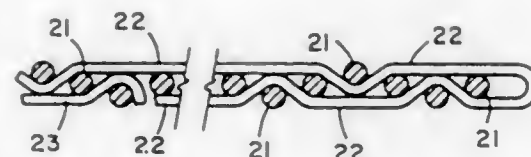
Henry J. Lee, Summerville, S.C., assignor to Asten Group, Inc., Charleston, S.C.

Continuation-in-part of Ser. No. 949,044, Sep. 21, 1992, Pat. No. 5,238,027, which is a continuation-in-part of Ser. No. 715,543, Jun. 14, 1991, Pat. No. 5,148,838, which is a continuation of Ser. No. 567,974, Aug. 15, 1990, Pat. No. 5,092,373, which is a continuation-in-part of Ser. No. 534,164, Jun. 6, 1990, Pat. No. 5,103,874. This application Aug. 23, 1993, Ser. No. 111,303

Int. Cl.<sup>6</sup> D03D 13/00, 15/00

U.S. Cl. 139—383 AA

16 Claims



1. A papermakers fabric comprising a system of MD yarns interwoven with a system of CMD yarns to define a body and opposing end portions of the fabric and a series of end loops formed on said opposing end portions, wherein selected end loops are made of yarn segments having the same geometric cross-section, but are made of a different material than the MD yarns which define said fabric body; and said yarn segments are interwoven into an end portion of the papermakers fabric in spaces vacated by trimming selected MD yarns back a selected distance within the end portion of the fabric, and do not extend into said fabric body, wherein the ends of the trimmed yarns and the ends of the selected end loop forming yarn segments all terminate on a common side of the fabric which is opposite to a paper carrying side of the fabric.

# 5,411,063

## SEAM-WEAVING MACHINE WITH FRINGE CATCHER

Hans-Eugen Hacker, Reutlingen; Edgar Hofstetter, Hohenstein, and Eckhard Kaminski, Pfullingen, all of Germany, assignors to Novatech GmbH, Reutlingen, Germany

Filed Feb. 7, 1994, Ser. No. 193,419

Claims priority, application Germany, Feb. 8, 1993, 9301722 U

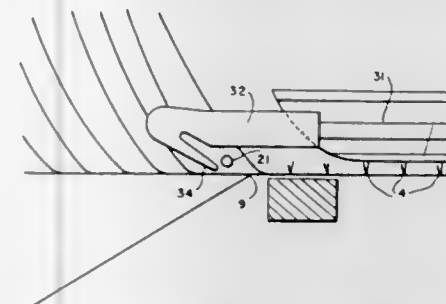
Int. Cl.<sup>6</sup> D03C 3/20, 13/00

U.S. Cl. 139—383 AA

2 Claims

1. In a seam-weaving machine for making a fabric endless by weaving a woven seam out of fringes formed at opposed fabric ends which constitute auxiliary weft threads and from weft threads removed from the fabric which constitute auxiliary warp threads in which a seam-weaving shed is formed, said machine including a separator for separating a single auxiliary weft thread from a fringe, a shedding device for forming a shed in said auxiliary warp threads, a gripper device for taking a single auxiliary weft thread from the separator and inserting said auxiliary weft thread through said shed, and a sley for

beating the inserted auxiliary weft thread against a fell of an already formed part of a woven seam, whereby auxiliary weft threads disposed in alignment with each other are guided upwardly out of the woven seam at splice points which are distributed over the width of the woven seam, the improvement comprising a fringe catcher overlying said already



formed part of the woven seam and a drive device for driving the fringe catcher disposed adjacent an edge zone of the woven seam perpendicular to the fell for moving the fringe catcher parallel to said auxiliary warp threads forwardly beyond the fell and backwardly while resting on the already formed part of the woven seam for engaging and drawing an upwardly protruding fringe thread away from the fell.

# 5,411,064

## NARROW FABRIC LOOM OPERATING MECHANISM

Kiichi Yamagishi, Niigata, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

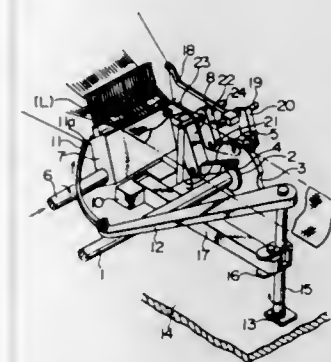
Filed Jan. 11, 1994, Ser. No. 179,917

Claims priority, application Japan, Jan. 19, 1993, 5-006342

Int. Cl.<sup>6</sup> D03D 35/00, 47/04, 47/27

U.S. Cl. 139—449

5 Claims



1. A loom in which a reed, a carrier, a latch needle, a catch sled are to be driven in timed relation with one another by driven rotation of a main drive shaft, comprising:

- (a) a carrier drive shaft rotatably mounted vertically on a loom frame and supporting said carrier and a pivotal member horizontally; and
- (b) an L-shaped carrier driving pivotal arm connected to said pivotal member via a link, said pivotal arm being fixed at one end to a horizontal reed drive shaft said reed drive shaft, connected to said reed and being adapted to rotate forwardly and reversely to move said reed back and forth, said L-shaped pivotal arm extending beneath said reed drive shaft to said link, whereby said rotation of the reed drive shaft through said L-shaped arm and said link causes a back and forth rotation of the carrier drive shaft.

# 5,411,065

## LIQUID SPECIMEN TRANSFER APPARATUS AND METHOD

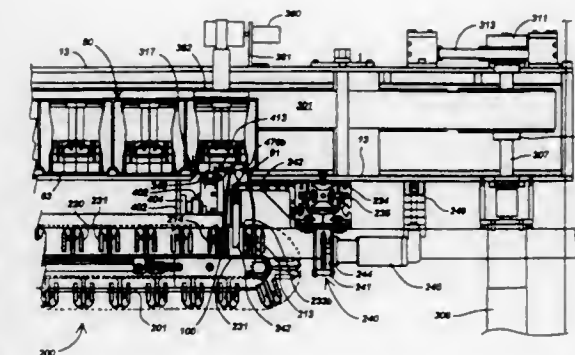
James W. Meador; Thomas G. Miller; Christopher T. Nikirk, all of Houston; Louis A. Waters, Jr., Bellaire, and Sean M. Donnelly, Houston, all of Tex., assignors to KVM Technologies, Inc., Houston, Tex.

Filed Jan. 10, 1994, Ser. No. 179,436

Int. Cl.<sup>6</sup> B65B 1/04, 3/04

U.S. Cl. 141—1

36 Claims



1. A method of transferring a sample of liquid from a sealed non-deformingly expandable container containing gas and the liquid without invasively contacting the liquid remaining inside the container, said method comprising:

- (a) non-deformingly volumetrically expanding said sealed container sufficiently to reduce pressure therein below ambient pressure outside the container;
- (b) applying heat selectively to a locus on said container to non-invasively create a hole having a diameter effective to equilibrate the pressure inside the container with said ambient pressure without loss of liquid from the container; and
- (c) non-deformingly volumetrically reducing said container to expel liquid from the container through said hole.

# 5,411,066

## METHOD OF PRODUCING VENEER

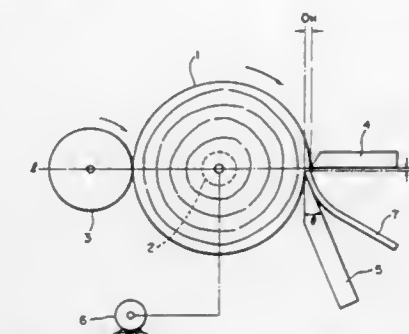
Sotaro Tsuda, 4-13, Nekogahara-dori, Chikusa-ku, Nagoya, Aichi-ken, Japan

Filed Oct. 29, 1993, Ser. No. 143,016

Int. Cl.<sup>6</sup> B27C 1/00; B27D 1/00; B27L 5/00

U.S. Cl. 144—348

14 Claims



1. A method of producing a veneer having a selected thickness, by cutting a stock material which is rotated by a spindle, with cutting means including a rotary lathe blade and a nose bar, comprising the steps of:

- positioning the nose bar at an outer periphery of the stock material in the vicinity of a cutting edge of the rotary lathe blade such that a spacing between a front end of the nose bar and the cutting edge in a horizontal direction is 20 to 30% smaller than the selected thickness; and



applying a backup roller rotated by the rotation of the stock material to constantly push the rotating stock material toward the nose bar, the backup roller being contacted to the outer periphery of the stock material at a position diametrically opposite to the rotary lathe blade.

5,411,067

# PNEUMATIC TIRE FOR USE ON AGRICULTURAL TRACTORS AND OTHER LIKE VEHICLES

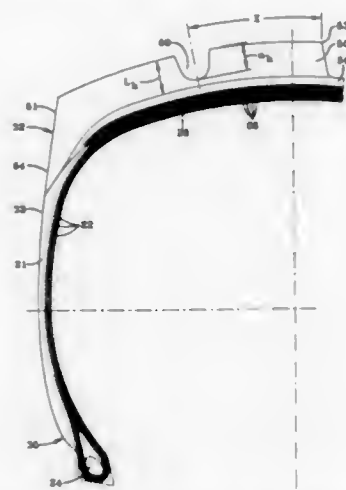
Richard M. Beeghly; Edward L. Montgomery, both of Cumberland, Mo.; William H. Legas, Meyersdale, Pa.; Robert L. Crump, Cumberland, Md., and Deloris J. Schad, Hyndman, Pa., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 36,004, Mar. 23, 1993, abandoned. This application Mar. 16, 1994, Ser. No. 214,081

Int. Cl.<sup>6</sup> B60C 1/21

U.S. Cl. 152—209 B

17 Claims



1. A pneumatic tire, the tire having a carcass, a belt reinforcement member disposed radially outwardly of the carcass, an annular tread disposed radially outwardly of the belt reinforcing member, the tread having a net-to-gross ratio of less than 35%, the tread comprising:

an inner tread;

a plurality of traction lugs extending radially outwardly from the inner tread, each traction lug having a leading and a trailing edge, and a centerline between the leading and trailing edges, the lug extending generally axially inwardly from an axially outer end to an axially inner end, the distance along the centerline between the axially outer and inner ends defining the length ( $l_l$ ) of the lug, the distance perpendicular to the centerline and extending between the leading and trailing edge defining the width ( $l_w$ ) of the lug, the radial distance extending between the inner tread and the edges of the lug determining the radial height ( $l_h$ ), the ratio of the lug width to lug radial height being less than 0.8 over at least 70% of the lug length ( $l_l$ ), at least 25% of the lugs having a notch extending between the leading and trailing edges and having a depth ( $n_h$ ) less than 100% and greater than 50% of the radial height ( $l_h$ ) of the lug at a center of the notch along the leading edge, at least one of the lugs having notches has an axially inner portion and an axially outer portion relative to the notch both inner and outer portions having centerlines between the leading and trailing edges, the centerlines being generally aligned, the inner and outer portions including axially inner ends and axially outer ends, adjacent the axially inner end of the axially outer portion is an enlarged lug head extending from the leading edge, the center of the notch being located at a position 40% to 60% of the lug

length from the axially inner end of the axially inner portion.

5,411,068

# PNEUMATIC RADIAL TIRE WITH REDUCED TREAD WEIGHT

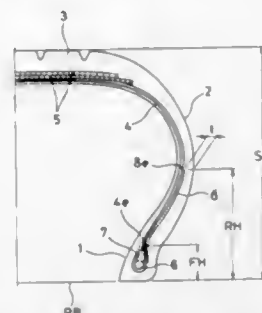
Tomohiko Kogure, Hiratsuka, Japan, assignor to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Jun. 15, 1993, Ser. No. 76,744

Claims priority, application Japan, Aug. 27, 1992, 4-228580 Int. Cl.<sup>6</sup> B60C 11/00, 15/06

U.S. Cl. 152—209 R

5 Claims



1. A pneumatic radial tire having a belt ply layer made of steel cords, wherein a tread weight  $\alpha$  per unit ground contact area is not greater than  $1.80 \times 10^{-3}$  kg/cm<sup>2</sup>; a depth of a groove provided in a surface of a tread is 6–8 mm; a single cord reinforcing ply which extends up to a location outside of the top end of a bead filler in a radial direction of the tire, is disposed in each of a pair of bead portions and a cord angle  $\theta$  of the cord reinforcing ply relative to a circumferential direction of the tire is  $25^\circ$ – $80^\circ$ ; a height RH of the cord reinforcing ply from a rim base up to the top end of the cord reinforcing ply, which is measured in the radial direction of the tire, satisfies the ratio,  $RH/SH=0.28$ – $0.65$ , with SH being a cross-sectional height of the tire; and a height FH of the bead filler from the rim base up to the top end of the bead filler, which is measured in the radial direction of the tire, satisfies the ratio  $FH/SH=0.11$ – $0.28$ , with SH being the cross-sectional height of the tire.

5,411,069

# PNEUMATIC RADIAL TIRES INCLUDING AN ANNULAR RECESS PORTION IN THE TREAD

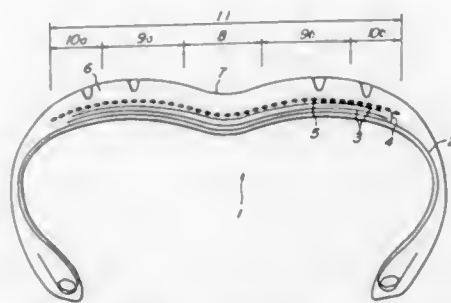
Toru Tsuda, Tokyo, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Mar. 15, 1994, Ser. No. 212,925

Claims priority, application Japan, Mar. 15, 1993, 5-054302 Int. Cl.<sup>6</sup> B60C 3/00, 9/20, 101/00

U.S. Cl. 152—209 R

7 Claims



1. A pneumatic radial tire comprising a carcass comprised of at least one rubberized cord ply, a belt superimposed on the carcass and comprised of rubberized cord layers, the cords of which layers being crossed with each other, at least one auxiliary reinforcing cord layer of rubberized heat shrinkable cords

arranged substantially in parallel to an equatorial plane of the tire, the at least one auxiliary reinforcing cord layer substantially enveloping a crown portion of the carcass and a full radially outer surface of the belt, and a tread having an annular recess portion arranged in the tread at a given region in the widthwise direction thereof and depressed inward in a radial direction of the tire along a circumference of the tread together with the carcass, belt, and at least one auxiliary reinforcing cord layer, in which a section profile of the tread in the widthwise direction is divided into a central region extending between inflection points of the annular recess portion having an outwardly concave curvature in the radial direction of the tire, a pair of middle regions each ranging outward from one of the inflection points in the widthwise direction along an outwardly convex curvature in the radial direction to at least a position of a maximum diameter of the tire and a pair of side regions each ranging outward from the corresponding middle region in the widthwise direction toward a side end of the tread, and a stretching ratio of the cords in the at least one auxiliary reinforcing cord layer in the central region and side regions of the tread is equal to or more than that in the middle regions of the tread.

5,411,070

# SELF-CONTAINED ANTI-SKID DEVICE FOR PNEUMATIC TIRES

Iraj Yadegar, P.O. Box 1635, Studio City, Calif. 91604

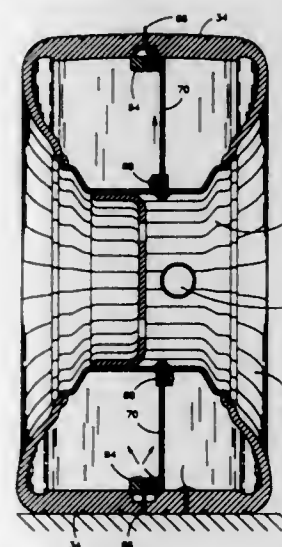
Continuation-in-part of Ser. No. 505,067, Apr. 5, 1990, This application Feb. 3, 1993, Ser. No. 13,250

Claims priority, application WIPO, Feb. 11, 1992, PCT/US92/01086

Int. Cl.<sup>6</sup> B60C 5/20, 23/12

U.S. Cl. 152—210

12 Claims



1. A self-contained anti-skid device for use with a pneumatic tire to increase traction of the tire against a slippery surface comprising:

- a plurality of projectable and retractable anti-skid pins to be implanted radially at a tread of the tire;
- a plurality of expandable pneumatic chambers adjacent to the anti-skid pins to project the anti-skid pins from the outer peripheral surface of the tire tread when said expandable pneumatic chambers are pressurized by a flow of pressurized air from the actual pressurized air of the tire;
- a plurality of adequate supports of sufficient size and strength accommodating the anti-skid pins and positioned to form hollow cells to store and seal the anti-skid pins and the expandable pneumatic chambers from the pressurized air of the tire; and
- a controllable air valve to direct a flow of air selectively from the tire to the expandable pneumatic chambers and

from the expandable pneumatic chambers to the atmosphere.

5,411,071

# RADIAL TIRE HAVING CROWN REINFORCEMENT FORMED OF PLYS OF DIFFERENT RESISTANCE

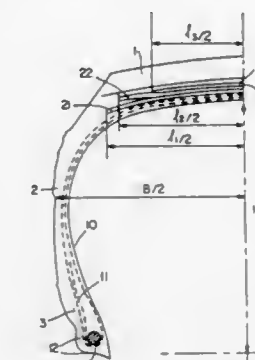
Michel Chapelle, Riom, France, assignor to Compagnie Generale Des Etablissements Michelin-Michelin & Cie, Cedex, France

Filed Dec. 2, 1992, Ser. No. 984,676

Claims priority, application France, Dec. 4, 1991, 91 15119 Int. Cl.<sup>6</sup> B60C 9/18, 9/20

U.S. Cl. 152—527

4 Claims



1. A rough terrain tire with radial carcass reinforcement (10) surmounted by a crown reinforcement (20) consisting of three plies (21, 22, 23) of substantially inextensible metal wires or cables forming angles  $\pm \alpha$  of between  $10^\circ$  and  $45^\circ$  with the circumferential direction, characterized by the fact that the resistances, per centimeter of width,  $R_1$ ,  $R_2$ ,  $R_3$  of the radially inner crown reinforcement ply (21), of the intermediate ply (22), and of the radially outer ply (23), respectively, are such that  $1.5 < R_1/R_2 < 2.5$  and  $0.5 < R_3/R_2 \leq 1$ , the intermediate ply (22) and the radially outer ply (23) being formed of wires or cables such that, in each ply, the axial distance (e) between two adjacent wires or cables is at least equal to the diameter of the wires or cables wherein the resistance per centimeter of width of a ply is defined as the breaking load of each wire or cable multiplied by the number of wires or cables per centimeter of width in the ply measured perpendicular to the direction of the wires or cables.

5,411,072

# FOLDABLE PARTITION

Hans Starck, Munich, Germany, and Guy E. Dixon, III, Coral Gables, Fla., assignors to Panelfold, Inc., Miami, Fla.

PCT No. PCT/US91/00033, § 371 Date Jul. 16, 1992, § 102(e) Date Jul. 16, 1992, PCT Pub. No. WO91/10802, PCT Pub. Date Jul. 25, 1991

Continuation of Ser. No. 910,146, Jul. 16, 1992, abandoned. This PCT application Jan. 10, 1991, Ser. No. 214,669

Claims priority, application Germany, Jan. 10, 1990, 900231 U; May 11, 1990, 9005382 U

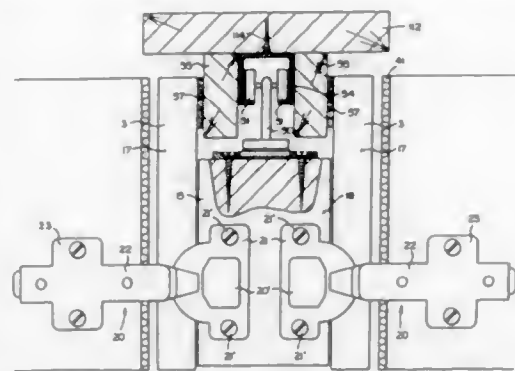
Int. Cl.<sup>6</sup> E06B 3/94

U.S. Cl. 160—84.11

48 Claims

1. A folding partition comprised of a plurality of vertical carrying posts, roller means mounted on the carrying posts for supporting the carrying posts from a horizontal track, a plurality of vertical panels arranged in pairs, each panel having two vertical edges, panel supporting hinges pivotally connecting one vertical edge of each panel of a pair of panels to a carrying post, panel connecting hinges pivotally connecting the other vertical edges of said pair of panels together, and means for initiating pivotal movement of the panels as they are moved from a closed position in which they lie substantially in edge to edge relationship, said panel supporting hinges being cup hinges having hinge parts including a hinge cup and hinge arm

which are connected by link means and are pivotally moveable relative to each other, one of said hinge parts being mounted in said panels for pivotal movement, the other of said hinge parts



being mounted in said carrying posts for non-pivotal movement, said hinge cup being pivotally linked to said hinge arm by said link means.

5,411,073

**HINGED FRAME SYSTEM**

Rupert I. Andrews, Hampshire, United Kingdom, assignor to Frames Design & Build Limited, London, England  
PCT No. PCT/GB92/00148, § 371 Date Nov. 2, 1993, § 102(e) Date Nov. 2, 1993, PCT Pub. No. WO92/13157, PCT Pub. Date Aug. 6, 1992

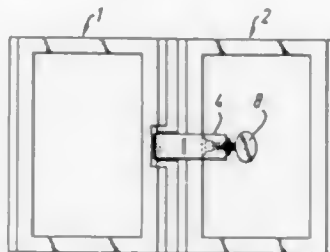
PCT Filed Jan. 27, 1992, Ser. No. 94,066

Claims priority, application United Kingdom, Jan. 28, 1991, 9101821

Int. Cl.<sup>6</sup> A47G 5/00

U.S. Cl. 160—135

20 Claims



1. A hinged frame system comprising:

at least first and second panels, the second panel having a concave edge profile formed to have a partially circular cross-section and the first panel having a convex edge profile formed to fit within the concave edge profile of the second panel; and

a clamp for clamping the first and second panels together so that the convex edge profile of the first panel is located within the concave edge profile of the second panel, the clamp having a partially circular end portion located so as to partly encircle a partially circular section of the convex edge profile of the first panel for clamping the first panel to the second panel.

5,411,074

**METHOD OF CONTROLLING TEMPERATURE OF METALLIC MOLD IN PERMANENT MOLD CASTING FACILITY AND APPARATUS THEREFOR**

Eiji Naruse, and Tadashi Nishida, both of Toyokawa, Japan, assignors to Sintokogio Ltd., Nagoya, Japan

Filed Sep. 24, 1993, Ser. No. 125,873

Claims priority, application Japan, Oct. 23, 1992, 4-309260

Int. Cl.<sup>6</sup> B22D 46/00

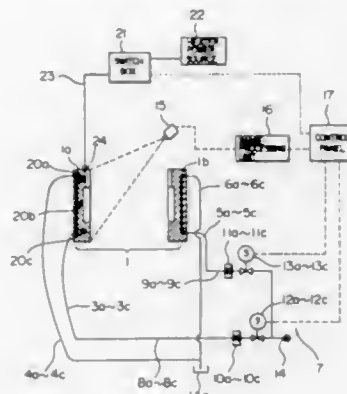
U.S. Cl. 164—4.1

9 Claims

1. A method of controlling the temperature of a metallic

mold, comprising a plurality of mold pieces which can be opened at their separating planes, at a fixed temperature before casting, comprising the steps of:

bringing said plurality of mold pieces to their operating temperature;  
opening at least one of said mold pieces at said operating temperature along its hot separating plane;  
viewing said hot separating plane with an infra-red vidicon camera so as to pick up an image of said hot separating plane of at least one of said plurality of mold pieces;  
delivering an image signal from said camera;



processing said image signal so as to detect a temperature distribution pattern on said hot separating plane of said mold piece;

comparing said detected temperature distribution pattern with a target temperature distribution pattern of said separating plane of said mold piece, said desired temperature distribution pattern having been previously set to correspond to said desired temperature and temperature distribution of said metallic mold; and

adjusting the temperature of said mold piece in accordance with the comparison to reduce differences between said temperature distribution pattern and said target temperature distribution pattern.

5,411,075

**ROLL FOR USE IN CASTING METAL PRODUCTS AND AN ASSOCIATED METHOD**

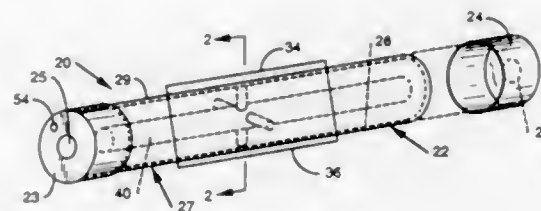
S. John Pien, Export; Albert C. Wang, and Ronald Bachowski, both of Murrysville, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 31, 1993, Ser. No. 114,782

Int. Cl.<sup>6</sup> B22D 11/128

U.S. Cl. 164—485

29 Claims



1. A roll for use in casting metal products from molten metal comprising:

a heat exchanger core including an inlet portion and an outlet portion for receiving and discharging a coolant fluid from a coolant fluid source;

an outer generally cylindrical shell surrounding said heat exchanger core, said outer cylindrical shell and said heat exchanger core defining an enclosed space; and

a working fluid contained in said enclosed space, said heat exchanger core separating said working fluid from said coolant fluid so that said coolant fluid does not enter into said enclosed space, whereby when molten metal is cast onto said outer cylindrical shell, said working fluid in proximity with said outer cylindrical shell changes from a liquid to a vapor and due to the rotation of said roll, the liquid phase of the working fluid forces said vapor in proximity with said outer cylindrical shell to return to an area adjacent said core where said vapor is condensed into a liquid which is then subsequently delivered radially to said outer cylindrical shell.

5,411,076

**SUBSTRATE COOLING DEVICE AND SUBSTRATE HEAT-TREATING APPARATUS**

Minobu Matsunaga, and Yasuhiro Mizohata, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd. Corp. of Japan, Kyoto, Japan

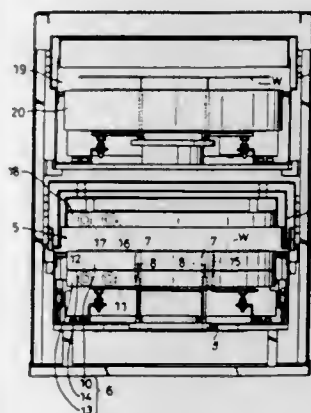
Filed Feb. 7, 1994, Ser. No. 192,563

Claims priority, application Japan, Feb. 12, 1993, 5-047528

Int. Cl.<sup>6</sup> F28F 7/00

U.S. Cl. 165—80.2

8 Claims



1. A substrate cooling device comprising:

a treating chamber for receiving a substrate;  
cooling plate means for supporting said substrate in said treating chamber; and

main cooling means for cooling said substrate supported on said cooling plate means;

wherein said treating chamber comprises auxiliary cooling means disposed above said substrate supported on said cooling plate means for cooling said substrate.

5,411,077

**FLEXIBLE THERMAL TRANSFER APPARATUS FOR COOLING ELECTRONIC COMPONENTS**

Lew A. Tousignant, Shoreview, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 11, 1994, Ser. No. 226,272

Int. Cl.<sup>6</sup> H01L 23/473

U.S. Cl. 165—104.33

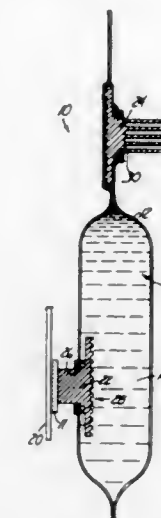
25 Claims

1. A two-phase thermal transfer apparatus adapted for thermal connection to a heat source, the thermal transfer apparatus comprising:

a flexible bag which is substantially impermeable to fluid and has at least one compartment that is expandable between a first volume and a second volume;

a thermal transfer liquid which is thermally connected to the heat source and is positioned within the flexible bag; and  
a rigid condenser which is sealably attached to the flexible

bag, has a high thermal conductivity, has an extended condensing surface positioned within the flexible bag and



has an extended heat dissipating surface positioned external to the flexible bag.

5,411,078

**AIR AND EVAPORATIVELY COOLED HEAT EXCHANGER AND REFRIGERATING SYSTEM THEREFOR**

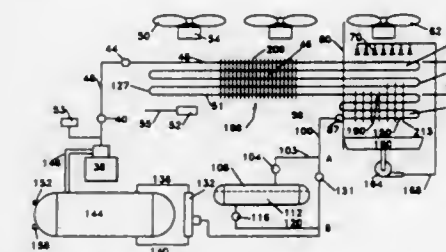
Roland Ares, 1004 Wedgewood Dr., St. Charles, Mo. 63303

Filed Dec. 13, 1993, Ser. No. 166,357

Int. Cl.<sup>6</sup> F22B 3/00

U.S. Cl. 165—113

20 Claims



1. A heat transfer device for transferring heat from a fluid to air, the device comprising a heat transfer element having a face area, the face area having a first portion having a center point and a second portion having a center point, the heat transfer element having a first array of spaced apart substantially straight parallel tubes distributed over the face area, each tube including a segment which traverses the first portion and another segment which traverses the second portion, and fins positioned on the tubes in heat transfer relation thereto over the first portion of the face area, means for moving air through the first portion and the second portion and means for distributing water over the second portion only.

5,411,079

**HEAT EXCHANGER AND METHOD FOR MANUFACTURING THE SAME**

Kenichi Sasaki, and Tomohiro Chiba, both of Isesaki, Japan, assignors to Sanden Corporation, Isesaki, Japan

Filed Oct. 4, 1993, Ser. No. 130,718

Claims priority, application Japan, Oct. 6, 1992, 4-267047

Int. Cl.<sup>6</sup> F28D 1/04

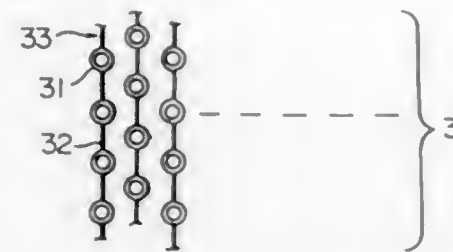
U.S. Cl. 165—151

6 Claims

1. A heat exchanger comprising:  
a first tank and a second tank;



an inlet connected to either said first tank or said second tank;  
an outlet connected to either said first tank or said second tank; and  
a plurality of unitary panel units provided between and



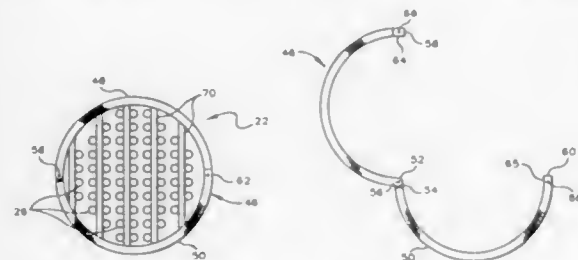
connected to said first and second tanks, each of said panel units comprising a plurality of metallic tube portions formed as fluid paths communicating between said first and second tanks and a plurality of plate portions connecting adjacent tube portions, said plate portions having a thickness less than a thickness of said tube portions.

**5,411,080**  
**BAFFLE RINGS FOR RETROFIT OF EXISTING SHELL-AND-TUBE HEAT EXCHANGERS**  
Cecil C. Gentry, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 29, 1993, Ser. No. 175,019  
Int. Cl.<sup>6</sup> F28F 9/00

U.S. Cl. 165—162

8 Claims



1. An improved rod baffle for use as a supporting apparatus in the tube bundle of a shell-and-tube heat exchanger comprising:

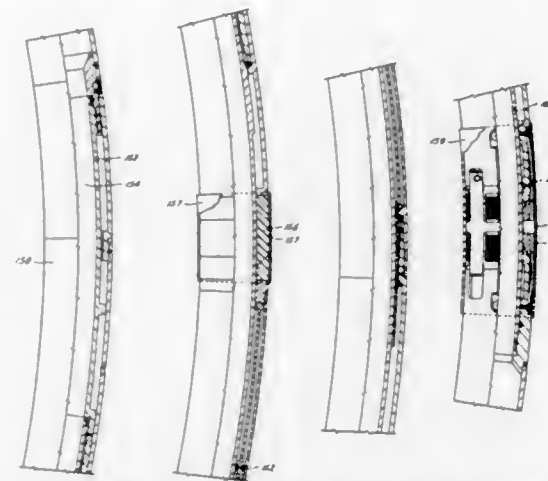
an improved baffle ring comprising a first semi-circular member having a first end and a second end; a second semi-circular member having a first end and a second end; hinge means having an axis of rotation perpendicular to the plane in which said baffle ring lies for rotatably securing said first end of said first semi-circular member to said first end of said second semi-circular member wherein said first end of said first semi-circular member is secured to said first end of said second semi-circular member by said hinge means in such a manner so as to allow said first semi-circular member to rotate about said first end of said second semi-circular member so that said second end of said first semi-circular member can be positioned in contact with said second end of said second semi-circular member; and

a plurality of support rods supported by said baffle ring with each support rod in parallel equally spaced relation to the other support rods.

**5,411,081**  
**SPOOLABLE FLEXIBLE HYDRAULICALLY SET, STRAIGHT PULL RELEASE WELL PACKER**  
Brian K. Moore, Humble, and Ronald E. Pringle, Houston, both of Tex., assignors to Camco International Inc., Houston, Tex.  
Division of Ser. No. 146,344, Nov. 1, 1993. This application Jul. 21, 1994, Ser. No. 278,213  
Int. Cl.<sup>6</sup> E21B 33/12

U.S. Cl. 166—120

3 Claims



1. A spoolable flexible hydraulically set, straight pull release well packer positioned in a coiled tubing comprising, a mandrel having a bore therethrough for the passage of wireline tools, an expandable packer seal positioned about the mandrel, expandable slip means positioned about the mandrel, said packer seal and said slip means being initially retracted to an outer dimension substantially equal to the outside diameter of the coiled tubing, hydraulic piston and cylinder actuating means positioned outside the mandrel and between the packer seal and the slip means for setting the slip means and the packer seal, said well packer being longitudinally flexible for allowing bending about the longitudinal axis of the well packer for allowing the packer to be spooled on a coiled tubing reel.

**5,411,082**  
**SCOOPHEAD RUNNING TOOL**  
Brian S. Kennedy, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Jan. 26, 1994, Ser. No. 187,277  
Int. Cl.<sup>6</sup> E21B 7/00

U.S. Cl. 166—181

15 Claims



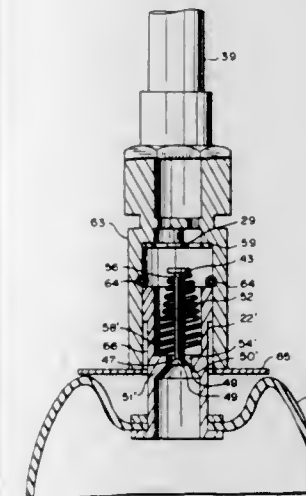
1. A running tool comprising:  
a mounting head having an opening passing longitudinally therethrough, said mounting head having a first end and an opposed second end;

a running stump extending outwardly from said second end; and  
a housing extending outwardly from said first end and communicating with said opening through said mounting head, said housing being parallel to said running stump, said housing and running stump being axially offset with respect to the longitudinal axis of said mounting head;  
an internal mandrel in said housing having an outer surface and an interior longitudinal opening, said internal mandrel being longitudinally movable within said housing in response to a selected force; and  
displaceable connecting means cooperating with said housing and internal mandrel to selectively engage or disengage from mating connecting means in another downhole device in response to the movement of said internal mandrel.

**5,411,083**  
**INFLATABLE WELL SEAL**  
Cletus N. Freiburger, 2820 Davenport St., Dubuque, Iowa 52001  
Filed Aug. 9, 1993, Ser. No. 103,113  
Int. Cl.<sup>6</sup> E21B 33/13

U.S. Cl. 166—187

15 Claims

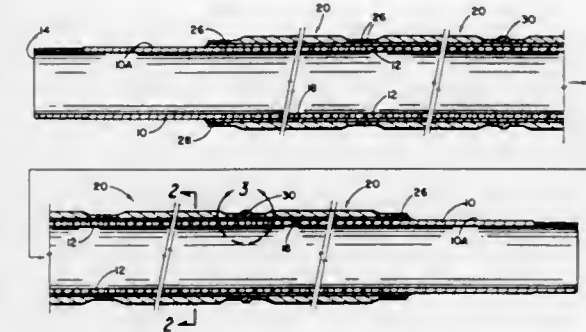


1. An apparatus for forming a seal within the wall of a well bore which comprises:  
an expansible hollow member,  
a normally closed valve attached to said expansible member,  
a coupler releasably mounted on said valve and having means provided therein to hold the valve in an open position,  
said coupler including means for automatically disengaging said coupler from said valve when a predetermined fluid pressure is accumulated in said expansible hollow member,  
said means for automatically disengaging including a washer loosely mounted on said valve for aiding in the separation of said coupler from said valve, and holding means for holding said coupler and said valve together comprising at least one O-ring, and  
means integrally attached to said coupler for conducting a fluid under pressure to said expansible hollow member to expand said expansible hollow member against the wall of the well bore, whereby when the fluid pressure within said member reaches a predetermined value, the coupler, with the aid of said washer, will collapse said O-ring and automatically disconnect from said valve and leave said expansible member as a seal within the well bore.

**5,411,084**  
**SAND FILTER SYSTEM FOR USE IN A WELL**  
James B. Padden, Kernersville, N.C., assignor to Purolator Products N.A., Inc., Tulsa, Okla.  
Filed Jun. 13, 1994, Ser. No. 258,696  
Int. Cl.<sup>6</sup> E21B 43/08

U.S. Cl. 166—230

9 Claims

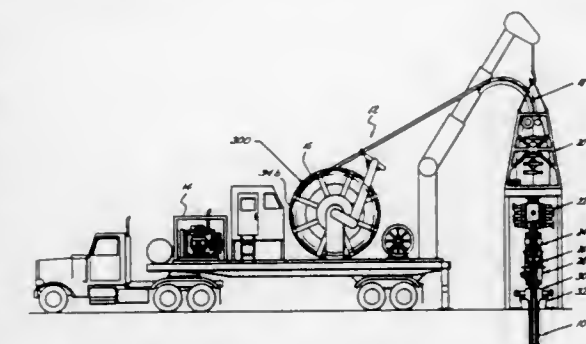


1. A sand filter for use in a well comprising:  
a length of tubing having opposed ends and a portion intermediate the opposed ends that is perforated;  
a tubular wedge wire screen received on and secured to said tubing and covering at least a portion of said perforated portion and having an external cylindrical surface; and  
a plurality of tubular corrugated filter elements received on and secured to said tubular wedge wire screen in end-to-end relationship, each filter element being formed of diffusion bonded multiple layers of wire mesh, each filter element being corrugated to provide an external surface having an area at least three times the area of said cylindrical external surface of said tubular wedge wire screen that is encompassed by each filter element, said corrugated filter elements having an external diameter, said filter elements being received on said tubular wedge wire screen in abutted, end-to-end relationship.

**5,411,085**  
**SPOOLABLE COILED TUBING COMPLETION SYSTEM**  
Brian K. Moore, Humble, and Ronald E. Pringle, Houston, both of Tex., assignors to Camco International Inc., Houston, Tex.  
Filed Nov. 1, 1993, Ser. No. 146,344  
Int. Cl.<sup>6</sup> E21B 43/00, 19/22

U.S. Cl. 166—242

27 Claims



1. A spoolable flexible coiled tubing completion system comprising,  
a flexible coiled tubing having an outer wall and a bore therethrough, said outer wall having a continuous outer diameter without upsets, and said bore adapted for passage of wireline tools,  
one or more longitudinally flexible gas lift valves positioned in the coiled tubing and having a bore therein for passage of wireline tools,

- a longitudinally flexible packer positioned in the coiled tubing and having a bore therein for passage of wireline tools;
- a longitudinally flexible landing nipple positioned in the coiled tubing and having a bore therein for the passage of wireline tools;
- a pump out plug connected to the coiled tubing, said plug having a bore therein for passage of wireline tools, and said gas lift valves, flexible packer, landing nipple, and pump out plug, each having an outside diameter continuous with the outside diameter of the coiled tubing.

5,411,086

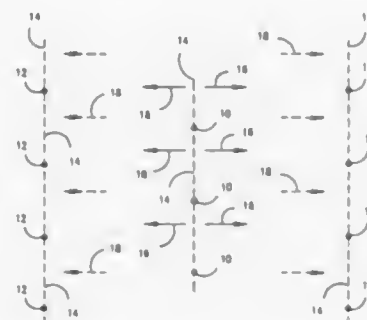
## OIL RECOVERY BY ENHANCED IMBIBITION IN LOW PERMEABILITY RESERVOIRS

Christopher Burcham, Princeton, N.J.; Robert E. Fast, Bakersfield, Calif.; Anthony S. Murer, Bakersfield, and Paul S. Northrop, Bakersfield, Calif., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 9, 1993, Ser. No. 164,269  
Int. Cl.<sup>6</sup> E21B 43/24, 43/267, 43/30

U.S. Cl. 166—245

31 Claims



1. A method for enhancing oil recovery from a low permeability diatomaceous reservoir or formation containing initially immobile hydrocarbons wherein enhanced imbibition is induced comprising:

- a) fracturing at least one injector and at least one producer well in a low permeability formation thereby creating at least one fracture;
- b) directing an aqueous mixture containing a chemical additive into the injector well where the additive is selected from a member of the group consisting of an alkali metal hydroxide, a surfactant, or a wetting agent that, either alone or in combination with organic acids in the formation's oil, is present in an amount effective to enhance imbibition by increasing the rate of water uptake from the low permeability formation and thereby increase oil flow therefrom; and
- c) continuing the injection of the aqueous mixture containing the chemical additive into the injector well for a time sufficient to cause oil to flow from the diatomaceous formation where it is subsequently produced to the surface via the producer well.

23. A method for enhancing oil recovery from a low permeability diatomaceous reservoir or formation which is naturally or hydraulically fractured wherein enhanced imbibition is induced comprising:

- a) drilling and completing one perforated well in the low permeability formation which contains at least one fracture that fluidly communicates with said well;
- b) injecting an aqueous mixture containing a chemical additive into the formation via said well where said additive is selected from a member of the group consisting of an alkali metal hydroxide, a surfactant, or a wettability agent that, either alone or in combination with organic acids in the formation's oil, is present in an amount effective to enhance imbibition by increasing the rate of water uptake

- thereby causing an increase in oil flow from said low permeability formation;
- c) ceasing the injection of the aqueous mixture into said formation; and
- d) producing thereafter hydrocarbonaceous fluids from said well.

5,411,087

## SOIL SAMPLER

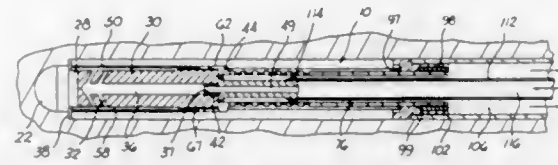
Byron D. Taylor, 110 Bonaventure Pl., Nashville, Tenn. 37205

Filed Jan. 27, 1994, Ser. No. 187,645

Int. Cl.<sup>6</sup> E21B 49/08

U.S. Cl. 166—264

12 Claims



7. A soil sampling device for being inserted down a borehole in the earth, the device comprising:
- an axially forward member having a radially extending forward projection;
- an axially rearward assembly that includes a radially extending rearward projection;
- said forward projection and said rearward projection define a volume between the earth and the device;
- a fluid means for supplying a heated fluid into the volume so as to volatilize selected compounds present in the region of the earth defining the volume into their vapor state; and
- a vacuum means for drawing the vapors out of the volume.

12. A method of sampling an earth formation for contaminants comprising the steps of:

- forming a borehole into the earth;
- inserting a soil sampling device into the borehole;
- positioning the soil sampling device at a desired depth in the borehole;
- providing the soil sampling device with an axially forward radial projection and an axially rearward radial projection that together with the device and the wall of the borehole define a volume;
- introducing a heated fluid into the volume so as to volatilize contaminants into the vapor state within the surface region of the borehole that defines the volume; and
- transporting the contaminant vapors to an analyzer.

5,411,088

## FILTER WITH GAS SEPARATOR FOR ELECTRIC SETTING TOOL

Kenneth J. LeBlanc, Houston, Tex., and Kenneth R. Rudd, Lake Charles, La., assignors to Baker Hughes Incorporated

Filed Aug. 6, 1993, Ser. No. 103,078

Int. Cl.<sup>6</sup> E21B 43/00

U.S. Cl. 166—265

14 Claims

8. A method for separating wellbore solids and/or gases from liquids for use as a motive fluid for operating a downhole tool capable of selectively sealing off a portion of the wellbore, comprising the steps of:

- lowering a pump with the downhole tool into the wellbore;
- extending a suction line from the pump into separator having a perforated housing;
- creating an annular stilling chamber between said suction line and said perforated housing;
- allowing gases to separate from liquid in said stilling chamber;
- allowing solids to drop directly by gravity toward the bot-

- tom of said stilling chamber upon passing through said perforated housing;
- drawing from the liquid phase through said suction line; and



- operating the downhole tool to selectively seal off a portion of the wellbore with pressure developed from said pump.

5,411,089

## HEAT INJECTION PROCESS

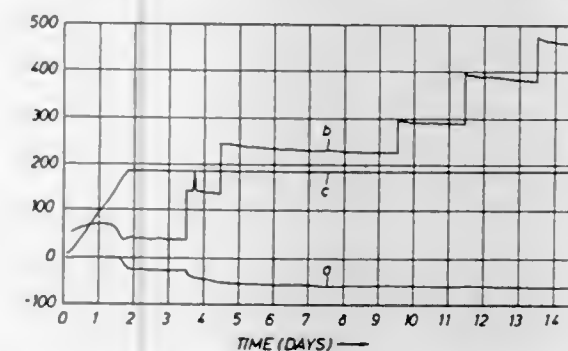
Harold J. Vinegar; Eric P. De Rouffignac, both of Houston; Lawrence J. Blumowicz; Phillip T. Baxley, both of Bellaire, and Scott L. Wellington, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 20, 1993, Ser. No. 170,564

Int. Cl.<sup>6</sup> E21B 43/24, 36/02, 36/04

U.S. Cl. 166—272

13 Claims



1. A method for heating a subterranean diatomite formation, the method comprising the steps of:

- (a) drilling a wellbore into the diatomite formation;
- (b) inserting a heater into the wellbore;
- (c) initially operating at a long term operating temperature for a time period of greater than about six months, which long term operating temperature is at or below a temperature at which the heater would be expected to operate for a period of about ten years or longer;
- (d) raising the heater temperature to a temperature that is at least 100° F. greater than the long term operating temperature for between about one day and about thirty days thereby sintering the diatomite formation in the vicinity of the heater; and
- (e) operating the heater for an extended period of time at or below the long term operating temperature.

5,411,090

## METHOD FOR ISOLATING MULTIPLE GRAVEL PACKED ZONES IN WELLS

H. Mitchell Cornette, and Stephen E. Morrison, both of Houston, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 15, 1993, Ser. No. 137,870

Int. Cl.<sup>6</sup> E21B 43/04

U.S. Cl. 166—278

4 Claims



1. A method for gravel packing two spaced-apart, fluid-producing subterranean zones within a well while preventing any substantial flow of fluids into said well from between said spaced-apart zones, said method comprising:

- depositing gravel in said well to form a first permeable gravel packing adjacent a first of said two spaced-apart zones, said gravel in said first gravel packing being sized to allow flow of fluids from said first zone into said well;
- depositing gravel in said well to form a second permeable gravel packing adjacent a second of said two spaced-apart zones, said gravel in said second gravel packing being sized to allow flow of fluids from said second zone into said well;

- providing an intermediate, impermeable layer of gravel between said first and said second gravel packings, said intermediate layer preventing any substantial flow of fluids therethrough into said well; and

- augering a screen assembly through said first and said second gravel packings and said intermediate gravel layer after all of said gravel has been deposited in said well to thereby position a first permeable section of said screen assembly within said first gravel packing and a second permeable section of said screen assembly within said second gravel packing whereby fluids from said first zone will be produced into said first permeable section of said screen assembly and fluids from said second zone will be produced into said second permeable section of said screen assembly.

5,411,091

## USE OF THIN LIQUID SPACER VOLUMES TO ENHANCE HYDRAULIC FRACTURING

Alfred R. Jennings, Jr., Plano, Tex., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 9, 1993, Ser. No. 164,270

Int. Cl.<sup>6</sup> E21B 43/267

U.S. Cl. 166—280

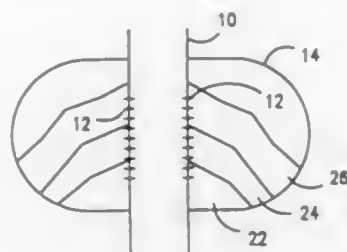
12 Claims

1. A method of enhanced hydraulic fracturing where a sealing liquid is not used subsequent to formation or reservoir breakdown comprising:

- a) injecting a fracturing fluid into a formation at a pressure



- and rate sufficient to fracture said formation which fracturing fluid lacks a proppant therein;
- b) hydraulically fracturing a formation or reservoir with a proppant laden fracturing fluid at a pressure and rate sufficient to create a fracture that is held open with said proppant which fracturing fluid is not subsequently cross-linked;
- c) injecting next a thin spacer fluid into the created fracture while the fracturing pressure is maintained which spacer fluid is diluted so as to allow proppant from a subse-



- quently injected fracturing fluid to fall through said spacer fluid while the fracturing pressure is maintained; and
- d) injecting thereafter a proppant laden fracturing fluid containing a proppant at a rate and pressure sufficient to hold the created fracture open which allows proppant to be more evenly distributed throughout the created fracture as proppant falls through the spacer fluid thereby enhancing proppant convection in the created fracture and obtaining substantially improved propping of the fracture.

5,411,092

**OPTIMIZING BLAST FURNACE SLAG CEMENTS**  
Kenneth M. Cowan, Sugar Land, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 30, 1993, Ser. No. 176,142  
Int. Cl.<sup>6</sup> E21B 33/13

U.S. Cl. 166—293 60 Claims

1. A method for cementing a well, comprising:  
combining constituents comprising water, blast furnace slag having a particle size within the range of 2,000 to 15,000 cm<sup>2</sup>/g, and an activator comprising trisodium phosphate, to form a cement slurry;  
displacing the cement slurry into the well; and  
allowing the cement slurry to set.

5,411,093

**METHOD OF ENHANCING STIMULATION LOAD FLUID RECOVERY**

Alfred R. Jennings, Jr., Plano, Tex., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 10, 1993, Ser. No. 164,860  
Int. Cl.<sup>6</sup> E21B 43/26

U.S. Cl. 166—300 15 Claims

1. A method for removing fracture fluid from a formation following a fracture treatment comprising:

- a) injecting granules or agglomerated particles containing a chemical blowing agent into a formation in an amount sufficient upon decomposition of said agent to create gas at a rate and volume sufficient to remove a fracture fluid from said formation where said chemical blowing agent is a member selected from the group consisting of dinitrosopentamethylenetetramine, sodium hydrogen carbonate and p-toluene sulfonyl hydrazide, azodicarbonamide, an alkali metal salt of azodicarboxylic acid and p,p'-oxybis(benzenesulfonyl hydrazide); and
- b) causing said chemical blowing agent to decompose so that gas is liberated in an amount sufficient to remove said fracture fluid from the formation's matrix into a fracture

thereby enhancing production of said fluid from said formation.

5,411,094

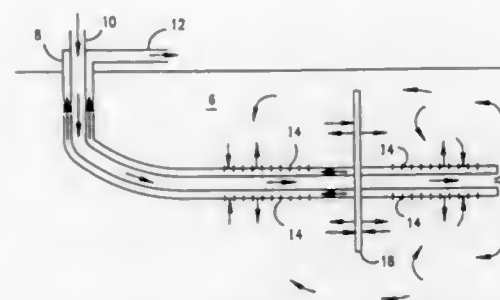
**IMBIBITION PROCESS USING A HORIZONTAL WELL FOR OIL PRODUCTION FROM LOW PERMEABILITY RESERVOIRS**

Paul S. Northrop, Bakersfield, Calif., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Nov. 22, 1993, Ser. No. 155,322  
Int. Cl.<sup>6</sup> E21B 43/22, 43/24

U.S. Cl. 166—303

26 Claims



1. A method for removing initially immobile hydrocarbons from a diatomaceous formation or reservoir penetrated by a horizontal wellbore comprising:

- a) circulating an aqueous mixture containing a chemical additive into said horizontal wellbore at a rate and for a time sufficient to cause oil to flow from said diatomaceous formation which additive is present in an amount effective to enhance imbibition by increasing a rate of water uptake from said formation so as to increase oil flow therefrom; and
- b) removing oil or hydrocarbonaceous fluids from the formation to the surface.

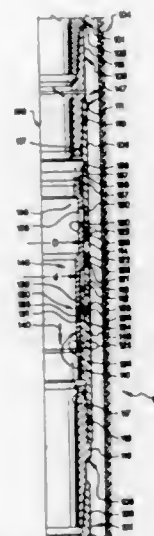
5,411,095

**APPARATUS FOR CEMENTING A CASING STRING**  
Jeffrey C. Ehlinger, Houston, and Frank Cole, Sugar Land, both of Tex., assignors to Davis-Lynch, Inc., Houston, Tex.

Filed Mar. 29, 1993, Ser. No. 38,234  
Int. Cl.<sup>6</sup> E21B 34/14, 33/16

U.S. Cl. 166—317

33 Claims



1. A port collar, for cementing a casing string having an upper and a lower end within a well bore, comprising:  
an outer, generally tubular-shaped barrel having an inner

and an outer surface with at least one fluid port disposed between and through the inner and outer surfaces of the barrel;

means for connecting the barrel to the casing string at a location intermediate the upper and lower ends of the casing string;

a movable, generally tubular shaped sleeve, having an inner bore and an outer surface, disposed within the barrel with the outer surface of the sleeve in a sealed relationship with the inner surface of the barrel, the sleeve having at least one fluid port extending between and through the inner bore and outer surface of the sleeve, and the inner bore of the sleeve includes a means for receiving a port collar engaging means;

a first means for releasably securing the sleeve within the barrel in a first position with the at least one fluid ports of the barrel and sleeve being longitudinally spaced from each other, whereby cement may not pass from the inner bore of the sleeve through the at least one fluid port of the barrel, the first releasable securing means requiring an application of a first predetermined hydraulic force upon the sleeve to release the sleeve and permit the sleeve to move in a first direction, longitudinally with respect to the barrel to a second position with the at least one fluid ports of the sleeve and the barrel in a mating, fluid communication relationship, whereby cement may pass from the inner bore of the sleeve and through the fluid ports into the well bore;

the sleeve requiring an application of a second predetermined force from the port collar engaging means, which is less than the first predetermined force, to move the sleeve and permit the sleeve to move in a second direction, opposite from the first direction of sleeve movement, longitudinally with respect to the barrel; and

means for locking the sleeve within the barrel in a third position with the at least one fluid ports of the barrel and sleeve being longitudinally spaced from each other, whereby cement may not pass from the inner bore of the sleeve through the at least one fluid port of the barrel.

5,411,096

**SURFACE CONTROLLED, SUBSURFACE TUBING SAFETY VALVE**

Neil H. Akkerman, 15106 Beacham, Houston, Tex. 77070

Continuation of Ser. No. 934,174, Aug. 21, 1992, abandoned.

This application Jun. 8, 1994, Ser. No. 255,460

Int. Cl.<sup>6</sup> E21B 34/10

U.S. Cl. 166—321

20 Claims

1. A surface controlled, subsurface tubing safety valve, comprising

a tubular body having a bore therethrough disposable in a tubing string,

a closure member movable within the body between positions opening and closing the bore,  
means yieldably urging the closure member to closed position,

a flow tube vertically reciprocable within the body,  
means yieldably urging the flow tube to an upper position to permit the closure member to close, and

means for lowering the flow tube to open the closure member, comprising

means including a pressure-responsive member having well pressure on one side and connected to the flow tube so as to lower the flow tube to open the closure member in response to the displacement of hydraulic fluid in a first chamber on the other side of the pressure responsive member,

means including a flexible metal membrane means which divides the first chamber on one side thereof from a second chamber on the other side thereof to which control fluid from a source at the surface may be supplied in order to displace hydraulic fluid in the first chamber, and

means in the second chamber which limits flexure of the

membrane means, responsive to the supply of control fluid thereto, so that the volume of hydraulic fluid



displaced in the first chamber is not substantially greater than that required to lower the flow tube to open the closure member.

5,411,097

**HIGH PRESSURE CONVERSION FOR CIRCULATING/SAFETY VALVE**

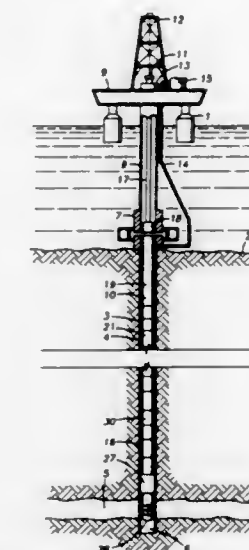
Kevin R. Manke, Flower Mound, and Paul Ringgenberg, Carrollton, both of Tex., assignors to Halliburton Company, Houston, Tex.

Filed May 13, 1994, Ser. No. 242,567

Int. Cl.<sup>6</sup> E21B 34/10

U.S. Cl. 166—324

15 Claims



1. An apparatus for use in a well, comprising:  
a housing having a central bore and a port through a wall in said housing;  
said housing further including a rupture port in said wall sealed by a rupture disc;  
a member slidably mounted in said housing between a first position closing said port and a second position opening said port, said member having an interior port in a wall of said member which communicates with said central bore,

said member and housing forming an annular cylinder with said member having a piston member extending into said cylinder; and  
said rupture port communicating with said cylinder on one side of said piston member and said interior port communicating with another side of said piston whereby a pressure differential across said piston member causes said piston member to slide said member from said first position to said second position.

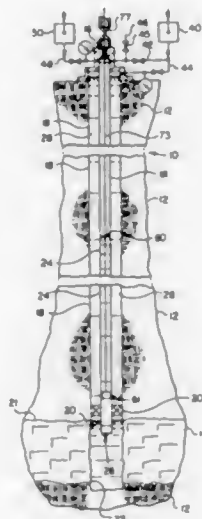
5,411,098

**METHOD OF STIMULATING GAS-PRODUCING WELLS**  
Joseph H. Schmidt, Anchorage, Ak., and Dennis R. Reimers, Farmington, N. Mex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Nov. 9, 1993, Ser. No. 149,579  
Int. Cl.<sup>6</sup> E21B 43/00

U.S. Cl. 166—369

10 Claims



1. A method of stimulating a subterranean coal seam to produce fluids therefrom and into which a wellbore has been drilled, comprising:  
filling at least a portion of said wellbore penetrating said coal seam with a fluid;  
providing an accumulator space operable to be in communication with said portion of said wellbore through a rapid opening closure;  
providing a fluid in said accumulator space and increasing the pressure of said fluid in said accumulator space with said closure in a closed position; and  
causing said closure to open rapidly to transfer the fluid pressure in said accumulator space into said portion of said wellbore to generate a pressure pulse acting on said coal seam.

5,411,099

**WELL TOOL AND METHOD**

Britt O. Braddick, 1038 Martin, Houston, Tex. 77018

Filed Nov. 30, 1993, Ser. No. 158,993

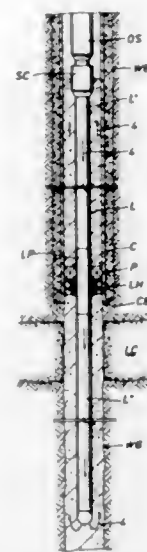
Int. Cl.<sup>6</sup> E21B 43/00

U.S. Cl. 166—387

7 Claims

1. A method of securing a liner in an overlapping well bore tubular member wherein the liner is releasably connected with an operating string and wherein the liner includes packer means and liner hanger means thereon comprising the steps of:  
lowering the liner into the well bore tubular member;  
manipulating the liner at a location remote from the liner hanger means to secure the liner hanger means with the overlapping well bore tubular member while maintaining the packer means secured against engaging the well bore tubular member flowing cement through the liner and out

the liner below the packer means and into the overlapping well bore tubular member above the packer means; and  
manipulating the liner at a location remote from the packer



means to engage and secure the packer means with the well bore tubular member to trap cement above the packer means and seal between the liner and the well bore tubular member.

5,411,100

**COMPRESSED AIR FOAM SYSTEM**

Michael A. Laskaris, Collegeville, and Richard E. Teske, Norristown, both of Pa., assignors to Hale Fire Pump Company, Conshohocken, Pa.

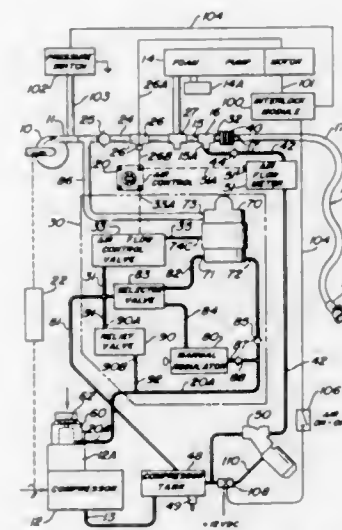
Continuation-in-part of Ser. No. 955,322, Oct. 1, 1992, Pat. No. 5,255,747. This application Jul. 8, 1993, Ser. No. 88,863

The portion of the term of this patent subsequent to Oct. 26, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> A62C 35/00

U.S. Cl. 169—14

9 Claims



1. A system for supplying compressed air and foam solution to produce a fire stream comprising an aerated foam, said system comprising:  
a mixing means having a foam solution inlet, a discharge, and an air inlet;  
a fire stream delivery means constructed and arranged to

receive fluid flow from the discharge of said mixing means;  
a fire pump for delivering water under pressure from a discharge thereof;  
a water supply conduit means for delivering water from the discharge of said pump to the foam solution inlet of said mixing means;  
water flow sensing means for sensing a flow rate of the water flowing through said water supply conduit means;  
a foam proportioner for delivering foam chemical into the water delivered by said water supply conduit means for making the foam solution;  
air conduit means for delivering the air to said air inlet of said mixing means;  
air flow sensing means for sensing a flow rate of the air flowing through said air conduit means;  
an air compressor for delivering the air at a discharge pressure to said air conduit means, said compressor having an inlet and a discharge;  
an inlet throttling valve means for varying a flow of air to said compressor inlet to thereby control the compressor discharge pressure, said inlet throttling valve means having a control chamber and a valve member responsive to pressure in said control chamber for varying the flow of air to said compressor inlet; and  
air flow control means for regulating the pressure of the air supplied to said control chamber of said inlet throttling valve means in accordance with the flow rate of the water sensed by said water flow sensing means and the flow rate of the air sensed by said air flow sensing means to automatically maintain the said flow rate of the air at a desired relationship to said flow rate of the water.

5,411,101

**COMBINATION CULTIVATOR AND EDGING TOOL**

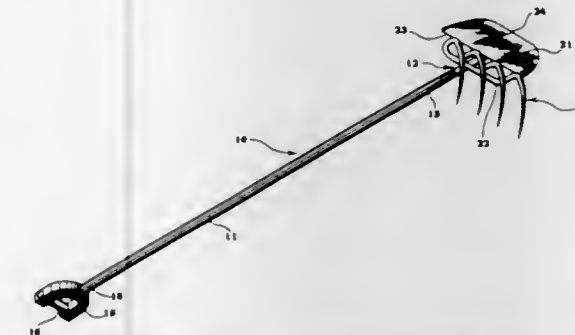
Michael Bonavitacola, 50 Woodvalley La., Port Washington, N.Y. 11050

Filed Jul. 22, 1993, Ser. No. 96,565

Int. Cl.<sup>6</sup> A01B 1/08, 1/14, 1/20; A01D 9/02

U.S. Cl. 172—378

2 Claims



2. A manually operated combination cultivator and edging tool comprising:  
an elongated handle having a central axis and two spaced opposite ends; and  
a transverse support member attached to one end of said handle perpendicular to said central axis;  
a plurality of downwardly projecting L-shaped tines separated by lateral spaces, each tine having a first leg integrally joined with said transverse support member and a second leg integrally joined with said first leg, said plurality of second legs being located within a first plane disposed generally perpendicular to said handle axis and said transverse support member; and  
a blade member having a blunt edge and a sharpened edge opposite said blunt edge, said blunt edge being connected to said plurality of first legs so that said blade member, said handle central axis, said first legs, and said transverse

support member are located substantially within a common second plane; said handle extending down between two of said first legs to contact said blunt edge of said blade member;  
wherein said first plane is disposed obliquely to the ground with said plurality of tines facing the ground for cultivating; and  
wherein said second plane is disposed perpendicular to the ground with said sharpened edge of said blade member facing the ground for edging, wherein pressure on said transverse support member facilitates entry of said sharpened edge into the ground.

5,411,102

**GRADER BLADE ATTACHMENT FOR SMALL TRACTORS**

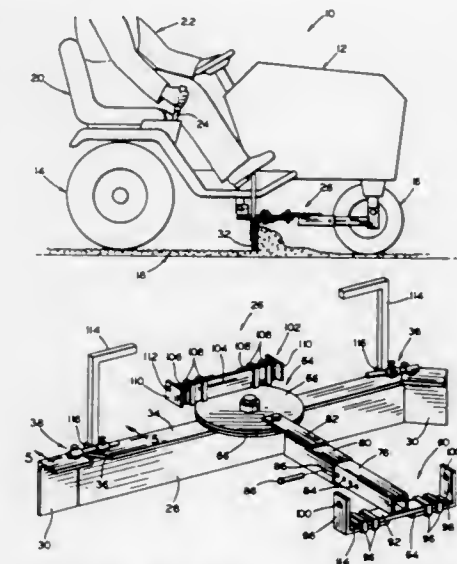
Dean R. Nickels, 11-429 Road J, Malinta, Ohio 43535, and Norman R. Nickels, 1-249 Road M, McClure, Ohio 43534

Filed Sep. 1, 1993, Ser. No. 115,912

Int. Cl.<sup>6</sup> E02F 3/76

U.S. Cl. 172—781

12 Claims



1. A tractor blade unit adapted for mounting on small tractors in place of an underslung mower deck, comprising a turntable, a grader blade carried by the turntable and mounted for pivoting movement to selected angular positions thereon, a drawbar affixed to the turntable, a front yoke affixed to the drawbar, and a rear yoke affixed to the turntable, the front and rear yokes including a pair of opposite end sections for attaching said front and rear yokes to the tractor, and at least one of said yokes is adjustable in width for selectively changing the spacing between said end sections.

5,411,103

**MOISTURE AND SOIL CONSISTENCY PROBE**

Mary K. Werner, Dayton, Ohio, assignor to M. W. Enterprises, Inc., Dayton, Ohio

Filed Mar. 7, 1994, Ser. No. 206,667

Int. Cl.<sup>6</sup> G01N 1/04

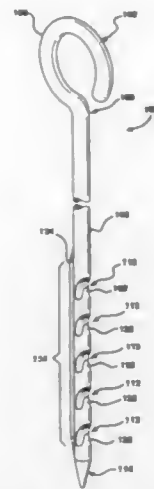
U.S. Cl. 175—20

15 Claims

1. A soil sampling probe comprising:  
a handle for grasping said probe; and  
a rod member defining a plurality of soil sampling slots positioned serially along a slot portion of said rod member and including a handle end connected to said handle and a soil penetrating end opposite said handle end for penetrating into soil, each of said plurality of soil sampling slots sloping inwardly and downwardly toward said soil penetrating end into said rod member to form an extended



substantially vertical lip for cutting and retaining soil within each of said plurality of soil sampling slots, wherein said probe is inserted into soil, rotated substantially



about a longitudinal axis of said rod member to substantially fill at least one of said plurality of soil sampling slots with soil and withdrawn to provide at least one soil sample.

5,411,104

## COALBED METHANE DRILLING

Matthew L. Stanley, Midland, Tex., assignor to Conoco Inc., Ponca City, Okla.

Filed Feb. 16, 1994, Ser. No. 197,440  
Int. Cl.<sup>6</sup> E21B 7/00

U.S. Cl. 175—65

9 Claims

1. A method for drilling a wellbore into a coalbed formation having a low permeability due to the highly anisotropic character of the natural fracture system within the coalbed formation wherein the anisotropic character of the coalbed formation includes face cleats which are longitudinal fractures that provide relatively highly permeable fluid communication paths, and butt cleats which are short transverse fractures that are relatively less permeable to fluid flow and wherein the face and butt cleats follow a generally locally fixed pattern throughout the formation being drilled, and further including the steps of;

- drilling or using a hole drilled substantially vertically into or near a coalbed formation;
- using primarily air, gas or a mixture of gases as a drilling fluid, drilling a horizontal borehole into the coalbed formation;
- determining the general direction of the face cleats within the coalbed formation; and
- orienting the drilling direction of the horizontal borehole to maximize intersection of the borehole and the face cleats.

5,411,105

## DRILLING A WELL GAS SUPPLY IN THE DRILLING LIQUID

Benjamin Gray, Alberta, Canada, assignor to Kldco Resources Ltd., Silver Valley

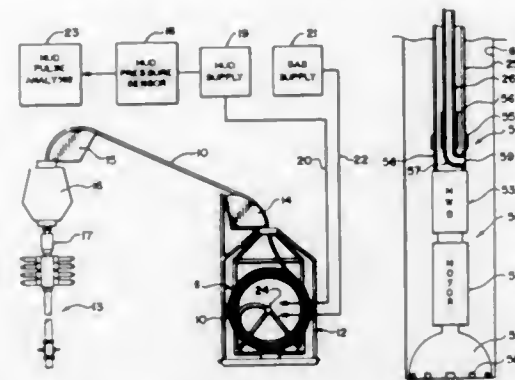
Filed Jun. 14, 1994, Ser. No. 260,365  
Int. Cl.<sup>6</sup> E21B 43/00

U.S. Cl. 175—69

6 Claims

1. A method of drilling a well comprising providing a drilling tool including a drill bit and a motor for the drill bit, providing a drill string comprising a continuous length of first tubing wound onto a reel, connecting the drilling tool to a downhole end of the drill string, sending the drilling tool and downhole end of the drill string down the well to effect drilling by paying out the first tubing from the reel, providing

within the first tubing a second tubing extending therealong from the reel to a position at or adjacent the drilling tool, supplying liquid through one of the first and second tubings, communicating the drilling liquid through the motor and drill



bit for effecting drilling, communicating gas through the other of the first and second tubings separately from the drilling liquid and releasing the gas into the well surrounding the drill string at or adjacent the drilling tool.

5,411,106

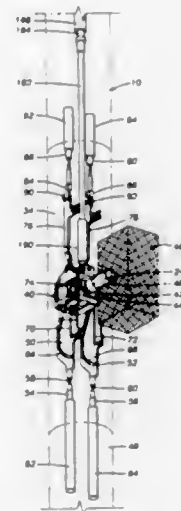
## METHOD AND APPARATUS FOR ACQUIRING AND IDENTIFYING MULTIPLE SIDEWALL CORE SAMPLES

Jacques Malissa; Marcelo F. Civarolo, and Derryl G. Schroeder, all of Houston, Tex., assignors to Western Atlas International, Inc., Houston, Tex.

Filed Oct. 29, 1993, Ser. No. 146,441  
Int. Cl.<sup>6</sup> E21B 25/02

U.S. Cl. 175—78

17 Claims



1. An apparatus for acquiring at least one sidewall core from a wellbore, said apparatus comprising;

- (a) a coring tool body having a core receptacle therein and being adapted for positioning at selected formation depths within said wellbore;
- (b) a rotary drive motor being located within said coring tool body;
- (c) a rotary coring bit movably located within said coring tool body, said bit orientable within said coring tool body from a coring position being substantially normal to the axis of said tool body to a core ejecting position in registry with said core receptacle, said rotary coring bit being extendable into said formation while being rotated by said rotary drive motor for acquisition of a core and being

retractable from said formation and into said coring tool body for recovery of said core;

- (d) means for selectively orienting said rotary coring bit at said coring position and said core ejecting position;
- (e) a core ejector operative at said core ejecting position of said rotary coring bit for moving the core from rotary coring bit and into said core receptacle; and
- (f) a speed reduction transmission within said coring tool body engaging said rotary drive motor in rotary driving relation with said rotary coring bit at said coring position, said speed reduction transmission providing a rotary output to said coring bit which has substantially lower speed and higher torque than provided by said motor.

5,411,107

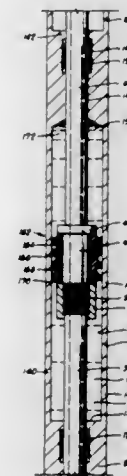
## COIL TUBING HYDRAULIC JAR DEVICE

Charles D. Hailey, 11628 Burning Oaks, Oklahoma City, Okla. 73150, and Ronald M. Beagle, 4129 Divison St., Metairie, La. 70002

Filed Aug. 3, 1993, Ser. No. 100,929  
Int. Cl.<sup>6</sup> E21B 31/13

U.S. Cl. 175—296

25 Claims



1. A jar device for suspension from coil tubing to loosen a stuck object, comprising:

- a tubular body having an upper end and an axial opening therethrough, and being positively coupled to a gripping means that can be secured to the stuck object;
  - a mandrel including an impact surface and being connected to an actuating plunger that extends reciprocally down through said axial opening;
  - connector means securing said mandrel upper end to the coil tubing to place vertical push and pull forces selectively on said mandrel;
  - a hydraulic cylinder with a central fluid restrictor of reduced diameter formed generally centrally along said tubular body axial opening;
  - a volume of fluid filling said hydraulic cylinder to approximately half full; and
  - a metering ring disposed on said actuating plunger and being reciprocal up and down through the hydraulic cylinder and central fluid restrictor in response to said vertical push and pull forces on said mandrel;
- whereby said metering ring and central restrictor coact on both the up and down mandrel reciprocations to delay plunger movement for subsequent release and accelerated movement to impact in both the up and down reciprocations.

5,411,108

## WALKING TRANSPORT VEHICLE

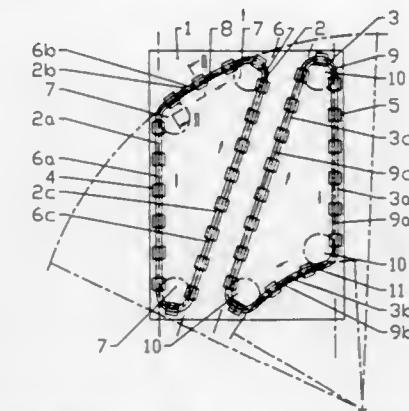
Vladilen I. Lobachev, and Ivan V. Lobachev, both of Degtyarny per., d.26, kv. 45, 193015, Leningrad, U.S.S.R.

Continuation of Ser. No. 934,441, Sep. 3, 1992, abandoned. This application Jun. 3, 1994, Ser. No. 253,838

Claims priority, application U.S.S.R., Mar. 13, 1990, 4801273  
Int. Cl.<sup>6</sup> B62D 51/06

U.S. Cl. 180—8.7

1 Claim



1. A track assembly for use on a walking transport vehicle having a platform with a top surface and a bottom surface and retractable legs within the track assembly comprising:

- a platform having a top surface and a bottom surface;
- a first and a second closed guide adapted for receiving the legs mounted substantially parallel to the bottom surface of the platform and having each a first section and a second section connected in series, said first section of each said guide passing rectilinearly and in parallel with said first section of said other of said guides, said second sections of said guides being substantially circular segments, each said circular segment lying in one plane normal to straight lines passing through centers of curvature of said circular segments, each said circular segment having a common center of curvature; and,
- a conveyor means for moving the legs along each of said guides.

5,411,109

## VEHICULAR HOOD PROP APPARATUS

Daryl L. Orns, P.O. 373, Wolcott, Ind. 47995

Filed Jun. 21, 1993, Ser. No. 78,923  
Int. Cl.<sup>6</sup> B62D 25/10

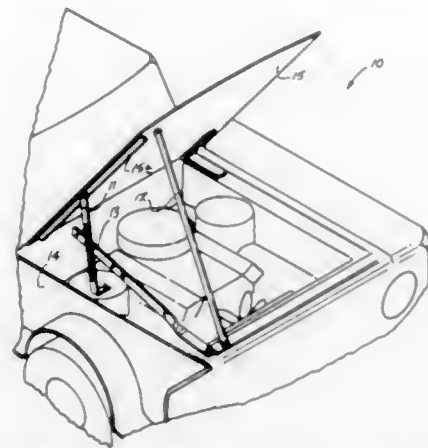
U.S. Cl. 180—69.2

4 Claims

1. A vehicular hood prop apparatus, for supporting a vehicular hood wherein the apparatus comprises,

- a first rigid leg spaced and structurally separated relative to a second rigid leg, and a third rigid leg structurally separated from the second leg, the third rigid leg having a third leg first end and a third leg second end, the third leg adjustably mounted to the first rigid leg adjacent to the third leg first end, and the third leg second end adjustably mounted within a vehicular engine compartment, with the

second leg having a second leg first free end for engaging the vehicular engine compartment and the second leg



having a second leg second free end for engaging the vehicle hood.

5,411,110

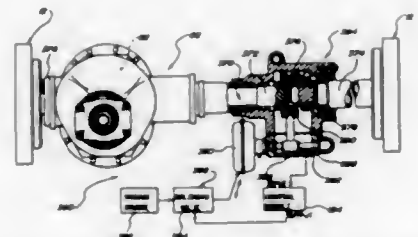
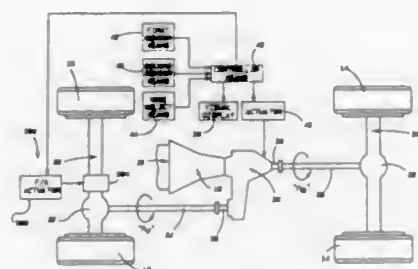
# POWER TRANSFER SYSTEM FOR A FOUR-WHEEL DRIVE VEHICLE

Robert J. Wilson, Warners; David Sperduti, Auburn, and Randy W. Adler, Seneca Falls, all of N.Y., assignors to New Venture Gear, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 28,299, Mar. 9, 1993, Pat. No. 5,363,938. This application Apr. 18, 1994, Ser. No. 228,670 Int. Cl.<sup>6</sup> B60K 17/354

U.S. Cl. 180-247

33 Claims



1. A power transfer system for a motor vehicle having a source of power capable of generating drive torque, comprising:

- a first axle assembly having a first differential interconnecting a first set of wheels;
- a second axle assembly having a second differential, a second set of wheels, an axle disconnect mechanism movable between a decoupled position for disconnecting said second set of wheels from said second differential and a coupled position for connecting said second set of wheels to said second differential, and a first actuator for moving said axle disconnect mechanism between said coupled and decoupled positions;
- first sensor means for sensing and generating a first input

signal indicative of the position of said axle disconnect mechanism;

- a transfer case having an input shaft rotatably driven by the power source, a first output shaft interconnected to said first differential for transmitting drive torque from the power source to said first set of wheels for establishing a two-wheel drive mode, a second output shaft interconnected to said second differential, a transfer clutch for selectively transmitting drive torque from said first output shaft to said second output shaft for establishing a four-wheel drive mode, said transfer clutch being operable for varying the drive torque transmitted therethrough by varying a clutch engagement force, a drive mechanism movable between a first position whereat a minimum clutch engagement force is generated and a second position whereat a maximum clutch engagement force, is generated and a second actuator for moving said drive mechanism between said first and second positions;

second sensor means for detecting an operating characteristic of the vehicle and generating a second input signal indicative thereof;

mode select means for enabling a vehicle operator to select one of said two-wheel drive mode, a part-time four-wheel drive mode, and an on-demand drive mode, said mode select means being operable to generate a mode signal indicative of the particular mode selected; and

controller means for controlling actuation of said first and second actuators in response to said first and second input signals and said mode signal, said controller means operable for causing said first actuator to move said axle disconnect mechanism to said decoupled position and said second actuator to move said drive mechanism to said first position when said mode signal indicates selection of said two-wheel drive mode, said controller means operable for causing said first actuator to move said axle disconnect mechanism to said coupled position and said second actuator to move said drive mechanism to said second position when said part-time four-wheel drive mode is selected, and said controller means operable for causing said first actuator to move said axle disconnect mechanism to said coupled position and said second actuator to vary the position of said drive mechanism between said first and second positions as a function of said second input signal for varying the drive torque transmitted through said transfer clutch when said on-demand drive mode is selected.

5,411,111

# ROLLING STAIRWAY

Christopher Greve, Covington, La., assignor to The Laitram Corporation, New Orleans, La.

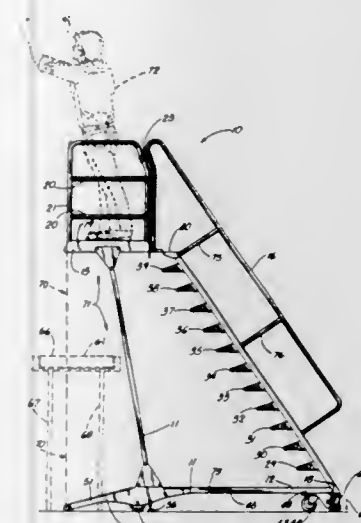
Filed Oct. 25, 1993, Ser. No. 142,800 Int. Cl.<sup>6</sup> E04G 3/00; E06C 5/00

U.S. Cl. 182-17

9 Claims

1. A rolling stairway apparatus comprising:
  - a) a frame having upper and lower end portions and a stairway extending between the upper and lower end portions, the stairway having a first tread at said lower end portion defining an entry to the stairway and a final tread at the upper end portion and a plurality of treads between the first and the final tread;
  - b) a platform supported upon the frame at the upper end portion and above the final tread that includes a flat surface that provides footing and a work area for a user that is substantially larger in area than the treads, the platform having a front edge portion and a rear edge portion, the front edge portion defining a frontal plane of the apparatus that limits placement of the platform against a vertical surface that extends as high as the platform;
  - c) the lower end portion of the frame including a wheeled base that includes a plurality of casters that includes at least a first pair of casters positioned generally under the front

- edge portion of the platform and a second pair of the casters being positioned under the entry;
- d) the frame providing structural support for holding the platform and stairway in elevated position and being configured to provide an open area below at least a portion of the platform and above the base so that objects can penetrate the frontal plane and occupy the area under the platform during use; and



- e) the base including a pair of spaced apart outrigger portions extending in front of the frame with a space therebetween, said outrigger portions having respective free ends that are positioned at the frontal plane, said first pair of casters being outrigger wheels positioned at the free ends of the outrigger portions respectively.

5,411,112

# APPARATUS FOR ESCALADING

David L. Jephcott, The Conifers, Heath Cote Avenue, Ashley Heath, Nr. Market Drayton, Shropshire, United Kingdom TF9 4QF

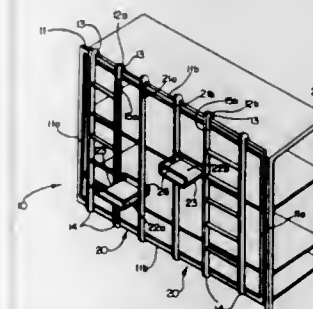
Filed Mar. 26, 1993, Ser. No. 37,270

Claims priority, application United Kingdom, Feb. 5, 1993, 9302283

U.S. Cl. 182-84

Int. Cl.<sup>6</sup> E04C 2/00

19 Claims



1. An apparatus for escalading comprising an upwardly extending framework adapted to be secured to a further structure; an upwardly extending ladder secured in the framework; and a goods hoist including load supporting means, and means for securing said goods hoist in said framework with said load supporting means being guided for continuous lateral and vertical movement relative to the framework to a plurality of positions.

5,411,113

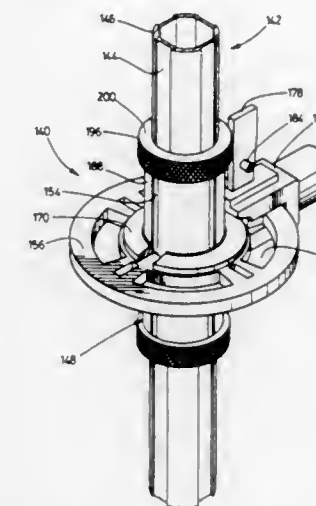
# ALUMINUM SCAFFOLD SYSTEM

Ronald Lubinski, 40 Centennial Heights Ct., Meaford, Ontario, Canada L0H 1Y8

Continuation-in-part of Ser. No. 729,150, Jul. 12, 1991, abandoned. This application Aug. 12, 1992, Ser. No. 928,336 Int. Cl.<sup>6</sup> E04G 7/14

U.S. Cl. 182-179

18 Claims



1. A scaffold comprising:
  - a plurality of uprights, each of the uprights comprising a tubular aluminum post extruded with a longitudinal aligning structure along its exterior and a plurality of flange assemblies associated with the post, each of the flange assemblies comprising an aluminum sleeve located about the associated post and extruded internally with a longitudinal aligning structure complementary to the aligning structure of the associated post, an annular aluminum flange mounted around the sleeve and formed with a set of openings in a predetermined spacing arrangement, means fixing the flange to the sleeve against relative rotation and relative longitudinal displacement, and means securing the sleeve to the associated post, the aligning structure of each of the flange assemblies being interlocked with the aligning structure of the post such that the sets of openings of the flange assemblies are in registration; and
  - a plurality of elongate braces for joining the uprights, each of the braces comprising a pair of connectors each at a different end of the brace, each of the connectors comprising a mouth portion shaped to receive a flange of any one of the uprights, a pair of aligned openings in the mouth portion positioned to register with one of the openings of the received flange, and a wedge shaped for insertion through the registered openings thereby to secure the connector to the received flange.

5,411,114

# COUPLER FOR QUICK DISCONNECT OIL CHANGE SYSTEM

Ram D. Bedi, and Adrianus J. van der Griendt, both of Bloomfield Hills, Mich., assignors to K.J. Manufacturing Co., Wixom, Mich.

Filed Feb. 22, 1994, Ser. No. 199,476

Int. Cl.<sup>6</sup> F16C 3/14

U.S. Cl. 184-1.5

4 Claims

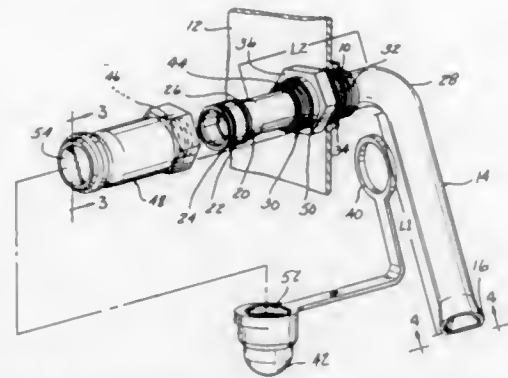
1. An apparatus for retrofitting a vehicle for changing oil in an internal combustion engine having an oil pan reservoir, the oil pan reservoir having a floor bottom and an access aperture on a sidewall of the oil pan reservoir, the apparatus for retrofitting the vehicle comprising:
  - a quick connect nipple;
  - a suction tube engageable through the access aperture hav-



ing an exterior surface and a first end positionably adjacent to the floor bottom and a second end external to the oil pan reservoir; and  
 an adapter slidably mounted on the exterior surface of the suction tube and having a first end adaptable to sealingly engage with the access aperture and a second end adaptable to sealingly engage with the quick connect nipple.

4. An apparatus for retrofitting a vehicle for changing oil in an internal combustion engine having an oil pan reservoir, the oil pan reservoir having a floor bottom and access plug threadably removable for providing an aperture on a sidewall of the oil pan reservoir, the apparatus for retrofitting the vehicle comprising:

a quick connect nipple;



a bent suction tube having a diameter for engaging through the access aperture such that a first end of the tube engages the floor bottom of the oil pan reservoir, said first end of the suction tube is flattened and widened, wherein the flattened end lies against the oil pan floor; said suction tube having a second end external to the oil pan reservoir, said second end being slightly flared; and

a slidable adapter mounted on the suction tube between the bend and the flared end, said adapter having a first end threadably mating to the access aperture and a second end engaging with the flared end of the suction tube thereby providing an annular seal of said suction tube and slidable adapter, said second end of said adapter threadably mating to the quick connect nipple.

#### 5,411,115 OIL DRAIN PLUG

Alan Shropshire, 220 Oak St., Gilbertsville, Pa. 19525  
 Filed Mar. 7, 1994, Ser. No. 206,707  
 Int. Cl.<sup>6</sup> F16C 3/14; F16N 33/00

U.S. Cl. 184-1.5 3 Claims

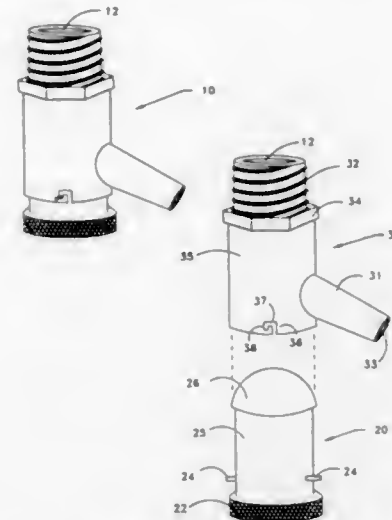
1. An improved drainage plug for draining oil from the existing oil drainage hole in an engine consisting of:

a first portion, said first portion having a stepped axial bore extending therethrough, said axial bore having an upper reduced diameter neck portion and an enlarged diameter lower portion, said axial bore forming an outer wall, and having an upper fluid inlet and a lower open end, and said first portion including threaded means for attaching said first portion to said existing oil drainage hole such that fluid communication is established between said oil drainage hole and said axial bore;

an outwardly and downwardly projecting tapered fluid outlet formed in said outer wall, in open fluid communication with said axial bore, intermediate said fluid inlet and said lower open end;

a second generally cylindrical portion dimensioned to be axially received in said lower portion of said first portion and further including an enlarged arcuate resilient sealing means having a crown dimensioned to sealingly engage the reduced diameter neck portion and having a peripheral edge portion dimensioned to sealingly engage the enlarged diameter lower portion of said first portion; and adjustable engagement means allowing for the selective

positioning of said sealing means at predetermined positions within said axial bore, such that said sealing means may be manipulated by said adjustable engagement means to a first position wherein said sealing means is positioned within said axial bore between said fluid outlet and the oil drainage hole, and where said sealing means may be further manipulated by said engagement means to a second position where fluid communication exists between the oil drainage hole, said axial bore, and said fluid outlet;



whereby, in said first position no oil passes through said fluid outlet and in said second position, oil is free to pass therethrough; wherein, said adjustable engagement means cooperating slots and protruding members located on said first and second portions, whereby the crown of said resilient sealing means must first be forcibly deformed and then relaxed to engage the sealing means in said first position, then counter-rotated while being forcibly deformed, then relaxed and withdrawn relative to said portion to dispose said sealing means in said second position.

#### 5,411,116 SELF-SCAVENGING, HYBRID LUBRICATION SUBSYSTEM

Jules G. Kish, Milford; Stephen R. Sammataro, Norwalk, and Charles J. Isabelle, Winsted, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 22, 1994, Ser. No. 263,584

Int. Cl.<sup>6</sup> F01M 3/00, 9/00

U.S. Cl. 184-6.12 16 Claims

1. A self-scavenging, hybrid lubrication subsystem for a main transmission gearbox that includes a lower portion having a planetary gearing system operationally housed therein, the lower portion of the main transmission gearbox being defined by a bottom wall and a side wall, said self-scavenging, hybrid lubrication subsystem comprising:

a sump containing lubricating medium that defines a dynamic fluid level, said sump being fabricated as an integral structural extension of the lower portion of the main transmission gearbox so that the dynamic fluid level of the lubricating medium in said sump is a predetermined height above the bottom wall of the main transmission gearbox; the side wall of the lower portion of the main transmission gearbox being structurally modified to include

a cylindrical segment defined by a first predetermined radius,

a transition segment contiguous with said cylindrical segment,

a throat segment defined by a second predetermined radius,

said first predetermined radius being greater than said second predetermined radius wherein a radial discontinuity is defined therebetween, and

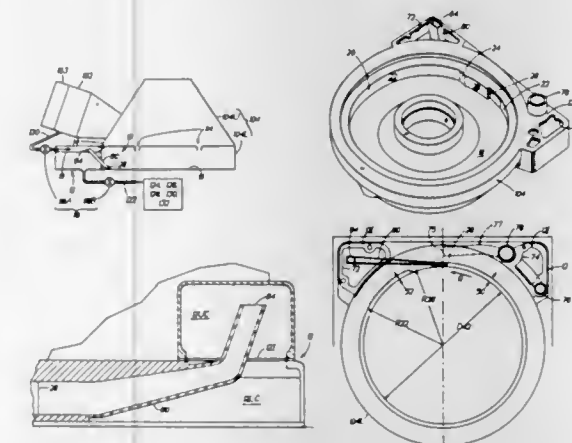
a nozzle inlet defined by the radial discontinuity between said cylindrical segment and said throat segment, the inner and outer walls defining said nozzle inlet being tangent to said throat and cylindrical segments, respectively;

a nozzle having an intake end and an outflow end, said intake end being defined by said nozzle inlet and said outflow end being positioned in said sump so that said outflow end is above the dynamic fluid level of said sump;

the planetary gear train including an annular planetary carrier plate having a peripheral surface defined by a predetermined radius, said annular planetary carrier plate being subjected to rotational motion during operation of the planetary gear train;

said peripheral surface of said annular planetary carrier plate and said cylindrical and throat segments of said structurally-modified side wall in combination forming primary and restricted flow channels defined by first and second gaps having first and second radial dimensions, respectively; and

a deflection plate mounted in combination with said annular planetary carrier plate to define a third gap having a vertical dimension between said deflection plate and the bottom wall of the main transmission gearbox;



interaction between said deflection plate and the bottom wall of the main transmission gearbox exerting a viscous pumping action on lubricating medium collected in the bottom of the main transmission gearbox that imparts a rotational and centrifugal velocity to the lubricating medium that causes the lubricating medium to flow outwardly into said primary and restrictive flow channels;

interaction between said peripheral surface of said rotating annular planetary carrier plate and said structurally-modified side wall exerting a viscous pumping action on the lubricating medium in said primary and restrictive flow channels to cause the lubricating medium to flow there-through; and wherein

substantially all of the lubricating medium flowing in said primary flow channel is diverted through said nozzle inlet and transported through said nozzle to said sump.

10. A self-scavenging, hybrid lubrication subsystem for a helicopter main transmission gearbox that includes an upper portion and a lower portion having a planetary gearing system operationally housed therein, the lower portion of the main transmission gearbox being defined by a bottom wall and a side wall, said self-scavenging, hybrid lubrication subsystem comprising:

a sump containing lubricating medium that defines a dynamic fluid level, said sump being fabricated as an integral structural extension of the lower portion of the main transmission gearbox so that the dynamic fluid level of the

lubricating medium in said sump is a predetermined height above the bottom wall of the main transmission gearbox; the side wall of the lower portion of the main transmission gearbox being structurally modified to include

a cylindrical segment defined by a first predetermined radius,

a transition segment contiguous with said cylindrical segment,

a throat segment defined by a second predetermined radius,

said first predetermined radius being greater than said second predetermined radius wherein a radial discontinuity is defined therebetween, and

a nozzle inlet defined by the radial discontinuity between said cylindrical segment and said throat segment;

a nozzle having an intake end and an outflow end, said intake end being defined by said nozzle inlet and said outflow end being positioned in said sump so that said outflow end is above the dynamic fluid level of said sump;

wherein the planetary gear train is a stacked compound planetary gear train that includes

a driving sun gear,

a plurality N of stacked primary planetary pinions functionally interacting with said driving sun gear, said plurality N of stacked primary planetary pinions including a first plurality N/2 of upper primary planetary pinions, and a second plurality N/2 of lower primary planetary pinions, and wherein said upper and lower primary planetary pinions are disposed in a staggered, biplanar relationship,

a plurality N of secondary planetary pinions,

a compound drive shaft supporting a respective primary planetary pinion and a secondary planetary pinion,

a fixed ring gear interacting with said plurality of secondary planetary pinions, and

a planetary carrier assembly disposed in rotatable combination with said compound drive shafts, said planetary carrier assembly including an annular planetary carrier plate having a peripheral surface defined by a predetermined radius, and wherein said annular planetary carrier plate is subjected to rotational motion during operation of said stacked compound planetary gear train;

said peripheral surface of said annular planetary carrier plate and said cylindrical and throat segments of said structurally-modified side wall in combination forming primary and restricted flow channels defined by first and second gaps having first and second radial dimensions, respectively;

a deflection plate mounted in combination with said annular planetary carrier plate to define a third gap having a vertical dimension between said deflection plate and the bottom wall of the main transmission gearbox;

interaction between said rotating deflection plate and the bottom wall of the main transmission gearbox exerting a viscous pumping action on lubricating medium collected in the bottom of the main transmission gearbox that imparts a rotational and centrifugal velocity to the lubricating medium that causes the lubricating medium to flow outwardly into said primary and restrictive flow channels;

interaction between said peripheral surface of said rotating annular planetary carrier plate and said structurally-modified side wall exerting a viscous pumping action on the lubricating medium in said primary and restrictive flow channels to cause the lubricating medium to flow there-through; and wherein

substantially all of the lubricating medium flow through said primary flow channel is diverted through said nozzle inlet and transported through said nozzle to said sump; and means for recirculating lubricating medium in said sump to the main transmission gearbox.

5,411,117

## SAFETY DEVICE ARRANGEMENT

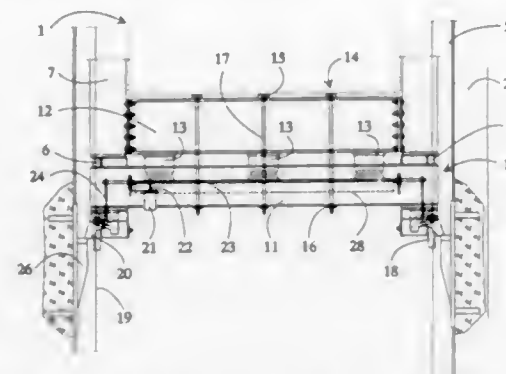
Seppo Häyrynen, Helsinki, Finland, assignor to Kone Elevator GmbH, Baar, Switzerland

Filed Jul. 6, 1993, Ser. No. 85,878

Claims priority, application Finland, Jul. 7, 1992, 923114  
Int. Cl.<sup>6</sup> B66B 5/16

U.S. Cl. 187—360

19 Claims



1. A safety device arrangement for stopping downward drift of an elevator car, the elevator car having a car supporting frame inside which the elevator cabin is fitted, the elevator travels in an elevator shaft, means for moving the elevator in the elevator shaft being attached directly to the car supporting frame, the arrangement comprising:

- a controllable arrester mounted on the supporting frame of the elevator car;
- at least one latch on the arrester;
- at least one stop block being placed in the elevator shaft so as to be substantially immovable relative to the shaft, said at least one stop block acting as a detent for the at least one latch; and
- at least one buffer element between the arrester and the car supporting frame of the elevator car, resulting supporting forces are passed between the car supporting frame and the arrester substantially only through the at least one buffer element when the elevator car rests on the at least one latch engaged by the at least one stop block.

5,411,118

## ARRIVAL TIME DETERMINATION FOR PASSENGERS BOARDING AN ELEVATOR CAR

Kandasamy Thangavelu, Avon, and Venkataramana S. Pullela, North Granby, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.

Continuation of Ser. No. 659,108, Feb. 21, 1991, abandoned.  
This application Mar. 30, 1993, Ser. No. 41,145

Int. Cl.<sup>6</sup> B66B 1/18

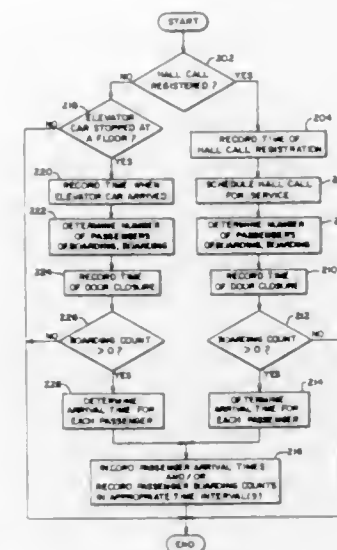
U.S. Cl. 187—392

9 Claims

1. In an elevator car system servicing a building having a plurality of floors, each of the floors having hall call buttons for requesting service in a travel direction, a method of dispatching including determining a unique arrival time for each of the passengers boarding an elevator car at a floor for travel in a direction, comprising:

- dispatching an elevator car to a predetermined floor in response to a hall call registered thereat;
- opening the elevator car door at the predetermined floor to allow passengers to enter and leave the elevator car;
- closing the elevator car door;
- determining the number (N) of passengers which boarded the elevator car at the predetermined floor;
- determining the time period between when the hall call was registered and when the elevator car door closed;
- dividing the time period between when the hall call was registered and when the elevator car door closed into about N predetermined time portions;
- determining the time of day of the arrival of the Nth passenger to have boarded the elevator car by adding (N-1) of said predetermined time portions to the time of day when the hall call was registered; and

ger to have boarded the elevator car by adding (N-1) of said predetermined time portions to the time of day when the hall call was registered; and



dispatching elevator cars in accordance with a method which uses said time of day of the arrival of the Nth passenger.

5,411,119

## INTERNAL SHOE-DRUM BRAKE ADJUSTER CAM WITH LEVERAGE PROJECTIONS FOR BRAKE DISENGAGEMENT

Keith Burton, and Timothy J. Hunt, both of Gwent, Wales, assignors to Lucas Industries, West Midlands, England

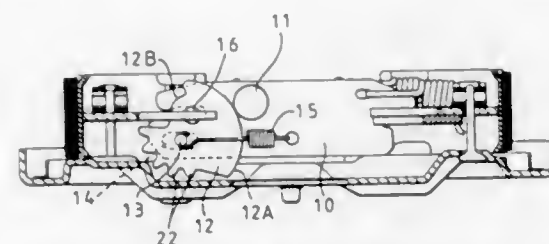
Filed Jun. 10, 1991, Ser. No. 712,524

Claims priority, application United Kingdom, Jun. 19, 1990, 9013612

Int. Cl.<sup>6</sup> F16D 65/52, 51/18

U.S. Cl. 188—79.51

14 Claims



1. An internal shoe drum brake comprising a pair of brake shoes separable by actuating means into braking engagement with a brake drum, and an automatic adjuster in the form of a strut extending between the shoes which includes a pair of strut parts of which one is a toothed adjuster element pivotally mounted on the other strut part and cooperating with toothed means rigid with said other part, resilient means acting linearly in a direction longitudinally of the strut and serving to bias the strut parts so as to normally maintain the teeth of the adjuster element and the toothed means in engagement, the strut parts being operatively associated respectively with the shoes in such a manner that excessive separation of the shoes upon brake actuation results in separation of the teeth of the adjuster element and the toothed means and angular movement of the element, enabling said teeth to re-engage in a fresh position, upon brake release, to increase the effective length of the strut and thereby set a new outwardly adjusted retracted position of the shoes, the pivotal adjuster element being provided with release means arranged generally radially of a pivotal connection of the adjuster element with the other strut part and at a location generally diametrically opposed to the teeth of the adjuster element, said release means being adapted for engagement by an external tool in order to move the adjuster element generally longitudinally of the strut so as to disengage the adjuster element from the other strut part and thereby permit rotation of the adjuster element towards a de-adjusted position, the line of action of the resilient means being radially inwardly of said release means.

5,411,120  
TRAILER BRAKE SYSTEM WITH RELEASE APPARATUS

Robert L. Null, Rte. 1, Box 344, Willow Wood, Ohio 45696

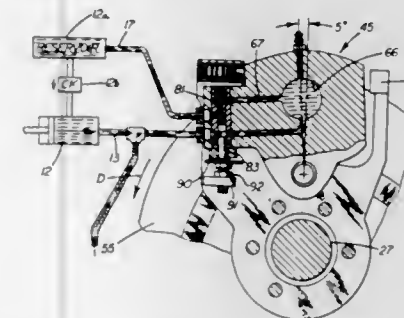
Continuation of Ser. No. 856,544, Mar. 24, 1992, Pat. No. 5,316,110. This application Feb. 10, 1994, Ser. No. 195,941

The portion of the term of this patent subsequent to May 31, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B60T 7/20

U.S. Cl. 188—112 R

10 Claims



1. A brake unit including a disc brake assembly having brake pads for a trailer or other towed vehicle to provide release of the brake pads from firm braking engagement with a rotor upon backing comprising:

- a stationary mounting bracket for attachment to the vehicle for supporting the disc brake assembly;
- hydraulic means for moving the pads into and out of engagement with the rotor in response to the presence and absence of hydraulic pressure for forward braking and backing non-braking modes of vehicle operation, respectively;
- a caliper unit including a housing for mounting said pads for relative movement toward and away from said rotor and into and out of engagement therewith;
- said hydraulic means including a piston within a brake cylinder in said housing in operative engagement with at least one of said pads to provide said relative movement; and
- means for securely mounting said caliper unit to said mounting bracket for stable pivoting movement in response to the rotor movement upon backing;
- said mounting bracket including a yoke having spaced arms for receiving and substantially embracing said housing and restricting said pivoting movement of said caliper unit to provide additional stability,
- whereby, said brake unit is effective to provide efficient braking during forward movement and automatic release upon backing in response to said hydraulic means.

5,411,121

## DEICING DEVICE FOR CABLE

Jean-Louis LaForte, 246, rue Régent, Chicoutimi, Québec, Canada G7G 2V7; Marc-André Allaire, 60, rue Valin, St-Fulgence, Québec, Canada G0V 1S0, and Masoud Farzaneh, 868, Pêre Champagnat, Chicoutimi, Québec, Canada G7H 3P6

Filed Mar. 22, 1994, Ser. No. 215,704

Int. Cl.<sup>6</sup> H02G 7/16; B60M 1/13

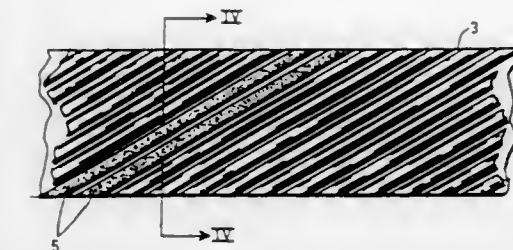
U.S. Cl. 191—33 PM

6 Claims

1. A deicing device for a cable comprising a plurality of helically wound strands made of conductor material, said device comprising:

at least one pair of conductive wires substituted for at least two strands of said cable, each wire of said pair being connected together at one end;

insulator means for electrically insulating said strands from said at least one pair of conductive wires, and said wires of each pair;



pulsing means connected to another end of said at least one pair of conductive wires for generating an electromagnetic pulse within said wires; whereby, when said pulsing means generates said electromagnetic pulse, said pulse travels in said at least one pair of conductive wires, which creates a repulsive force between the conductive wires of each pair that shake the wires and shatters the ice that may be attached to the cable.

5,411,122

## CONE RAMP CLUTCH

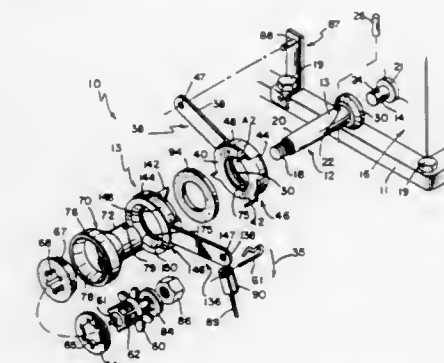
Roderick N. Uphaus, Richmond, Ind., assignor to Hoffco, Inc., Richmond, Ind.

Filed May 24, 1993, Ser. No. 66,464

Int. Cl.<sup>6</sup> F16D 13/28, 23/12

U.S. Cl. 192—66

36 Claims

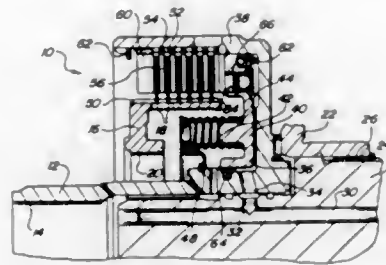


1. A clutch assembly for transmitting power from a drive shaft to a driven mechanism, the assembly comprising means for receiving power from a drive shaft, means for transferring power to the driven mechanism, and means for connecting the receiving means and the transferring means to transmit power, the connecting means including a thrust bearing assembly and a central hub having triangular camming tabs formed on the central hub to project in a first direction orthogonally from a plane of the central hub and rectangular bearing-retaining tabs formed on the central hub to project in an opposite second direction from the central hub, the bearing-retaining tabs and the triangular tabs being arranged to lie in coextensive relation to one another, the rectangular tabs being situated to define an interior region therebetween, the connecting means further including a thrust bearing assembly mounted in said interior region.



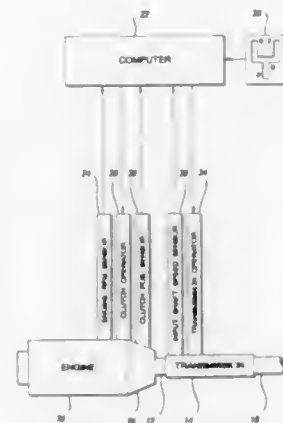
**5,411,123**  
**CARTRIDGE BALL CHECK VALVE HAVING INTEGRAL FILTER FOR AN AUTOMATIC TRANSMISSION CLUTCH**

Dawn A. Rej, Plymouth, and Carlton J. Fendt, Jr., Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.  
Filed Dec. 27, 1993, Ser. No. 172,800  
Int. Cl.<sup>6</sup> F16D 25/0638, 25/12  
U.S. Cl. 192—85 AA 4 Claims



1. A friction element for engaging and releasing a drive connection between first and second members of the friction element operated by hydraulic fluid, comprising:
  - a cylinder;
  - passages for pressurizing and venting the cylinder;
  - a first set of friction discs driveably connected to the first member;
  - a second set of friction discs driveably connected to the second member, each disc of the second set of friction discs located between a disc of the first set of friction discs;
  - a piston located in the cylinder for displacement along the cylinder, applying force to the friction discs, thereby producing a drive connection therebetween, having an opening therethrough;
  - a check valve means supported on said piston, located in said opening, for closing the check valve means when the cylinder is pressurized; and
  - filter means fixed to the check valve, located between the check valve and cylinder for preventing passage of contaminants present in the fluid.

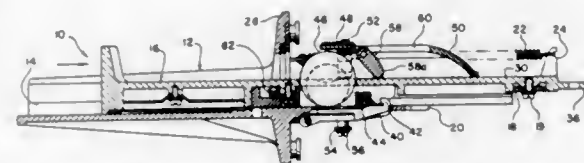
**5,411,124**  
**METHOD AND APPARATUS FOR DETERMINING CLUTCH TOUCH POINT**  
Otis J. Olson, Farmington Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio  
Filed Aug. 26, 1993, Ser. No. 112,568  
Int. Cl.<sup>6</sup> B60K 41/02  
U.S. Cl. 192—103 R 7 Claims



1. Apparatus for determining a touch point position of a

clutch coupling a vehicle engine with a transmission input shaft, said apparatus comprising means for moving said clutch from a disengaged position toward an engaged position, first sensor means for sensing a speed of said input shaft, second sensor means for sensing the position of said clutch, computer means responsive to inputs from said first and second sensor means, and providing an output to control the positioning of said clutch, said computer means being programmed to move said clutch at a substantially constant rate toward said engaged position while detecting first and second positions of said clutch when the speed of said input shaft is respectively at first and second predetermined speeds, said computer means being programmed to calculate said touch point position equal to said first position minus an offset position equal to the distance between said first and second position times the square root of the ratio of said first and second speeds.

**5,411,125**  
**COIN CHUTE ASSEMBLY WITH ANTI-PRY COIN SLIDE**  
John C. Hjordahl, Lothian, Md., assignor to HOF Service Company, Inc., Silver Spring, Md.  
Continuation of Ser. No. 854,691, Mar. 20, 1992, Pat. No. 5,303,808. This application Apr. 13, 1994, Ser. No. 227,245  
The portion of the term of this patent subsequent to Apr. 19, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> G07F 5/06  
U.S. Cl. 194—202 10 Claims

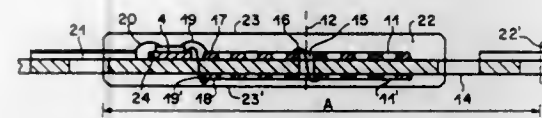


2. An anti-pry assembly adapted to be coupled to an existing coin slide, comprising:
  - a baffle adapted to be coupled to an existing coin slide, and having a forward end, a rearward end, an upper wall extending between said forward and rearward ends, and a pair of opposite side walls extending from said upper wall;
  - a gate member pivotally coupled to said baffle substantially adjacent said forward end of said baffle and above a linear coin path of the coin slide for pivotal movement of said gate member upwardly out of the coin path upon engaging a coin to permit passage of the coin underneath said gate member in one direction along the coin path, and for pivotal movement of said gate member downwardly back into the coin path after the coin passes underneath said gate member and prior to the coin reaching a coin discharge position to prevent passage of the coin in the opposite direction along the coin path, said gate member and said baffle being sized to be coupled to an existing coin slide.

**5,411,126**  
**COIN DETECTOR**  
Thomas Seitz, Zug, Switzerland, assignor to Landis & Gyr Business Support AG, Zug, Switzerland  
Filed May 17, 1993, Ser. No. 72,913  
Claims priority, application Switzerland, Jun. 6, 1992, 1782/92  
Int. Cl.<sup>6</sup> G07D 5/08  
U.S. Cl. 194—317 17 Claims

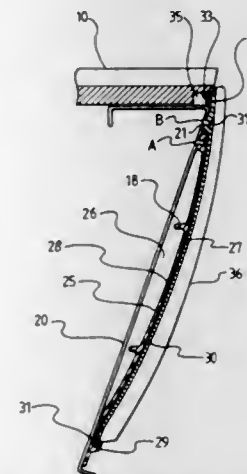
1. A coin detector for inductively scanning coins moving in a direction in a channel, comprising:
  - (a) an LC oscillator designed to produce a high frequency alternating current, comprising a single coil and an oscillator circuit;
  - (b) the single coil located at one side of the channel, the coil

connected to produce an alternating field penetrating the channel at a right angle to the coin's direction of movement, the coil comprising at least one flat helicoidal conductor arrangement on a single flexible insulation film; and



- (c) a detector circuit mounted on the insulation film outside the conductor arrangement, comprising the oscillator circuit and a measuring circuit, the measuring circuit being arranged to detect a frequency change in the alternating field indicating a presence of a coin, the detector circuit being connected by a two pole feeder to a feeding device and by a signaling line to a recognition circuit.

**5,411,127**  
**ESCALATORS**  
Alexander Findlay, Auckland, New Zealand, assignor to Escalator Advertising Limited, Auckland, New Zealand  
Filed Jul. 15, 1994, Ser. No. 275,403  
Claims priority, application New Zealand, Aug. 5, 1993, 248337  
Int. Cl.<sup>6</sup> B66B 23/12  
U.S. Cl. 198—333 4 Claims

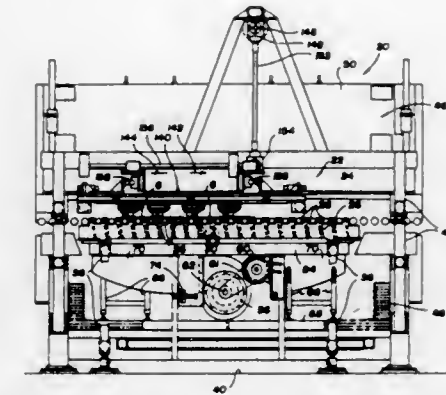


4. A step for an escalator, said step having a cover plate fastened to an exterior surface thereof, wherein said cover plate is fastened by means including in combination: a projecting flange adjacent an edge of said cover plate and a complementary channel in which said flange can be engaged, with said cover plate being pivotally movable relative to said step on said engaged flange and channel; and at least one fastener passing through an aperture in said cover plate spaced away from said edge, to fasten onto said step.

**5,411,128**  
**HEATED GLASS SHEET POSITIONING ON ROLL CONVEYOR**  
Michael J. Vild, 2526 Meadowood St., Toledo, Ohio 43606, and Daniel G. Common, 926 Mambino, Oregon, Ohio 43616  
Filed Jan. 3, 1994, Ser. No. 177,360  
Int. Cl.<sup>6</sup> B65G 47/00  
U.S. Cl. 198—345.1 22 Claims

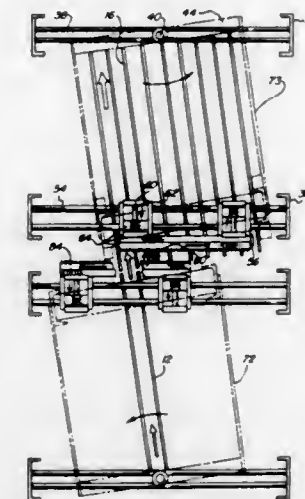
1. Glass sheet roll conveyor apparatus, comprising:

a roll conveyor having spaced rolls for conveying a heated glass sheet in a direction of conveyance;  
an air hearth having openings for supplying upwardly directed pressurized air between the conveyor rolls;  
an elevator for providing relative vertical movement between the rolls of the roll conveyor and the air hearth between: (a) a first position where the glass sheet is supported on the rolls for conveyance, and (b) a second



- position where the rolls are located at a lower position relative to the air hearth than in the first position such that upwardly directed pressurized air supplied by the air hearth floats the heated glass sheet above the rolls; and a positioner for positioning the heated glass sheet while floated above the conveyor rolls by the air hearth to allow subsequent support and conveyance of the heated glass sheet on the rolls at a desired position.

**5,411,129**  
**DUAL MOTION DIVIDER FOR NON-ROUND BOTTLES**  
G. William Crouch, Colchester, Conn., assignor to B & B Equipment, Inc., Middletown, Conn.  
Filed Nov. 10, 1993, Ser. No. 130,688  
Int. Cl.<sup>6</sup> B65G 47/26  
U.S. Cl. 198—442 17 Claims



11. A dual motion divider for articles moving along a conveyor belt comprising:
  - (a) an intake lane defining member having article receiving and discharge ends and elongated parallel spaced partition walls extending between said ends defining an intake lane for articles carried on an associated conveyor belt, said member being pivotable at its article receiving end in an arc extending transversely of the partition walls and movable at its discharge end to alter the position of the end of

- said intake lane at the discharge end of the intake lane defining member, said member further having a pair of coupled lane support members at the ends thereof and said partition walls are supported thereby;
- (b) a discharge lane defining member having article receiving and discharge ends and a multiplicity of elongated parallel spaced partition walls extending between said ends defining a plurality of discharge lanes for articles carried on an associated conveyor belt, said discharge lane defining member being pivotable at its article discharging end in an arc extending transversely of said partition walls and movable at its article receiving end to alter the position of the ends of the lanes of said discharge lane defining member at said article receiving end thereof, said movable ends of said members being adjacent each other, said member further having a pair of coupled lane support members at the ends thereof and said partition walls are supported thereby; and
- (c) drive means connected to each of said lane defining members to move concurrently said movable ends in opposite directions and bring said intake lane into alignment with a predetermined one of said discharge lanes.

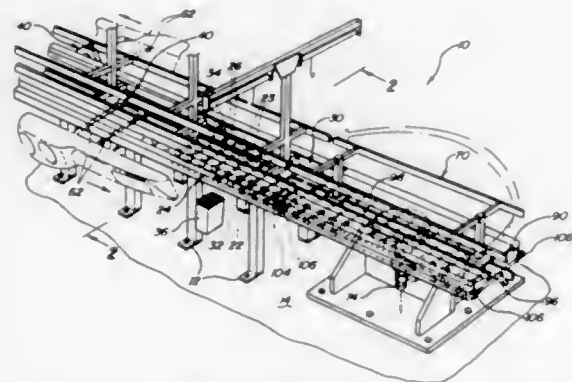
5,411,130

# CONVEYOR SYSTEM WITH TURN TABLE TRANSFERRING MEANS

Andrew Noestheden, Tecumseh, Canada, assignor to Valiant Machine & Tool, Inc., Windsor, Canada  
Filed Feb. 17, 1994, Ser. No. 197,725  
Int. Cl.<sup>6</sup> B65G 47/26

U.S. Cl. 198—457

12 Claims



1. A conveyor system comprising:
- a frame having a first elongated rail and a second elongated rail, said rails being spaced apart from each other,
  - a plurality of first rollers,
  - means for rotatably mounting said first rollers to said first rail at longitudinally spaced positions therealong so that said first rollers define a first conveyor line,
  - a plurality of second rollers,
  - means for rotatably mounting said second rollers to said second rail at longitudinally spaced positions therealong so that said second rollers define a second conveyor line,
  - a pallet having means for supporting a work piece, said pallet adapted to be supported by either said first rollers or said second rollers,
  - means for transferring said pallet from said first conveyor line to said second conveyor line comprising a turntable, said turntable having a first set of a plurality of longitudinally spaced rollers defining a conveyor line section, means for rotating said turntable between a first position in which said conveyor line section is aligned with said first conveyor line and a second position in which said conveyor line section is aligned with said second conveyor line;
- wherein said transferring means further comprises a second set of a plurality of longitudinally spaced rollers on said

turntable, said second set defining a second conveyor section spaced apart and parallel to said first mentioned conveyor section by a distance substantially the same as said rails so that when said first mentioned conveyor section is aligned with said first conveyor line, said second conveyor section is aligned with said second conveyor line, and vice versa.

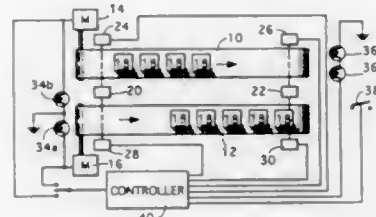
5,411,131

# NON-SYNCHRONOUS CONVEYOR SYSTEM FOR ASSEMBLY OPERATIONS

Richard P. Haegele, 888 Linden Dr., Elmhurst, Ill. 60126  
Filed Jun. 13, 1994, Ser. No. 259,693  
Int. Cl.<sup>6</sup> B65G 37/00

U.S. Cl. 198—572

6 Claims



1. A non-synchronous conveyor system for transporting articles between first and second workstations said system comprising
- a plurality of conveyors adapted to receive, support and transport articles from a first workstation to a second workstation;
  - means for driving each of said conveyors independently of the other said conveyors, at least one in a deliver mode and at least one in an accumulate mode at any time;
  - said driving means for a conveyor in the deliver mode operating to incrementally operate said conveyor each time an article is removed therefrom, and said driving means for a conveyor in the accumulate mode operating to incrementally operate said conveyor each time an article is placed thereon; and
  - means for alternating the operation of said conveyors between said deliver and accumulate mode.

5,411,132

# ACCUMULATING ROLLER CONVEYOR

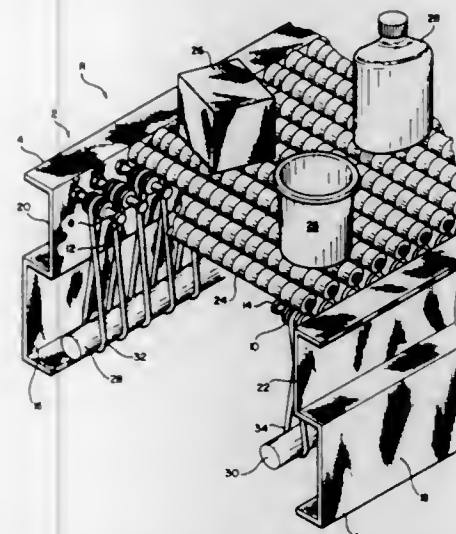
Ronald D. Bourgeois, 80 Front St., Scituate, Mass. 02066  
Continuation-in-part of Ser. No. 184,189, Jan. 21, 1994, Pat. No. 5,360,100. This application Jul. 19, 1994, Ser. No. 275,735  
Int. Cl.<sup>6</sup> B65G 13/07

U.S. Cl. 198—790

22 Claims

1. A roller conveyor, comprising:
- a) a frame having oppositely disposed substantially parallel sides;
  - b) a plurality of pulleys disposed on each side of said frame, said pulleys on one side being coaxial with said pulleys on the other side of said frame;
  - c) a drive operably associated with said pulleys on one side of said frame for rotating said pulleys;
  - d) a plurality of rollers resting freely and disposed between adjacent pairs of said pulleys;
  - e) each of said rollers including a first shaft portion and a drive sleeve secured to said first shaft portion such that rotation of said sleeve causes rotation of the respective roller and stoppage of articles being conveyed on said

rollers causes slippage between the respective first shaft portion and sleeve; and



- f) each drive sleeve is engaged with the respective driven pulleys such that rotation of said driven pulleys causes corresponding rotation of the respective drive sleeves.

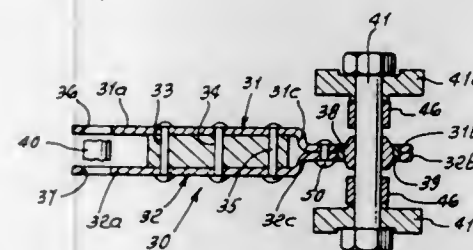
5,411,133

# NEWSPRINT CONVEYOR LINK ASSEMBLY

Richard Lyndhurst, 2885 Miguel La., Costa Mesa, Calif. 92626  
Filed Feb. 7, 1994, Ser. No. 192,380  
Int. Cl.<sup>6</sup> B65G 39/20

U.S. Cl. 198—845

11 Claims



1. In a newsprint conveyor assembly, the combination comprising:
- a) a carrier for a transverse rod that transports newsprint,
  - b) a support for the carrier, including two branches including two primary plate portions that are relatively long and extend endwise longitudinally in parallel relation and are transversely spaced apart, and two secondary plate portions that are relatively short and extend endwise longitudinally in parallel, side-by-side relation, each branch including a relatively sharp bend portion interconnecting one of said relatively long plate portions with one of said relatively short plate portions, said sharp bend portion having an intermediate section which is substantially perpendicular to planes defined by the primary and secondary plate portions, and there being connector means interconnecting said branches at said relatively short plate portions,
  - c) said primary plate portions defining primary bearing openings and said secondary plates defining secondary bearing openings,
  - d) said carrier having a base positioned between said relatively long plate portions and endwise between said relatively sharp bend portions and said primary bearing openings,
  - e) and at least three endwise spaced rivets connecting said carrier base to said primary plate portions, said base hav-

ing the same width at each rivet location and said rivets passing widthwise through the base,

f) one of said rivets and an end portion of said base extending in proximity to said sharp bend portions of said branches,

g) the spacing of said base from said bend portion intermediate sections being less than the width of said base at said one rivet location.

5,411,134

# CONTAINER FOR COMPACT DISKS AND THE LIKE

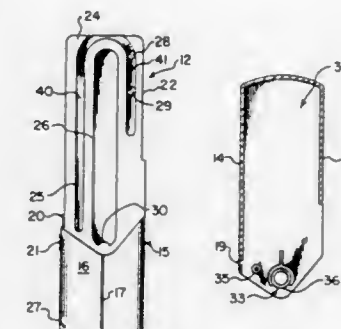
James M. Temple; James A. Bergh, both of Boulder, and Robert P. Stanley, Longmont, all of Colo., assignors to Case Logic, Inc., Longmont, Colo.

Filed Dec. 30, 1993, Ser. No. 175,704

Int. Cl.<sup>6</sup> B65D 85/57

U.S. Cl. 206—45.13

17 Claims



1. A container for compact disks, comprising:
- a base member having a vertical back wall, a horizontal bottom wall, and first and second vertical side walls defining an open top and open front cavity for said compact disks,
  - an inverted and generally U-shaped track in each of said side walls,
  - a cover for said base member adapted to substantially cover said open top and said open front of said base member, said cover having a vertical front wall, a horizontal top wall, and first and second vertical side walls,
  - protrusion guide means carried by each of said side walls of said cover and cooperating with said U-shaped track in each of said side walls of said base member,
  - latch means associated with said base member and said cover and operable to latch said cover in a closed position with said cover substantially covering said open top and said open front of said base member, and
  - spring force means associated with said base member and said cover and operable to be force loaded when said cover is in said closed position,
- such that operation of said latch means operates to move said cover vertically up and away from said closed position as a result of said force loading of said spring force means, whereupon said vertical front wall of said cover may be rotated vertically upward and over said top wall of said base member, as said guide means moves in said U-shaped tracks, said cover then forming a stand whereby said back wall of said base member is tilted to a nonvertical position.
11. A container for a plurality of compact disks and the like, said disks having similar planar areas, the container comprising:
- a base member having an open top and an open front, said base member being defined by
  - a generally flat and rectangular back wall having a top edge, a bottom edge, and first and second side edges, said edges defining an area to accommodate the planar area of said compact disks,
  - a generally flat and rectangular bottom wall fixed to the bottom edge of said back wall and extending generally perpendicular to said back wall, said bottom wall having a dimension perpendicular to said back wall to



accommodate said plurality of compact disks whose planar areas mutually engage.

- a first generally flat and rectangular side wall fixed to said first side edge of said back wall and extending generally perpendicular to said back wall, said first side wall having a dimension perpendicular to said back wall that is generally equal to said perpendicular dimension of said bottom wall, and
- a second generally flat and rectangular side wall fixed to said second side edge of said back wall and extending generally perpendicular to said back wall, said second side wall having a dimension perpendicular to said back wall that is generally equal to said perpendicular dimension of said bottom wall,
- a cover for said base member, said cover having an open bottom and a generally open back, said cover being movable to a closed position relative to said base member, and said cover being defined by
  - a generally flat and rectangular front wall having a top edge, a bottom edge, and first and second side edges, said edges defining a planar area generally equal to said area of said back wall of said base member,
  - a generally flat and rectangular top wall fixed to the top edge of said front wall and extending generally perpendicular to said front wall, said top wall having a dimension perpendicular to said front wall to accommodate said plurality of compact disks whose planar areas mutually engage,
  - a first generally flat and rectangular side wall fixed to said first side edge of said back wall and extending generally perpendicular to said back wall, said first side wall having a dimension perpendicular to said back wall that is generally equal to said perpendicular dimension of said bottom wall, and
  - a second generally flat and rectangular side wall fixed to said second side edge of said back wall and extending generally perpendicular to said back wall, said second side wall having a dimension perpendicular to said back wall that is generally equal to said perpendicular dimension of said bottom wall,
- two springs, one spring being carried by each of said side walls of said cover, and
- two spring loading means, one spring loading means being carried by each of said side walls of said base member, whereupon when said cover is moved to said closed position each of said two springs is force loaded.

5,411,135

## CONTAINER AND ORGANIZER

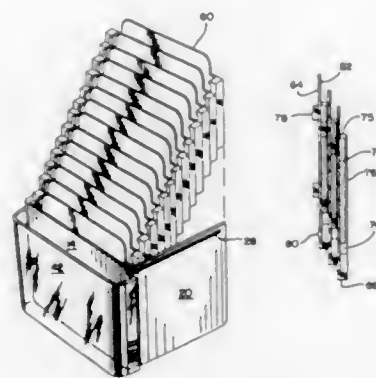
Howard Danzyger, Bartlett, and Michael Jaron, Mount Prospect, both of Ill., assignors to Fellowes Manufacturing Company, Itasca, Ill.

Continuation of Ser. No. 53,048, Apr. 26, 1993, abandoned. This application Jul. 21, 1994, Ser. No. 278,553

Int. Cl.<sup>6</sup> B65D 5/50

U.S. Cl. 206—45.15

32 Claims



1. A container comprising a housing containing a plurality of

adjacent holders, each holder comprising a front, a rear, a top and a bottom, wherein the front of at least some of the holders are slidably engaged to the rear of an adjacent holder, with the rear of at least some of the holders having at least one horizontal retaining ridge located between and spaced from the top and bottom such that when the front of one holder is offset with respect to the rear of the adjacent holder having a retaining ridge, the retaining ridge on the adjacent holder substantially abuts the front of one holder and retains the one holder in the offset position.

5,411,136

## ORTHODONTIC BAND STERILIZATION CASSETTE

Susan K. Brigham, 7324 E. Ironwood Ct., Scottsdale, Ariz. 85258

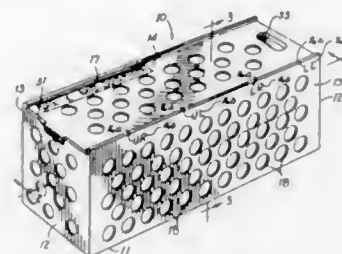
Division of Ser. No. 121,698, Sep. 15, 1993, Pat. No. 5,305,876, which is a continuation-in-part of Ser. No. 33,290, Mar. 16, 1993, abandoned, which is a continuation of Ser. No. 811,657, Dec. 23, 1991, abandoned. This application Apr. 21, 1994, Ser. No. 230,601

The portion of the term of this patent subsequent to Apr. 26, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61L 2/00; B65D 81/00

U.S. Cl. 206—63.5

14 Claims



1. A method of organizing a plurality of orthodontic bands comprising the steps of:
  - (a) providing a sterilization cassette of generally rectangular configuration having vertical sidewalls, vertical endwalls, a base and an opening on at least one side,
  - (b) forming a plurality of discrete interior compartments in the sterilization cassette by dividing the interior of the cassette with a first set of generally parallel, dividing wall members supported within the cassette interior with each of the compartments being accessible through the open side of said sterilization cassette,
  - (c) associating multiple indicia with each compartment identifying each compartment with respect to a jaw, a quadrant and a tooth of a patient's mouth;
  - (d) closing the opening with a lid; and
  - (e) preventing passage of an orthodontic band identified for one compartment to an adjacent compartment.

5,411,137

## RETAINING FLAP FOR SHIPPING CARTONS

Donald E. Weder, Highland, and Jack Feld, Edwardsville, both of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation of Ser. No. 93,109, Jul. 16, 1993, Pat. No. 5,311,992, which is a continuation-in-part of Ser. No. 892,441, Jun. 2, 1992, Pat. No. 5,240,109, which is a continuation-in-part of Ser. No. 692,329, Apr. 26, 1991, Pat. No. 5,092,465. This application Feb. 25, 1994, Ser. No. 202,058

The portion of the term of this patent subsequent to May 17, 2011, has been disclaimed.

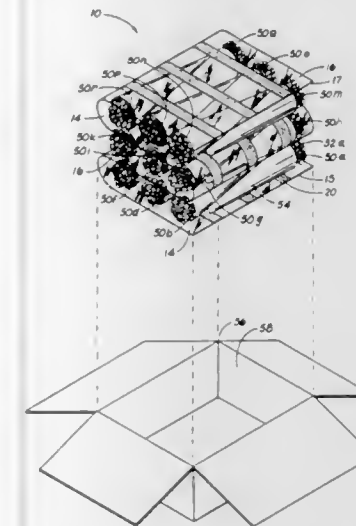
Int. Cl.<sup>6</sup> B65D 85/50

U.S. Cl. 206—423

28 Claims

1. A shipping carton assembly for holding a floral grouping, comprising:
  - a carton having an inner surface defining a receiving space; and

a retaining flap comprising a sheet of material having a bonding material disposed thereon, the sheet of material being positioned about a portion of the floral grouping with the bonding material being positioned on the sheet of



material whereby the bonding material is releasably connected to the carton for connecting the sheet of material to the carton by way of the bonding material for cooperating to hold the floral grouping generally immobile within the receiving space of the carton.

5,411,138

## PACKAGING FOR A TOY

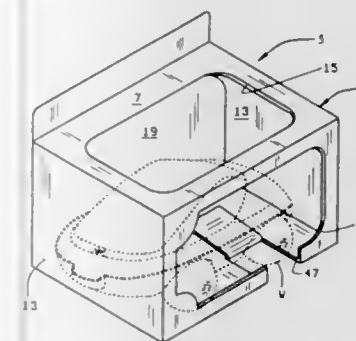
Ronald R. Klawiter, Berger, Mo., assignor to Handi-Pac, Inc., Hermann, Mo.

Filed Feb. 15, 1994, Ser. No. 196,524

Int. Cl.<sup>6</sup> B65B 61/00; B65D 5/50

U.S. Cl. 206—459.1

16 Claims



1. Packaging for a toy including a body having a bottom wall, the bottom wall defining a slot having a first axis which is greater in length than a second axis; the packaging including bottom, top, front, back and side walls defining a box sized to receive the toy and a key; the bottom wall of said box having an opening aligned with the slot of said toy bottom wall when said toy is in said box;

said key including a shaft, a head at one end of said shaft and a base at another end of said shaft, said head being sized to fit through said box opening and toy body slot and shaped to retain said key head in said body when said key head is rotated in said body, said head having a length smaller than said toy slot first axis and greater than said toy slot second axis;

said key base being sized to prevent passage of said base through said box opening.

5,411,139

## ORIENTABLE KEYBOX WITH KEYPANELS VERTICALLY AND HORIZONTALLY EXTENDABLE

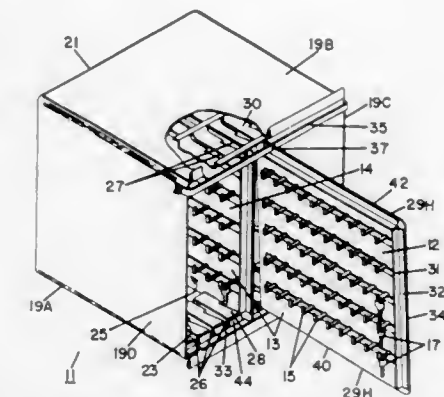
James Victory, 4520 Forest Hill Cir., #13, Fort Worth, Tex. 76140

Filed Feb. 14, 1994, Ser. No. 195,816

Int. Cl.<sup>6</sup> A47F 7/00

U.S. Cl. 206—493

11 Claims



1. An apparatus for retaining a plurality of keys, comprising:
  - an open-faced box having walls which form a cavity therebetween, said walls defining an opening that communicates with said cavity;
  - at least one keypanel removably mounted in a stowed position within said cavity of said box;
  - a shoulder extending along one of said walls of said box adjacent said opening, said shoulder being structured and arranged to support a first portion of each keypanel located in an extended position extending out of said box through said opening;
  - a stop coupled to another of said walls of said box, said stop being opposite of said one wall with said shoulder and being structured and arranged to engage and hold a second portion of each keypanel located in an extended position;
  - a plurality of keyhooks coupled to and extending from each keypanel, said keyhooks being capable of receiving and retaining keys thereon.
11. A method of providing access to keys in a keybox, comprising the steps of:
  - providing a keybox having a cavity located therein and a sidewardly facing opening accessing said cavity; a plurality of notched keypanels slidably mounted in said cavity, each keypanel having a plurality of keyhooks for retaining keys thereon; a pivotally mounted retaining bar located along an upper edge of said opening; and a shoulder located along a lower edge of said opening;
  - sliding a keypanel out of said cavity through said sidewardly facing opening by pulling said keypanel through said opening;
  - locating said keypanel in a stable accessible position by locating a lower edge of said keypanel on said shoulder;
  - securing said keypanel in said stable accessible position by pivoting said retaining bar into a notch in an upper edge of said keypanel, thereby securing said upper edge.

5,411,140

## PRODUCT PACKAGE WITH MATCHING INDICIA AND RECESS

Lloyd J. Byer, Centerville, Iowa, assignor to Wells Manufacturing Company, Fond du Lac, Wis.

Filed Feb. 8, 1994, Ser. No. 193,216

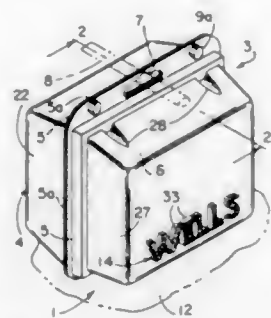
Int. Cl.<sup>6</sup> B65D 21/02

U.S. Cl. 206—504

18 Claims

1. A product display package unit for displaying a contained product within the package unit, comprising a semi-rigid outer

wall structure for supporting and including a product, said wall structure including a front wall having an outwardly projecting identification member defining indicia on a small portion of said front wall, said wall structure having a back wall connected to said front wall by a side wall, said back wall having a planar portion defining the outermost location of said back wall and having an inwardly projecting opening matched in size with said outwardly projecting identification member,



said opening being located within said planar portion, said outwardly projecting identification member and said opening being located and aligned so that plural ones of said product display package unit are adapted to be located in stacked relation with a front wall of a rear package unit adjacent the back wall of a front package unit and with said identification member of said rear package unit projecting into said opening of the front package unit.

5,411,141

## EATING UTENSIL SUPPORT

H. Dean Bounds, 5714 Holston Hill Rd., Knoxville, Tenn. 37914-5136

Filed Feb. 3, 1994, Ser. No. 190,995

Int. Cl.<sup>6</sup> B65D 85/00; A47G 21/14

U.S. Cl. 206—553

7 Claims



1. A support for receiving and elevating at least one eating utensil above a support surface, said support comprising:

a continuous sheet of material defining a plurality of relief lines oriented parallel one to another, said relief lines being oriented parallel to a first pair of opposing edges of said continuous sheet and extending between a second pair of opposing edges of said continuous sheet, a plurality of panels being defined by between consecutive pairs of said first pair of opposing edges and said plurality of relief lines;

a plurality of receptacles, one each of said plurality of receptacles being provided for receiving one of said eating utensils, each of said plurality of receptacles being defined by cooperating openings in a first of said plurality of panels, a second of said plurality of panels, and a last of said plurality of panels, said second of said plurality of panels being defined between a first of said plurality of relief lines and a second of said plurality of relief lines; and a fastening device for securing said first of said plurality of panels to said last of said plurality of panels, said first of said plurality of panels being defined between a first edge of said first pair of opposing edges of said continuous sheet and said first of said plurality of relief lines, said last of said

plurality of panels being defined between a second edge of said first pair of opposing edges of said continuous sheet and said last of said plurality of relief lines.

5,411,142

## AIR-FLOW CONTROL FOR PARTICLE CLEANING SYSTEMS

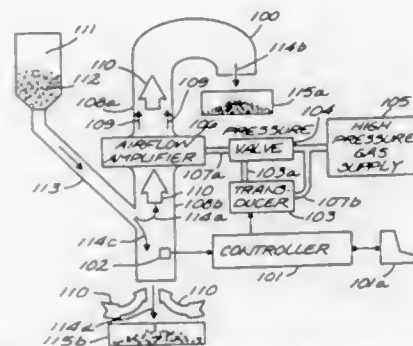
Kenneth E. Abbott, 4400 N. Bidahochi, Tucson, Ariz. 85749; Patrick J. Lyons, 1392 Via Rhonda Oriente, Tucson, Ariz. 85715, and Richard M. Satariano, 4765 E. 24th St., Tucson, Ariz. 85711

Continuation-in-part of Ser. No. 39,722, Mar. 29, 1993, Pat. No. 5,351,832. This application Feb. 16, 1994, Ser. No. 196,985

Int. Cl.<sup>6</sup> B07B 9/00

U.S. Cl. 209—29

32 Claims



1. A mechanism to separate particles based upon their mass comprising:

- a substantially vertical first channel;
- air-flow means for creating an upward air-flow in said vertical first channel, said air-flow means operating at a constant speed;
- a first wind speed means for determining air-flow rates and generating flow data indicative of air-flow, said first wind speed means being positioned in said vertical first channel;
- a first means for depositing particles into said vertical first channel;
- dampening means for restricting air-flow between said vertical first channel and said air-flow means such that heavier particles fall in said upward air-flow caused in said vertical first channel while lighter particles are entrained in said air-flow; and,
- control means communicating with said first wind speed means and said dampening means, said control means for adjusting said dampening means based upon said flow data from said wind speed means.

5,411,143

## APPARATUS FOR THE MAGNETIC TREATMENT OF FLUIDS

Don Greene, 1395 S. Atlantic Ave. #2, Cocoa Beach, Fla. 32931

Filed Dec. 9, 1993, Ser. No. 164,471

Int. Cl.<sup>6</sup> C02F 1/48

U.S. Cl. 210—222

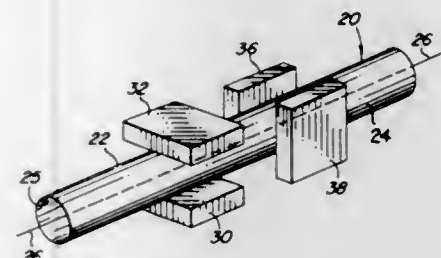
9 Claims

1. An apparatus for the magnetic treatment of fluids comprising:

- a fluid conduit including an upstream end, a downstream end, and a central flow through path defining a central axis of said fluid conduit,
- an upstream pair of magnetic sources, said upstream pair of magnetic sources including a first magnetic source and a second magnetic source disposed on opposite exterior sides of said fluid conduit at said upstream end thereof, said first magnetic source including a first pole face and said second magnetic source including a second pole face, said first and second magnetic pole faces being of opposite

polarity and disposed in confronting relation to one another so as to attract one another, a downstream pair of magnetic sources, said downstream pair of magnetic sources including a third magnetic source and a fourth magnetic source disposed on opposite exterior sides of said fluid conduit at said downstream end thereof,

said third magnetic source including a third pole face and said fourth magnetic source including a fourth pole face, said third and fourth pole faces being of like polarity and disposed in confronting relation to one another so as to repel one another,



said upstream pair of magnetic sources and said downstream pair of magnetic sources being offset substantially 90° from one another, relative to said central axis of said fluid conduit, and

said upstream pair of magnetic sources and said downstream pair of magnetic sources being spaced a predetermined distance from one another and being disposed relative to one another such that minerals within a fluid passing through said fluid conduit align themselves in a center of a flow stream of the fluid exiting said fluid conduit.

5,411,144

## HAT RACK

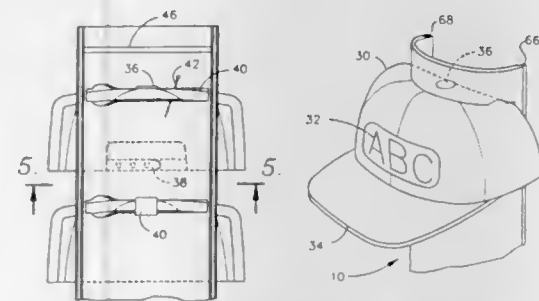
David W. Deupree, 18601 Salisbury Rd., Independence, Mo. 64056

Filed Feb. 7, 1992, Ser. No. 832,746

Int. Cl.<sup>6</sup> A47F 7/00

U.S. Cl. 211—30

11 Claims



1. A rack system for removable storage of baseball-style caps, each of such caps having a generally half-spherical body adapted to receive a portion of the user's head, a visor extending outwardly from a forward portion of the periphery of the body and a button mounted on the body, and the body being capable of being folded about a substantially horizontal line to define a ledge at the fold line with a rear portion of said body being received in opposed relation within a forward portion of the body, such that the button is adjacent the ledge, said rack comprising:

- a substantially rigid member having a first portion extending forwardly with respect to laterally adjacent portions; and at least one laterally extending slot extending through said member at a position such that said slot includes said first portion and said laterally adjacent portions, whereby said slot has a generally concave configuration in lateral cross-section and having a width less than the thickness of the

ledge and the button combined, said slot being adapted to receive and support the ledge of the cap and including a portion with a relatively widened width adjacent a first lateral end of said slot capable of receiving both the ledge and the button, whereby movement of the cap forward out of said slot is prevented by abutment of the button with said rigid member.

5,411,145

## PORTABLE FILE ORGANIZING RACK

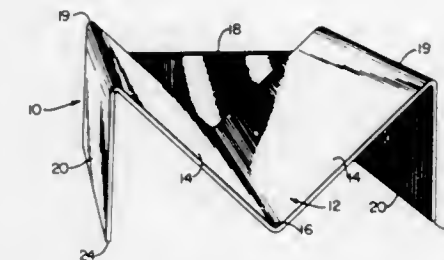
Barber J. Parks, 2288 Old Quarry Rd., Golden, Colo. 80401

Filed Oct. 18, 1993, Ser. No. 138,712

Int. Cl.<sup>6</sup> A47F 5/00

U.S. Cl. 211—50

15 Claims



1. A file rack in combination with a plurality of generally rectangular file folders, each of said folders having a front side and a back side joined together along a common bottom edge, comprising:

- an elongated bed having a pair of upwardly divergent sidewalls each having a generally flat surface and a common trough therebetween, said bed being of a length sufficient to support each folder lengthwise along said bed with a lower edge of each said file folder disposed lengthwise in said trough in contact with one of said sidewalls, the other of said pair of sidewalls supporting at least one side of one of said folders;

an end wall member extending transversely across and closing only one end of said bed to define a stop for an end of each said file folder disposed along said bed; and spaced base support means extending downwardly from said sidewalls for supporting said bed on a level surface such that said sidewalls diverge upwardly from said trough and said folders will lay against one of said sidewalls.

5,411,146

## SHELVING DISPLAY AND STORAGE SYSTEM FOR BULK CONTAINER ITEMS

James J. Jarecki, Greendale; Paul Mylander, New Berlin, and James L. Wiest, Milwaukee, all of Wis., assignors to Newell Operating Company, Freeport, Ill.

Filed Jun. 9, 1992, Ser. No. 896,027

Int. Cl.<sup>6</sup> A47B 55/00, 57/58

U.S. Cl. 211—59.2

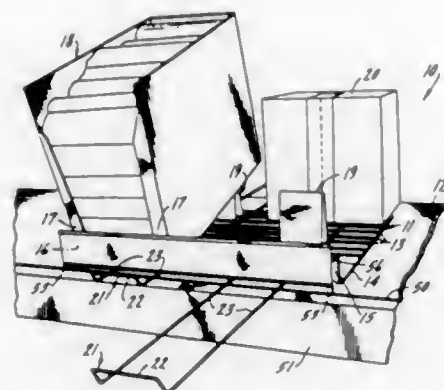
9 Claims

1. A system for displaying goods in bulk containers on a shelf, the system comprising:

- a base including a front end, two opposing sides a rear section and a plurality of generally parallel crosspieces extending between the two opposing sides, the front end being connected to a front wall for restraining and supporting containers, the front wall extending generally upwardly above the base, back support which extends upwardly from the base, the back support being detachably attached to two parallel crosspieces so that the back support may be positioned at varying distances from the front wall, at least one rear container puller retrieving bulk containers stored behind the back support, the rear container puller comprising a rear end, a front end and two parallel rods connecting the front and rear ends, the back support being accommodated between the parallel rods and providing a



guide for forward and rearward movement of the rear container puller, the rear end of the rear container puller including an upwardly projecting portion for engaging containers stored on top of the rear container puller behind the back support, the front end of the rear container puller extending below the front wall and above the shelf, the front end of the rear container puller further including a handle for pulling the rear container puller forward to retrieve bulk containers stored on top of the rear container puller behind the back support,



whereby, depending on the size of a bulk container and the distance between the front wall and the back support, a bulk container is restrained by the front wall the back support and supported by the front wall and the back support against normal dislodgement forces in either a tilted forward or a tilted rearward position and bulk containers stored behind the back support on top of the rear container puller may retrieved and pulled forward along a path defined by engagement between the rods of the rear container puller and the back support disposed therebetween.

5,411,147

**DYNAMIC LANDFILL RECYCLING SYSTEM**

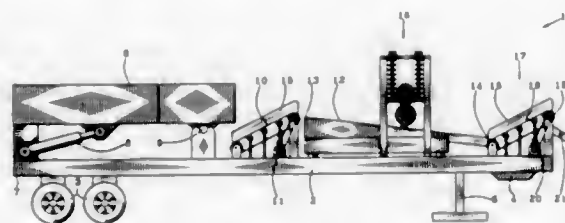
David S. Bond, 615 Twin Brooks Way, Marietta, Ga. 30067

Filed Jan. 28, 1993, Ser. No. 10,663

Int. Cl.<sup>6</sup> B07C 3/04

U.S. Cl. 209—44.4

46 Claims



1. A dynamic landfill recycling apparatus comprising: at least one solid waste processing platform having an aft end, wheel means attached to the solid waste processing platform for mobility purposes, solid waste receiving means located proximate to the aft end of the solid waste processing platform, the solid waste processing platform comprising a plurality of vehicular units with a front end of a first vehicular unit abutting an aft end of a second vehicular unit and the solid waste receiving means being positioned proximate the aft end of the first vehicular unit such that the first vehicular unit and at least one additional vehicular unit in end to end relationship comprise the solid waste processing platform in vehicular unit sections, a solid waste receiving conveyor positioned forwardly on

the solid waste processing platform from the solid waste receiving means in solid waste conveyance relationship to solid waste deposited on the solid waste receiving means, a solid waste feeder positioned forwardly on the solid waste processing platform from the solid waste receiving conveyor in solid waste dispersive relationship to solid waste deposited on the solid waste feeder, a bag cutter positioned intermediate the solid waste feeder in bag cutting relationship to bags of solid waste on the solid waste feeder, a ferrous material separator having a ferromagnet positioned forwardly on the solid waste processing platform from the solid waste feeder in magnetic-separation relationship to ferrous material deposited on the ferrous material separator, a recycling conveyor positioned forwardly on the solid waste processing platform from the ferrous material separator in conveyance relationship to solid waste remaining after separation of ferrous materials, and a solid waste sorting means positioned laterally to the recycling conveyor on the solid waste processing platform in solid waste sorting relationship to solid waste on the recycling conveyor.

5,411,148

**SELECTIVE FLOTATION PROCESS FOR SEPARATION OF SULPHIDE MINERALS**

Sadat Kelebek, Levack, Peter F. Wells, Sudbury, and Simon O. Fekete, Thornhill, all of Canada, assignors to Falconbridge Ltd., Toronto, Canada

Filed Jun. 28, 1993, Ser. No. 82,574

Claims priority, application Canada, Nov. 13, 1992, 2082831

Int. Cl.<sup>6</sup> B03D 1/01, 1/018, 1/002, 1/02

U.S. Cl. 209—166

14 Claims

1. A process for the concentration of at least one mono- or multi-metal sulphide mineral containing non-ferrous metal co-existing with pyrrhotite in a sulphide ore or its processed streams, the streams consisting essentially of middlings resulting from previous unit operations; the process comprising subjecting the ore or the streams to froth flotation employing at least one collector for said at least one mineral and frother for the production of bubbles from a gas phase introduced into said froth flotation, said process further comprising, prior to said froth flotation, conditioning the pulp containing a finely ground mixture of said mineral at an alkaline pH with at least one water soluble inorganic sulphur-containing compound selected from the group consisting of sulphides, sulphites dithionates, tetrathionates and sulphur dioxide, in an amount varying from 0.10 kg/ton to 3 kg/ton of dry solids processed, as an essential step for further conditioning with at least one nitrogen-containing organic compound having a configuration selected from the group consisting of OCNCCCNCNC and NCCN used at an adequate dosage for a particular flotation feed, wherein upon subjecting said further conditioned pulp to froth flotation, said pyrrhotite is depressed as a result of combined effects of said at least one sulphur-containing compound and said at least one nitrogen-containing organic compound, thereby allowing selective flotation and concentration of said mineral containing non ferrous metal.

5,411,149

**AQUEOUS BIPHASIC EXTRACTION PROCESS WITH PH AND PARTICLE CONTROL**

David J. Chaiko, Woodridge, and R. Mensah-Biney, Downers Grove, both of Ill., assignors to ARCH Development Corporation, Argonne, Ill.

Filed Aug. 11, 1992, Ser. No. 928,790

Int. Cl.<sup>6</sup> B03B 5/30; C01B 33/12

U.S. Cl. 209—172.5

9 Claims

1. A process for aqueous biphasic extraction of excess particulate silica from clay using aqueous extraction phases, comprising the steps of:

introducing a clay containing said excess particulate silica coexisting with silica chemically bonded to one or more oxides, into said aqueous extraction phases; controlling the pH of said aqueous extraction phases between about 6 and 14; allowing said clay and silica to separate under the influence of said aqueous extraction phases; and removing said particulate silica from said clay.

5,411,150

**CULLING DEVICE FOR VACUUM CLEANERS AND OTHER EQUIPMENT**

Steinn Sigurdsson, Steinasel 1, 109 Reykjavik, Iceland

Filed Oct. 28, 1992, Ser. No. 967,506

Claims priority, application Iceland, Oct. 28, 1991, 3776

Int. Cl.<sup>6</sup> B07B 9/00; A47L 9/00

U.S. Cl. 209—235

10 Claims



1. A culling device for a vacuum cleaner, said culling device comprising means defining a duct extending through the device through which air can pass, a culling comb inside said duct, said culling comb comprising a movable axle with wave-formed parallel teeth, and an actuating mechanism for selectively moving the culling comb between a first position where said teeth of the comb extend across the duct inside the culling device for arresting articles which are carried into it, and a second position which permits the articles to pass through said duct, wherein said actuating mechanism includes means for biasing said actuating mechanism for holding said culling comb in said first position when said actuating mechanism is not actuated.

5,411,151

**AUTOMATIC DISTRIBUTION CENTER SYSTEM**

Yasuhiro Sasada, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

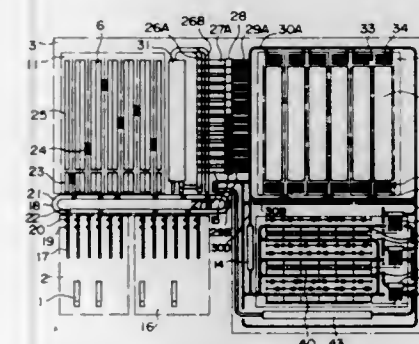
Filed Dec. 7, 1993, Ser. No. 162,283

Claims priority, application Japan, Dec. 14, 1992, 4-332700

Int. Cl.<sup>6</sup> B07C 5/00

U.S. Cl. 209—583

3 Claims



1. An automatic distribution center system including an unloading place for unloading articles of cargo transported into a distribution center, a storage/sorting area for sorting and storing the transported articles of cargo according to how the articles are packed, a shipping area for shipping the articles sorted in accordance with their destination from the distribution center, and a transfer apparatus for transferring the articles

from the unloading place to the storage/sorting area or from the storage/sorting area to the shipping area, so that the articles are distributed from the unloading place to the shipping area by automatically sorting the articles in accordance with their destination, the system comprising a pallet-type automatic storage/supply apparatus provided in the storage/sorting area for loading and storing case cargo containing the articles on pallets and performing automatically a taking-out operation in accordance with requests for taking-out the articles, a case picking apparatus for storing cases containing a plurality of the articles each in case units and taking out in case units in accordance with requests for taking-out the articles, and a piece picking apparatus for storing articles each put into opened cases and taking out the articles in the smallest handling unit in accordance with requests for taking-out the articles, whereby the articles loaded on a pallet, the articles contained in cases and an individual article are automatically taken out in accordance with requests for taking-out the articles, and the taken-out articles are packed and palletized using a case packing machine and a palletizer so as to distribute the articles from the shipping area in accordance with their destination.

5,411,152

**APPARATUS FOR SORTING OBJECTS ACCORDING TO SIZE**

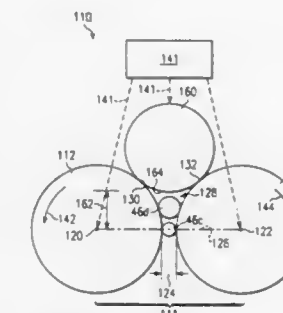
Mark Matthews, Richardson, and Michael R. Weidman, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 30, 1993, Ser. No. 159,645

Int. Cl.<sup>6</sup> B07B 13/05

U.S. Cl. 209—668

16 Claims



1. Improved apparatus for sorting particulate material by size, the apparatus being of the type which includes (i) a pair of adjacent, generally coextensive rollers, the rollers having generally circular cross-sections, the facing surfaces of the rollers being separated by a gap which is coplanar with a plane defined by the major axes of the rollers, a sorting region being generally defined and bounded by the plane and the facing surfaces of the rollers above the plane; and (ii) means for counter-rotating the roller surfaces away from the sorting region above the plane and toward the sorting region below the plane; wherein particles in the sorting region float on the counter-rotating rollers, and wherein the improvement comprises: means for preventing the floating particles from hopping or jumping within or out of the sorting region and thereafter moving along the gap and reentering the sorting region due to the frictional effects on the floating particles of the rotating roller surfaces.

5,411,153

**STORAGE RACK ASSEMBLY SYSTEM**

Greg J. Unfried, 10830 Sunset Dr., Evansville, Tenn. 47712

Filed Oct. 22, 1993, Ser. No. 140,302

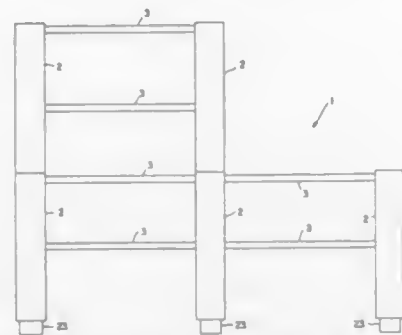
Int. Cl.<sup>6</sup> A47B 47/00

U.S. Cl. 211—188

14 Claims

1. A storage rack assembly system, comprising: a plurality of vertical members, each said vertical member

having a pair of legs that are interconnected to form a structural unit, a projection at one end of each said leg and a socket at an opposite end of each said leg, said projections of each said vertical member being adapted to fit into said sockets of another said vertical member, and both said projections and said sockets of each said vertical member having through holes extending laterally therethrough and positioned so as to be alignable when said projections of one said vertical member are in said sockets of another said vertical member;



a plurality of cross-members adapted to be horizontally supported between pairs of said vertical members so as to provide a horizontal support surface; and  
a plurality of connectors adapted to be inserted in said through holes of said sockets and said projections and to support said cross-members on said vertical members; wherein said connectors are bolts and said cross-members are shelves, each said shelf comprising a horizontal surface having a downwardly extending edge, and said edge of each said shelf having recesses therein for engaging said bolts.

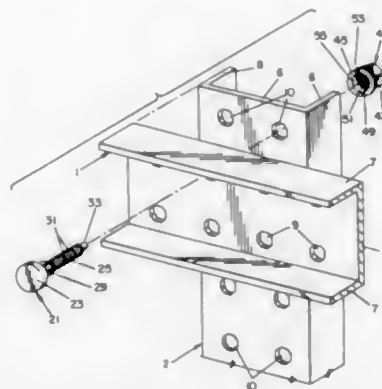
5,411,154

**SYSTEM FOR JOINING SUPPORT MEMBERS**  
William R. Vargo, Lithonia, Ga., assignor to Hardy Manufacturing, Inc., Lithonia, Ga.

Filed Sep. 13, 1993, Ser. No. 119,486  
Int. Cl.<sup>6</sup> A47F 5/00

U.S. Cl. 211—189

29 Claims



1. An assembly comprising a plurality of elongated rigid support members joined together to form a static structure such as scaffolding, shelving, bracing or the like, each support member including a plurality of identically sized holes, each hole being an equilateral polyhedron having four sides or a multiple thereof and a depth, said holes arranged in at least one row in the longitudinal direction of each support member in alignment with at least one matching hole in a second support member, and a fastener extending through a pair of such aligned holes in said support members, said fastener comprising an assembled nut and bolt, said bolt comprising a head, and a shank joined to said head forming a shoulder, said shank in-

cluding a non-threaded neck portion adjacent said head and a threaded portion engaging the threads of said nut, said non-threaded portion having a cross-section conforming to the polyhedral shape of the hole and a length at least equal to the combined said depth of said holes through which said bolt passes.

5,411,155

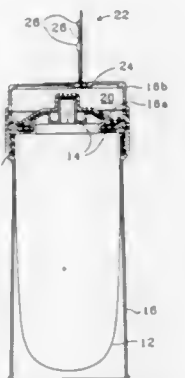
**BABY BOTTLE STORAGE COVER**

Rinda M. Gordon, 10370 NW. 17th Ct., Plantation, Fla. 33322, and Charles B. Gordon, 5070 N. Ocean Dr., Apt. 20C, Singer Island, Fla. 33404

Filed Dec. 27, 1993, Ser. No. 172,928  
Int. Cl.<sup>6</sup> A61J 9/00, 9/08

U.S. Cl. 215—11.1

10 Claims



1. In a nurser bottle comprising a bottle proper, a nipple, a cap for closing the bottle proper and clamping the nipple thereto, and a removable nipple-cover member associated with the nipple and cap for covering and protecting the nipple against contamination until the bottle is used for feeding, the improvement in which the removable nipple-cover member comprises means for storing, on the exterior side of the nipple, a single measure of powdered milk sufficient for a single full bottle feeding, said nipple-cover member further comprising means for dispensing said powdered milk.

5,411,156

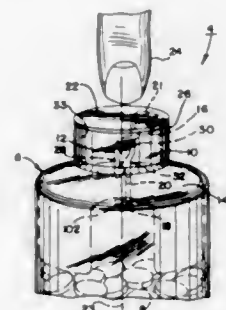
**PACKAGE HAVING CONTENT IMMOBILIZING DEVICE**

Christopher J. Reckamp, 1764 N. Clark St., Chicago, Ill. 60614  
Continuation of Ser. No. 907,384, Jul. 1, 1992, abandoned. This application Mar. 10, 1994, Ser. No. 209,596

Int. Cl.<sup>6</sup> B65D 39/16

U.S. Cl. 215—231

5 Claims



1. A package having, in combination, a container for holding loose articles, and a content immobilizing device for immobilizing the loose articles in the container, wherein the package comprises:  
said container having a body with an open top for dispensing the articles;

and said device having an elongate, foldable, compressible immobilizing medium for placement between the loose articles and the open top for immobilizing the loose articles; and  
a flexible, invasive plastic grip member, passing through the foldable immobilizing medium, having a pull grip end connected to a "T" shaped coupling end by an intermediate support section.

5,411,158

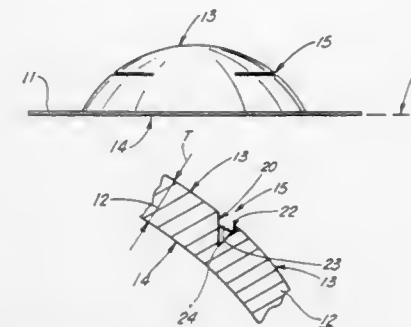
**RUPTURE DISK CONSTRUCTION**

Jerry W. Kays, Tulsa, Okla.; John W. Reynolds, Bixby, and Alan T. Wilson, Broken Arrow, all of Okla., assignors to Oklahoma Safety Equipment Co., Broken Arrow, Okla.

Filed Dec. 2, 1992, Ser. No. 984,918  
Int. Cl.<sup>6</sup> B65D 25/00

U.S. Cl. 220—89.2

7 Claims



1. A rupture disk comprising:  
a) an annular skirt member that is substantially flat, so as to define a horizontal plane;  
b) a concave/convex disk portion integrally formed and extending from the plane of the skirt and having a periphery that is surrounded by the skirt member;  
c) the disk portion having concave and convex respective surface portions;  
d) a score formed on the convex side of the disk portion and extending circumferentially about the disk portion to define a generally circular score pattern, wherein the score has end portions that terminate with an unscored portion of the disk portion therebetween to define a hinge;  
e) the score being substantially "V" shaped in transverse section, and comprising a substantially vertically extending first annular surface, perpendicular to said horizontal plane and a second annular surface that forms an acute angle with the plane of the skirt of between about twenty degrees and seventy degrees (20° and 70°); and  
f) the score having an inner edge defined by an intersection of the first and second annular surfaces, the inner edge being positioned generally between the concave and convex surfaces.

5,411,159

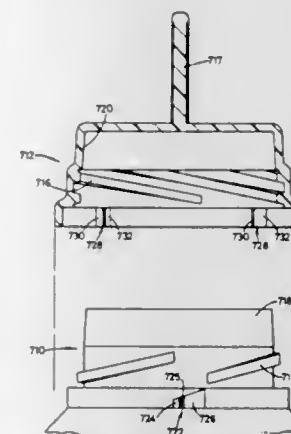
**EASILY OPENABLE CAN WITH FOLDABLY CONCEALED TAB**

Kuo-Wei Fan, No. 302, Chung-san Road, Sec. 2, Hu-Kuo Hsiang, Hsin Chu Hsien, Taiwan, Prov. of China  
Filed Apr. 14, 1994, Ser. No. 227,624

Claims priority, application China, Apr. 29, 1993, 93105201.7  
Int. Cl.<sup>6</sup> B65D 17/34

U.S. Cl. 220—269

1 Claim

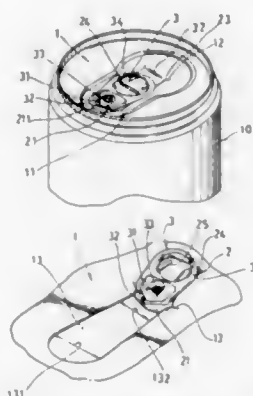


1. A container closure assembly comprising:  
a container neck;  
a closure for said container neck;  
a screw thread on at least one of said closure and said container neck for retaining said closure on said container neck;  
a sealing mechanism forming a seal between said closure and said container neck when said closure is at a sealing position on said container neck; and  
an urging mechanism co-operating between said closure and said container neck when said closure is near said sealing position to apply a closing torque to said closure independently of whether an external closing torque is being applied to said closure, and thereafter maintaining a closing torque on said closure when said closure is in said sealing position on said container neck until a sufficient external release force is applied to said closure.

1. An easily openable can comprising:  
a can cover (1) capping a top end portion of a can having a score line (11) preformed on the can cover circumferentially confining a foldable tab (2) which normally flatly shields a drinking opening (13) formed in the can cover (1) having a circumferential opening edge of the drinking opening (13) matching with the score line (11) on said can cover (1);  
said foldable tab (2) generally formed as an elongate tongue shape and including: a front tab portion (21) secured with an actuating ring (3) by a rivet (33) adjacent to a rim flange (14) circumferentially disposed around the can cover (1), said score line having terminal end portions located on either side of the tab forming a rear end of the tab, said rear end located adjacent to a central portion of the can cover (1), a base folding line (22) transversely notched on a base portion (23) of the tab (2) with the base



portion (23) formed on said rear end of the tab (2) with the base folding line (22) having a longitudinal section of said tab (2) at said base folding line (22) concave upwardly when the tab (2) normally flatly shields the drinking opening (13) of the can cover (1), and an intermediate folding line (24) transversely formed on an intermediate portion of the tab (2) and having a longitudinal section of said tab (2) at said intermediate folding line (24) convex upwardly when the tab (2) normally flatly shields the drinking opening (13) of the can cover (1); with the front tab portion (21) having a first width (W1) matching with a front opening width (131) of the drinking opening (13) formed on a front opening edge of the drink opening (13) when opened by tearing the foldable tab (2), and having a second width (W2) of a rear tab portion (23a) adjacent to the base portion (23) of the tab (2) with the second width (W2) matching with a rear opening width (132) of the drinking opening (13) formed on a rear opening edge of the drinking opening (13) when opened by tearing tab the foldable tab (2), with the first width (W1) at the front tab portion (21) larger than the second width (W2) at the rear tab



portion (23a), said front tab portion (21) engageable with said rear opening edge of the drinking opening (13), whereby upon tearing of the tab (2) to open the drinking opening (13) and folding and depressing the tab (2) downwardly, the front tab portion (21) of the tab (2) can be stably locked on the rear opening edge of the drinking opening (13) by downwardly squeezing the front tab portion (21) with wide width (W1) to be engaged with and retained on the rear opening edge with narrow rear opening width (132); and

said actuating ring (3) including: a front plate portion (31) secured to the front tab portion (21) by the rivet (33), an acute end portion (32) formed on a central front portion of the front plate portion (31) and adjacent to an outermost end (211) of the front tab portion (21), and a ring member (34) protruding rearwardly from the front plate portion (31);

whereby upon pulling of said tab (2) for disclosing the drinking opening (13) and upon folding of the tab along said base and intermediate folding lines (22), (24), the tab (2) can be folded and retained on the opening of the can cover (1).

5,411,160

## CHILD RESISTANT CLOSURE

Jean-Francois Goulet, St-Damien de Bellechasse; Sylvain Labrie, Charny, and Dominique Lesqure, Buckland, all of Canada, assignors to IPL, Inc., Canada

Filed Jul. 26, 1993, Ser. No. 95,519

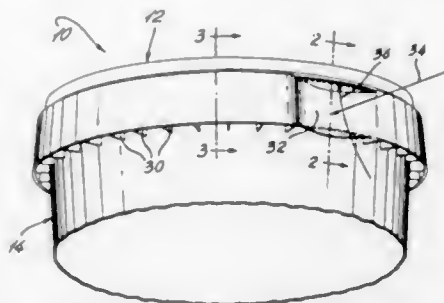
Int. Cl.<sup>6</sup> B65D 43/04

U.S. Cl. 220—182

2 Claims

1. A child resistant closure comprising, in combination: a lid comprising a main upper face displaying a peripheral

edge having a downwardly-depending skirt having a peripheral lower edge; a container made of plastic material defining a body comprising a bottom wall and a side wall; said side wall having an upper edge fixedly engageable with and under said peripheral edge of said lid and a peripheral integral flange extending outward at a distance below said upper edge; said flange including an upper peripheral lip and a downward peripheral portion; said lower edge of said lid, when fixedly engaged onto said container, being in close relationship behind said peripheral lip of said flange of said container so as to be hidden from view; said downward peripheral portion of said flange having, adjacent said



upper edge, a resilient area which is manually depressible so as to distance said flange of the container from said lower edge of the lid and to allow a manual gripping of said lower edge of the lid whereby removal of the lid from the container may be effected through two successive operations in directions substantially perpendicular to one another, one being a depression of said resilient area substantially perpendicular to the axis of said body, the other being a lifting of the lid substantially parallel to said axis, said lifting being carried out while maintaining said depression of said resilient area; the resiliency allowing said area to return to its original position after said lid has been lifted.

5,411,161

## CONTAINER HAVING A TWIST-LOCKING COVER

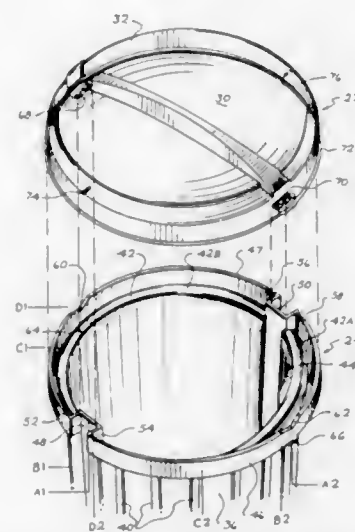
Milton L. Fish, Jr., 1145 Oak Ridge Dr., Glencoe, Ill. 60022

Filed Aug. 19, 1994, Ser. No. 293,357

Int. Cl.<sup>6</sup> B65D 41/06

U.S. Cl. 220—293

13 Claims



1. A device for containing refuse, comprising:

a cover having a top portion, a downwardly depending

circular collar attached to the top portion, a first tab attached to the collar, spaced apart from the top portion, and extending inwardly from the collar, and a second tab diametrically opposite the first tab and attached to the collar, spaced apart from the top portion, and extending inwardly from the collar;

a container having a sidewall terminating in an upper edge, a closed bottom attached to the sidewall opposite the upper edge, an outwardly extending rim attached to the upper edge of the sidewall, and an upwardly extending lip attached to the rim opposite the sidewall upper edge, the lip including a first channel extending inwardly through the lip and the rim toward the sidewall and a second channel diametrically opposite the first channel and extending inwardly through the lip and the rim toward the sidewall, the first and second channels being configured to permit the first and second tabs to pass through the lip and the rim;

wherein the cover is rotatably moveable between a first, removable position and a second, non-removable position in which the cover is rotatable on the container, the first tab being aligned with and positioned below one of the first and second channels and the second tab being aligned with and positioned below the second of the first and second channels when the cover is in the first position, and the first tab being positioned below a portion of the rim and the second tab being positioned below a portion of the rim opposite the first tab when the cover is in the second position.

5,411,162

## V-BAND COUPLING FOR AN EXPLOSION-PROOF ENCLOSURE

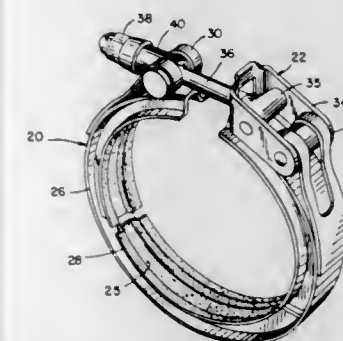
Joseph E. Kozickowski, Milwaukee County; Jeffrey R. Annis; Roland L. Krieger, both of Waukesha County, and Jerome P. Stache, Milwaukee County, all of Wis., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Jul. 31, 1992, Ser. No. 923,039

Int. Cl.<sup>6</sup> B65D 45/37

U.S. Cl. 220—320

5 Claims



1. An explosion-proof enclosure, comprising:

a metal chamber having two halves which fit together at outwardly extending flanges and which define an interior cavity; and

a V-band coupling constructed and arranged to grip said flanges and hold said halves together, said V-band coupling including:

a retaining strap;

at least one trunnion joint for circumferentially joining together respective ends of the retaining strap, the trunnion joint having a yield value of circumferential tensile load beyond which the trunnion joint is subject to failure;

at least one V-band segment on the interior of the retaining strap for engaging said flanges and holding the two halves of the metal chamber together;

means formed on the V-band segment for reducing transmission of force from a first force acting to separate the metal chamber halves to a second force acting to impart

circumferential tensile load on the retaining strap and the trunnion joint;

wherein (a) the means for reducing transmission of force comprises a roughened layer applied to surfaces of the V-band segment which grip the flanges on the metal chamber halves, (b) the roughened layer provides a coefficient of friction greater than approximately 0.30 between the V-band segment and the flanges, (c) contact surfaces on the flanges where the flanges contact the V-band segment are painted, (d) frictional forces between the V-band segment and the flanges are acting on said painted contact surfaces, (e) the adhesion of the paint onto the flanges is strong enough to prevent separating of the paint from the flanges for all said tolerable values of said first force, and (f) said means for reducing transmission of forces substantially increases the magnitude of said first force which can be tolerated while keeping the second force below said yield value of circumferential tensile load for the trunnion joint.

5,411,163

## CASE PROVIDED WITH A CLOSURE DEVICE NOT INCLUDING A MOVABLE MEMBER

Jean-Louis H. Gueret, Paris, France, assignor to L'Oreal, Paris, France

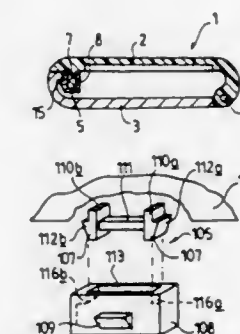
Filed Jun. 9, 1993, Ser. No. 73,464

Claims priority, application France, Jun. 9, 1992, 92 06918

Int. Cl.<sup>6</sup> B65D 45/16

U.S. Cl. 220—326

12 Claims



1. A case including first and second rigid case halves movable between open and closed positions, and a closure system for holding the case in the closed position, the closure system comprising:

a first element disposed on the first case half and including a rigid support fixed stationary on and projecting from the first case half, and a separate component formed of a material having elasticity that is fixed around the rigid support, said separate elastic component including a catch; and

a second element disposed on the second case half and including a receptacle fixed stationary at an edge of the second case half for engaging the catch,

wherein, when the case is closed and pressure is applied to open the case, a portion of the elastic component deforms, allowing the catch to disengage from the receptacle and allowing the case to open and, when the first half is closed relative to the second half, the portion of the elastic component again deforms, allowing the catch to engage the receptacle and allowing the case to remain closed.

5,411,164

## LAUNDRY AREA ORGANIZER DISPOSED BETWEEN A CLOTHES WASHER AND DRYER

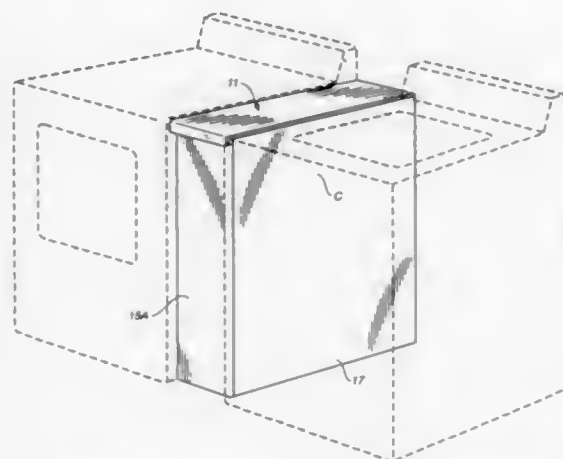
Paul C. Smith, Box 1200, Occidental, Calif. 95465, and Barbara J. Smith, Box 120, Camp Meeker, Calif. 95419

Continuation-in-part of Ser. No. 759,420, Sep. 13, 1991, abandoned. This application Mar. 1, 1993, Ser. No. 25,218

Int. Cl.<sup>6</sup> A47B 41/00

U.S. Cl. 220—334

20 Claims



1. A laundry area organizer for use with a clothes washer and dryer, each of the clothes washer and dryer having a top surface and side walls, the laundry area organizer configured to be located between the clothes washer and dryer, the laundry area organizer comprising:

a bin comprising a front, a back, a bottom, first and second side walls, and an open top, the first side wall of the bin being juxtaposed to and abutted with a side wall of one of the clothes washer and dryer and the second side wall of the bin being juxtaposed to and abutted with a side wall of the other of the clothes washer and dryer so that the bin is disposed between and laterally supported by the clothes washer and dryer, the front, back, and first and second side walls of the bin defining an interior chamber;

a cover for the bin open top, the cover having a top surface, the cover being manipulable to an open position for providing access to the interior of the bin and, alternatively, to a closed position for precluding access to the interior of the bin; and

a plurality of legs for the bin for vertically supporting the bin so that the top surface of the cover is at about the same height as the top surfaces of the clothes washer and dryer so that the top surfaces of the cover and the clothes washer and dryer lie approximately in a plane when the cover is in the closed position;

the height of the laundry area organizer being substantially greater than the width of the laundry area organizer for convenient location of the laundry area organizer between the clothes washer and dryer to allow the clothes washer and dryer to remain in close proximity so that the transfer of clothes from the washer to the dryer is not substantially impeded, the laundry area organizer having a high center of gravity when the laundry area organizer is filled with laundering agents, the laundry area organizer relying on abutting contact of the first and second side walls of the bin with the juxtaposed side walls of the clothes washer and dryer for lateral support to overcome the instability created by the high center of gravity and high ratio of height to width.

5,411,165

## DRAWER AND INSERT FOR RAPID REMOVAL OF VALUABLES

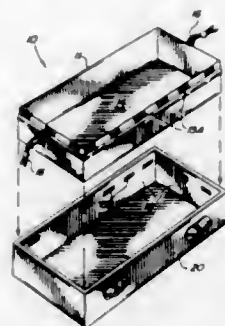
Thomas J. Ellis, 5407 E. Libby St., Scottsdale, Ariz. 85254

Filed Nov. 2, 1993, Ser. No. 124,707

Int. Cl.<sup>6</sup> B65D 25/16

U.S. Cl. 220—404

17 Claims



1. A removable, portable liner for a drawer, for rapid removal and transport of drawer contents, comprising:

a flexible, closable, open top carrier having a bottom and an enclosing wall; said enclosing wall having interior and exterior surfaces; said bottom having a selected length and width for conforming to the bottom of the drawer to be lined by said carrier; said enclosing wall of said carrier having a height adapted to be selected to extend beyond the top of the side walls of said drawer to be lined by said carrier;

folds in said enclosing wall of said carrier adapted to foldingly reduce said height of said enclosing wall below the height of said side walls of said drawer when said drawer is lined by said carrier and adapted to form a portion of said interior surface of said enclosing wall which faces outwardly; and

coupling means attached to that portion of said interior surface which is adaptable to face outwardly and adapted to coact with complementary coupling means mounted on the interiors of said side walls of said drawer for releasably coupling said enclosing wall to said side walls of said drawer and for maintaining said carrier top open when said drawer is lined by said carrier.

5,411,166

Patent Not Issued For This Number

5,411,167

## BASKET LINING MATERIAL HAVING AN ADHESIVE OR COHESIVE THEREON AND METHOD

Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.

Continuation of Ser. No. 781,040, Oct. 21, 1991, abandoned, which is a continuation-in-part of Ser. No. 649,379, Jan. 31, 1991, Pat. No. 5,111,638, and a continuation-in-part of Ser. No. 502,358, Mar. 29, 1990, abandoned. This application Sep. 14, 1993, Ser. No. 121,967

Int. Cl.<sup>6</sup> B65D 5/00

U.S. Cl. 220—460

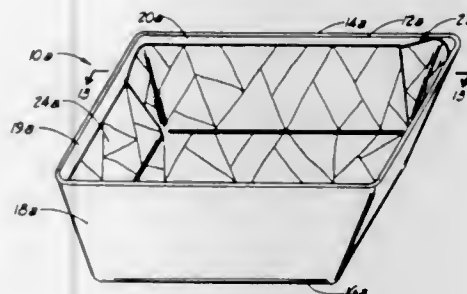
8 Claims

1. A basket lining material, comprising:

a basket having an upper end, a lower end, and an outer surface, a basket opening being formed in the basket with a portion of the basket opening intersecting the upper end of the basket forming an inner surface having contours, the basket opening being sized and shaped for receiving items and the items being retained in the basket opening by the basket; and

an unpreformed sheet of material having an upper surface, a lower surface and an outer periphery, the sheet of material having an adhesive on at least one surface thereof, the sheet of material being disposed in the basket opening without first being preformed to conform to the inner surface of the basket the adhesive on the sheet of material being disposed adjacent the inner surface of the basket and

the sheet of material being crushed and flattened against the inner surface of the basket thereby forming a liner, the liner adhesively contacting and connecting to the inner surface of the basket, the liner thereby substantially conforming to the shape of the inner surface of the basket, the



adhesive bonding to the inner surface of the basket and holding the liner in place against the inner surface of the basket, wherein items placed in the basket are received upon the liner, and wherein the liner remains firmly and unmovably connected to the inner surface of the basket when items are both disposed and retained on the liner.

5,411,168

## SHEET DISPENSER AND DISPENSER SUBASSEMBLIES

Timothy A. Mertens, Cottage Grove; Alden R. Miles, Lakeville; Wayne K. Darvell, North St. Paul, and David C. Windorski, Woodbury, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 3, 1993, Ser. No. 101,615

Int. Cl.<sup>6</sup> B65G 59/02

U.S. Cl. 221—22

26 Claims

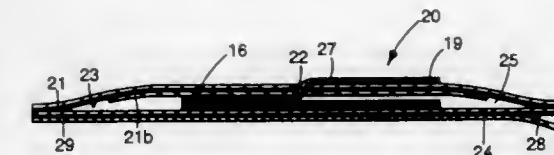
21. A pop-up sheet dispenser comprising:

(a) a stack of sheets disposed one on top of another, each sheet comprising a backing having opposite first and second major side surfaces and opposite first and second ends with ends of the sheets being in alignment in the stack, and a layer of adhesive permanently adhered to the first side surface of said backing, the layers of adhesive of said sheets being releasably adhered along the second surfaces of the adjacent sheets in said stack, at least some of said sheets comprising release means for providing a first adhesion level along first end portions of said sheets adjacent said first ends of said backings between said first side surfaces and the second side surfaces of the adjacent

sheets in the stack to which the layers of adhesive are releasably adhered, which first adhesion level provides a sufficiently low or no release force between said first side surfaces and the adjacent sheets to which the adhesive along those first side surfaces are releasably adhered to afford sliding movement between the side surfaces of the adjacent sheets along said first end portions, and attachment means for providing a second adhesion level along second end portions of said sheets adjacent said second ends of said backings between said layers of adhesive and the second side surfaces of the adjacent sheets in the stack to which said layers of adhesive are releasably adhered, which second adhesion level provides a release force that is higher than said sufficiently low release force along said first end portions and firmly adhere the sheets to the adjacent sheets in the stack during sliding movement of the sheets relative to the adjacent sheets along said first end portions while affording peeling away of the sheets from the stack along said second end portions;

(b) a supple cover layer less than 0.2 millimeter (0.008 inch) in thickness having inner and outer major surfaces, a central portion, a peripheral portion or portions on at least two opposite sides of said central portion, and a through slot extending transversely across said central portion;

(c) said stack of sheets being positioned along the inner surface adjacent said central portion with the first end portion of the uppermost sheet in the stack extending through said slot;



(d) a thin, supple bottom layer having inner and outer surfaces, said bottom layer extending over the inner surface of the cover layer and the stack of sheets and being attached to said peripheral portion of the cover layer with the inner surface of the bottom layer adjacent the cover layer to form a chamber around the stack of sheets;

(e) said sheets, slot and chamber being adapted to afford dispensing of the sheet having the first end portion extending through the slot when that first end portion is manually pulled through the slot by sequential sliding movement of one of the sheets relative to the adjacent sheet along the first end portion and peeling away of the sheet from the stack along said second end portion, and positioning of the first end portion of an underlying sheet in a position extending through the slot as a result of said dispensing;

(f) a layer of pressure-sensitive adhesive on the outer surface of the bottom layer; and

(g) a disposable release liner over the surface of the layer of pressure-sensitive adhesive layer opposite the bottom layer, which release liner can be removed to permit the dispenser to be adhered to a surface.

5,411,169

Patent Not Issued For This Number



5,411,170

**SYSTEM FOR METERED FEEDING OF CYLINDRICAL BODIES FROM A STOCK TO A PROCESSING MACHINE**  
 Everardus H. Boschman, Aerd, Netherlands, assignor to Boschman Holding B.V., Nijmegen, Netherlands

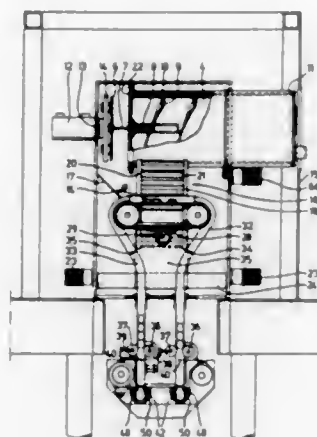
Filed Nov. 22, 1993, Ser. No. 155,138

Claims priority, application Netherlands, Nov. 24, 1992, 9202042

Int. Cl.<sup>6</sup> B23Q 7/12

U.S. Cl. 221-167

10 Claims



1. System for metered feeding of cylindrical bodies from a stock to a processing machine, comprising:  
 a device for holding said stock;  
 a device for aligning the cylindrical bodies coming from the stock;  
 a transfer device to move the cylindrical bodies to the processing machine; and  
 a device for metered feeding of the cylindrical bodies to said transfer device; wherein:

the device for aligning the cylindrical bodies coming from the stock comprises a rotatable drum-shaped member, consisting of a number of bars which are disposed in the form of a ring and whose longitudinal centre line is essentially parallel to a longitudinal centre line of the drum, there being a spacing between the bars, which corresponds to a thickness of the cylindrical bodies, a rotational centre line of the drum-shaped member being essentially horizontal, and screening means being disposed near the bottom half of the drum-shaped member and adjoining the latter, an inlet for cylindrical bodies being disposed near a centre of the drum-shaped member and an outlet for cylindrical bodies at the circumference of the bars, together with a motor for driving the drum-shaped member in a rotary manner.

5,411,171

**APPARATUS FOR AND METHOD OF GENTLY PACKAGING A PRODUCT**

Jens Quirling, Schwarmstedt, and Hejo Frerichs, Verden, both of Germany, assignors to Lieder Maschinenbau GmbH & Co KG, Germany

Filed Jul. 6, 1993, Ser. No. 88,556

Claims priority, application Germany, Jul. 4, 1992, 42 22 062.9

Int. Cl.<sup>6</sup> B67B 7/00

U.S. Cl. 222-1

41 Claims

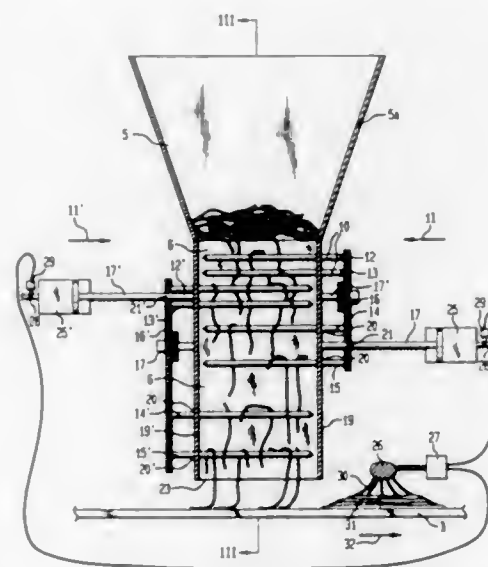
1. Apparatus for loosening a product of a type composed of a plurality of separable components tending to adhere to one

another, before being discharged and transferred for further processing; said apparatus comprising:

a container for receiving the product, said container having a discharge well defining a transport path between an inlet opening and an outlet opening;

loosening means provided in said discharge well for separating components of the product said loosening means including a plurality of rods arranged successively in direction of the transport path and movable between a first position in which said rods are positioned in said discharge well across the transport path and a second position in which said rods are withdrawn from said discharge well; control means operatively connected to said loosening means for moving successive rods in such a manner that a first plurality of said rods is in the first position when a second plurality of said rods is in the second position, and said second plurality of said rods is in the first position when said first plurality of said rods is in the second position to allow product components to descend by increments toward said outlet opening.

13. Apparatus for gently packaging a product having a consistency which can be affected by external influences and including a plurality of separable components which are transported along a transport path, said apparatus comprising:



a container with a discharge well for defining the transport path;

loosening means for separating components of the product, said loosening means including

a plurality of rods subdividing the cross sectional area of the transport path in free sections of given size and movable in longitudinal direction between a first position in which said rods extend transverse to the transport path and a second position in which said rods are withdrawn from the transport path to at least partly free the cross sectional area thereof,

a first support member for supporting a first plurality of said rods and a second support member for supporting a second plurality of said rods, and

a control unit operatively connected to said first and second support members for withdrawing and returning said rods from and to the cross sectional area of said discharge well in such a manner that said rods of said first support member are in the first position when said rods of said second support member are in the second position, and that said rods of said second support member are in the first position when said rods of said first support member are in the second position.

5,411,172

**UNITARY ASSEMBLY OF BEVERAGE KEG AND GAS RESERVOIR**

Jean-Renaud Brugerolle, and Alain Robin, both of Paris, France, assignors to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procédés Georges Claude, Paris, France

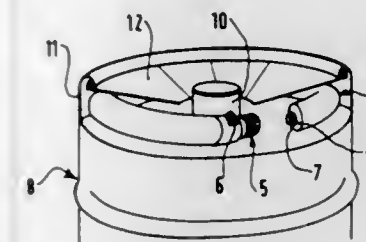
Filed Dec. 16, 1993, Ser. No. 169,983

Claims priority, application France, Jan. 5, 1993, 93 00036

Int. Cl.<sup>6</sup> B67D 1/04

U.S. Cl. 222-4

12 Claims



1. The combination of a keg having a handling skirt defining an annular space and a gas reservoir housed in the annular space, the gas reservoir being in the shape of a portion of a torus having spaced apart opposite ends, a pressure regulator fitted into a first of said ends in the prolongation thereof, the pressure regulator being in fluid flow communication with an outlet connection projecting laterally from said first end.

5,411,173

**COUNTER ATTACHMENT FOR PRODUCT DISPENSERS**

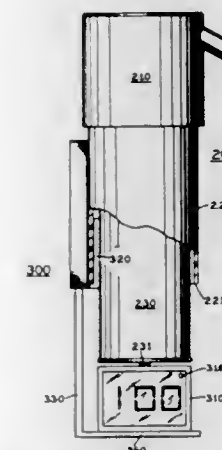
Albert Weinstein, 9070 Tracy Ct. 3, Boca Raton, Fla. 33496

Filed Dec. 17, 1993, Ser. No. 168,143

Int. Cl.<sup>6</sup> B67D 5/22

U.S. Cl. 222-38

18 Claims



1. A counter attachment for a fluid dispenser, the dispenser includes a fluid tank with a top portion extending into a hollow casing and abutting against a dispenser cap, the container having a bottom portion extending beneath the bottom of the casing, the counter attachment comprising:

a clip with a first end and second end, the first end contacting an inner side of the casing;  
 a shaft housing connected to the second end of the clip;  
 a counter;  
 a vertical shaft with top end extending into the shaft housing and a bottom end extending below the shaft housing;  
 a foot-leg positioned beneath the fluid tank and connected to the bottom end of the vertical shaft; and  
 an indexing button which is located between the fluid tank and the foot-leg, wherein the button abuts against the bottom of the fluid tank and is depressed each time the

tank and foot-leg is depressed, wherein depressing the tank and foot-leg increments the counter.

5,411,174

**EMPTYING BALANCE HAVING A PRODUCT FLOW SETTING DEVICE**

Thomas Braun, Schwaebisch-Hall, and Werner Gwinner, Rosengarten, both of Germany, assignors to Optima-Maschinenfabrik Dr. Buhler GmbH & Co., Germany

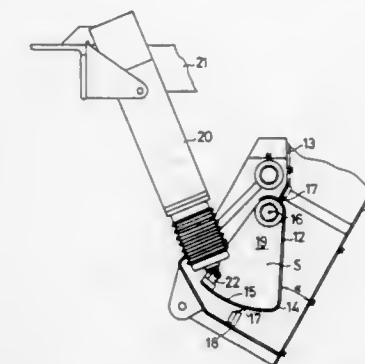
Filed Feb. 11, 1993, Ser. No. 16,879

Claims priority, application Germany, Feb. 11, 1992, 42 03 883.9

Int. Cl.<sup>6</sup> G01G 13/06; B65G 53/46, 65/40

U.S. Cl. 222-77

7 Claims



1. An emptying balance for a product with a product flow setting device, comprising: a fixed wall, a slide valve wall positioned facing the fixed wall and being inclined with respect to the fixed wall, the slide valve wall forming with said fixed wall a passage for the product, the passage cross-section being determined by a minimum spacing between the two walls; the slide valve wall being adjustable for varying the minimum spacing from the fixed wall; the slide valve wall being part of a rotary slide valve and being pivotable about a shaft located in its upper area; and a blocking flap for selectively blocking a flow of product being passed through said flow setting device until a predetermined value of product is accumulated adjacent said blocking flap and for passing said predetermined value of product by being selectively opened, wherein the rotary slide valve has a wall portion extending from the slide valve wall in a circular cylindrical arc about the shaft.

5,411,175

**CARTRIDGES, DEVICES AND METHODS FOR DISPENSING LIQUIDS**

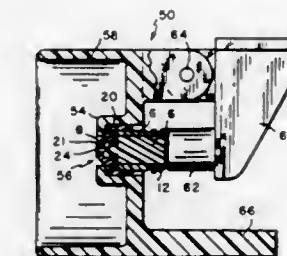
John C. Armstrong, Milton, Mass., and Frank Venus, Jr., Merrimac, N.H., assignors to New England Pharmaceuticals, Inc., North Easton, Mass.

Filed Mar. 8, 1993, Ser. No. 27,518

Int. Cl.<sup>6</sup> B67D 5/00

U.S. Cl. 222-83.5

15 Claims



14. A dispenser adapted for receiving at least one cartridge for providing a liquid to be dispensed, wherein the cartridge comprises a container for holding the

liquid, the container having the liquid disposed therein and comprising a piercer and a pierceable section, wherein the piercer is capable of piercing the pierceable section, and wherein the dispenser comprises (i) a member for moving the piercer and the pierceable section together to effect the piercing thereof, and (ii) a dispensing member for dispensing the liquid to an intended delivery target, the dispensing member comprising a spray head adapted to receive the cartridge at the pierceable section, the spray head comprising a spray tip having an orifice open to the atmosphere and to the pierceable section.

5,411,176

# VARIABLE DOSAGE DISTRIBUTOR FOR FLUID PRODUCTS

Bernard Favre, Chevilly-Larue, France, assignor to LIR-France, Chevilly-Larue, France

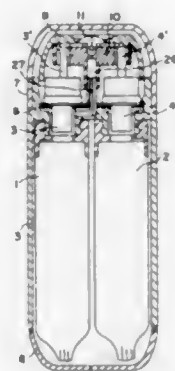
Filed Oct. 22, 1993, Ser. No. 139,788

Claims priority, application France, Oct. 22, 1992, 92 12660

Int. Cl.<sup>6</sup> B67D 5/22, 5/52

U.S. Cl. 222—94

8 Claims



1. Distributor for fluid products, comprising a flexible bag (1) filled with the product to be distributed and connected in a sealed manner to a pump (3) sealed from the air, a body (5) enclosing the bag (1) and the pump (3), and an actuating button (9) for said pump provided with an outlet for the product to be distributed, a movable member (10) interposed between the downstream end (3') of the pump (3) and the outlet in the button (9) for the product, said movable member (10) having a first conduit (13) which in a first position of the movable member (10) places an upstream end of the pump (3) directly in communication with the outlet of the button (9), and at least one second conduit comprising a direct circuit and a branch (22, 24, 25), said direct circuit (22, 24) in a second position of the movable member placing a downstream end (3') of the pump (3) in communication with the outlet of the button (9) while the branch (25) places the downstream end of the pump (3) in communication with the upstream end of the pump (3).

5,411,177

# FOAM DISPENSING APPARATUS

Joseph W. Blake, III, New Canaan, Conn., assignor to Jack W. Kaufman, Merrick, N.Y.

Continuation-in-part of Ser. No. 763,366, Sep. 20, 1991, Pat. No. 5,222,633. This application Jun. 20, 1993, Ser. No. 84,422

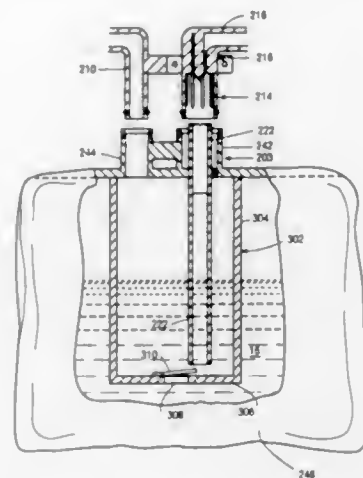
Int. Cl.<sup>6</sup> B67D 5/00

U.S. Cl. 222—105

31 Claims

1. A foam dispensing apparatus comprising: a container for holding a foamable liquid; means for directing a pressurized gas into said container; a foaming device having a hollow receiver portion, a foam generating portion having an inner wall, and a discharge portion; a flow restrictor in said foam generating portion spaced from said inner wall; and a tube having one end in said receiver portion, said tube

extending out of said foaming device into said container for directing foamable liquid through said receiver portion into said foam generating portion; said one end of said tube and said receiver portion defining a plurality of spaced, passages juxtaposed said tube connecting said receiver portion with said foam generating



portion, whereby pressurized gas entering said container forces said foamable liquid through said tube and into said foam generating portion past said flow restrictor while said gas simultaneously enters said foam generating portion through said passages so as to create foam from said foamable liquid.

5,411,178

# FLUID DISPENSER POUCH WITH VENTURI SHAPED OUTLET

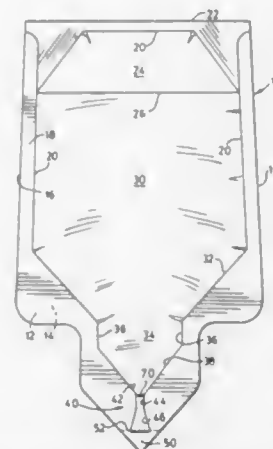
George W. Rodgers, Kenosha, and Stewart Banks, Brantford, Canada, assignors to Beeton Holdings Limited, St Peter Port, Channel Islands

Filed Mar. 11, 1994, Ser. No. 208,884

Int. Cl.<sup>6</sup> B65D 37/00

U.S. Cl. 222—105

14 Claims



1. A pliable pouch for storing liquids therein, comprising: flexible, liquid impermeable superposed sheets being sealed together in liquid-tight relation to enclose therebetween a liquid storage compartment and a flexible shot-chamber in flow communication with said liquid storage compartment, including a venturi shaped outlet passageway extending from said flexible shot-chamber to an associated liquid discharge opening located at a peripheral edge of

said liquid tight seal, said venturi shaped outlet passageway including a first tapered portion, a second tapered portion, and an elongate throat portion having opposed ends, the first tapered portion extending from said flexible shot chamber to one end of said elongate throat portion and said second tapered portion extending from the other end of said elongate throat portion to said discharge opening, the pliable pouch including detachable closure means attached to said pouch for blocking said discharge opening.

5,411,179

# SELF-CONTAINED BEVERAGE DISPENSING SYSTEM

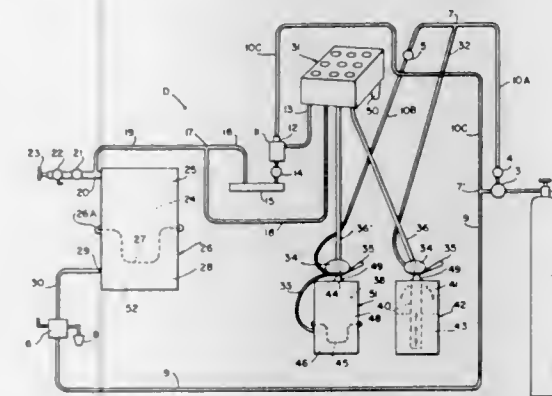
Edward N. Oyler, Newnan, and Harold F. Stover, Grantville, both of Ga., assignors to S.O.B. Partnership, Newnan, Ga.

Filed Aug. 31, 1993, Ser. No. 113,805

Int. Cl.<sup>6</sup> B67D 5/56

U.S. Cl. 222—129.1

3 Claims



1. A self-contained beverage dispensing system comprising: a) a cabinet; b) a refillable source of CO<sub>2</sub> gas under pressure and disposed in said cabinet; c) a water storage tank disposed in said cabinet and for storing flat water, said water storage tank including an upper water storage portion having a water refill inlet and a flat water outlet, and further including a lower CO<sub>2</sub> gas portion and water isolation means for separating said upper water storage portion from said lower CO<sub>2</sub> gas portion; d) a first pipeline for communicating said CO<sub>2</sub> gas portion of said water storage tank with said CO<sub>2</sub> gas source thereby to apply pressure against said water isolation means; e) a flat water line connected to said flat water outlet of said water storage tank; f) a refillable beverage storage tank disposed in said cabinet and for storing a first beverage and including a take-up tube; g) a second pipeline for communicating said CO<sub>2</sub> gas source with an upper portion of said refillable beverage storage tank, so that pressurized CO<sub>2</sub> gas directly contacts said first beverage and is operative to force said first beverage through said take-up tube and out of said refillable beverage storage tank; h) an isolation storage tank disposed in said cabinet and for storing a second beverage, said isolation storage tank including an upper beverage storage portion for storing said second beverage, a lower portion and a beverage isolation means for separating said upper beverage storage portion from said lower portion; i) a third pipeline for communicating said CO<sub>2</sub> gas source with said lower portion of said isolation storage tank thereby to apply pressure against said beverage isolation means and operative to force said second beverage out of said isolation storage tank; and j) a carbonator, in communication with said CO<sub>2</sub> gas source

and also with said flat water line, for carbonating at least a portion of said flat water; k) dispensing valve means for dispensing a selected one of said flat water, said carbonated water, said first beverage in carbonated form and said second beverage in non-carbonated form; and l) means for communicating said dispensing valve means with each of said water storage tank, said carbonator, said isolation storage tank and said refillable beverage storage tank.

5,411,180

# SELF-CONTAINED HYDRAULIC DISPENSING MECHANISM WITH PRESSURE RELIEF REGULATOR

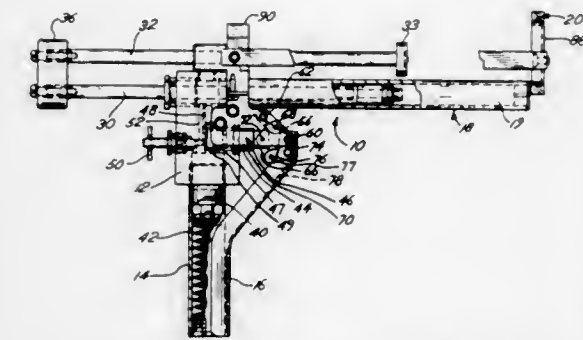
John F. Dumelle, Chicago, Ill., assignor to Innovative Technology Sales, Inc., Chicago, Ill.

Filed May 7, 1993, Ser. No. 60,208

Int. Cl.<sup>6</sup> B67D 5/00

U.S. Cl. 222—137

15 Claims



1. A self-contained dispensing mechanism for a viscous material comprising body means including a reservoir for liquid, piston and cylinder means connected to said body means and operatively connected to said reservoir, said piston and cylinder means including a cylinder affixed to the body means and a piston movable in said cylinder, a piston rod secured to said piston, pump means in said body means for pumping liquid from said reservoir into said cylinder for actuating said piston in one direction, push rod means connected to said piston rod for movement therewith, and a stop assembly on said body means for receiving and retaining at least one container of viscous material, said push rod means aligned with said container and movable substantially along the axis of said container, said push rod means including a push end adapted to engage within and move within said container to force viscous material from an exit end thereof said pump means comprising a piston slidable in a chamber in said body means, handle means pivoted on said body means for actuating the piston slidable in said body means, link means between the handle means and the piston, spring means for biasing the handle means to a first position, the handle means being manually actuatable between said first position and a second position for actuating the piston to pump liquid.

5,411,181

# VARIABLE RESTRICTOR FOR A MANUALLY ACTUATED PUMP

Michael G. Knickerbocker, 4516 Hillside Ct., Crystal Lake, Ill. 60012

Filed Sep. 17, 1993, Ser. No. 128,768

Int. Cl.<sup>6</sup> B65D 88/54

U.S. Cl. 222—309

16 Claims

1. An improved variable restrictor for a manually actuated pump for dispensing a variable volume of liquid from a container, comprising in combination: a body having a first body end and a second body end with an internal pump cylinder interposed therebetween; securing means for securing said body to the container;



an induction tube affixed to said second body end of said body for providing fluid communication between the liquid within the container and said internal pump cylinder of said body;

first one-way valve means for enabling the flow of the liquid only from the container into said internal pump cylinder of said body;

a piston slidably disposed within said internal pump cylinder of said body;

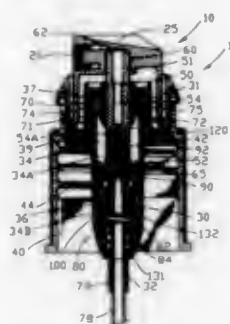
a pump stem having a first and a second stem end with an internal stem passage extending therein;

said first stem end being disposed external said body with said second stem end being disposed within said internal pump cylinder body;

a spring for biasing said pump stem and said piston into an extended position;

second one-way valve means cooperating with said piston for enabling the flow of the liquid only from said internal pump cylinder into said second end of said internal stem passage of said pump stem;

an actuator having a base surface and including a terminal orifice communicating with said first end of said internal stem passage of said pump stem;



said actuator discharging a volume of the liquid from the container through said terminal orifice upon a longitudinal movement of said actuator from an extended position to a retracted position by an operator;

variable restrictor means for varying said retracted position to vary said longitudinal movement of said actuator from said extended position to said retracted position for altering the volume of liquid discharged from the container through said terminal orifice;

said variable restrictor means providing a continuous variation of said retracted position independent of a rotational position of said actuator;

said variable restrictor means comprising a collar being spaced apart from said piston stem for enabling said actuator base surface to be received within said collar;

said collar having an overhang extending radially inwardly toward said pump stem for defining said retracted position upon engagement of said base surface of said actuator; and;

said collar being rotatable relative to said body for varying the position of said overhang to vary said longitudinal movement of said actuator from said extended position to said retracted position upon rotation of said collar.

5,411,182

**DISPENSING DEVICE FOR VISCOUS MATERIALS**  
Gonzolo U. Marte, Metro Manila, Philippines; Maria H. G. Herrera; Federico H. Saa, both of Valle, Colombia; Maria E. H. Cequera; Leopoldo J. S. Gonzalez, both of Valencia, Venezuela, and Orlando Fuquen, Somerset, N.J., assignors to Colgate-Palmolive Co., New York, N.Y.

Filed Apr. 19, 1993, Ser. No. 47,523

Int. Cl.<sup>6</sup> B67D 5/42

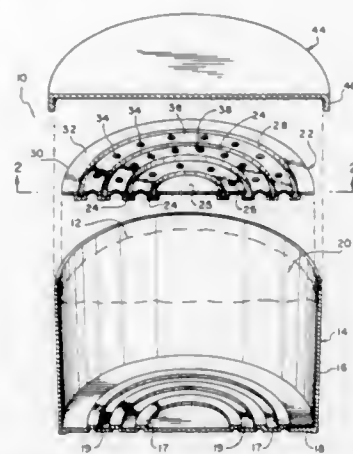
U.S. Cl. 222—386

17 Claims

9. A container and dispensing device for delivering a viscous material, the combination comprising:

a substantially non-planar dispenser device disposed on the

surface of said viscous material, said dispenser device comprising a substantially non-planar member having an outer edge complementing the shape of said side wall of



said container, said non-planar member having a plurality of recessed areas and a plurality of raised areas, a plurality of holes in said raised areas defining outlets.

5,411,183

**LIQUID SPRAY OR FOAM DISPENSING APPARATUS**  
Bodo Hildebrandt, Riedstadt, Germany, assignor to Wella Aktiengesellschaft, Darmstadt, Germany

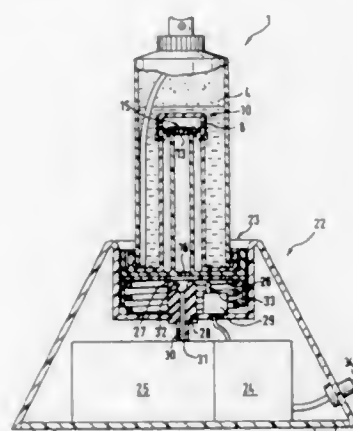
Filed Dec. 9, 1993, Ser. No. 164,352

Claims priority, application Germany, Dec. 17, 1992, 9217250 U

Int. Cl.<sup>6</sup> B65D 83/00

U.S. Cl. 222—399

10 Claims



1. Dispensing apparatus comprising

a container provided with a reservoir chamber for holding a liquid;

a metering valve connected to said reservoir chamber for dispensing purposes;

a manually operable air pump means for pressurizing said reservoir chamber with pressurized air, said manually operable air pump means including a piston pump having a piston, a nondetachable operating handle connected to said piston by which said piston can be manipulated so that said piston pump pressurizes said reservoir chamber with said pressurized air and a pressure equalizing valve communicating with an outer atmosphere, said operating handle being provided with a throughgoing opening communicating with and adjacent to said the pressure equalizing valve;

a one-way valve connecting said manually operable air pump means with said reservoir chamber to permit flow

from said manually operable air pump means to said reservoir chamber and to prevent flow in said reservoir chamber from said reservoir chamber to said manually operable air pump means; and

pressurized air filling means for feeding said pressurized air to said reservoir chamber, wherein said pressurized air filling means is located outside said container and includes a pressurized air connector connectable in an air-tight manner with said throughgoing opening of said operating handle through which said pressurized air can be fed.

5,411,184

**ACTUATOR FOR AEROSOL CONTAINERS AND CORRESPONDING BASE**

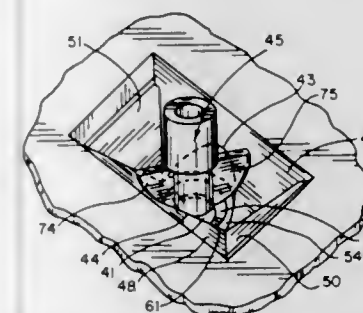
Thomas J. Smrt, 9716 S. Grant Hwy., Marengo, Ill. 60152

Filed Oct. 21, 1993, Ser. No. 140,250

Int. Cl.<sup>6</sup> B65D 83/20

U.S. Cl. 222—402.13

44 Claims



1. A base assembly for receiving and seating an aerosol container actuator, the aerosol container actuator having an orifice and capable of receiving an aerosol container, the contents of the aerosol container being dischargeable through the orifice of the aerosol container actuator, the base assembly comprising, in combination,

a base surface at least partially disposed in a base plane and having an opening, the contents of the aerosol container being dischargeable through the orifice and the opening when the aerosol container actuator is seated within the base assembly,

at least one wall extending upward from the base surface and defining two actuator-orienting guides, the guides being defined by substantially arcuate-shaped profiles substantially disposed in respective guide planes, the guide planes being disposed at an angle to one another of less than 180° and at an angle of less than 90° to the base plane, the guides being capable of contacting the actuator as it is received in the base assembly, the guides being disposed relative to one another such that they rotate the actuator to guide the actuator into the seated position.

5,411,185

**SPRAY PUMP PACKAGE EMPLOYING MULTIPLE ORIFICES HAVING AN ORIFICE SELECTOR SYSTEM**

James L. Drobish, Wyoming, Ohio, assignor to The Procter &amp; Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 96,636, Jul. 22, 1993, Pat. No.

5,337,926, which is a continuation of Ser. No. 832,526, Feb. 7, 1992, abandoned. This application Jun. 1, 1994, Ser. No. 252,613

Int. Cl.<sup>6</sup> B65D 83/06

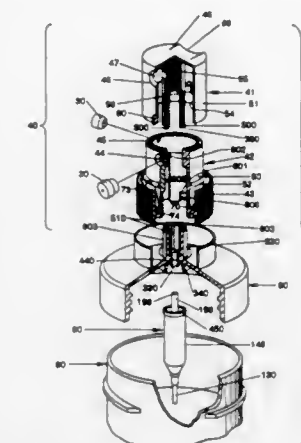
U.S. Cl. 222—402.17

3 Claims

1. A spray orifice selector system for a spray package having at least two spray orifices, each of said orifices being manually selected by the user of said package, said selector system comprising:

a) a spray orifice selector movably secured to a container for housing a liquid, said selector providing fluid communication between said container and a first spray orifice when said selector is moved to align said first spray orifice with said container, and between said container and a second

spray orifice when said spray orifice selector is moved to align said second spray orifice with said container, said spray orifice selector exposing for spraying only one of said first and second spray orifices at a time; and



b) means for moving said selector such that said user may grip said container in a first hand and operate said spray orifice selector with a second hand without having to regrip said container with said first hand in order to spray said liquid in a fixed direction from said first and said second spray orifices.

5,411,186

**DISPENSING CAP WITH ROTATABLE TOP**

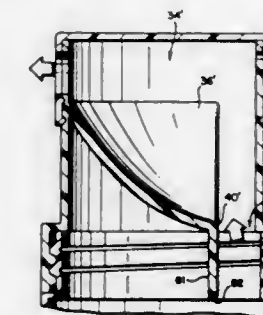
Edward S. Robbins, III, 2802 E. Avalon Ave., Muscle Shoals, Ala. 35661

Continuation-in-part of Ser. No. 47,086, Apr. 16, 1993, abandoned, which is a continuation-in-part of Ser. No. 979,042, Nov. 19, 1992, abandoned. This application Jun. 14, 1993, Ser. No. 76,132

Int. Cl.<sup>6</sup> G01F 11/28

U.S. Cl. 222—442

10 Claims



1. A dispenser cap for discharging measured amounts of contents from a container comprising:

a first peripheral skirt having upper and lower portions, said lower portion provided with interior surface means for securing the cap to a container, said upper portion at least partially defining a dispensing chamber, wherein said upper and lower portions of said first peripheral skirt are separated by a weir panel, said weir panel configured to provide a weir opening between said upper and lower portions, said weir opening defined by a straight weir edge and an arcuate portion of said peripheral skirt; and

a top including a second peripheral skirt telescoped over and secured to said first peripheral skirt, wherein said first and second peripheral skirts have alignable first and second respective discharge apertures formed therein, said first

discharge aperture in said first peripheral skirt diametrically opposed to said weir opening.

5,411,187

# AEROSOL SPRAY CONTAINER AND SPRAY DIRECTOR

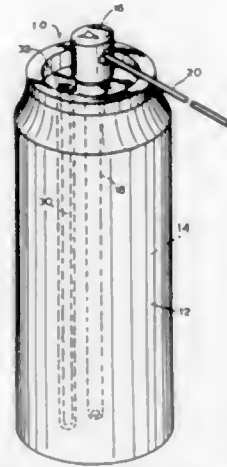
William Schwab, 60 Caryl Ave., Yonkers, N.Y. 10705

Filed Jun. 29, 1994, Ser. No. 267,588

Int. Cl.<sup>6</sup> B05B 15/06

U.S. Cl. 222—538

13 Claims



## 1. An aerosol spray container comprising:

(A) a container defining first and second non-communicating open-topped chambers, said first chamber being airtight and configured and dimensioned to hold a liquid to be dispensed as an aerosol spray, and said second chamber being configured and dimensioned to receive therein a substantial portion of the length of a longitudinally extending spray director, with the remaining portion of the length of the director extending freely upwardly beyond the top of said second chamber, said second chamber being smaller in volume than said first chamber, open only at the top thereof and surrounded by said first chamber save at the top thereof; and

(B) an aerosol valve operatively closing the top of said first chamber and actuable to release aerosol spray therefrom, said valve being configured and dimensioned to receive therein one end of the spray director, whereby aerosol spray released through said valve exits the opposite end of the director, thereby to guide and direct the aerosol spray.

5,411,188

# ADJUSTABLE FRAME BOW MAKING DEVICE

Craig S. Teuten, 17 Wapping Rd., Kingston, Mass. 02364

Filed Mar. 16, 1994, Ser. No. 213,867

Int. Cl.<sup>6</sup> A41H 43/00

U.S. Cl. 223—46

17 Claims

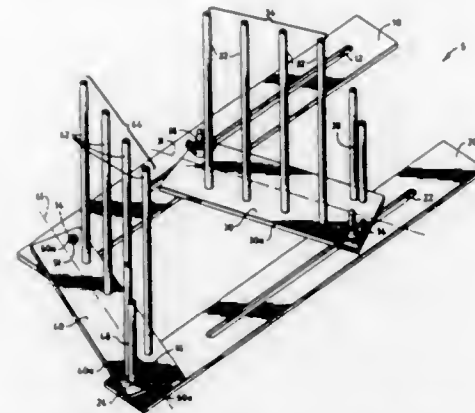
## 1. Apparatus for making ribbon bows comprising,

a quadrilateral frame structure formed of four individual elongated planar members, the first and second of said elongated planar members being positioned to form opposite sides of said quadrilateral frame and being formed with elongated slots therein extending along the longitudinal axes of said first and second elongated planar members,

a first plurality of upstanding rod elements attached to the third elongated planar member and spaced apart to form a first array extending along the longitudinal axis of said third elongated planar member,

a second plurality of upstanding rod elements attached to said fourth elongated planar member, said rod elements being spaced apart to form a second array extending along

the longitudinal axis of said fourth elongated planar member, pivotal connections at each end of said third and fourth elongated planar members for pivotally mounting said third and fourth elongated planar members to said first and second elongated planar members, said third elongated planar member having its pivotal connections pivotally mounted in said elongated slots of said first and second



ond planar members for adjustable positioning along the longitudinal axes of said slots, means for fixing said pivotal connections at the ends of said fourth elongated planar member in a fixed pivoting position at one end of each of said first and second elongated planar members, and means for fixing said pivotal connections at said ends of said third elongated planar member in any of a plurality of adjustable positions along said elongated slots.

5,411,189

# GARMENT HANGER

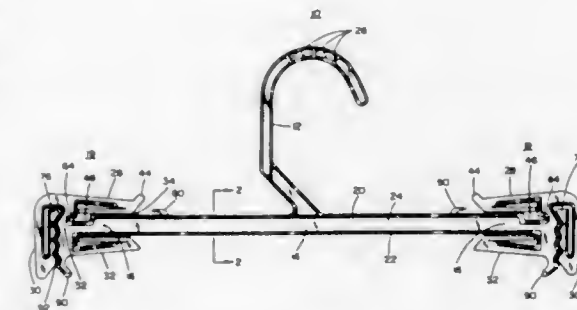
Stanley Gouldson, Northport, N.Y., assignor to Spotless Plastics Pty. Ltd., Moorabbin, Australia

Filed Sep. 14, 1993, Ser. No. 121,998

Int. Cl.<sup>6</sup> A47G 25/48

U.S. Cl. 223—85

6 Claims



## 1. A light-weight, molded, plastic garment hanger comprising:

a hook member;

a body member extending longitudinally from said hook member, said body member defining first and second ends; a garment retaining member integrally molded with said body member at each of said first and second ends; wherein said garment retaining member comprises at least a first garment retaining clip, a second garment retaining clip, and a pocket;

said first garment retaining clip positioned adjacent to said body member defining a first garment receiving channel therebetween, said first garment retaining clip having a substantially U-shaped configuration comprising a first

member and a second member integrally connected in spaced relation at a connecting portion, whereby said second member deflects into a deflecting area defined by said first member, said second member and said connecting portion, and said connecting portion formed with a rounded lip to facilitate the insertion of a garment to be suspended from said hanger;

said pocket being open along an upper portion to said first garment receiving channel with said pocket defined by said body member on a bottom portion and a first side portion, and by a web integrally connected to said body member on a second side portion; and

said second garment retaining clip extending from an end of said body member in a substantially U-shaped configuration including a deflecting leg, with said deflecting leg defining a second garment receiving channel adjacent said body member, said deflecting leg having an uppermost portion having a substantially triangular configuration, wherein said deflecting leg and said web are each formed with a series of complementary rippled protrusions, said uppermost portion beginning at or near the center longitudinal axis of the body member, wherein a first side of said triangular uppermost portion is parallel to said body member and a second side of said triangular uppermost portion is angled downwardly at an acute angle.

5,411,190

# LUGGAGE CARRIER FOR A TWO-WHEELED VEHICLE

Ludger Kortenbrede, Telgte, Germany, assignor to Aug. Winkhaus GmbH & Co. KG, Telgte, Germany

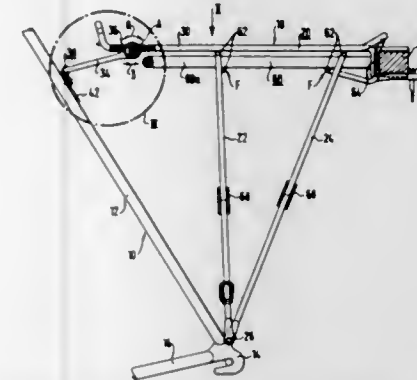
Filed Sep. 3, 1992, Ser. No. 940,032

Claims priority, application Germany, Sep. 6, 1991, 41 29 729.6; European Pat. Off., Nov. 12, 1991, 91119266

Int. Cl.<sup>6</sup> B62J 7/04

U.S. Cl. 224—39

31 Claims



supporting frame stay means (22, 24) provided on said supporting frame (20) on substantially said luggage remote side of said virtual supporting surface, said supporting frame stay means (22, 24) including means for being fastened to a vehicle frame (10) adjacent a wheel receiving area (14) of said vehicle frame (10);

connecting means (34, 36, 38) provided on said supporting frame (20) adjacent said first end of said supporting frame, said connecting means (34, 36, 38) including means for being connected to said vehicle frame (10) at a location (42) remote from said wheel receiving area (14), said connecting means comprising at least one swivelling part (34a) having a supporting-frame-side end portion (34aa) and a vehicle-frame-side end portion (34b);

at least one swivelling and sliding unit (36, 48, 50) in which

said supporting-frame-side end portion (34aa) of said swivelling part (34a) is swivellably mounted about an axis substantially perpendicular to said longitudinal central plane;

a longitudinal bar member (30) of said supporting frame (20) extending in a direction substantially parallel to said longitudinal central plane, said swivelling and sliding unit being guided along said longitudinal bar member (30); and a securing means (54, 56, 50) for securing said swivelling and sliding unit (36, 48, 50) in a selected position along said longitudinal bar member (30).

5,411,191

# RACK ASSEMBLY FOR PICKUP TRUCKS FOR DEVICES WITH HANDLES OF VARYING LENGTHS

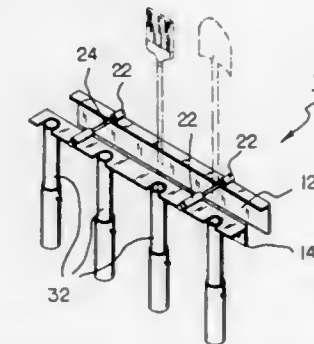
Raymond Bunn, Jr., 6097 Stanley Ct., San Jose, Calif. 95123

Filed May 31, 1994, Ser. No. 251,123

Int. Cl.<sup>6</sup> B60R 11/06; A47F 5/13

U.S. Cl. 224—42.45 R

4 Claims



a bracket assembly formed of a first inverted L-shaped member and a second inverted L-shaped member each with a vertical portion and a horizontal portion, each bracket having a pair of tubular members secured in a horizontal orientation to the upper surface of the horizontal portions of the bracket and coupling bolts with associated nuts extending through the tubular members for securing the tubular members with respect to each other and the vertical portions of the bracket in space parallel relationship on opposite sides of a wall of a truck to which the assembly is to be mounted, the interior surfaces of the L-shape members being provided with an elastomeric surface to preclude scratching of the truck contacted by the bracket; a plurality of hollow cylindrical members secured in a vertical orientation parallel with each other along the exterior vertical surface of one of the L-shaped members, each of the cylindrical members having an open upper and lower end to allow the passage of the handle of a tool there-through;

a cup shaped member having an open upper end and a closed lower end with an interior diameter to fit over the exterior diameter of the lower extent of each cylindrical member, the cup shaped members adapted to overlay the lower extents of the cylindrical members to a predetermined extent, a horizontal radially disposed threaded aperture extending through an upper extent of each cup shaped member; and

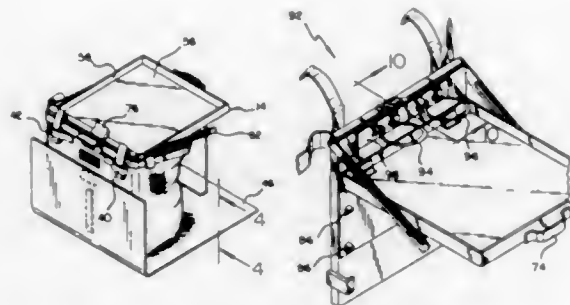
a locking bolt having a threaded interior end threadedly positionable within the threaded aperture of the cup shaped member and having at its exterior end a knurled head adapted to be rotated by the user whereby when rotated in one direction the interior end of the bolt will move in the aperture away from the cylindrical member but when rotated in the opposite direction the free end will move into frictional locking contact with the exterior adjacent surface of the cylindrical member to lock the cup



shaped member at a predetermined axial orientation with respect to the cylindrical member to accommodate the handle of a tool of a predetermined length.

side extending substantially further away from said valve than said second side extends away from said valve; and,

**5,411,192**  
**TOTE BAG AND TABLE APPARATUS**  
Ji Xiao, 1564 18th Ave., San Francisco, Calif. 94122  
Filed Jul. 1, 1993, Ser. No. 84,463  
Int. Cl.<sup>6</sup> A45F 4/00; A47B 23/00, 37/00  
U.S. Cl. 224—151 11 Claims



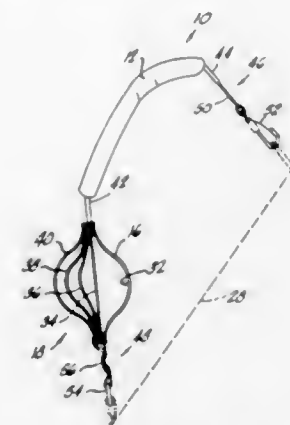
1. A tote bag and table apparatus comprising:  
a fabric bag of substantially rectangular shape and having a rear area, a front area, and a peripheral opening;  
a table assembly contained within said bag and extensible from said peripheral opening of said bag, said table assembly comprising an upright member positioned within said bag in abutting relationship with an interior surface of said rear area thereof; a first arm pivotally mounted to a first side of said upright member proximal to a top end thereof; a second arm pivotally mounted to a second side of said upright member proximal to said top end thereof, said first and second arms each having an elongated slot extending along a longitudinal length thereof; a table member positioned between said arms, said table member being pivotally and movably mounted to said arms by a pair of pins, with each of said pins extending through an individual one of said elongated slots and engaging said table member; and means to magnetically couple said table member to said upright member.

**5,411,193**  
**PORTABLE CONTAINMENT DEVICE FOR CONTAMINATED MEDICAL OBJECTS**  
Joel B. Culp, 605 Pioneer Ave., Kent, Ohio 44240  
Continuation of Ser. No. 749,583, Aug. 26, 1991, abandoned.  
This application Sep. 2, 1993, Ser. No. 116,218  
Int. Cl.<sup>6</sup> A45F 5/00 13 Claims

1. A portable device for containment of contaminated medical objects during a medical procedure, including a container receiving the contaminated medical objects and having an opening through which the contaminated medical objects are placed by the medical practitioner, and a valve in operative association with the opening in said container precluding egress of the contaminated medical objects placed in said container, the improvement comprising:  
said container configured to mount on the medical practitioner, said container further including an apron extending in a direction away from said valve for assisting the medical practitioner in locating the opening of said container and for guiding contaminated medical objects into said valve, said apron having a first side and a second side, said first

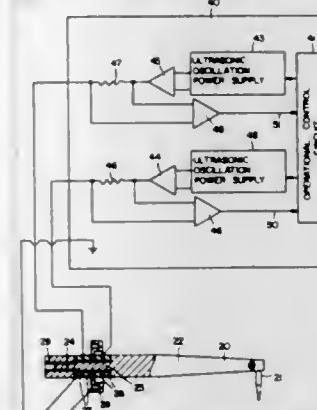
**5,411,194**  
**SHOULDER STRAP ASSEMBLY**  
Mitsuru Nagasawa, 411 N. Ynez Ave. #E, Monterey Park, Calif. 91754; John Tate, 3436 Marna Ave., Long Beach, Calif. 90808, and R. Joseph Trojan, 4148 Inglewood Blvd. #203, Mar Vista, Calif. 90066  
Filed Jan. 22, 1993, Ser. No. 7,979  
Int. Cl.<sup>6</sup> A45F 3/14 13 Claims

U.S. Cl. 224—254



1. A shoulder strap assembly comprising:  
an elongated shoulder strap having a first end and a second end;  
a functional subassembly secured to said first end of said shoulder strap, said subassembly having an elongated load bearing strap member and a plurality of resilient strap members having variable lengths, said resilient strap members positioned parallel to said load bearing strap member, said load bearing member having a length that is longer than said lengths of said resilient strap members;  
first and second load attachment means, said first load attachment means attached to said second end of said shoulder strap, said second load attachment means secured to said functional subassembly whereby said shoulder strap assembly may be secured to a load.

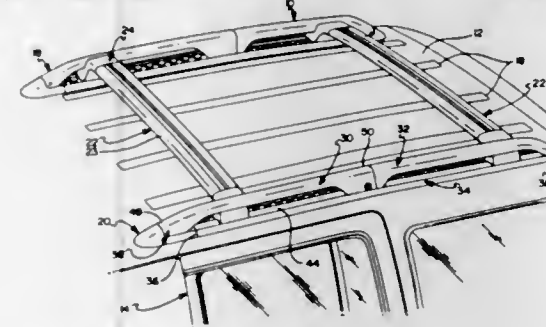
**5,411,195**  
**BONDING APPARATUS**  
Nobuto Yamazaki, and Ryuichi Kyomatsu, both of Tokyo, Japan, assignors to Kabushiki Kaisha Shinkawa, Tokyo, Japan  
Filed Jan. 18, 1994, Ser. No. 182,858  
Claims priority, application Japan, Jan. 18, 1993, 5-023324  
Int. Cl.<sup>6</sup> B23K 1/06, 20/10  
U.S. Cl. 228—1.1 8 Claims



1. A bonding apparatus comprising an ultrasonic horn mounted to a bonding arm of said bonding apparatus, said ultrasonic horn being equipped with vibration-generating sources, and a bonding tool that is attached to one end of said ultrasonic horn, wherein said ultrasonic horn is further provided with a horn support, which is used to mount said ultrasonic horn to said bonding arm, so that said vibration-generating sources are located on both sides of said horn support, and an ultrasonic oscillation device that controls said vibration-generating sources via separate outputs.

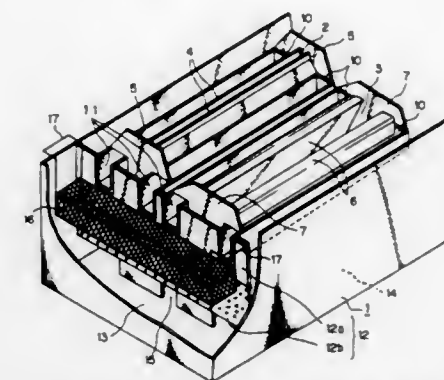
**5,411,196**  
**ARTICLE CARRIER**  
James A. Lee, Jr., Warren; Douglas L. Wickham, Troy; Gregory L. Eilers, Royal Oak; William D. Batterson, Grand Blanc, and Craig A. Stapleton, Rochester Hills, all of Mich., assignors to Masco/Tech, Inc., Taylor, Mich.  
Filed Sep. 21, 1993, Ser. No. 124,984  
Int. Cl.<sup>6</sup> B60R 9/045 17 Claims

U.S. Cl. 224—321



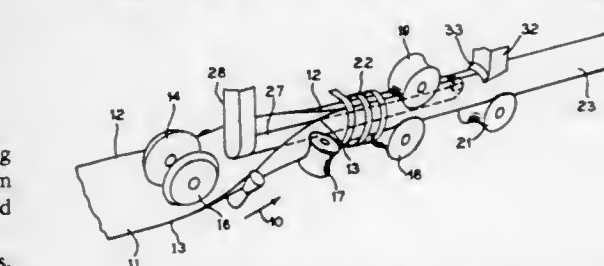
1. A luggage carrier comprising:  
a pair of transversely spaced, parallel rails, each rail having an upper arm, a lower arm registering with said upper arm and a support positioning said upper arm at a spaced position above said lower arm;  
at least one crossbar extending transversely across said rails, each said crossbar having first and second ends, each end dimensioned to be received between said upper and lower arms of said rails such that said ends do not extend beyond the rails;  
wherein at least one rail includes a hinge coupling said upper arm to said lower arm for pivotal movement to and from said spaced position to an open position; and  
wherein said at least one rail includes a latch for releasably latching said upper arm in said spaced position.

**5,411,197**  
**SOLDERING POT**  
Hideki Nakamura, and Tadamichi Ogawa, both of Tokyo, Japan, assignors to Senju Metal Industry Co., Ltd., Tokyo, Japan  
Filed Oct. 19, 1993, Ser. No. 139,193  
Int. Cl.<sup>6</sup> B23K 3/06 2 Claims



1. A solder ejection vessel comprising: a vessel body for containing therein a quantity of fused solder; an ejection nozzle for ejecting a flow of the fused solder in said vessel body to an object to be soldered; a trough for receiving a flow of waste fused solder containing oxides therein, which has been ejected from said ejection nozzle but has not been effectively consumed during soldering process, and for directing said flow of waste fused solder along an inclined surface thereof; a cage removably mounted in said vessel body for receiving therein said flow of waste fused solder from said trough, so as to prevent said oxides from passing therethrough and to permit a flow of substantially pure fused solder to pass therethrough into said vessel body; and a partition plate dividing said vessel body into a filtration chamber in communication with said trough and a solder reservoir containing therein a quantity of substantially pure fused solder, said partition plate serving to filtrate a quantity of fused solder, having flown from said trough into said filtration chamber, as it flows into said solder reservoir, so as to prevent said oxides from flowing from said filtration chamber into said solder reservoir.

**5,411,198**  
**CLEAN STEEL TUBING**  
Steven G. Jansto, Bowling Green, Ohio, assignor to Alpha Tube Corporation, Holland, Ohio  
Filed Jan. 26, 1994, Ser. No. 186,557  
Int. Cl.<sup>6</sup> B23K 13/02, 101/06 3 Claims



1. A clean steel tubing made by the process of forming steel into a flat strip, forming the flat strip into a circular form with its edges abutting, induction heating the circular formed strip in the vicinity of the abutting edges so as to heat the edges, pressing the heated edges together so that they are joined by welding to form a tube, removing the inner weld bead with a first cutting tool supported within the tube, and removing the outer weld bead with a second cutting tool so as to smooth the outer surface and wherein the steel consists of:

Carbon	0.20%
Sulfur	<0.005%
Phosphorus	0.011%
Silicon	0.08%
Manganese	0.40%
Chromium	0.01%
Nickel	0.01%
Molybdenum	0.01%
Vanadium	<0.005%
Aluminum	0.042%
Copper	0.01%
Cobalt	<0.005%
Titanium	<0.005%
Zirconium	<0.005%
Columbium	<0.005%
Tantalum	<0.005%
Tungsten	<0.01%

and does not contain any rare earth elements.

5,411,199

## METHOD FOR ATTACHING A SHIELD

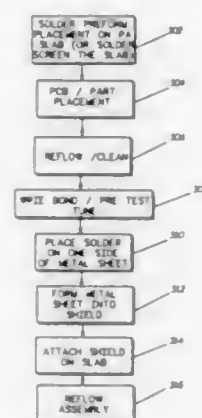
Anthony J. Suppelsa; Robert F. Darveau; Thomas A. Goodwin, all of Coral Springs; Julio Abdala, Ft. Lauderdale, and Henry F. Liebman, Tamarac, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 7, 1994, Ser. No. 206,693

Int. Cl.<sup>6</sup> H05K 3/30

U.S. Cl. 228—179.1

13 Claims



1. A method for forming a shielded assembly, comprising the steps of:

- providing a shield having inner and outer walls, the inner walls of the shield being clad with solder;
- providing an electronic assembly having a substrate attached to a heat sink;
- placing the shield against the electronic assembly such that the substrate is substantially enclosed between the shield and heat sink and the shield and heat sink are in contact with each other; and
- heating the shield such that the solder found on the inner walls of the shield flows and solders the shield to the heat

sink substantially about all the areas where the heat sink and shield are making contact with each other.

5,411,200

## PROCESS AND APPARATUS FOR THE WAVE SOLDERING OF CIRCUIT BOARDS

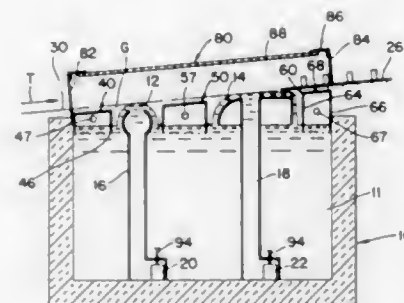
Robert W. Connors, Western Springs; Frederick W. Glacobbe, Naperville; Benjamin Jurcik, Willowbrook, and Kevin P. McKean, Naperville, all of Ill., assignors to American Air Liquide, Inc. and Air Liquide America Corp., both of Walnut Creek, Calif.

Filed Feb. 28, 1994, Ser. No. 202,489

Int. Cl.<sup>6</sup> B23K 1/00, 3/00

U.S. Cl. 228—219

41 Claims



1. A process of wave soldering a member comprising the steps of:

- A) emitting a solder wave upwardly from a solder nozzle;
- B) passing the member along a path so that at least an underside of the member passes through the solder wave;
- C) providing shield gas within first and second gas plenums disposed upstream and downstream, respectively, of the solder wave as defined with reference to the direction of travel of the member, each gas plenum including a side wall disposed opposite the solder wave, with orifice means formed in the side wall; and
- D) pressurizing the shield gas within each plenum so that the shield gas exits the orifice means for travel toward the solder wave at a velocity in the range of 1–30 m/s.

5,411,201

## SINGLE LAYER MULTI-PART MAILER ASSEMBLY

Glenn Petkovsek, 20 Tortoise Park Cove, Little Rock, Ark. 72211-2349

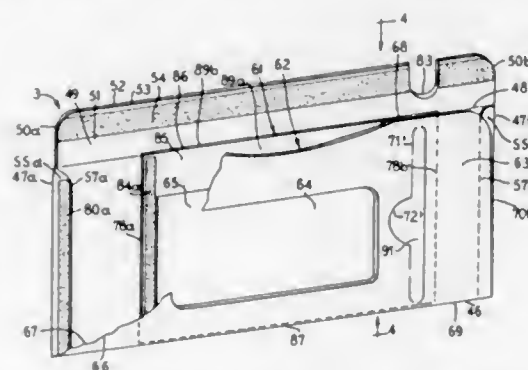
Division of Ser. No. 913,893, Jul. 16, 1992, Pat. No. 5,316,208.

This application Nov. 5, 1993, Ser. No. 147,554

Int. Cl.<sup>6</sup> B65D 27/34, 27/36

U.S. Cl. 229—71

4 Claims



1. An envelope having a front side and a back side, the envelope capable of receiving a plurality of separable parts related to mail handling, said envelope comprising:

- a plurality of compartments formed within said front side

and said back side wherein each of said plurality of compartments has at least one window integrally related thereto;

a sealing flap enclosing contents of said plurality of compartments, said sealing flap extending from said front side to overlap on said back side;

a perforated tear line formed in the back side and parallel to an edge of the back side wherein at least one of said plurality of separable parts can be removed from at least one of said plurality of compartments without disturbing the remainder of the plurality of separable parts and further wherein the sealing flap includes a notched section wherein the notched section is substantially overlying and is aligned with the perforated tear line.

5,411,202

## PACKAGE HAVING A SEALING WRAPPER WITH A TEAR STRIP EASY-OPENING DEVICE

Federico Fenini, Parma, Italy, assignor to Barilla G. eR. F.lli - Societa per Azioni, Parma, Italy

Filed Sep. 27, 1993, Ser. No. 127,062

Claims priority, application Italy, Sep. 30, 1992, MI92A02270

Int. Cl.<sup>6</sup> B65D 27/38

U.S. Cl. 229—87.05

5 Claims



1. A package with a sealed wrapper having a longitudinal closure fin having a free edge folded flat on to said wrapper along a fold line including a tear strip means disposed in a loop under said wrapper and extending transversely of said fin, said wrapper and said fin having, along said fold line, two incisions having end spaced from the free edge of said fin and extending transversely of said fold line and alongside, respectively on one side and the other, of said tear strip means.

5,411,203

## STAND-UP TYPE SACHET INTENDED TO CONTAIN A LIQUID, PASTY OR PULVERULENT PRODUCT

Thierry Bochet, Pontchateau, and Jean-Pierre Moriniere, Bouzelle, both of France, assignors to Packart Holding, France

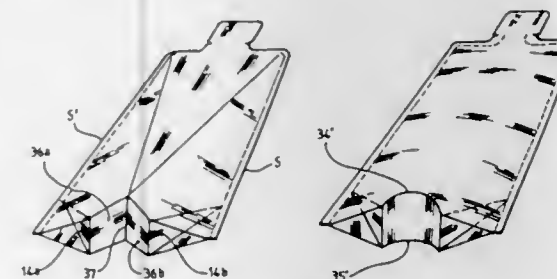
Division of Ser. No. 861,795, Sep. 22, 1992, Pat. No. 5,356,069.

This application Jul. 29, 1994, Ser. No. 282,725

Int. Cl.<sup>6</sup> B65D 5/42, 3/26

U.S. Cl. 229—104

14 Claims



1. A stand-up sachet comprising:

- a pair of opposing face walls each comprising a top edge, a bottom edge having a pair of outer edge portions and a central edge portion therebetween, two parallel outer side

edges, and primary marginal side regions formed along said outer side edges, said primary marginal side regions having a first width;

a bottom connecting said central edge portions of said bottom edges of said face walls and comprising a pair of parallel bottom support edges extending transverse to said central edge portions of said bottom edges, said bottom support edges and said central edge portions defining a central bottom wall therebetween, said bottom support edges defining a base plane coextensive with said bottom support edges, said central bottom wall being disposed above said base plane and directed inwardly towards said interior volume of said sachet, said bottom support edges being constructed and arranged to allow said sachet to balance thereon when said sachet is in its stand-up position, and said opposing face walls being sealed along said corresponding primary marginal side regions and said top edges such that said face walls and said bottom define an interior volume of said sachet,

said bottom further comprising a pair of triangular facets depending from each of said bottom support edges and having side edges tapering to an apex, said triangular facets being inclined upward toward said top edges and toward said interior volume of said sachet, a pair of secondary marginal side regions corresponding to said primary marginal side regions, said apexes of said pair of triangular facets being located at said secondary marginal side regions, and two pairs of opposing intermediate facets, each said intermediate facet of said pair depending from one of said outer edge portions of said bottom edge of said face walls and one of said tapering side edges of one of said triangular facets, each said pair of intermediate facets tapering to one of said secondary marginal side regions, each of said secondary marginal side regions having an outer side edge coextensive with a respective one of said outer side edges of said opposing face wall and a second width less than said first width of said primary marginal side regions, such that said secondary marginal regions are captured within said primary marginal side regions when said sachet is sealed in its closed position and said outer side edges of each said pair of intermediate facets are recessed from said outside edges of said opposing face walls to insure tightness and homogeneity of said sachet.

5,411,204

## RECLOSEABLE FOOD TRAY AND TRAY BLANK

Karl F. DeMay, Newark, N.Y., assignor to Fold-Pak Corp., Newark, N.Y.

Continuation of Ser. No. 855,774, Mar. 23, 1992, abandoned, which is a continuation of Ser. No. 577,517, Sep. 5, 1990, abandoned. This application Mar. 24, 1993, Ser. No. 36,510

Int. Cl.<sup>6</sup> B65D 5/24, 5/64

U.S. Cl. 229—114

20 Claims

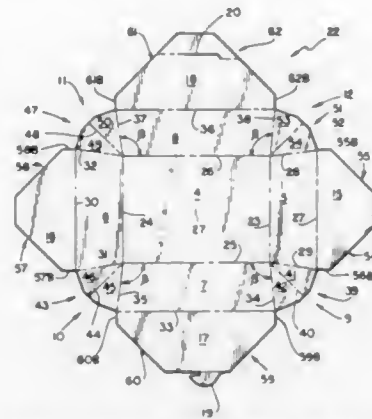
1. A reclosable food tray erected from a single unitary blank having an interior and exterior surface and a substantially square gross geometry, which comprises:

- a fully constructed receptacle portion having an access opening permitting introduction of food into said receptacle portion having a volumetric geometry defined by a rectangular shaped bottom panel, a first substantially upstanding pair of opposing side panels, a second substantially upstanding pair of opposing side panels said pairs of opposing side panels defining four pairs of adjacent side panels, with each pair of adjacent side panels being hingedly connected by one of four folded gussets, with each of said gussets unitary with said adjacent side panels and secured to the exterior surface of one of said adjacent side panels by an adhesive applied between each said folded gusset and said exterior surface, each said side panel being disposed at a first obtuse angle measured from said bottom panel so that said volumetric geometry facili-



tates nesting of the receptacle portion of one reclosable food tray within the receptacle portion of another reclosable food tray;

a first pair of opposing closure flaps, each extending from one of said opposing side panels and being capable of closing off a portion of said access opening; and



a second pair of opposing closure flaps, each extending from one of the other pair of opposing side panels and being adapted to cooperatively interlock with each other and overlap a portion of said first pair of opposing closure flaps to close off said access opening.

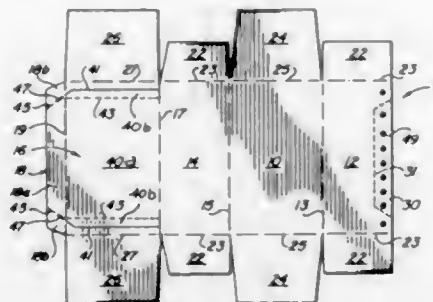
5,411,205

**CARTON WITH IMPROVED OPENING FEATURE**  
Gerald R. Pfeffer, Seattle, Wash., assignor to Jefferson Smurfit Corporation, Clayton, Mo.

Filed Sep. 14, 1994, Ser. No. 305,566  
Int. Cl.<sup>6</sup> B65D 5/54

U.S. Cl. 229-244

12 Claims



1. A carton having an improved opening feature, said carton being formed from a unitary blank of foldable paperboard and comprising:

- a generally rectangular bottom wall panel having opposed front and rear side wall panels foldably joined to and upstanding from front and rear side edges thereof, respectively;
- a top wall panel having a rear edge foldably joined to an upper edge of said rear side wall panel, and forming with said bottom and side wall panels a tubular structure open at the ends;
- said top wall panel having a center section and a pair of end sections detachably joined to opposed ends thereof by pairs of generally parallel, partial, cut lines in upper and lower surfaces thereof;
- end wall flaps foldably joined to end edges of said bottom, top, and side wall panels and secured to each other in overlapping relation, to form end walls for closing the open ends of said tubular structure;
- said front side wall panel including a relatively narrow, elongated, detachable strip portion having three edges defined by weakened lines of tear and a fourth edge de-

fined by a central area of an upper edge of said front side wall panel;

- a relatively narrow, elongated, securing flap foldably joined at its upper edge to, and depending from, a front edge of said top wall panel;
- said securing flap having a vertical dimension substantially equal to the vertical dimension of said front wall panel detachable strip portion;
- said securing flap including a center section, aligned with said top wall panel center section, and a pair of end sections, detachably secured to opposed ends of said center section, by a pair of interrupted cut lines extending there-through aligned with certain of said top wall panel cut lines, said securing flap center and end sections being aligned with respective top wall panel end sections;
- said securing flap center section being adhesively secured to an outer surface of said front side wall panel detachable strip portion, and said securing flap end sections being adhesively secured to outer surfaces of adjacent portions of said front side wall panel;
- said securing flap center section being adapted to be depressed with said front side wall detachable strip portion, to detach said securing flap center section from said securing flap end sections and also detach said front side wall panel detachable strip portion from the remainder of said front side wall panel, whereby said securing flap center section and said front wall panel detachable strip portion can thereafter be lifted, to detach said top wall panel center section from said top wall panel end sections to open the carton.

5,411,206

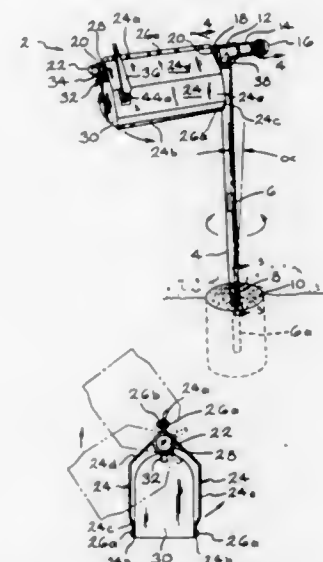
**SELF-RIGHTING PROTECTIVE STRUCTURAL DEVICE FOR A RURAL MAILBOX**

Thomas C. Latham, 2916 Broadway, Toledo, Ohio 43614, and Ronald J. Majerowski, 12 N. Lathrop Rd., Swanton, Ohio 43558

Filed May 20, 1994, Ser. No. 246,846  
Int. Cl.<sup>6</sup> B65D 91/00

U.S. Cl. 232-39

8 Claims



1. A self-righting protective structural device for a rural mailbox, comprising a rotatable post-arm assembly and a rotatable protective cladding-mailbox assembly, further comprising in combination:

- Concentrically mounted substantially vertical tubings aligned at a small angle with ground level, comprising an interior tubing and an exterior tubing, said interior tubing and said exterior tubing further comprising a bottom end

and a top end, wherein said bottom end of said interior tubing is set below said ground level;

- A tee mounted upon said top end of said exterior tubing, said tee comprising an interior surface and an annular sidewall;
  - A substantially horizontal tubing comprising a near end and a far end, wherein said near end of said tubing is fitted to said tee at one end of said tee at said top end of said exterior tubing to form said post-arm assembly;
  - Pivot means mounted upon said top end of said interior tubing, said pivot means comprising an annular sidewall and a radially extending lip and a top-bearing surface for rotational engagement with said interior surface of said tee;
  - Protective cladding sufficient in size to cover a standard rural mailbox, said protective cladding being secured to said mailbox to form said cladding-mailbox assembly, said assembly further comprising a cavity for reception and rotational engagement of said assembly about said substantially horizontal tubing; and
  - Retainer means located on said far end of said substantially horizontal tubing to retain said cladding-mailbox assembly on said substantially horizontal tubing without interfering with said rotational engagement of said assembly about said substantially horizontal tubing;
- whereby said post-arm assembly is rotatable axially about said interior tubing and said cladding-mailbox assembly is rotatable radially about said substantially horizontal tubing upon application of an outside force, and said post-arm assembly and said cladding-mailbox assembly are self-rightable upon removal of said outside force, to provide protection to said mailbox and to provide safe retrieval of mail from said mailbox.

5,411,207

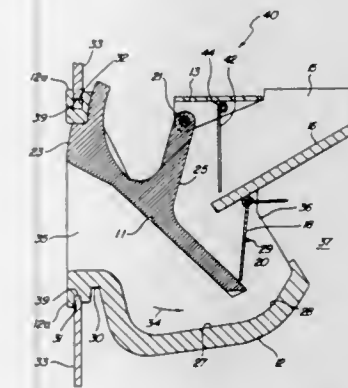
**PROTECTIVE COIN RETURN FOR TELEPHONE PAYSTATION**

Ellis Ashkenazi, Irvine, Calif., assignor to Calstar Technologies, Inc., Anaheim, Calif.

Filed Jul. 21, 1993, Ser. No. 95,307  
Int. Cl.<sup>6</sup> H04M 17/00; B65G 11/04

U.S. Cl. 232-57.5

19 Claims



1. A coin return for insertion into a telephone paystation enclosure assembly, comprising, in combination: an exterior housing comprised of two halves secured together to form an internal coin path in an interior cavity having a front opening, rear opening and a coin entry opening connected together by said interior cavity; a sweep means comprised of an outer flap means dimensioned to snugly fit into said interior cavity; said outer flap means pivotably mounted in said interior cavity for movement between a first position adjacent said front opening and a second position, away from said front opening and toward said rear opening; said internal coin path formed in said interior cavity extend-

ing between said coin entry area and a coin retrieval area adjacent to and accessible through said front opening;

- said front opening having a top portion and a bottom portion, with said bottom portion being open at all times so that any coins or other materials in said coin retrieval area may be viewed and accessible through said bottom portion;
- said outer flap means including a front face and a rear face, with an actuating portion connected to said front face and extending into said top portion of said front opening;
- said front face of said outer flap means extending away from said actuating portion and said front opening, and ending in a downwardly depending leg portion having an outer end;
- said rear face of said outer flap means forming a portion of said internal coin path;
- said rear opening connected to said interior cavity allowing any unwanted materials stuffed into said coin retrieval area and behind said outer flap means, to be swept from said internal coin path and through said rear opening, by said outer end of said downwardly depending leg portion, upon movement of said outer flap means, by said actuating portion, from said first position to said second position; and
- said outer end of said downwardly depending leg portion of said outer flap means being dimensioned to allow coins to pass along said internal coin path on said rear face of said outer flap means and past said outer end, but to sweep any unwanted materials inserted into said coin retrieval area, out of said internal coin path, and through said rear opening of said exterior housing.

5,411,208

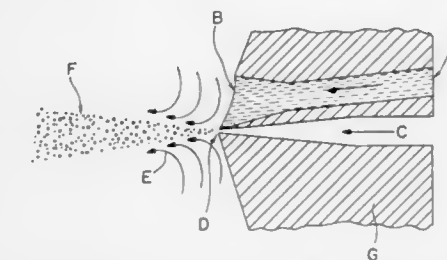
**PARALLEL PATH INDUCTION PNEUMATIC NEBULIZER**

John A. Burgener, 944 Meadow Wood Rd., Mississauga, Ontario L5J 2S6, Canada

Filed Jan. 28, 1994, Ser. No. 187,556  
Int. Cl.<sup>6</sup> B05B 7/24

U.S. Cl. 239-8

20 Claims



1. A process for atomizing liquids directly from a surface of a body of liquid at an interface between the liquid and an ambient gas or air, comprising the steps of: providing a gas stream having a cross section that is substantially smaller than the body of the liquid; directing said gas stream away from the surface of the liquid in close proximity to the surface of the liquid so that the surface of the liquid is induced to extend directly to said gas stream without requiring formation of a film of the liquid on a surface of another material and being broken up into aerosol particles; and atomizing the liquid into a gaseous medium as a fine, highly consistent and uniform dispersion.

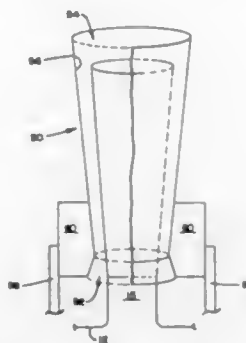
5,411,209  
ANTI-HAIL SHOCK WAVE GENERATOR  
Gerald Ollivier, 1625 Lincoln Avenue #1901, Montreal, Quebec, Canada H3H 2T5

Filed Oct. 18, 1993, Ser. No. 138,598

Int. Cl.<sup>6</sup> A01G 15/00

U.S. Cl. 239—14.1

2 Claims



1. An anti-hail shock wave generator comprising: a combustion chamber having an upper orifice; fuel injection means for injecting fuel into said chamber; ignition means for igniting said fuel in said chamber; a conical barrel having a small diameter lower end connected to said upper orifice and a large diameter upper end; a shroud member, surrounding said barrel, vertically guiding an upward convective air flow carrying ionized particles towards said upper end, said shroud member having a top extending above said upper end; and means for mounting said shroud member around said barrel with a separation between said shroud member and said barrel.

5,411,210  
AUTOMATIC COATING USING CONDUCTIVE COATING MATERIALS

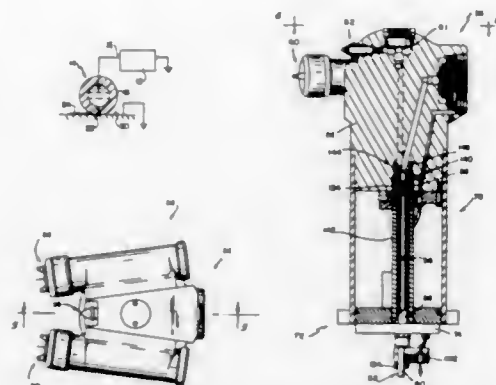
James J. Gimple, Oregon, Ohio; David L. Hamilton, Belleville, Mich.; Daniel C. Hughey; Chris M. Jamison, both of Indianapolis, Ind., and David M. Seltz, Temperance, Mich., assignors to Ransburg Corporation, Indianapolis, Ind.

Continuation-in-part of Ser. No. 618,053, Nov. 26, 1990, abandoned. This application Jun. 5, 1992, Ser. No. 894,089

Int. Cl.<sup>6</sup> B05B 15/02

U.S. Cl. 239—110

4 Claims



1. A device for atomizing and dispensing a first liquid coating material onto a first group of articles including at least one article to be coated by the first coating material and then for dispensing a second liquid coating material onto a second group of articles including at least one article to be coated by the second coating material, the device including at least one atomizing nozzle providing a first flow rate of the first and second coating materials required for high quality atomization

of the first and second coating materials, the device further including a second outlet providing a second and substantially greater flow rate of the first and second coating materials and at least one of lower quality atomization than the at least one atomizing nozzle and no atomization, a first conduit for coupling the second outlet to the at least one atomizing nozzle, a second conduit for coupling the at least one atomizing nozzle to a source of fluid to be dispensed, and a valve for controlling the flow of fluid to the second outlet, operation of the valve between dispensing of the first coating material onto articles to be coated thereby and dispensing of the second coating material onto articles to be coated thereby, coupled with dispensing of a flushing fluid through the first and second conduits flushing excess coating material simultaneously through both the at least one nozzle and the second outlet from the dispensing device.

5,411,211  
SPRAY GUN

Robert H. Greene, Westfield, 5 Prospect Villas, Wetherby, Leeds LS22 4PL, United Kingdom; Alan C. Outhwaite, 1 Cobbler Hall, West Bretton, Wakefield WF4 4LJ, United Kingdom; Timothy J. Noakes, The Hollies, Llyn-y-Pandy Lane, Pantymwyn, Near Mold, Clwyd CH7 5JF, Wales, United Kingdom; Michael L. Green, 2 Tai-cochion, Village Road, Nannerch, Clwyd CH7 5RE, Wales, United Kingdom, and Jonathan Jones, c/o Apex Product Design, 4 Crinan Street, Kings Cross, London, United Kingdom

PCT No. PCT/GB92/01490, § 371 Date May 25, 1994, § 102(e) Date May 25, 1994, PCT Pub. No. WO93/03853, PCT Pub. Date Mar. 4, 1993

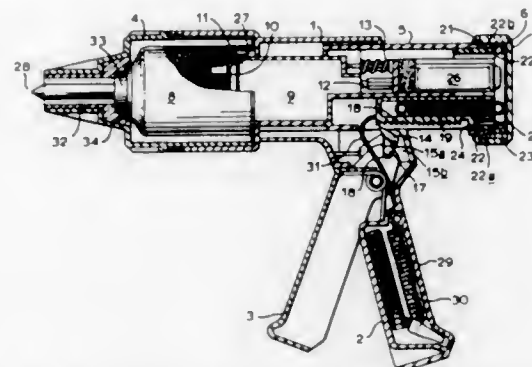
PCT Filed Aug. 12, 1992, Ser. No. 193,185

Claims priority, application United Kingdom, Aug. 13, 1991, 9117462; Jun. 18, 1992, 9212974

Int. Cl.<sup>6</sup> B05B 11/02, 5/16

U.S. Cl. 239—708

10 Claims



1. An electrostatic spray gun comprising a housing for receiving a replaceable fluid container, a nozzle from which fluid is to be sprayed, means for expelling fluid from the container, and a high voltage generator for applying electrostatic potential to the fluid-to form an electrically charged atomized spray at the nozzle, wherein an electrical path from the generator to the nozzle passes through the fluid, entering the fluid prior to its emergence from the nozzle, conveniently via the wall of the container, and wherein the container is rigid and fluid is expelled from the container by a piston, under pressure exerted thereon through a forward part of the generator.

5,411,212  
FUEL INJECTION VALVE  
Tsuyoshi Munezane; Norihisa Fukutomi, and Osamu Matsumoto, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

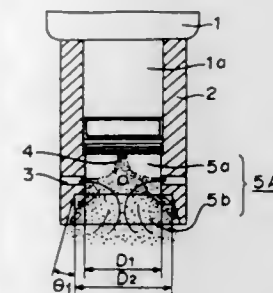
Filed Mar. 29, 1994, Ser. No. 219,361

Claims priority, application Japan, Jun. 23, 1993, 5-151769

Int. Cl.<sup>6</sup> B05B 7/12

U.S. Cl. 239—408

4 Claims



1. An air assist type fuel injection valve adapted to be disposed in an air intake passage communicated with a combustion chamber in an internal combustion engine to apply air to fuel to atomize the fuel, wherein the fuel injection valve has an adapter at a bottom end thereof for mixing the fuel with air; the adapter including an air-fuel mixing portion into which an air injection opening opens; and the air-fuel mixing portion comprising a cylindrical portion having an inner diameter larger than a length thereof, and a tapered portion formed on a downstream side of the cylindrical portion with respect to a direction of fuel flow and flared outwardly in the downstream direction at an angle in a range from 10° to 60° wherein an inner diameter D<sub>1</sub> of the air-fuel mixing portion including the air injection opening and a smallest diameter D<sub>2</sub> of the tapered portion formed downstream of the air injection opening have a relation of D<sub>1</sub> < D<sub>2</sub>.

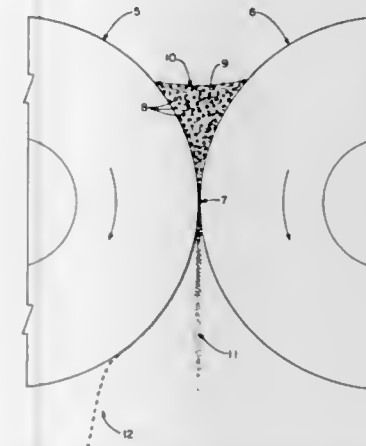
5,411,213  
METHOD FOR TREATMENT OF SOLID MATERIALS  
Arden L. Just, 4486 Sunnybrook Rd., Kent, Ohio 44240

Continuation-in-part of Ser. No. 581,297, Sep. 12, 1990, abandoned, and Ser. No. 833,342, Oct. 2, 1992, abandoned. This application Apr. 29, 1993, Ser. No. 57,048

Int. Cl.<sup>6</sup> B02C 4/02

U.S. Cl. 241—16

17 Claims



1. A process for comminuting/pulverizing material to produce fine to powdery particles selected from the class consisting of commercial and municipal solids comprising the steps of: forming a zone between two members with at least one member being moveable;

moving said material into and through said zone, said material having a partitioning agent thereon; and subjecting said material to a compressive shear as said material passes into and through said zone to produce a fine to powdery material.

5,411,214  
METHOD FOR DISPOSING OF ENAMELED WIRE SCRAPS

Yasuo Akuta, Ichihara, Japan, assignor to The Furukawa Electric Co., Ltd., Tokyo, Japan

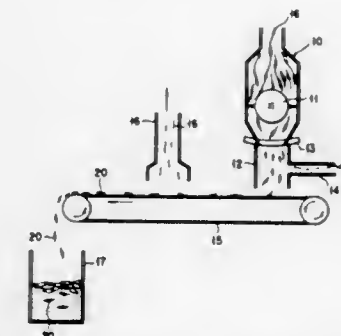
Filed Aug. 31, 1993, Ser. No. 114,667

Claims priority, application Japan, Aug. 31, 1992, 4-257480; May 11, 1993, 5-132954

Int. Cl.<sup>6</sup> B02C 23/10, 23/18

U.S. Cl. 241—19

17 Claims



1. A method for disposing of an enameled wire scrap comprising the steps of: cutting the enameled wire scrap consisting of a metal wire and an enamel covering while stirring the enameled wire scrap to obtain pieces and to peel off the enamel covering from the metal wire; selecting from said pieces, pieces having a length equal to or less than a predetermined length, wherein said predetermined length is 10 times the diameter of the enameled wire scrap; and separating the enamel covering from said selected pieces.

5,411,215  
TWO STAGE GRINDING  
Michael W. Rouse, P.O. Box 820, Vicksburg, Miss. 39182-0369

Filed Nov. 27, 1991, Ser. No. 798,940

Int. Cl.<sup>6</sup> B02C 23/18, 23/38

U.S. Cl. 241—21

2 Claims

SUPPORTING DATA

OPERATION NO.	STAGE 1 OPERATIONS	STAGE 2 OPERATIONS	STAGE 3 OPERATIONS
1	21%	21%	21%
2	21%	21%	21%
3	21%	21%	21%
4	21%	21%	21%
5	21%	21%	21%
6	21%	21%	21%
7	21%	21%	21%
8	21%	21%	21%
9	21%	21%	21%
10	21%	21%	21%
11	21%	21%	21%
12	21%	21%	21%
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14	21%	21%	21%
15	21%	21%	21%
16	21%	21%	21%
17	21%	21%	21%
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42	21%	21%	21%
43	21%	21%	21%
44	21%	21%	21%
45	21%	21%	21%
46	21%	21%	21%
47	21%	21%	21%
48	21%	21%	21%
49	21%	21%	21%
50	21%	21%	21%

1. A process for more efficient reduction of the size of polymer particles to less than a desired final size using grinding machines which may be set, by choice of grinding stone grit, to produce particles of a desired size, comprising: providing a slurry of about ten percent weight ten mesh particulate rubber in a water carrier;



grinding said slurry in a first grinding mill having an approximately 12 to 16 grit grinding stone, such that substantially all of said rubber is ground to less than a minus 30 mesh particulate rubber in a single pass;  
 re-wetting said minus 30 mesh particulate rubber with water to form an intermediate slurry of about ten percent weight rubber in water;  
 grinding said intermediate slurry in a plurality of second grinding mills, each having an approximately 24/36 grit grinding stone, such that substantially all of said rubber is ground to less than a minus 80 mesh particulate rubber in a single pass.

5,411,216

## TIRE SHREDDER AND PROCESS FOR SHREDDING TIRES

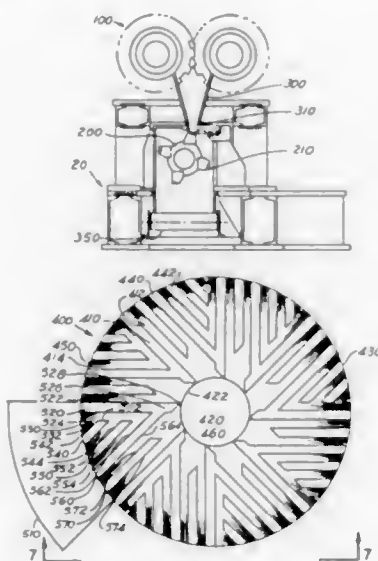
Dennis O'Keefe, W275 S3240 Burnell Dr., Waukesha, Wis. 53188

Filed Dec. 11, 1992, Ser. No. 989,259

Int. Cl.<sup>6</sup> B02C 19/12

U.S. Cl. 241-24

24 Claims



14. A process for shredding vehicular tires comprising:  
 a first step in which said tires are cut into small strips using a shredding machine having a primary shredder with opposing cutters containing a plurality of cutting teeth and a secondary shredder;  
 a second step in which said strips are further reduced in size using an improved grinding machine having mating grinding discs with respective working surfaces separated by a controlled gap;  
 a third step in which metal wires and fibers are separated from said rubber granules using a machine comprising:  
 a magnetic conveyor for separating said metal wires from said rubber and polyester;  
 a shaker conveyor with apertures for separating said rubber from said polyester fibers;  
 a vacuum means for further separating said rubber from said polyester fibers;  
 a fourth step further granulating said rubber granules using:  
 said improved grinding machine of said second step with said controlled gap between said working surfaces of said grinding discs being reduced to approximately 0.001 inch (0.00254 cm);  
 the improved grinding machine including a set of grinding discs for a grinding machine for grinding rubber chips, the grinding discs comprising:  
 a first and a second grinding disc;  
 each said disc having a first side, a second side, a center, and an outer perimeter;

said first side of each said disc being a working surface;  
 said first disc having an aperture generally located in said center;  
 said working surface of said first disc being parallel to and separated by a controlled gap from said working surface of said second disc;  
 said working surfaces of said first and second discs having raised portions and lowered portions;  
 said lowered portions having bottom surfaces;  
 said bottom surfaces being tapered such that their maximum depth is substantially at said center of each said disc, decreasing in depth toward said outer perimeter of each said disc;  
 each of said working surfaces being divided into a plurality of sections;  
 each said section having a first, second, third, fourth, fifth, and sixth raised portion;  
 each said raised portion having a top surface;  
 each said raised portion extending from said outer perimeter inward;  
 said first, third, fourth, fifth, and sixth raised portions being generally trapezoidal;  
 each of said trapezoidal raised portions having two long sides;  
 said long sides of said third, fourth, fifth, and sixth raised portions being parallel;  
 said second raised portion being substantially triangular;  
 said first, third, fourth, and sixth raised portions having a tapered end;  
 said tapered end of said first raised portion parallel to said long sides of said third, fourth, fifth, and sixth raised portions;  
 said tapered ends of said third, fourth, and sixth raised portions parallel to said long sides of said first raised portion;  
 said first raised portion having a point near its tapered end;  
 said fifth raised portion intersecting said first raised portion at said point;  
 said sixth raised portion being longer than said fourth raised portion;  
 said fourth raised portion being longer than said third raised portion.

5,411,217

## COMPRESSIBLE BOBBIN FOR YARN TREATMENT

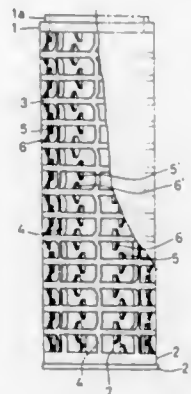
Nobutaka Ono, Ashiya, Japan, assignor to Osaka Bobbin Co., Ltd., Osaka, Japan

Filed Aug. 31, 1993, Ser. No. 114,742

Int. Cl.<sup>6</sup> B65H 75/20

U.S. Cl. 242-118.11

7 Claims



1. A compressible bobbin for yarn treatment made of a synthetic resin which comprises a pair of upper and lower end rings positioned in opposed relation to each other and spaced a required distance apart from one another; a plurality of rectilinear longitudinal frames disposed axially in parallel relation with one another, oriented over a majority of the length

thereof in planes containing a central axis of the bobbin, and are equidistantly spaced circumferentially of the bobbin to interconnect the end rings and become deformed in a zigzag form when axially compressed; and a plurality of annular frames disposed equidistantly between said end rings in parallel relation to the end rings in a manner intersecting the rectilinear longitudinal frames, thus forming a cylindrical framework;  
 the cylindrical framework further comprising multiple columns of upstanding piece members for regulating a degree of compression of the bobbin and functioning as a stopper when the cylindrical framework is axially compressed, the upstanding piece members having a height equal to one half of the interval between any two adjacent annular frames or between either endmost annular frame and either adjacently disposed end ring, said upstanding piece members being disposed upstandingly on both sides of each annular frame and on one side of each end ring over the whole length of the bobbin spanning the distance between the end rings, the upstanding piece members being arranged between any two adjacent annular frames and between any two adjacent rectilinear longitudinal frames and in an alternately staggered manner and, when the bobbin is in either the compressed state or the noncompressed state, are circumferentially spaced apart and free of engagement with one another; and  
 the upstanding piece members of each column, when axially compressed, abutting each intervening horizontal frame on both sides thereof in an opposing manner.

5,411,218

## BEARING TYPE DRAG MECHANISM FOR FISHING REEL

Masayuki Uehara; Hiroshi Hashimoto, and Tadashi Furubayashi, all of Tokyo, Japan, assignors to Daiwa Seiko, Inc., Tokyo, Japan

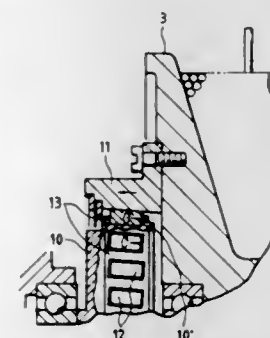
Filed Jun. 29, 1993, Ser. No. 83,170

Claims priority, application Japan, Jul. 2, 1992, 4-197479; Jul. 2, 1992, 4-197480; Jul. 2, 1992, 4-197481

Int. Cl.<sup>6</sup> A01K 89/027, 89/033

U.S. Cl. 242-245

21 Claims



1. A drag mechanism for a fishing reel having a first member rotatably supported on a reel casing and a second member rotatable relative to the first member about a rotational axis, said drag mechanism comprising:  
 a first holder non-rotatively provided on said first member and formed with a substantially conical outer circumferential surface;  
 a second holder non-rotatively provided on said second member and formed with a substantially conical inner circumferential surface, said inner circumferential surface facing said outer circumferential surface in parallel relation thereto;  
 rolling members held between said first and second holders and contactable with both said inner and outer circumferential surfaces;  
 interlocking means for causing said rolling members to produce a frictional force and interlocking said first holder with said second holder through said frictional force; and

modulating means for manually modulating said frictional force.

5,411,219

## VIDEOTAPE CASSETTE CASE

Gil-Goo Yi; Jun-Tae Kwon, and Duk-Kyoon Yoon, all of Chungcheongnam-Do, Rep. of Korea, assignors to SKC Limited, Suwon, Rep. of Korea

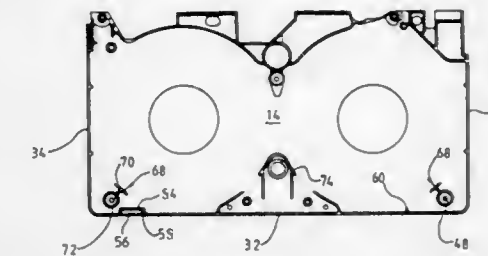
Filed Aug. 2, 1993, Ser. No. 101,444

Claims priority, application Rep. of Korea, Aug. 3, 1992, 92-14499

Int. Cl.<sup>6</sup> G11B 23/087

U.S. Cl. 242-347

2 Claims



1. A videotape cassette case including an upper and a lower sections, each of which has a bottom panel, a rear wall, a pair of sidewalls, wherein said cassette case is characterized in that:  
 each wall of said upper and lower sections including a plurality of protruding ribs, each of said rear walls including a shielding rib, the bottom panel of the upper section including a first U-shaped rib and a pair of first bosses having a plurality of radially extending ribs, the bottom panel of the lower section including a second U-shaped rib mating with the first U-shaped rib and a pair of second bosses, each having a T-shaped rib, each of which has a guide portion for guiding a tape reel, and a reinforcing portion extended between the second boss and the guide portion.

5,411,220

FILM CASSETTE WITH FILM SEPARATING CLAW  
 Kitchiro Kitagawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

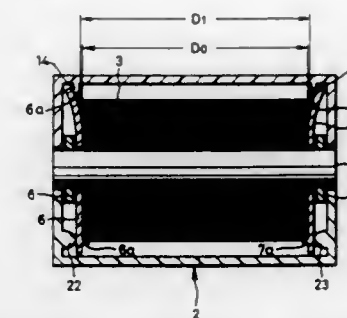
Filed Oct. 18, 1991, Ser. No. 779,244

Claims priority, application Japan, Oct. 18, 1990, 2-280301

Int. Cl.<sup>6</sup> G03B 17/26

U.S. Cl. 242-348.3

17 Claims



1. A photographic film cassette, for containing a photographic film having a film leader, said cassette comprising:  
 a spool having a core for winding said photographic film thereon in a roll, and first and second flanges defining positions of lateral edges of said film roll;  
 a cassette shell having a cylindrical film chamber for rotatably containing said spool, said cassette shell also having a film passageway and a film passage mouth defined by said film passageway, wherein rotation of said spool advances

said film leader through said film passageway and said film passage mouth outside of said cassette shell; circumferential lips formed on said flanges to project toward said film roll for contact with edges of an outermost turn of said film roll wherein portions of said peripheral edges of said flanges extend in a direction to enlarge a diameter of said flanges relative to a position of said circumferential lips;

at least one separating claw means positioned in said film passageway for coming into contact with a front edge of said film leader when said spool is rotated, from any position, in an unwinding direction and said photographic film is entirely contained in said film chamber of said cassette shell for separating said film leader from said film roll to guide said film leader to said film passage mouth; and a film releasing mechanism positioned in correspondence to said at least one separating claw means in said cassette shell for pressing peripheral edges of said flanges to separate said peripheral edges from said film roll to release said film roll from said circumferential lips, said film releasing mechanism presses said peripheral edge portions of said flanges to satisfy a condition:

$$D_0 + 0.1 \text{ mm} \leq D_1 \leq D_0 + 0.5 \text{ mm}$$

where  $D_1$  is a distance defined between respective tops of said circumferential lips, and  $D_0$  is a width of said photographic film.

5,411,221

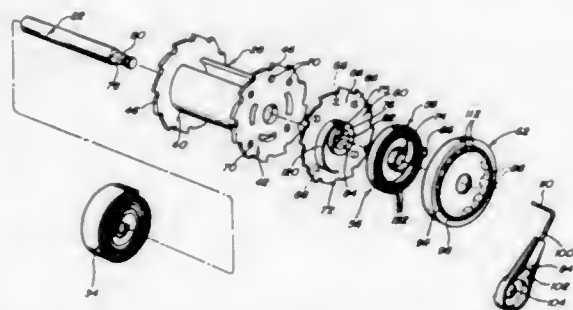
# SEAT BELT RETRACTOR WITH TENSION RELIEF MECHANISM

Cecil A. Collins, Shelby Township, Macomb County, and Alfred J. Fisher, III, Grosse Pointe, both of Mich., assignors to AlliedSignal, Inc., Morristown, N.J.

Filed May 24, 1993, Ser. No. 65,404  
Int. Cl.<sup>6</sup> B60R 22/44

U.S. Cl. 242—372

40 Claims



1. A safety belt retractor comprising: first biasing means for exerting a retractive tensile force on a safety belt webbing such that said belt webbing is urged toward a stored position within said retractor; second biasing means for generating a counteractive force in opposition to said retractive force such that a vehicle occupant may vary the magnitude of said counteractive force between a minimum value for establishing a maximum tension on said belt webbing and a maximum value for establishing a minimum tension on said belt webbing; clutch means for limiting said maximum value of said counteractive force generated by said second biasing means to inhibit over-loading thereof; and actuation means operable in response to the withdrawal of a predetermined length of said belt webbing for selectively causing said counteractive force to be exerted on said belt webbing for reducing the tension exerted thereon by said first biasing means.

5,411,222

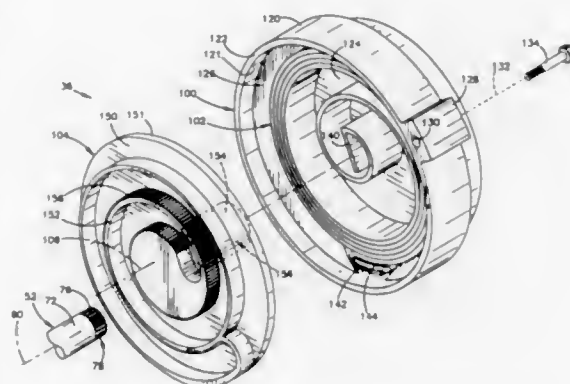
# SEAT BELT RETRACTOR WITH TENSION CONTROLLER

Mark F. Gray, and Ken M. Forget, both of Ontario, Canada, assignors to TRW Vehicle Safety Systems Limited, Midland, Canada

Filed Sep. 23, 1993, Ser. No. 127,198  
Int. Cl.<sup>6</sup> B60R 22/44; B65H 75/48

U.S. Cl. 242—375.3

6 Claims



2. Apparatus comprising:

a spool having a spool axis and means for holding seat belt webbing on said spool;  
a pinion having a pinion axis;  
frame means supporting said spool for rotation about said spool axis in winding and unwinding directions, said frame means further supporting said pinion to rotate about said pinion axis upon rotation of said spool;  
a coil spring biasing said spool to rotate in said winding direction;  
a gear which is rotated by said pinion upon rotation of said spool, said gear having means for stressing said coil spring when said gear is rotated by said pinion upon rotation of said spool in said unwinding direction;  
said gear further having a gear axis and means for causing said gear axis to move radially relative to said pinion axis and for thus changing the effective pitch diameter of said gear when said gear is rotated by said pinion, said means for causing said gear axis to move radially relative to said pinion axis including gear teeth extending around said gear axis in a spiral array; and  
directing means for directing movement of said gear relative to said pinion, said directing means defining a pivot axis spaced radially from said pinion axis and said gear axis, said directing means directing said gear axis to move pivotally about said pivot axis when said gear axis moves radially relative to said pinion axis;  
said directing means including a housing containing said gear, said directing means supporting said housing for movement relative to said frame under the influence of said gear when said gear axis moves radially relative to said pinion axis, said directing means constraining said housing to move relative to said frame only pivotally about said pivot axis, whereby said directing means causes said housing to direct said gear axis to move pivotally about said pivot axis when said gear axis moves radially relative to said pinion axis.

5,411,223

# DEVICE FOR JOINING FILMS OF HEAT-SHRINKABLE PLASTIC MATERIAL IN A MACHINE USING SAID FILM

Emanuele Gatteschi, Parma, Italy, assignor to OCME S.r.l., Parma, Italy

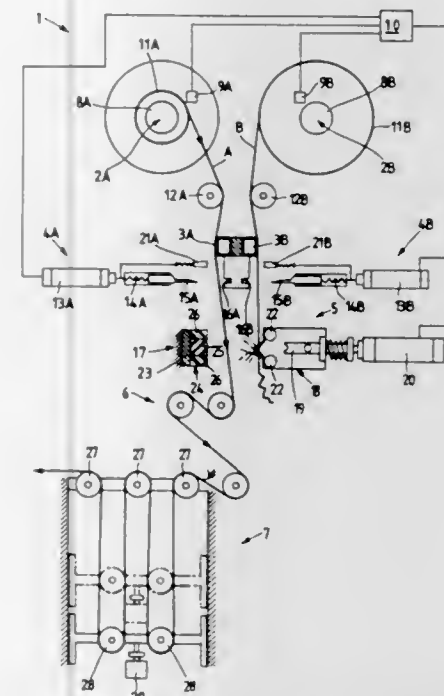
Filed Nov. 9, 1993, Ser. No. 149,202

Claims priority, application Italy, Nov. 11, 1992, MI9200978 U

Int. Cl.<sup>6</sup> B65H 19/18

U.S. Cl. 242—551

3 Claims



1. Device (1) for automatically joining films (A-B) of heat-shrinkable plastic material in a machine using said film, characterized in that said device comprises directional means for unwinding film, and means listed in the direction of film unwinding comprising:

one pair of reels (2A, 2B) with parallel axes, suitable for respectively housing a first bobbin (11A) of heat shrinkable film from which said (A) is being unwound, and a second bobbin (11B) which is in stand-by step and is ready to supply film (B) as soon as the first bobbin (11A) is emptied,

one pair of sucking devices (3A, 3B), acting on the whole width of films (A, B) and suitable for keeping the film (A) coming from the first bobbin (11A) and the film (B) coming from the second bobbin (11B) independently clamped by means of their sucking action;

one pair of cutting devices (4A, 4B), each of which is capable of independently acting on the respective film (A, B), a welding device (5) suitable for acting on both films (A, B) which comprises

an actuator device (20), a pressing element (18), a welder bar (19) and a stationary shoulder (23), in which the actuator device (20) simultaneously acts: elastically on the pressing element (18); and rigidly on the welder bar (19) contained inside the interior of said pressing element (18),

the pressing element (18) is provided with air blowing nozzles (22) for blowing air for welded joint cooling, the stationary shoulder (17) is formed by support (23) of rigid material and a layered portion (24) provided with a plurality of mutually overlapped layers of elastically yielding material.

5,411,224

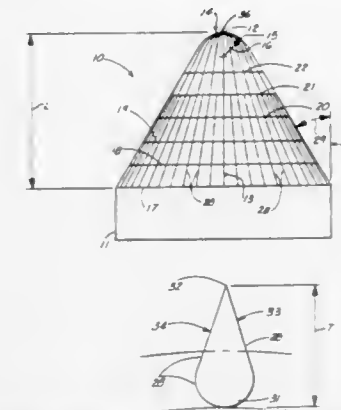
# GUARD FOR JET ENGINE

Raymond M. Dearman, Five Bellwood Dr., Hattiesburg, Miss. 39402, and John J. Bethea, P.O. Box 83, Hattiesburg, Miss. 39403

Continuation-in-part of Ser. No. 45,503, Apr. 8, 1993, abandoned. This application Mar. 21, 1994, Ser. No. 215,316 Int. Cl.<sup>6</sup> B64D 33/02

U.S. Cl. 244—53 B

5 Claims



1. A jet engine intake guard apparatus comprising:

a) a generally circular base ring member adapted for connection to an engine cowl of a jet engine;  
b) a plurality of longitudinally extending rods, each of said rods having an asymmetrical cross section that includes a pointed front portion and a generally curved convex rear surface;  
c) a plurality of spaced apart concentric rings forming connections to the plurality of longitudinally extending rods, each of the concentric rings being of a progressively smaller diameter, and the concentric rings being positioned in spaced apart position from the base ring to the front end portion of the guard apparatus;  
d) the smallest ring carrying a hemispherically shaped front end portion of the guard apparatus;  
e) wherein the apparatus defines a central longitudinal axis and the plurality of longitudinally extending rods each form an acute angle with the longitudinal central axis.

5,411,225

# REUSABLE NON-PYROTECHNIC COUNTERMEASURE DISPENSER CARTRIDGE FOR AIRCRAFT

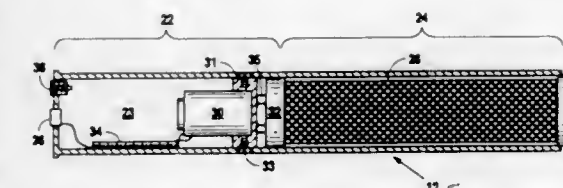
Robert G. Lannon, 1507 Palma Plz., Austin, Tex. 78703, and William F. Weldon, 4707 Peace Pipe Path, Austin, Tex. 78746

Filed Jul. 26, 1993, Ser. No. 97,645

Int. Cl.<sup>6</sup> B64D 1/02

U.S. Cl. 244—137.1

18 Claims



1. A reusable, self-contained, refillable non-pyrotechnic countermeasure dispensing cartridge, comprising:

a countermeasure storage section comprised in said countermeasure dispensing cartridge for storing one or more countermeasures;  
a self-contained gas chamber comprised in said countermeasure dispensing cartridge for storing compressed gas; and  
a self-contained non-pyrotechnic gas release mechanism



comprised in said countermeasure dispensing cartridge positioned between said gas chamber and said countermeasure storage section which may be activated to release said compressed gas from said gas chamber into said countermeasure storage section, thus ejecting said one or more countermeasures.

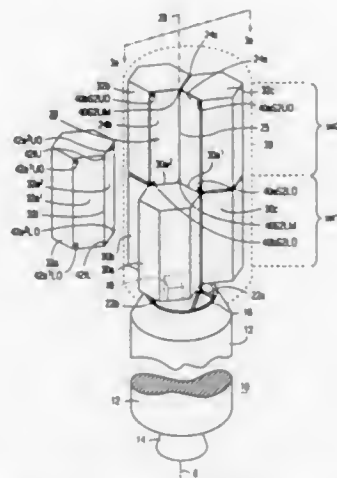
5,411,226

## SPACECRAFT ADAPTER AND DISPENSER

Ernest R. Jones, Ormond Beach, Fla.; James P. Foley, Yardley, and Robert K. Dockstader, Jr., Morrisville, both of Pa., assignors to Martin Marietta Corporation, East Windsor  
Filed Oct. 13, 1993, Ser. No. 139,892  
Int. Cl.<sup>6</sup> B64G 1/64, 1/10

U.S. Cl. 244—158 R

20 Claims



1. A spacecraft launch arrangement for a plurality of spacecraft;

a lift vehicle defining a longitudinal axis substantially coincident with a thrust axis, and also defining an upper end; an elongated support structure affixed to said upper end of said lift vehicle, said support structure defining an axis of elongation parallel with said longitudinal axis of said lift vehicle, said support structure being associated with a plurality of attachment planes, each of which attachment planes contains said axis of elongation, said attachment planes dividing a region about said axis of elongation into a predetermined number N of angular regions, each having an angular extent about said axis of elongation equal to  $360^\circ/N$ ;

a plurality MN of spacecraft organized into a plurality of M sets, each of said M sets of spacecraft including a plurality N of spacecraft, each of said spacecraft defining first and second lateral support planes, said first and second lateral support planes of each of said spacecraft being mutually disposed at an external angle equal to  $360^\circ/N$ , whereby said first and second lateral support planes of each of said spacecraft intersect along a line of intersection, which line of intersection, when any one of said spacecraft is mounted to said support structure of said lift vehicle, lies parallel to said axis of elongation of said support structure, to thereby define upper and lower ends of said spacecraft and to also define a spacecraft length between said upper and lower ends, whereby, when said N spacecraft of one of said sets of spacecraft are mounted to said support structure of said lift vehicle, each of said spacecraft lies within one of said angular regions about said axis of elongation, with said first and second lateral support planes of said spacecraft lying contiguous with and parallel with corresponding ones of said attachment planes associated with said support structure;

first attachment means attached to each of said spacecraft, said first attachment means including attachment devices

located in said first and second lateral support planes and near said upper and lower ends of said spacecraft; second attachment means attached to said support structure, said second attachment means including mating attachment devices releasably mating with said attachment devices of said first attachment means, said mating attachment devices of said second attachment means being located in said attachment planes associated with said support structure at locations which, when any one of said spacecraft is mounted to said support structure of said lift vehicle at its predetermined location and with said first and second lateral support planes of said one of said spacecraft lying contiguous with and parallel with said corresponding ones of said attachment planes associated with said support structure, correspond to the locations of said attachment devices of said first attachment means, for releasably supporting said spacecraft against at least shear force components acting parallel to a plane in which one of said attachment means is located;

one of said spacecraft of each of said sets of spacecraft lying in each of said angular regions, with said lower end of at least one of said spacecraft of one of said sets of spacecraft lying adjacent to said upper end of one of said spacecraft of another one of said sets of spacecraft, whereby said spacecraft in each of said angular regions are stacked end-to-end, and the sum of said lengths of those of said spacecraft which lie in any one of said angular regions is substantially equal to the sum of said lengths of those of said spacecraft which lie in another one of said angular regions.

5,411,227

## SATELLITE THRUSTER UNCERTAINTY ESTIMATION IN TRANSITION MODE

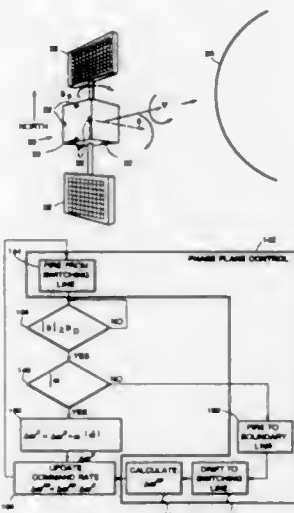
Sibnath Basuthakur, Rancho Palos Verdes, and Bernard Soriano, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 23, 1992, Ser. No. 996,241

Int. Cl.<sup>6</sup> B64G 1/26

U.S. Cl. 244—169

20 Claims



18. For use with a satellite having thrusters, a method for moving a probability distribution for thruster on-time from a fixed bias offset to one with no bias, comprising the steps of:

- firing a thruster of a satellite;
- estimating an attitude state; and
- compensating for a fixed thruster on-time uncertainty by adjusting a compensating feedforward command using a rate equivalent to a fixed period of thruster on-time for each said firing of said thruster until said probability distribution

bution is substantially within a desired target region wherein there is no said fixed bias offset.

5,411,228  
CABLE CLIP

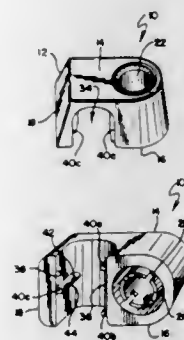
Joseph E. Morawa, Chicago; Bjarne Frederiksen, Lombard; George Z. Lannert, Evanston, and Mohammad Masghati, Addison, all of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill.

Filed Dec. 16, 1993, Ser. No. 167,158

Int. Cl.<sup>6</sup> F16L 3/08

U.S. Cl. 248—74.5

22 Claims



1. A cable clip for retaining cables against a mounting surface, comprising:

a housing member having an upper surface, and a lower surface disposed substantially parallel to said upper surface;

a fastening hole extending through said housing member and between said upper surface and said lower surface; cable receiving means formed within said lower surface of said housing member for accommodating cables of different size diameters; and

fastener retaining means formed within said fastening hole for retaining a fastening device in place prior to installation of said fastening device within said mounting surface, and comprising an annular, tubular wall member axially slotted so as to define a plurality of segmented, arcuate-shaped wall portions for resiliently gripping said fastening device in a frictional mode such that said fastening device can be slidably inserted into and removed from said tubular wall member, without relative rotation with respect thereto, along axially smooth inner surface portions of said tubular wall portions.

5,411,229  
BAG HOLDER

Heiner Hoefkes, 2285 Dunwin Drive, Unit 4, Mississauga, Ontario, Canada L5L 3S3

Filed Dec. 17, 1993, Ser. No. 168,202

Int. Cl.<sup>6</sup> A63B 55/04

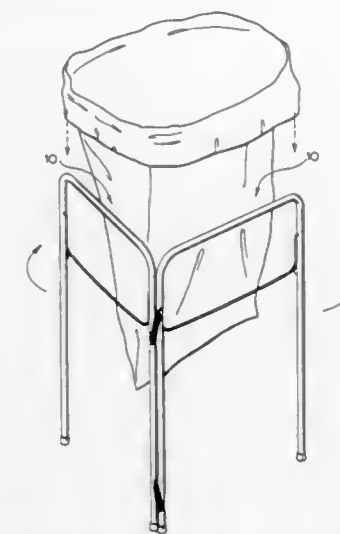
U.S. Cl. 248—97

13 Claims

1. Bag holder comprising:

a pair of frames, each in the form of an inverted U each frame comprising a pair of standards, each defining a longitudinal direction adapted for vertical orientation and a cross-bar joining the upper ends of the standards, means swingably connecting a standard of one frame with a standard of the other frame for relative rotation relative to each other about a connection axis parallel to the longitudinal direction of said standards, a clamp member connecting each pair of standards and

mounted on said standards to pivot about a substantially horizontal axis relative to said standards to and from a



location where it passes beneath the cross-bar connecting the pair of standards, with a snap action.

5,411,230

## SUCTION-TYPE CLAMP

Jules Messinger, Froburgstrasse 297, CH-8057 Zurich, Switzerland

PCT No. PCT/CH93/00069, § 371 Date Nov. 16, 1993, § 102(e) Date Nov. 16, 1993, PCT Pub. No. WO93/19304, PCT Pub. Date Sep. 30, 1993

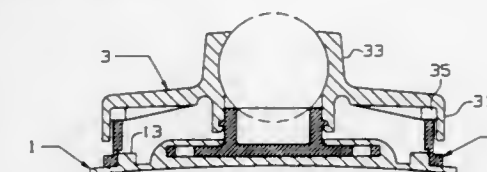
PCT Filed Mar. 15, 1993, Ser. No. 150,041

Claims priority, application Switzerland, Mar. 16, 1992, 835/92

Int. Cl.<sup>6</sup> A45D 42/14

U.S. Cl. 248—205.8

5 Claims

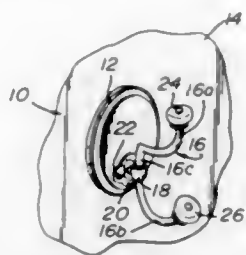


1. In a holding device having a flexible diaphragm (1), a central pin (10) embedded in the diaphragm (1), a pressure ring (2) positioned on a circumferential area of the diaphragm (1), and means for lifting the central pin (10) with respect to the pressure ring (2), the improvement comprising: the diaphragm (1) having a plurality of cams (13) circumferentially arranged about the diaphragm (1), an inside surface of a wall (21) of the pressure ring (2) having a plurality of recesses (22) which engage the cams (13) and connect the diaphragm (1) with the pressure ring (2) and secure the diaphragm (1) against relative rotation with respect to the pressure ring (2), and the diaphragm (1) being axially moveable with respect to the pressure ring (2), the means for lifting the central pin (10) comprising a cover (3), the cover (3) being connected to the central pin (10) in a rotatable but axially fixed manner, projections (35) disposed on a surface of an underside of the cover (3), and a plurality of ramps (23) disposed on a rim of the pressure ring (2) cooperating with the projections (35).

5,411,231  
MAGNETIC ATTACHMENT MEANS OF  
NON-MAGNETIC ACCESSORIES TO METAL DOORS  
Richard F. Buck, 1707 Lotus Dr., Orefield, Pa. 18069  
Filed Dec. 14, 1993, Ser. No. 167,229  
Int. Cl.<sup>6</sup> A47G 1/17

U.S. Cl. 248—206.5

4 Claims

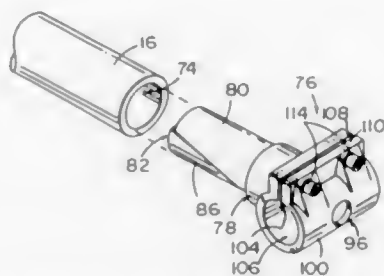


1. A device for removably holding a non-magnetic object to a magnetic object comprising:
  - a donut-shaped magnet having two faces and a central aperture creating a magnetic field having a pre-determined intensity;
  - a non-magnetic object;
  - means for connecting the non-magnetic object to one face of said magnet said means for connecting comprising a suction device of non-magnetic material concentrically located within said central aperture;
  - a magnetic component directed toward the other face of said magnet and establishing a magnetic field therebetween; and
  - means, interposed between said magnet and said magnetic component, for varying the intensity of the magnetic field between said magnet and said magnetic component.

5,411,232  
UNION FOR SENSOR MOUNTING ASSEMBLY  
Donald L. Hufford, 11741 Villa Rd., Charlevoix, Mich. 49720  
Filed Mar. 5, 1993, Ser. No. 27,007  
Int. Cl.<sup>6</sup> A47B 96/06

U.S. Cl. 248—231.3

11 Claims



1. An instrument and vacuum cup support boom assembly, comprising:
  - a boom having a longitudinal axis and an inner wall defining a cavity, said cavity extending along said axis and through one end of said boom;
  - at least one side member with an instrument mounted thereon;
  - a union adjustably and releasably coupling said one side member with said boom, said union having an elongated body extending along said axis, said body including a first end, including a received portion adjacent said first end, said received portion being positioned in said cavity, and including a second end opposite said first end, said second end being connected with said one side member; said union having an inclined surface extending over said received portion, from said first end toward said second end; and said union having a cam with a cooperating cam surface abutting said inclined surface in sliding engagement, said cam and said received portion defining a pas-

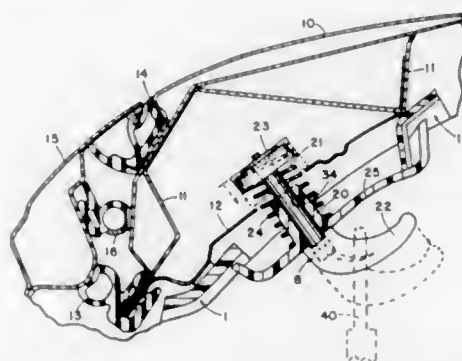
sage therebetween, said passage extending at least through said cam, at least one of said received portion and said cam having aligned, narrowed opposing flattened sides defining a width narrower than about a minimum of a variable, combined cooperative height of said received portion and said cam; and

a draw member interconnecting said cam and said body to slide said cam relative to said body, said draw member having an elongated body oriented generally parallel to said inclined surface.

5,411,233  
VEHICLE COAT HOOK ASSEMBLY  
Robert W. Grimes, III, Grand Haven; Douglas A. Fischer, Grand Rapids; Nels R. Smith, Holland, and Larry E. Mathias, Hudsonville, all of Mich., assignors to Prince Corporation, Holland, Mich.  
Filed Jan. 21, 1993, Ser. No. 6,613  
Int. Cl.<sup>6</sup> B60R 7/00

U.S. Cl. 248—305

7 Claims



1. A coat hook assembly for an automobile vehicle having a roof with a header having a major portion thereof located on substantially a horizontal plane, said coat hook assembly having means for supporting it on said roof adjacent the periphery of the header and the edge of the roof whereby several clothes hangers are supportable on said coat hook assembly along the side of the vehicle comprising:
  - said means for supporting said coat hook including a support comprising an elongated sleeve extending at an inclined angle to said horizontal plane and having a centrally located bore slidably receiving an elongated stem on the end of which is a coat hook, the outer surface configuration of said stem including a plurality of ribs and the configuration of said bore of said sleeve corresponding thereto;
  - a coil spring biasing said coat hook toward said roof and header for normally positioning said coat hook in a first position close to said header;
  - said configuration of said stem and bore minimizing any binding between the wall of the bore of said sleeve and stem, said inclined angle, the configuration of said stem and bore, and said coil spring permitting linear movement of said stem and coat hook in a direction away from said roof and header in response to the force applied in a downward direction orthogonal to said horizontal plane by hanging clothes hangers on said coat hook whereby as the number of hangers hung on said hook is increased, a greater space between the coat hook and header is provided to permit said coat hook to accommodate several clothes hangers located side-by-side;
  - said coil spring located around said stem and sleeve and biasing said coat hook in a direction toward said first position;
  - a removable spring retainer cap secured to the end of said stem and sufficiently large to retain said coil spring located around said stem and sleeve whereby said coil spring biases said coat hook to said first position; and

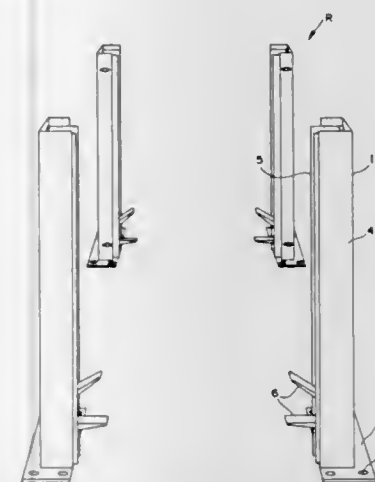
said retainer cap being removable whereby said coat hook assembly can be easily installed.

5,411,234  
STAND FOR THE STORAGE OF TWO-DIMENSIONAL  
WORKPIECES  
Heinz Schoeller, Mengen, Germany, assignor to Croon & Lucke Maschinenfabrik GmbH, Mengen, Germany  
Filed Feb. 22, 1993, Ser. No. 20,349  
Claims priority, application Germany, Mar. 24, 1992, 9203901 U

U.S. Cl. 248—345.1

Int. Cl.<sup>6</sup> A47B 95/00

13 Claims

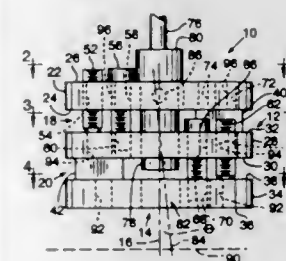


1. A stand for the storage of workpieces, comprised of individual stacking columns wherein each column includes a movable jack, a stacking profile having a length and at least interconnecting walls extending said length, and a protective profile securely attached to a base, wherein said base is adapted to be secured to a support surface, said movable jack disposed in and attached to said stacking profile and said stacking profile detachably connected to said protective profile such that said stacking profile is unattached at a lowermost surface thereof to said base and is adapted to be interchanged with other stacking profiles to accommodate different workpieces while said protective profile and said base are adapted to remain stationary, wherein said protective profile shields said at least two interconnecting walls from contact along a substantial portion of the length of said walls.

5,411,235  
FIXTURE FOR ANGULARLY ALIGNING AN OPTICAL  
DEVICE  
Scott H. Rumbaugh, Lake Oswego, Oreg., assignor to Apeldyn Corporation, Portland, Oreg.  
Filed Mar. 31, 1993, Ser. No. 40,758  
Int. Cl.<sup>6</sup> A47G 29/00

U.S. Cl. 248—371

8 Claims



1. A fixture for angularly aligning an optical device, comprising:
  - a monolithic member having a longitudinal axis and a first

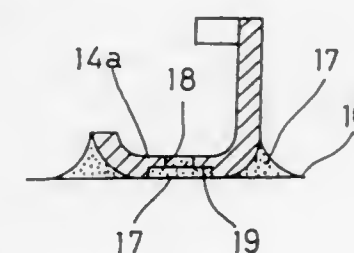
lateral slot therein extending into and across said monolithic member so as to separate said monolithic member into a first portion and a second portion, said first lateral slot extending only partially into said monolithic member so that part of said monolithic member forms a first connection between said first portion and said second portion; holder means for attaching said optical device to said first portion; and

first tilt adjuster, connected to said monolithic element, for tilting said first portion of said monolithic element with respect to said second portion of said monolithic element by flexing said first connection therebetween.

5,411,236  
REINFORCING METAL FITTING FOR SURFACE  
MOUNT CONNECTOR  
Shigehiro Morita, and Akira Shirai, both of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan  
Filed Dec. 12, 1991, Ser. No. 805,686  
Claims priority, application Japan, Dec. 25, 1990, 2-404153 U

U.S. Cl. 248—500

2 Claims



1. A mounting part for surface-mounting an electrical connector on a board, comprising:
  - a substantially L-shaped body having a vertical section and a horizontal section;
  - an opening formed in said horizontal section and having a side face plated with solder thereby facilitating surface-mount soldering, wherein said opening comprises upper and lower concentric circular holes, said lower hole having a diameter greater than that of said upper hole to provide a step portion between them, facing said mounting surface, said step portion being plated with solder, thereby not only facilitating surface-mounting soldering but also increasing surface-mount soldering strength.

5,411,237  
GOLF CART UMBRELLA HOLDER  
Robert G. Dougherty, 3551 Blue Jay Way, Eagan, Minn. 55123  
Filed Jul. 9, 1993, Ser. No. 89,046  
Int. Cl.<sup>6</sup> A01K 97/10

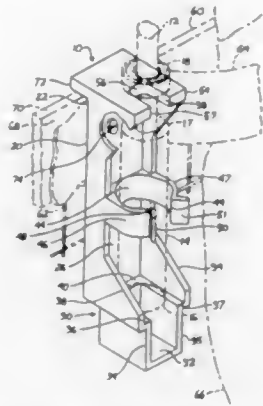
U.S. Cl. 248—534

10 Claims

1. A golf cart apparatus for holding an umbrella having a shaft portion terminating in a bulging handle portion with a butt end, said apparatus comprising:
  - (i) a vertical spine having lower and upper ends,
  - (ii) a gripping member projecting forwardly from said spine at a medial location between said lower and upper ends for gripping said umbrella handle portion, said gripping member having laterally spaced forwardly protecting arms sufficiently distendable to embracingly receive said umbrella handle portion,
  - (iii) a support member projecting forwardly from said spine at said lower end for resting the butt end of said umbrella handle portion thereupon,
  - (iv) a stop member projecting forwardly from said spine at said upper end, said stop member having a substantially U-shaped slot of a width for receiving said umbrella shaft portion as said umbrella handle portion is placed in said



gripping member, the width of said slot being sufficiently narrow to prevent upward movement of said umbrella handle portion through said slot, and  
(v) means for mounting said apparatus on a golf cart having a frame band with a horizontal upper edge, said means comprising a ledge member projecting rearwardly from said spine at said upper end in opposing relationship to said forwardly projecting stop member at said upper end,



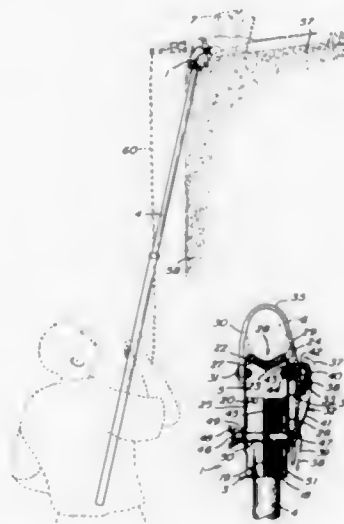
said ledge member being for resting upon the upper edge of said golf cart frame band, said ledge member having a width greater than the distance of its rearward protection from said spine, said mounting means additionally comprising fastener means for pulling said spine toward said frame band, said fastener means being at a location on said spine spaced downwardly from said ledge member a distance at least as great as the width of said ledge member.

#### 5,411,238 PIVOTAL TOOL HOLDER

Clément Caron, 6, Nell Armstrong, Mansonville, Québec, Canada JOE 1X0

Filed Sep. 1, 1993, Ser. No. 114,178  
Claims priority, application United Kingdom, Sep. 3, 1992, 9218617

Int. Cl.<sup>6</sup> F16M 13/00; B26B 19/06  
U.S. Cl. 248—664 10 Claims



1. A tool holder for allowing a user to remotely operate, through an elongate shaft, a manual tool provided with a handle, comprising:  
a first tool holder section with means for mechanically con-

necting said first tool holder section; to one end of said elongate shaft;  
a second tool holder section with means for mechanically connecting said second tool holder section; to said handle of the manual tool, wherein (a) said second tool holder section comprises first and second generally parallel, spaced apart plate members and a third plate member interconnecting said first and second plate members, (b) said first tool holder section is positioned in between said first and second plate members, and (c) said third plate member is bent to define a channel on a side of said third plate member opposite to the first tool holder section, said channel being structured to receive the handle of said manual tool; and  
a pivotal connection comprising means for pivotally mounting said first tool holder section between said first and second plate members to thereby enable articulation of the first and second holder sections in order to adjust a relative angular position between said holder sections, and means for locking said first and second holder sections in the adjusted relative angular position;  
whereby the tool is remotely and manually operated with said elongate shaft after the relative angular position between said first and second tool holder sections has been adjusted to facilitate remote manual operation of said tool.

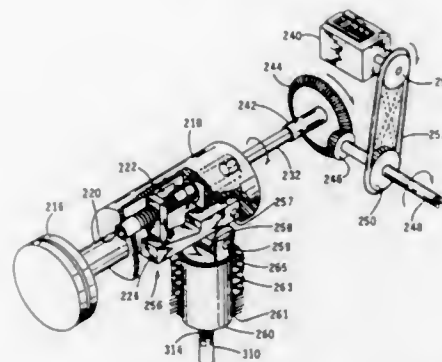
#### 5,411,239 VALVE ACTUATOR

Erling A. Sorensen, Searook, Tex., assignor to Delta-P Engineering, Inc., Texas City, Tex.

Filed Jan. 6, 1993, Ser. No. 1,309  
Int. Cl.<sup>6</sup> F16K 31/163

U.S. Cl. 251—58

13 Claims



1. An actuator for controlling the opening of a flow control valve in response to signals indicative of desired flow rate through the valve, comprising:  
a drive member operable in response to such signals to generate movement as a function of the magnitude of the signals wherein the drive member comprises a piston of a piston and cylinder assembly;  
a first linkage comprising a first cam and coupling the drive member to the valve so as to vary opening of the valve over a range of openings as a function of changes in magnitude of said movement; and  
a second linkage comprising a second cam and operable to displace the first linkage relative to the valve while maintaining coupling of the drive member and the valve so as to change the range of openings of the valve in response to the magnitude of said movement.

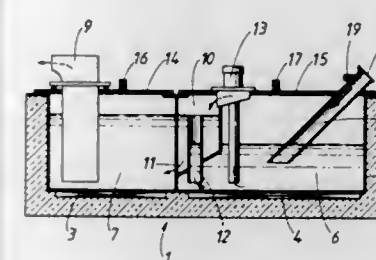
#### 5,411,240 FURNACE FOR DELIVERING A MELT TO A CASTING MACHINE

Josef Rapp, Traunkirchen, and Erich Rauch, Gmunden, both of Austria, assignors to Ing. Rauch Fertigungstechnik Gesellschaft m.b.H., Gmunden, Austria

Filed Jan. 24, 1994, Ser. No. 185,473  
Claims priority, application Austria, Jan. 26, 1993, 115/93  
Int. Cl.<sup>6</sup> C21B 13/14

U.S. Cl. 266—94

2 Claims



1. A furnace for delivering a melt to a casting machine, which comprises  
(a) a storage chamber having an inlet device for material to be melted,  
(b) a removal chamber having an outlet device for removing the melted material,  
(c) an intermediate chamber arranged between the storage chamber and the removal chamber,  
(1) the intermediate chamber communicating with the removal chamber through a balancing port and with the storage chamber by an overflow, and  
(d) a control device for controlling the level of the melted material in the removal chamber, the control device including  
(1) a pump for moving the melted material from the storage chamber to the intermediate chamber.

#### 5,411,241 CONTROL VALVE FOR A FAUCET AND USE OF ULTRASONIC MOTOR

Pekka W. Nilsson, Rauma, and Risto A. Saaristo, Rauma, both of Finland, assignors to Oras Oy, Rauma, Finland  
PCT No. PCT/FI90/00009, § 371 Date Aug. 23, 1991, § 102(e)  
Date Aug. 23, 1991, PCT Pub. No. WO90/08283, PCT Pub. Date Jul. 26, 1990

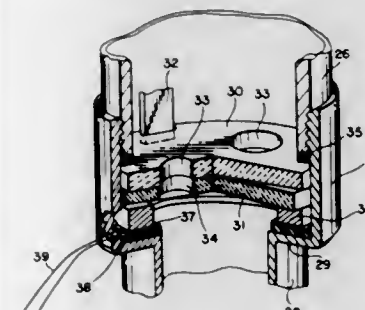
PCT Filed Jan. 10, 1990, Ser. No. 689,868  
Claims priority, application Finland, Jan. 11, 1989, 890138;  
Jan. 10, 1990, 893764

The portion of the term of this patent subsequent to Aug. 2, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> F16K 31/02

U.S. Cl. 251—129.06

6 Claims



1. A control valve comprising:  
a rotating valve member, rotation of said valve member being effected by a rotor of an ultrasonic motor, said valve member being said rotor of said ultrasonic motor;

a cylindrical housing having a longitudinal axis, a proximal end, a distal end and an internal wall;  
a plate fixed in said cylindrical housing, said plate having a top and a first hole, said top being relatively perpendicular to said longitudinal axis;  
an ultrasonic motor constructed concentric to said internal wall comprising:  
(a) said valve member being within said cylindrical housing, said valve member having a bottom and a second hole, said bottom contacting said top of said plate forming a water-tight seal therebetween, said valve member being rotatable with respect to said plate and, said second hole rotatably aligning with said first hole;  
(b) an oscillating body, said body being in vibrational contact with said valve member; and  
(c) a piezo-electric element, said element being in vibrational contact with said oscillating body; and  
control and supply means for supplying power to and controlling said ultrasonic motor.

#### 5,411,242 CHARGING DEVICE WITH MEMBER FOR REGULATING THE FLOW RATE

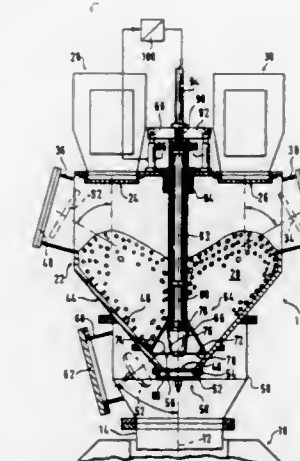
Emile Lonardi, Bascharage; Gilbert Bernard, Helmdange; Giovanni Cimenti, Fentange, and Jean-Jacques Venturini, Obercorn, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Mar. 3, 1994, Ser. No. 205,524  
Claims priority, application Luxembourg, Mar. 4, 1993, 88 231

Int. Cl.<sup>6</sup> C21B 7/18

U.S. Cl. 266—184

8 Claims



1. A charging device for feeding an enclosure with a predetermined flow rate of a solid material, comprising:  
a hopper including a funnel-shaped lower part which defines a substantially vertical central outflow axis through a central discharge opening of the hopper;  
a pipe for feeding the enclosure, which is positioned axially below said lower part of the hopper;  
a bell located inside said hopper for closing off said discharge opening in the hopper;  
driving means operatively connected to said bell, for moving said bell between a lower position, wherein said bell closes off said discharge opening, and an upper raised position, wherein said bell is substantially neutral to a flow rate flowing through said discharge opening; and  
a central metering body which is oblong and distinctly more slender than said bell, said central metering body being movable relative to said bell along said central outflow axis so as to penetrate to a greater or lesser degree through said discharge opening in the direction of the feed pipe; and

adjusting means operatively connected to said central metering body for adjusting its penetration through said discharge opening in the direction of the feed pipe when said bell is in said upper raised position.

5,411,243

## HYDRAULIC ANTIVIBRATION DEVICES

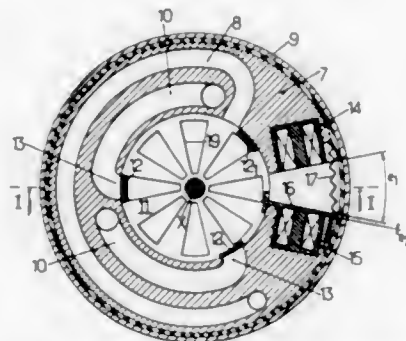
André Genesseeux, Chateaudun, France, assignor to Hutchison, Paris, France

Filed Feb. 14, 1994, Ser. No. 195,144

Claims priority, application France, Feb. 12, 1993, 93 01605  
Int. Cl.<sup>6</sup> F16F 9/34

U.S. Cl. 267—140.14

8 Claims



1. A hydraulic antivibration device comprising a rigid strength member (1) that is annular about an axis X, a rigid stud (3) coaxial with said strength member, an annular elastomer wall (5) about the axis X and capable of withstanding axial compression interposed between the strength member and the stud, a flexible and liquid-tight bellows (6) carried by the strength member and co-operating with the strength member, the stud, and the annular wall to define an enclosure, a rigid intermediate partition (7) carried by the strength member and subdividing the inside of the enclosure into two chambers, a working chamber (A) adjacent to the wall, and a compensation chamber (B) adjacent to the bellows, two passages of different size sections (8, 10) putting the two chambers into communication with each other, a mass of liquid filling the two chambers and the passages, a shutter (11) that is rotary about the axis X and that is suitable for opening or closing at will at least the passage (10) of larger section, a tab of ferromagnetic material (16, 31, 34) that forms a portion of the rotary shutter and that is eccentric relative to the axis X, electromagnetic means housed in the periphery of the rigid intermediate partition (7) and disposed to act angularly on the tab in one direction about the axis X, resilient means (17) urging said tab angularly in the opposite direction, and slots (19) formed through the rotary shutter and suitable for co-operating with slots (20, 21) formed through the intermediate partition in such a manner as to put both chambers into communication with a decoupling valve member (22) centered on the axis X and mounted to move within the intermediate partition, the antivibration device being characterized in that the electromagnetic means comprise two small electromagnets (14, 26; 15, 27) eccentric relative to the axis X, and two magnetic circuits that are looped by the tab (16, 31, 34) via two respective gaps (e<sub>1</sub>, e<sub>2</sub>) disposed angularly on either side of said tab, in that the resilient means (17) are disposed to urge the tab constantly towards a middle angular position in which the widths of the two gaps are equal, and in that the slots (19) formed through the shutter are disposed in such a manner that the above communication with the decoupling valve member (22) is established while the larger section passage is closed, and, on the contrary, is interrupted when said passage is opened.

5,411,244

## CLAMP USING ELASTIC TENSION MEMBER

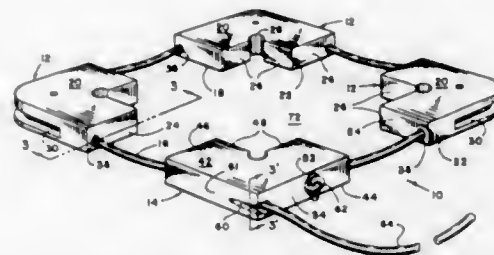
Tommy P. Turner, 4243 Council Crest Cir., Battle Creek, Mich. 49017

Filed Mar. 4, 1994, Ser. No. 205,642

Int. Cl.<sup>6</sup> B25B 1/20

U.S. Cl. 269—42

3 Claims



1. A frame clamp for assembling a plurality of side members to form a closed frame wherein adjacent side members engage and define corners comprising, in combination, a plurality of first corner elements each having side member corner engaging surfaces defined thereon, an anti-friction roller rotatably mounted upon each of said first corner elements, a second corner element having side member corner engaging surfaces defined thereon, a flexible elastic resilient tension member having a first end and a second end region, a tension member anchor defined on said second corner element, said tension member first end being affixed to said tension member anchor, a tension member lock defined on said second corner element for receiving said tension member second end region, said lock being selectively engageable with said tension member second end region to adjustably lock said tension member second end region with respect to said second corner element upon said tension member being under tension and comprising a wedge shaped notch defined on said second corner element receiving and retaining said tension member, said tension member passing about said anti-friction rollers of said first corner elements upon said first and second corner elements being located at the corners of a frame whereby upon tensioning of said tension member said second end region may be locked with respect to said second corner element to maintain the tension within said tension member and all of said corner elements will be substantially equally biased into engagement with the frame side members.

5,411,245

## FOLDING APPARATUS WITH ROTATING VACUUM ROLLER

Johannes Springer, Heidelberg, and Volker Wickenheisser, Reilingen, both of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Germany

Filed Jun. 1, 1993, Ser. No. 70,542

Claims priority, application Germany, May 29, 1992, 42 17 814.2

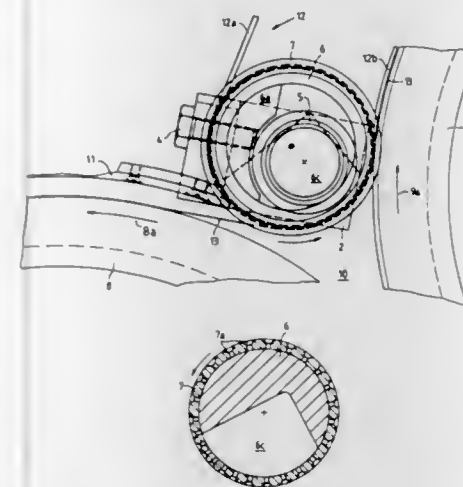
Int. Cl.<sup>6</sup> B41F 13/56

U.S. Cl. 270—20.1

10 Claims

1. In a folding apparatus of a rotary printing press, the folding apparatus having two mutually counter-rotating sheet-guiding cylinders between which signatures are transported and which form a nip therebetween, a device for facilitating a reversal of the transport direction of the signatures between the signature-guiding cylinders, comprising guide means extending over an axial length of the signature-guiding cylinders for receiving signatures thereon, said guide means being disposed in the nip formed by the signature-guiding cylinders so as to facilitate the reversal of the transport direction of the signatures, support means whereon said guide means are rotatably supported, at least one conveyor belt for driving said

guide means, and means for applying negative pressure, during rotation of said guide means, to peripheral regions of said guide



means and between said guide means and a respective signature received thereon.

5,411,246

## PAPER FEEDER

Tomohiro Nonomura, and Hiroshi Kishimoto, both of Hyogo, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation-in-part of Ser. No. 11,727, Feb. 1, 1993, Pat. No. 5,335,901. This application Jul. 29, 1993, Ser. No. 98,820

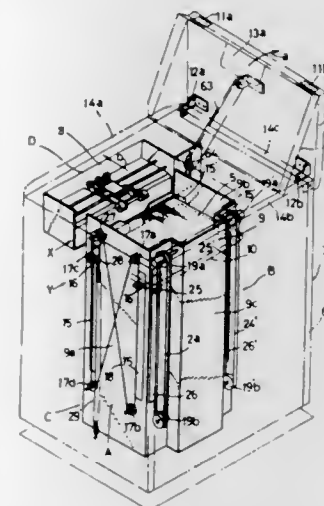
Claims priority, application Japan, Jan. 19, 1993, 5-007028; Mar. 25, 1993, 5-066984

The portion of the term of this patent subsequent to Aug. 9, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B65H 3/06

U.S. Cl. 271—117

26 Claims



1. A paper feeder comprising:

- (a) an opening section having an upper part which is openable when the paper feeder is in a paper feeding state during which paper sheets are picked up and fed;
- (b) a paper feed table disposed below said opening section which can be lifted to the opening section or lowered therefrom while being held horizontal and onto which the paper sheets are loaded from above through the opening section; and
- (c) a pick-up member for picking up the paper sheets stacked on the paper feed table one after another for feeding, starting with a top sheet.

5,411,247

## AUTOMATIC DOCUMENT FEEDER WITH SMOOTH SHEET FEEDING MECHANISM

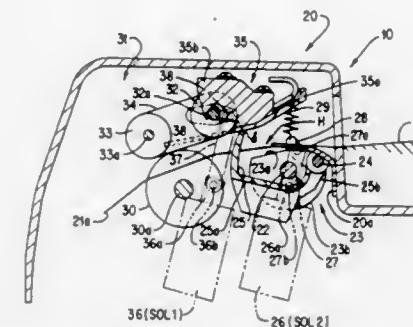
Yukio Ohsawa, Yamanashi, Japan, assignor to Nisca Corporation, Yamanashi, Japan

Filed Dec. 1, 1993, Ser. No. 160,095

Int. Cl.<sup>6</sup> B65H 3/00

U.S. Cl. 271—119

9 Claims



1. An automatic document feeder for feeding a sheet, comprising:

- a sheet mounting portion for receiving a sheet thereon,
- a rotating member located in the sheet mounting portion at a downstream side of a sheet transfer direction, said rotating member rotatably contacting the sheet in the sheet mounting portion and transferring the sheet from the sheet mounting portion,
- a pressure device situated at a side opposite to the rotating member, said sheet being supplied onto the sheet mounting portion from an upstream side of the sheet transfer direction so that the sheet is located between the rotating member and the pressure device and is urged onto the rotating member by the pressure device, and
- a guide member partly covering the rotating member at the upstream side of the sheet transfer direction, said guide member being located under the sheet and guiding the sheet on the sheet mounting portion from the upstream side to a downstream side thereof over the rotating member.

5,411,248

## PAPER FEEDING DEVICE

Takeshi Yamaguchi, Aichi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

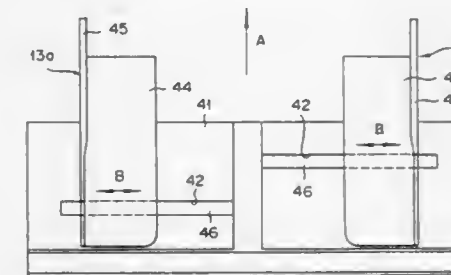
Filed Nov. 12, 1993, Ser. No. 152,196

Claims priority, application Japan, Nov. 27, 1992, 4-318446

Int. Cl.<sup>6</sup> B65H 1/00

U.S. Cl. 271—171

5 Claims



1. A paper feeding device comprising:

- a pair of regulating members for regulating the position of recording paper in a direction perpendicular to a paper transporting direction, at least one of the regulating members being slidable in the direction perpendicular to the paper transporting direction by a slide member attached



thereto and having a regulating surface which contacts a side of the recording paper;  
a supporting member for supporting recording paper thereon; and  
at least one guide provided on the supporting member in the direction perpendicular to the paper transporting direction so that the slide member of said regulating member is slidably connected therewith, the guide being provided at a position displaced from the regulating surface of said regulating member in the paper transporting direction.

5,411,249

# CURRENCY VALIDATOR AND CASSETTE TRANSPORT ALIGNMENT APPARATUS

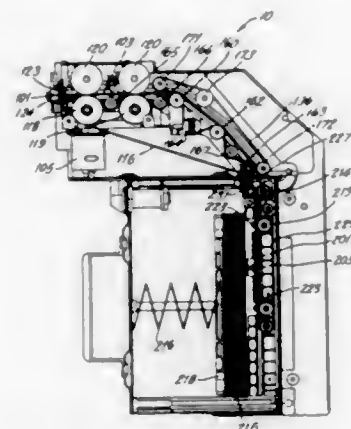
John Zouzoulas, deceased, late of West Chester, Pa. by Helen Zouzoulas, executrix, assignor to Mars Incorporated, McLean, Va.

Filed Jan. 10, 1994, Ser. No. 179,113

Int. Cl.<sup>6</sup> B65H 29/38

U.S. Cl. 271—181

33 Claims



1. An improved currency transport apparatus for use in conjunction with a currency validator and stacker unit having at least one removable subassembly which insures proper component alignment when said removable subassembly is removed and replaced, comprising:

- a mounting chassis having at least one guide for slidably guiding said removable subassembly to its correct position;
  - means for securing said removable subassembly in its correct position;
  - a first gear mounted in the removable subassembly; and
  - a second gear mounted in the mounting chassis for engaging the first gear when the removable subassembly is guided to its correct position;
- wherein the first and second gears have offset center lines.

5,411,250

# TURN-UP AND ALIGNMENT APPARATUS

Eric A. Belec, Southbury, and William D. Toth, Milford, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Nov. 15, 1993, Ser. No. 152,793

Int. Cl.<sup>6</sup> B65H 29/00

U.S. Cl. 271—185

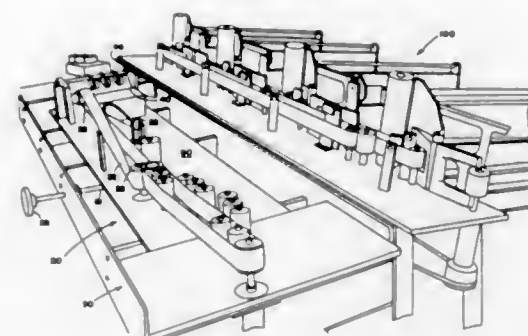
9 Claims

1. Apparatus for receiving flat articles having a top edge alignment and horizontal orientation and transporting the articles along a transport path to a vertical orientation and a bottom edge alignment, comprising:

- a frame;
- a deck plate adjustably mounted to said frame;
- means for adjusting the position of said deck plate in a direction transverse to the paper path;
- a pair of entrance pulleys and exit pulleys each mounted to said deck plate, said entrance pulleys rotating on a hori-

zontal axis and said exit pulleys rotating on a vertical axis; and

first and second flexible, endless belts, each of said belts



being wrapped around one of said entrance pulley and said exit pulleys wherein said belts complete a 90 degree twist from the respective entrance pulley to the respective exit pulley.

5,411,251

# SHEET DELIVERY OF A PRINTING MACHINE WITH A FLOATING CONVEYOR

Gotthard Schmid, Nussloch, and Arno Wirz, Bammental, both of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Germany

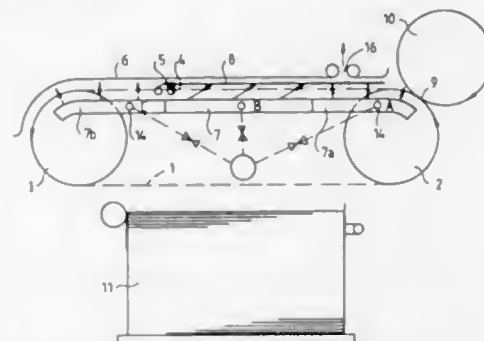
Filed Dec. 17, 1993, Ser. No. 169,518

Claims priority, application Germany, Dec. 17, 1992, 42 42 730.4

Int. Cl.<sup>6</sup> B65H 29/24

U.S. Cl. 271—195

9 Claims



1. Sheet delivery of a printing machine having a gripper system running on an endless conveyor, comprising interchangeable air cassettes removably disposed adjacent the endless conveyor and having a sheet-wide field of air-outlet openings formed therein, the gripper system including grippers for gripping a sheet of printing material at a leading edge thereof so that the sheet is floatingly conveyable by the endless conveyor over said sheet-wide field of air-outlet openings formed in said air cassettes, said endless conveyor having means for turning the sheet and depositing it on a sheet pile, at least one of said air cassettes extending over the sheet width and having air-outlet openings of varying shapes formed so that air is discharged therefrom in different directions, and means for charging said air cassettes with blowing air regulatable in accordance with specific requirements of the printing material of the sheet, wherein said air cassettes form a contact-free sheet-carrier having varying properties for meeting different requirements.

5,411,252

# TWO WAY ADJUSTABLE SIDE GUIDE DEVICE

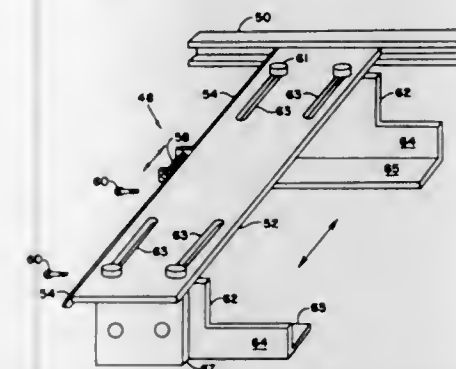
Kenneth W. Lowell, Bristol, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Apr. 18, 1994, Ser. No. 230,024

Int. Cl.<sup>6</sup> B65H 9/00

U.S. Cl. 271—240

10 Claims



1. A side guide device for aligning sheets conveyed serially through a sheet processing machine having opposed side frames, comprising:

- side guides having at least vertical members; and
- first means for mounting said side guides to the side frames, said mounting means including adjustable positioning means for longitudinally positioning said side guides along the direction of the side frames wherein said adjustable positioning means include means for locking said guides in a fixed longitudinal position, wherein said first mounting means include a transverse mounting plate and said adjustable positioning means include a pair of rail members mounted on said opposed side frames, each of said rail members including a longitudinal groove wherein ends of said transverse mounting plate are adjustably positioned within the grooves of said rail members whereby said side guides are positionable longitudinally.

5,411,253

# PUTTING TRAINING METHOD

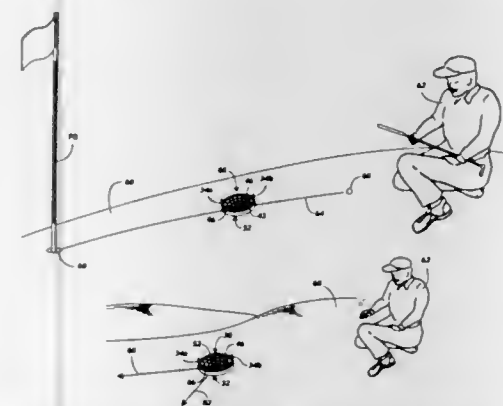
Robert L. Kimble, 2935 Sope Creek Dr., Marietta, Ga. 30068

Filed Jun. 14, 1994, Ser. No. 259,443

Int. Cl.<sup>6</sup> A63B 69/36

U.S. Cl. 273—32 H

11 Claims



1. A method of facilitating the training of a golfer to putt a golf ball from a first location into a golf hole on a sloped golf green, said method comprising the steps of:

- providing a putting aid including a base, a concave upper surface, a movable indicator on said upper surface, and means defining a straight sighting line passing through the center of said concave surface; and
- placing the putting aid upon the sloped golf green at a point

between the golf ball at the first location and the golf hole, with said sighting line directed toward said golf hole; and observing the resting location of the movable indicator on said upper surface relative said sighting line.

5,411,254

# TENNIS RACKET

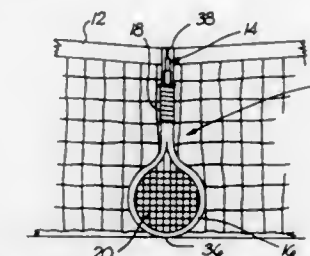
Keith B. Dressler, 6750 Hickory Brook Rd., and Philip H. Johnson, 2135 Mae Dell Rd., both of Chattanooga, Tenn. 37421

Filed Oct. 6, 1994, Ser. No. 319,315

Int. Cl.<sup>6</sup> A63B 49/08

U.S. Cl. 273—73 J

4 Claims



1. A tennis racket having a frame including a head and a handle extending from the head, said racket having a first end defined at least by a point on said head disposed furthest from said handle, and a second end defined by at least a point on said handle disposed furthest from said head, a cavity formed in said handle extending from said second end toward said head, a measuring aid having a fixed end secured within said cavity and a free end normally disposed within said cavity and extendible selectively out of said cavity beyond said second end, the distance from said first end to said free end being substantially equal to three feet when said free end is fully extended out of said cavity.

5,411,255

# GOLF CLUB HEAD

Takao Kurashima, and Takeshi Iwanaga, both of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan

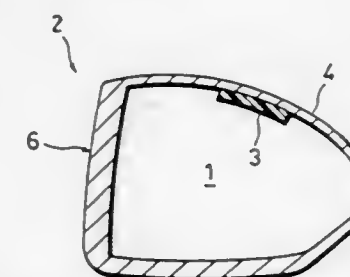
Filed Aug. 2, 1993, Ser. No. 100,157

Claims priority, application Japan, Sep. 22, 1992, 4-072222 U

Int. Cl.<sup>6</sup> A63B 53/04

U.S. Cl. 273—78

12 Claims



7. A metallic golf club head formed by integrally arranged metal walls defining an enclosed hollow chamber portion, comprising a layer of coating material having sound attenuating, vibration restraining characteristics disposed substantially within the perimeter of one of said walls of said hollow chamber portion and applied to a surface thereof.

5,411,256

## SLAPBALL HOCKEY GAME

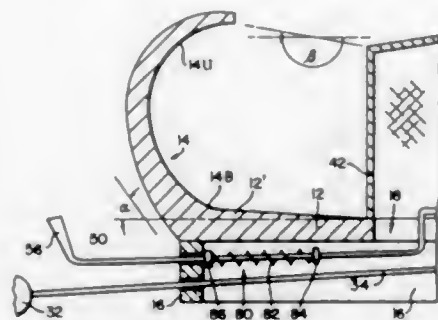
Louis E. Savage, 280 Rector Pl., Apt. 4C, New York, N.Y. 10280  
Continuation-in-part of Ser. No. 28,374, Mar. 9, 1993, Pat. No. 5,320,350, which is a continuation-in-part of Ser. No. 823,135, Jan. 21, 1992, Pat. No. 5,222,735. This application May 26, 1993, Ser. No. 67,714

The portion of the term of this patent subsequent to Jun. 29, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> A63F 7/06

U.S. Cl. 273—85 A

6 Claims



1. A slapball game having two teams, each said team including a plurality of slapper units, each slapper unit having a ball engaging arm subtending a link arm through a vertical post means, each slapper unit pivotally mounted on an essentially oval board, said board peripherally enclosed by a wall and having a goal means proximate each of two arcuate ends thereof, an improvement comprising:

first and second movable goalies, wherein each of said goalies is located forwardly of an associated one of said goal means, said goalies each having a forward portion for releasably catching a playing ball;

first and second handle members, wherein each of said handle members is located proximate an opposite, arcuate end of said board and is attached to an associated one of said goalies by a connecting means, wherein by moving one of said handle members, an operator can move an associated goalie toward or away from the goal means and also in a side to side motion; and

first and second spring means each operatively connected to an associated one of said goalies, wherein the spring means biases the associated goalie toward a forward position whereby when an operator pulls back on a handle member attached to a goalie, the spring means is compressed so that if the operator releases the handle member when the spring means is in a compressed condition, the spring means will snap back to its unstretched state thereby enabling an operator to cause a goalie that has a playing ball located within the forward portion thereof to forcefully eject the playing ball.

5,411,257

## METHOD OF PLAYING A POKER-TYPE GAME AND APPARATUS THEREFOR

Stanley E. Fulton, Las Vegas, Nev., assignor to D D Stud, Inc.  
Continuation of Ser. No. 911,018, Jul. 9, 1992, Pat. No. 5,251,897, which is a continuation of Ser. No. 784,696, Oct. 30, 1991, Pat. No. 5,167,413, which is a continuation-in-part of Ser. No. 605,443, Oct. 30, 1990, abandoned. This application Oct. 4, 1993, Ser. No. 131,490

The portion of the term of this patent subsequent to Mar. 31, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> A63F 1/00

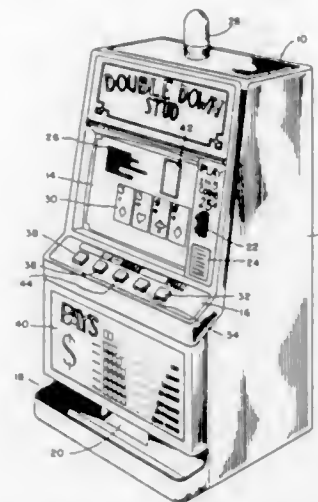
U.S. Cl. 273—85 CP

14 Claims

1. A method of playing a card game comprising the steps of: providing a display surface;

providing at least one player with the option of placing an initial wager;

displaying a plurality of playing cards to at least one player; providing at least one player with an opportunity to change said player's initial wager to a resulting wager which is different from said initial wager thereby providing said player with an opportunity to maximize said player's



winnings even after receiving an indication of the hands ultimate outcome;

displaying at least one additional card; and providing a winning payout based on said resulting wager if a plurality of said displayed cards matches at least one preselected winning card combination.

5,411,258

## INTERACTIVE VIDEO HORSE-RACE GAME

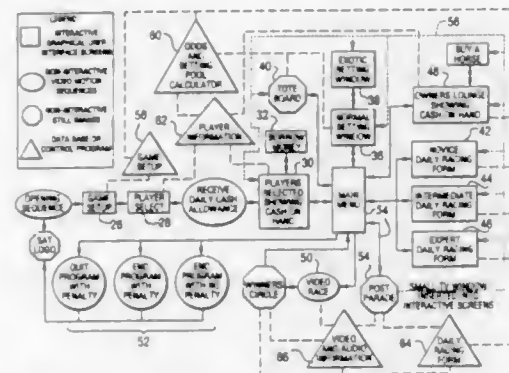
Gordon Wilson; Danny Lowe, and Michael Baker, all of Calgary, Canada, assignors to Fresh Logic Ltd., Alberta Calgary, Canada

Filed Mar. 17, 1994, Ser. No. 214,205

Int. Cl.<sup>6</sup> A63F 9/22

U.S. Cl. 273—86 B

54 Claims



1. An interactive video horse-race game comprising: data storage and retrieval means; at least one pre-recorded video track of a horse-race, said at least one video track stored in said data storage and retrieval means; at least one pre-recorded audio track of a horse-race, said at least one audio track stored in said data storage and retrieval means; wherein names of horses and their post and finishing positions in each said at least one audio track correspond to post and finishing positions of horses in corresponding ones of said at least one video track; at least one race form stored in said data storage and re-

trieval means, one said form corresponding to each said audio track; means for preselecting one said race form and a corresponding video and corresponding audio track to be replayed as a race being run; means for displaying said preselected race form; means for entering player identification into said data storage and retrieval means; means for selecting and entering player financial information into said data storage and retrieval means; means enabling players to enter bets on the outcome of the race displayed on each said preselected race form into said data storage and retrieval means; means for replaying as a race being run, said preselected video and audio track; and means for tallying results of said bets against said financial information of said players.

5,411,259

## VIDEO SPORTS GAME SYSTEM USING TRADING CARDS

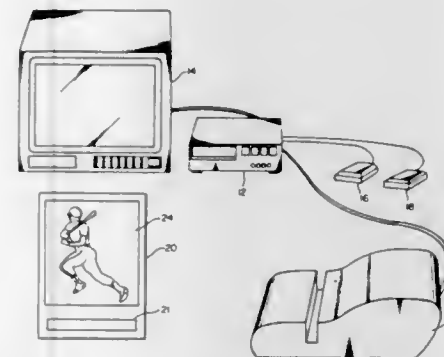
Carl P. Pearson, Edmonds, and David W. Hood, Seattle, both of Wash., assignors to Hero, Inc., Seattle, Wash.

Filed Nov. 23, 1992, Ser. No. 984,304

Int. Cl.<sup>6</sup> A63F 9/22

U.S. Cl. 273—93 C

8 Claims



1. A video game system, comprising: an electronic game system for use with a video monitor for displaying the playing of a video game, wherein the players in the video game are representative of actual people with known performance information; software control means for carrying out a video game and controlling the display on the monitor in accordance with a software program stored in said software control means and in accordance with certain selected input data for the players in the video game supplied by trading card elements and certain additional input data for said players which is stored in a separate system memory means and accessed by access indicia on said trading card elements, wherein the access indicia on each trading card accesses additional input data for the player featured on the trading card; means for obtaining for said software control means said additional input data, which includes performance information, from said system memory means; card reader means supplying said selected input data and said access indicia to said software control means, in response to the trading card elements being selectively placed therein; and trading card elements having stored thereon said selected input data concerning performance information of said players and said access indicia, wherein said selected input data and said access indicia are readable by said card reader means.

5,411,260

## GAME

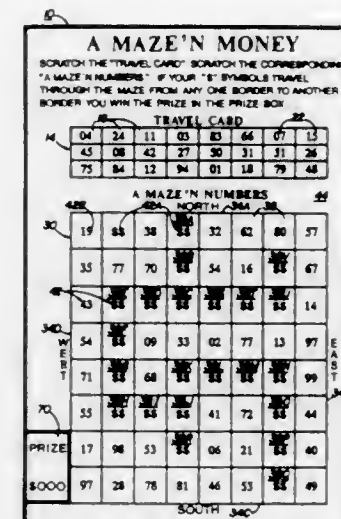
Judy F. Smith, Gainesville, Ga., assignor to Dittler Brothers Incorporated, Atlanta, Ga.

Filed May 31, 1994, Ser. No. 251,593

Int. Cl.<sup>6</sup> A63F 3/06

U.S. Cl. 273—139

12 Claims



1. A game piece comprising: a. a substrate; b. a grid of indicia printed onto the substrate at a first location and defined by an N×M matrix of first boxes, where N and M are variable numbers, at least a variable number, P, of the first boxes having a symbol of a first symbol type printed therein and the remainder of the first boxes having a symbol of a second symbol type printed therein, where P equals the lesser of N and M; c. a variable number of at least the P number of symbols of a third symbol type printed on the substrate at a second location; d. a removable coating applied onto the boxes of the grid of indicia to conceal the symbols printed therein; and e. indicia printed onto the removable coating, each indicia being a symbol of the third symbol type, and at least some of which symbols are identical to the symbols of the third symbol type printed on the substrate at the second location.

5,411,261

## PUZZLE BOX

Carol Jacques, 35 Federal St., Walpole, Mass. 02081

Filed Jun. 16, 1994, Ser. No. 260,540

Int. Cl.<sup>6</sup> A63F 9/12; E05B 37/20

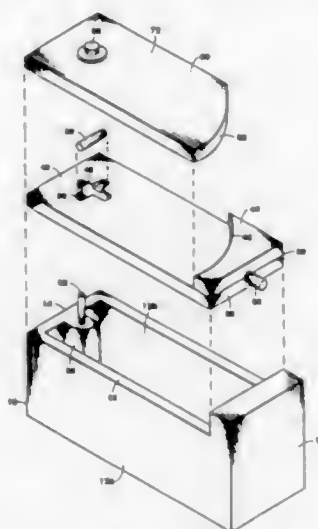
U.S. Cl. 273—156

8 Claims

1. A locking enclosure comprising: an enclosure having an opening, defined by a side wall having an upper edge lying in a plane, and a raised portion extending above said side wall upper edge; a shaft fastened within said enclosure, said shaft vertically aligned and extending above said upper edge of said enclosure; a first cover plate having a top surface, said first cover plate disposed in a closed position proximate said raised portion, said first cover plate including: a slot disposed through said first cover plate and having first and second slot ends with said shaft extending through said first end with said first cover plate in said closed position; a first groove disposed in said first cover plate top surface, said first groove extending across said slot between said first and second slot ends; and



a horizontally extending locking member selectively engaging said raised portion with motion of said cover plate in a direction determined by said slot and shaft; a second cover plate having a bottom surface, said second cover plate bottom surface in a closed position disposed proximate said first cover plate top surface and pivotably secured to said shaft, said second cover plate including: a second groove, disposed in said second cover plate bottom surface and adjacent said shaft, wherein said second groove is aligned with said first groove by rotation of said second cover plate about said shaft; and



a pin dimensioned to fit entirely within each said first and second grooves and imparting to said first and second cover plates a first, locked position with said pin lying within said first groove, and a second, unlocked position with said pin lying within said second groove, said pin translatable under gravity between cover plates by rotation of said second cover plate to produce alignment of said first and second grooves and appropriate orientation of said enclosure.

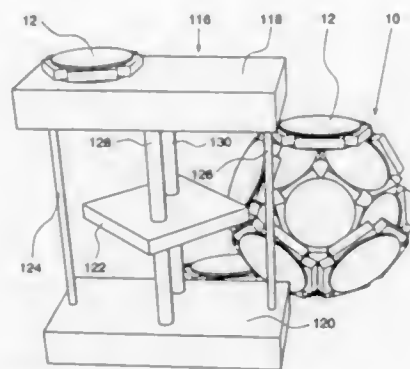
5,411,262

## PUZZLES AND TOYS (II)

Michael R. Smith, 1531 1st Ave., Apt. 414, Seattle, Wash. 98101  
Continuation-in-part of Ser. No. 924,304, Aug. 3, 1992,  
abandoned. This application Dec. 8, 1993, Ser. No. 163,923  
Int. Cl.<sup>6</sup> A63F 9/08

U.S. Cl. 273—157 R

10 Claims



1. A combination of:
  - a. a plurality of pieces, each piece having at least three edges, where attachment means are so formed on the edges that the pieces may be joined together to construct a completed form; and
  - b. a holder having first and second plates held in a spaced

apart relation by a plurality of support members, where the plates and support members are arranged such that the pieces can be stored individually in the holder in a stacked configuration and can be stored in the holder joined together as the completed form with the support members extending through the completed form.

5,411,263

## GOLF PUTTER WITH BOTTOM RAIL

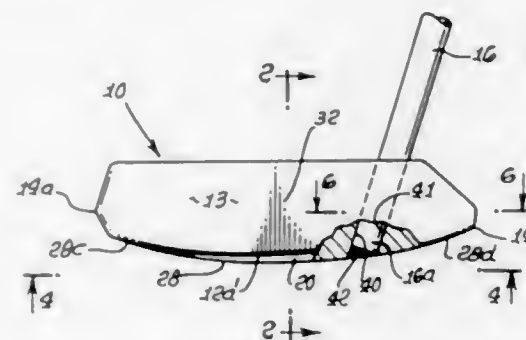
Glenn H. Schmidt, Malibu, and Richard C. Helmstetter, Carlsbad, both of Calif., assignors to Callaway Golf Company, Carlsbad, Calif.

Continuation of Ser. No. 8,628, Jan. 28, 1993, Pat. No. 5,314,184. This application May 19, 1994, Ser. No. 246,096  
The portion of the term of this patent subsequent to May 24, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A63B 53/02, 53/04

U.S. Cl. 273—164.1

17 Claims



1. A golf putter for use with a putter shaft supporting a head, the head comprising, in combination:

- a) a putter body having a heel, toe, sole defining a bottom wall, and a ball striking front face, the body elongated between the heel and toe, and
- b) a control rail projecting downwardly from said bottom wall, the rail being elongated in a direction between the heel and toe to engage the turf as the putter is placed downwardly on a golf green, and in a manner to stabilize the head against twist during said head downward placement,
- c) said rail spaced rearwardly from said front face along the major length of the rail,
- d) the rail having a depth which decreases toward at least one of the toe and heel.

5,411,264

## GOLF CLUB HEAD

Yutaka Oku, Tokyo, Japan, assignor to Daiwa Golf Co., Ltd., Tokyo, Japan

Filed Jan. 14, 1994, Ser. No. 181,464

Claims priority, application Japan, Jan. 19, 1993, 5-974 U

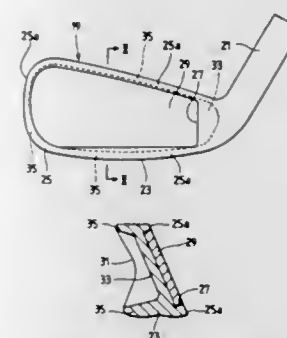
Int. Cl.<sup>6</sup> A63B 53/04

U.S. Cl. 273—169

10 Claims

1. A golf club head having a face portion of a head main body, said golf club head comprising:
  - a face plate mounted to the face portion and formed of material different from that of the head main body;
  - a flange portion extends from an entire peripheral edge of said head main body to provide a cavity in a back portion of said head main body, said cavity is approximately congruent with respect to said face plate; and
  - said flange portion projects backwardly of said head main

body longer than the thickness of said flange portion so as to increase a mass of said golf club head while distributing



the increased weight of said head main body backwardly away from said peripheral edge of said main body.

5,411,265

## AERODYNAMIC GOLF CHIPPING TARGET

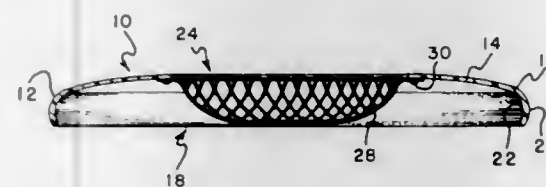
John D. Falco, 242 Steelmanville Rd., Linwood, N.J. 08221

Filed Apr. 22, 1994, Ser. No. 231,520

Int. Cl.<sup>6</sup> A63B 69/36; A63H 27/00

U.S. Cl. 273—181 A

9 Claims



6. A golf chipping target adapted to be thrown through the air comprising a body having a disc-shaped upper surface and a circumferential portion surrounding said upper surface, said circumferential portion extending downwardly from said upper surface, said upper surface having a hole formed through the center thereof, and means fitted in said hole for receiving and holding a golf ball therein, said receiving and holding means being adapted to hold at least a portion of said golf ball below the underside of said upper surface.

5,411,266

## ALIGNMENT AND SETUP DEVICE FOR GOLF TRAINING ACTIVITIES

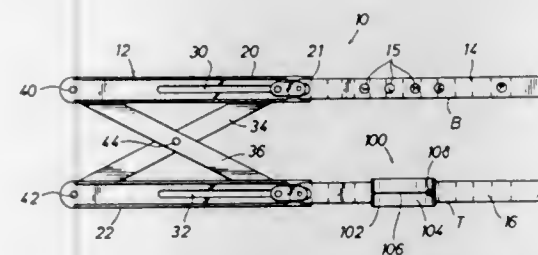
Joe M. Guthry, The Woodlands, Tex., assignor to Pro Gruv, Inc., The Woodlands, Tex.

Filed May 17, 1994, Ser. No. 243,922

Int. Cl.<sup>6</sup> A63B 69/36

U.S. Cl. 273—187 R

14 Claims



1. A setup and alignment device for enabling golfers to establish a proper setup, body alignment and golf club swing and through controlled practice to develop automatic muscle reaction for a repeatable golf swing, said device comprising:
  - (a) an elongate, stance ruler adapted to lie on the ground and establishing a substantially straight target line with which

the toes of the golfer's shoes are selectively positioned during use;

- (b) an elongate ball position ruler adapted to lie on the ground and establishing a substantially straight ball position line being disposed in parallel relation with said target line;
- (c) means establishing movable interconnection between said stance and position rulers and maintaining parallel relation of said target line and said ball position line at all relative positions of said stance and position rulers and establishing a ball position reference;
- (d) indicia on said stance ruler enabling golfer to identify spacing measurement of the golfer's shoes in relation to said stance ruler; and
- (e) indicia on said ball position ruler for identifying relative to said ball position reference the spacing of said target line and said ball position line and for enabling selective ball positions relative to said ball position line.

5,411,267

## GOLF BALL TEEING APPARATUS

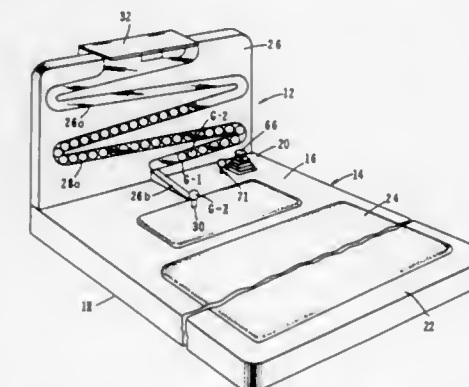
Donald Burks, 10624 Santa Cruz Ave., and Walter Flynn, 8490 Warwick, both of Desert Hot Springs, Calif. 92240

Filed Aug. 4, 1993, Ser. No. 101,969

Int. Cl.<sup>6</sup> A63B 57/00

U.S. Cl. 273—201

19 Claims



1. A golf ball teeing apparatus comprising:
  - (a) a base having an upper surface and an interior chamber;
  - (b) a golf ball supporting means carried by said base including a golf ball receiving tee movable relative to said base between a first lower position and a second elevated position wherein said tee extends above said upper surface of said base;
  - (c) containment means connected to said base for containing a multiplicity of golf balls, said containment means including an inclined ramp for rollably supporting said golf balls, said ramp having a terminal portion disposed adjacent said tee;
  - (d) metering means connected to said containment means for sequentially permitting the golf balls contained within said containment means to roll along said inclined ramp toward said terminal portion thereof;
  - (e) operating means connected to said metering means and to said golf ball supporting means for operating said metering means and for moving said tee between said first and second positions, said operating means comprising first, second and third pivotally interconnected links disposed within said interior chamber of said base and foot operated means connected to said third link for imparting pivotal movement to said links, said foot operated means comprising:
    - (i) a cylinder disposed within said interior chamber, said cylinder having an internal chamber;
    - (ii) a plunger sealably receivable within said internal chamber of said cylinder for reciprocal movement

apparatus comprising:  
a seal housing;  
said seal housing comprising a first annular portion and a  
second annular portion, each of said first annular portion



and said second annular portion being disposed about the propeller shaft;

a lip seal being fixedly held between said first annular portion of said seal housing and said second annular portion of said seal housing;

said second annular portion comprising a recessed portion disposed adjacent said lip seal;

said lip seal being configured for sealing out an outside medium;

said lip seal comprising:

an upper portion, an intermediate portion and a lower portion;

said upper portion being fixedly held between a portion of said first annular portion of said seal housing and a portion of said second annular portion of said seal housing;

said lower portion for being disposed directly about the propeller shaft and being configured for sealing about the propeller shaft;

said intermediate portion extending between said upper portion and said lower portion;

said intermediate portion of said lip seal being configured for, in response to a change in the pressure of the outside medium:

being displaced into said recessed portion of said second annular portion; and

relieving pressure from said lower portion of said lip seal;

said intermediate portion of said lip seal comprising:

a first zone disposed adjacent said upper portion;

a second zone disposed adjacent said lower portion;

said second zone being configured for supporting said lower portion;

an angled zone connecting said first zone and said second zone;

said angled zone being configured to define an acute angle between said first zone of said intermediate portion and said second zone of said intermediate portion;

said second annular portion comprising a first portion adjacent said first zone of said intermediate portion of said lip seal;

said recessed portion of said second annular portion of said seal housing being configured such that:

at a normal pressure of the outside medium, a gap exists between said first zone of said intermediate portion of said lip seal and said first portion of said second annular portion; and

when the pressure of the outside medium is higher than the normal pressure, said first zone of said intermediate portion of said lip seal fills said gap;

said recessed portion of said second annular portion comprising a curved surface, said curved surface being concave with respect to said lip seal; and

said gap, when the outside medium is at normal pressure, is bounded by:

said intermediate portion of said lip seal; and

said curved surface of said recessed portion of said second annular portion.

5,411,274

#### VORTEX GASKET FOR AUTOMOTIVE EXHAUST SYSTEM

Hideo Yabagi, Susono; Masahiko Takaoka, Sanda; Shingo Hoshikawa, Sanda; Takeshi Miyoshi, Sanda, and Keiji Okada, Sanda, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi and Nippon Pillar Packing Co., Ltd., Osaka, both of Japan

Filed May 13, 1993, Ser. No. 60,069

Claims priority, application Japan, May 18, 1992, 4-124709  
Int. Cl.<sup>6</sup> F16J 9/04

U.S. Cl. 277—203

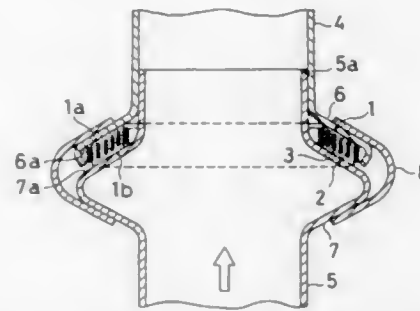
4 Claims

1. A vortex gasket for an automotive exhaust system comprising:

a spiraled metal hoop of flat strip material forming spiral

loops revolving about an axis and having a hoop width in an axial direction;

a gasket filler tape of gasket material also arranged in spiral loops and being positioned between loops of said metal hoop so that the gasket filler tape overlays said spiraled metal hoop, said gasket filler tape having a tape width in said axial direction which is slightly greater than the hoop width, with side edges of the gasket filler tape extending in the axial direction beyond side edges of adjacent loops of the metallic hoop on both sides of the metallic hoop so as to position end faces of the gasket filler tape beyond the side edges of adjacent loops of the metallic hoop;



said vortex gasket having a conical shape with an innermost loop of the metallic-hoop and an innermost loop of the gasket filler tape being substantially axially displaced from an outermost loop of the metallic hoop and an outermost loop of the gasket filler tape and with intermediate loops thereof being axially displaced from said innermost and outermost loops to be graduated between said innermost and outermost loops in a conical fashion;

whereby said end faces of the gasket filler tape have conical shapes.

5,411,275

#### CHUCK WITH TORQUE LIMITING MECHANISM AND INCLINED PLANE FOR FINAL TIGHTENING

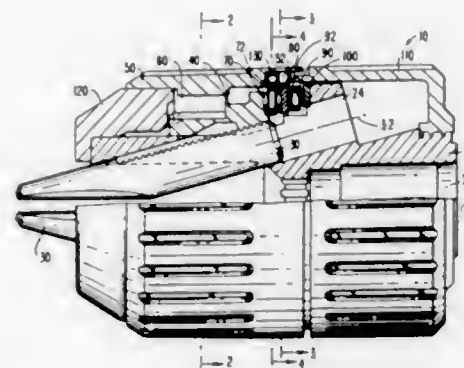
Robert O. Huff, Piedmont, and Louis M. Shadeck, Anderson, both of S.C., assignors to Jacobs Chuck Technology Corporation, Wilmington, Del.

Filed Sep. 27, 1993, Ser. No. 127,621

Int. Cl.<sup>6</sup> B23B 31/12

U.S. Cl. 279—62

8 Claims



1. A chuck for releasably gripping a tool comprising:

a main body;

a plurality of longitudinal tool-gripping jaws mounted for movement relative to said main body, each of said jaws being movable relative to said main body parallel to a longitudinal axis of that jaw, the longitudinal axes of said jaws being synclinal in a distal direction along said body;

a nut rotatably mounted on said body, said nut being also mounted for limited axial motion relative to said body parallel to said distal direction, said nut being threadably

engaged with each of said jaws for causing said jaws to move parallel to their longitudinal axes when said nut is rotated relative to said body or when said nut is moved axially relative to said body parallel to said distal direction;

a sleeve rotatably mounted on said body;

a torque limiting coupling operatively connected between said sleeve and said nut for causing said nut to rotate relative to said body with said sleeve in a jaw-tightening direction until said jaws have begun to grip said tool and more than a predetermined threshold torque must be applied to said sleeve to continue to rotate said nut in said jaw-tightening direction, after which said torque limiting coupling releases so that said sleeve can continue to rotate in said jaw-tightening direction with at least substantially reduced transmission of torque from said sleeve to said nut and therefore without further rotation of said nut in said jaw-tightening direction, said predetermined threshold having a value greater than a minimum required to couple said sleeve and said nut before said jaws grip said tool and substantially less than a value required to finally tighten said tool for operation;

a plurality of rolling cam follower elements disposed between a substantially proximal-facing first surface of said nut and a substantially distal-facing second surface that rotates relative to said body with said sleeve, said cam follower elements being axially compressed between said first and second surfaces only after said jaws have begun to grip said tool and said nut moves relative to said body in the proximal direction in reaction to the tool-gripping force applied to said tool by said jaws, each of said cam follower members rolling, from initial positions relative to said first and second surfaces, along an arcuate segment of each of said first and second surfaces when said cam follower elements are compressed between said first and second surfaces and after said torque limiting coupling has released and said sleeve continues to rotate in said jaw-tightening direction relative to said nut, at least one of said segments along which each of said cam follower elements rolls being inclined toward another of the segments along which that cam follower element rolls in the direction in which that cam follower element rolls so that said cam follower elements force said nut to move in said distal direction relative to said body, thereby further tightening said jaws on said tool; and

means for resiliently urging each of said cam follower elements to automatically return to its initial position relative to at least one of said first and second surfaces when said cam follower elements are not compressed between said first and second surfaces.

5,411,276

#### ROLLER SKATE BRAKE

Paul G. Moldenhauer, St. Louis Park, Minn., assignor to Rollerblade, Inc., Minneapolis, Minn.

Filed Feb. 24, 1994, Ser. No. 201,362

Int. Cl.<sup>6</sup> A63C 17/14

U.S. Cl. 280—11.2

6 Claims

1. A roller skate brake for a roller skate, the roller skate having at least a front and a rear rolling wheel, each rolling wheel having a circumferential surface, and being rotatably mounted to the roller skate about a rolling front and a rear rolling wheel axle, respectively, the brake comprising:

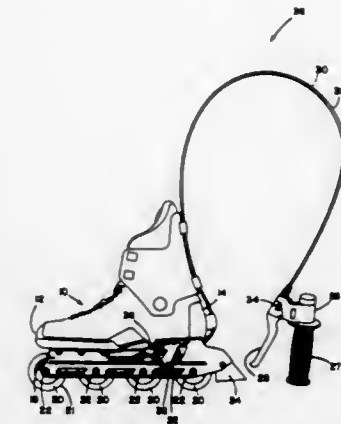
a pivot having a longitudinal axis approximately parallel to the rolling wheel axles, the pivot being operably connected to the roller skate between said rolling wheels;

a front and a rear braking wheel lever each having a first end rotatably mounted to the pivot;

a front and a rear braking wheel each having a circumferential surface, the front and rear braking wheels being rotatably mounted to a second end of the front and rear braking wheel levers, respectively, about a front and a rear brak-

ing wheel axle approximately parallel the rolling wheel axles; and

braking means for rotating the wheel levers about the longitudinal axis of the pivot, so that the front and rear braking wheels move between a first position wherein the circumferential surface of the front and rear braking wheels are



spaced apart from the circumferential surface of the front and rear rolling wheels, and a second position wherein the circumferential surface of the front and rear braking wheels are in contact with the circumferential surface of the front and rear rolling wheel, and the braking means brakes the rotation of the front and rear braking wheels when in the second position.

5,411,277

#### MULTI-TERRAIN IN-LINE SKATE CHASSIS

Michael K. Pratt, Ware, Mass., assignor to Seneca Sports, Inc., Milford, Mass.

Filed Aug. 3, 1993, Ser. No. 102,476

Int. Cl.<sup>6</sup> A63C 17/06

U.S. Cl. 280—11.22

11 Claims



1. A multi-terrain in-line skate chassis comprising:

at least one base plate for supporting a skate boot, said base plate having a side edge and defining a base plane;

a single vertically oriented wheel support plate having an upper edge,

said upper edge of said wheel support plate joined to said base plate along said side edge;

said wheel support plate defining at least a first set of longitudinally aligned, axle receiving apertures and a second set of longitudinally aligned, axle receiving apertures;

said first set of apertures being located at a first predetermined distance below said base plane, and said second set of apertures being located at a second

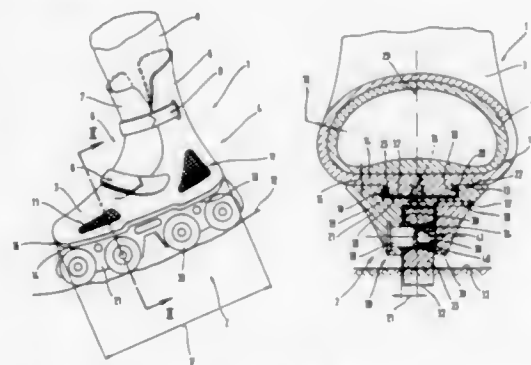
predetermined distances below said base plane, said second predetermined distance being different from said first predetermined distance, and each aperture of said second set of apertures being longitudinally offset from each aperture of said first set of apertures.

# 5,411,278 SKATING SHOE

Walter Wittmann, Köflach, Austria, assignor to Koflach Sport Gesellschaft m.b.H. & Co. KG., Wagnrain, Austria  
Continuation of Ser. No. 920,895, Jul. 28, 1992, abandoned. This application May 5, 1994, Ser. No. 238,575

Claims priority, application Austria, Jul. 31, 1991, 91/1530  
Int. Cl.<sup>6</sup> A63C 17/06, 17/18  
U.S. Cl. 280—11.22

4 Claims



1. A roller skating shoe integrally injection molded of synthetic resin and comprising
  - (a) a shell defining an interior space for receiving a foot and including a sole,
  - (b) a shaft projecting from the shell for receiving a portion of a leg projecting from the foot, and
  - (c) a bearing device extending in a longitudinal direction along substantially the entire length of the sole on an underside thereof, and the roller skating shoe further comprising
    - (d) a heat-insulating liner form-fitted inside the shell and facing the interior space,
    - (e) tensioning elements affixed to the shell and the shaft for tightening the shell and the shaft about a foot and leg portion received in the interior space of the shell and in the shaft,
    - (f) a bearing housing for a succession of skating rollers form-fittingly connected to the bearing device and extending towards a support surface on which the skating rollers support the shoe,
      - (1) each of the skating rollers having a horizontal rotary axle journaled in the bearing housing, the rotary axle having an end face defining a recess, and
    - (g) a support housing part mounted on the bearing housing,
      - (1) the housing part having a support bolt coaxial with the rotary axle and engaging the recess to support the axle, and
    - (h) the bearing housing and the support housing part having coupling means comprised of cooperating and complementary, transversely extending, interengaging ribs and grooves coupling the support housing part to the bearing housing.

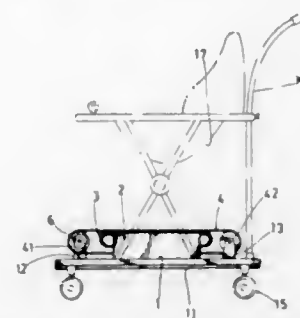
# 5,411,279 MULTIPLE-BELT CONVEYING APPARATUS WITH FLAT TOP SURFACE

Sidney H. Magid, c/o Hung Hsing Patent Service Center, P.O. Box 55-1670, Taipei (104), Taiwan, Prov. of China  
Filed Dec. 17, 1993, Ser. No. 169,143

Int. Cl.<sup>6</sup> A63B 23/06

U.S. Cl. 280—47.38

8 Claims



1. A multiple-belt conveying apparatus comprising:
  - a base, said base attachable to a functional supporting frame;
  - a substrate plate having a flat slipping surface formed on an upper surface of the plate, two arcuate end portions, disposed on a front end portion and a rear end portion of the substrate plate, and a pair of side brackets securing two longitudinal side edge portions of the substrate plate on the base;
  - an endless inner belt having an outer frictional surface in contact with an inner surface of an endless outer belt, and an inner slipping surface made of slipping materials to be in contact with the slipping surface of the substrate plate, with the endless inner belt movably wound on the two arcuate end portions formed on the front and rear end portions of the substrate plate; and
  - the endless outer belt made of frictional materials and wound on a front roller and a rear roller rotatably mounted, by a front shaft and a rear shaft, on a front bracket and a rear bracket respectively secured on a front end portion and a rear end portion of the base.

# 5,411,280

## BICYCLE BRAKE AND DERAILLEUR MOUNT

James D. Allsop, and Michael G. Allsop, both of Bellingham, Wash., assignors to Softride, Inc., Bellingham, Wash.

Division of Ser. No. 947,274, Sep. 18, 1992, which is a continuation-in-part of Ser. No. 873,878, Apr. 22, 1992, Pat. No. 5,240,268, which is a continuation of Ser. No. 589,771, Sep. 28, 1990, abandoned, which is a continuation-in-part of Ser. No. 521,130, May 9, 1990, Pat. No. 5,029,888, which is a continuation of Ser. No. 333,891, Apr. 7, 1989, Pat. No. 4,934,724. This application Nov. 24, 1993, Ser. No. 157,616

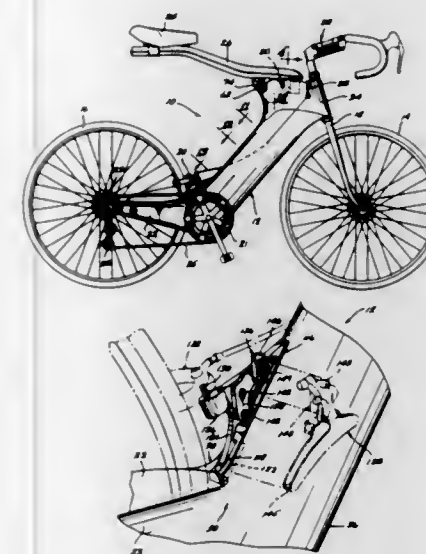
Int. Cl.<sup>6</sup> B62K 19/02, 19/38, 19/40

U.S. Cl. 280—281.1

15 Claims

1. A bicycle comprising:
  - (a) a composite frame including a center section, a bottom bracket affixed to said center section, and at least one chain stay attached to said center section, said center section having a top side and a bottom side;

- (b) a rear brake attached to the top side of said center section of said frame adjacent said chain stay; and



- (c) a front derailleur attached to the top side of said center section of said frame adjacent said brake and above said bottom bracket.

# 5,411,281

## FIFTH WHEEL CONSTRUCTION HAVING ROTATABLE BEARING PLATE

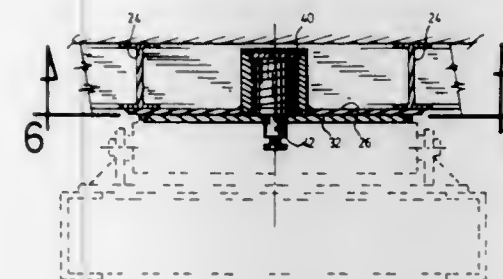
Bertin Poirier, 7 rue Poirier, St. Blandine, Comte de Rimouski, Canada G0K 1J0

Filed Nov. 23, 1993, Ser. No. 155,693

Int. Cl.<sup>6</sup> B62D 53/08

U.S. Cl. 280—433

9 Claims



1. A fifth wheel assembly suitable for coupling a trailer unit to a tractor unit, said assembly comprising a non-rotatable housing and a non-rotatable plate adapted to be secured to said tractor unit, a king pin assembly comprising a king pin and a body portion, said body portion being rotatably mounted within said housing, and a rotatable disk mounted adjacent said non-rotatable plate.

# 5,411,282

## SYSTEM FOR GUIDING APPARATUS OVER A SURFACE

Walter Shannon, 12012 S. Compton Ave., Apt. 3-116, Los Angeles, Calif. 90059

Filed Mar. 4, 1994, Ser. No. 206,866

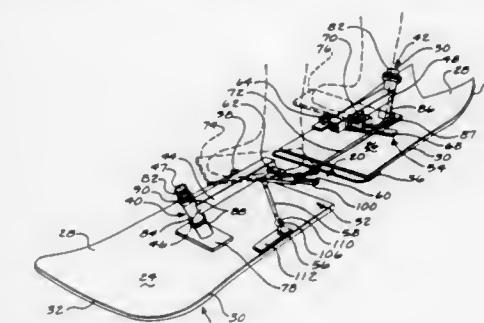
Int. Cl.<sup>6</sup> A63C 5/03

U.S. Cl. 280—606

14 Claims

1. A system for guiding an apparatus for sliding on a surface, the apparatus including a forward runner and a rear runner, the forward runner and the rear runner each having an upper substantially horizontal surface and an opposing substantially horizontal lower surface; the system comprising:
  - a first shaft for mounting to the upper surface of the forward runner;
  - a second shaft for mounting to the upper surface of the rear runner;
  - an elongate beam having a forward end and a rear end, the forward end including a forward coupling for connecting the forward end to the first shaft for rotation in a horizontal plane about the first shaft, the rear end including a rear coupling for connecting the rear end to the second shaft for rotation in a horizontal plane about the second shaft;
  - a rear strut assembly including a rear strut having a runner

- end and a lever end, the runner end of the rear strut connected to the rear runner and the lever end of the rear strut connected to a rear lever, the rear lever being pivotally connected to the elongate beam;
- a forward strut assembly including a forward strut having a runner end and a lever end, the runner end of the forward strut connected to the forward runner and the lever end of the forward strut connected to a forward lever, the forward lever being pivotally connected to the elongate beam; and
- an intermediate strut connecting the forward lever to the rear lever.



# 5,411,283

## SAFETY SKI BINDING

Gerhard Nowak, Biedermannsdorf; Alfred Winter, Vienna; Rudolf Theurer, Trumau; Hans-Peter Morbitzer, Vienna; Klaus Kruschik, Gumpoldskirchen, and Peter Wieser, Vienna, all of Austria, assignors to HTM Sport- und Freizeitgerate Aktiengesellschaft, Schwechat, Austria

PCT No. PCT/EP92/01916, § 371 Date Jun. 25, 1993, § 102(e) Date Jun. 25, 1993, PCT Pub. No. WO93/03803, PCT Pub. Date Mar. 4, 1993

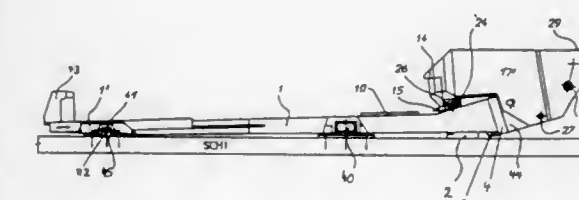
PCT Filed Aug. 21, 1992, Ser. No. 50,149

Claims priority, application Austria, Aug. 23, 1991, 1664/91

Int. Cl.<sup>6</sup> A63C 9/08

U.S. Cl. 280—618

5 Claims



1. A safety ski binding, comprising a movably supported sole-down-holding means, an electronic evaluating circuit and an electric motor connected in circuit therewith, a force-receiving means giving off electrical signals in response to relative movement between said safety ski binding and a ski on which said safety ski binding is mounted, an electrical current supply connected in electrical circuit with said electric motor,



a control element movable between a first position locking said sole-down-holding means in a skiing position and a second position releasing said sole-down-holding means, a locking system for controlling the movement of said control element, and a locking mechanism coupled to said movably supported sole-down-holding means, said electric motor being arranged in a tightly closed housing of a control block, said electric motor having a driven output shaft sealingly guided through a wall of the housing and connected to said locking system, said locking system including a gear matingly coupled with a pinion coupled to said output shaft of said electric motor, said gear including a crank arranged eccentrically of said gear, a pull rod pivotally coupled to said crank at one end thereof and which is hingedly connected to a pivotally supported lever at another end thereof, said lever blocking in said first position of said control element movement of said control element in a direction towards said second position of said control element to thereby support the forces applied by said locking mechanism of said sole-down-holding means.

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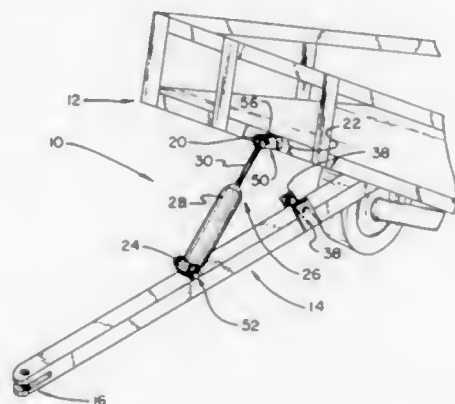
## TILT TRAILER STABILIZER APPARATUS

Kenneth L. Harbin, Rte. 1, Box 24-A, Scobey, Miss. 38953  
Filed Mar. 11, 1994, Ser. No. 209,216

Int. Cl.<sup>6</sup> B60D 1/14

U.S. Cl. 280—656

4 Claims



1. A new and improved tilt trailer stabilizer apparatus for a tilt trailer assembly which includes a tiltable bed assembly which is capable of being placed in a horizontal orientation or in a tilted orientation and which includes a frame assembly that supports the tiltable bed assembly, said tilt trailer stabilizer apparatus comprising:

- a first bracket assembly connected to a first edge of the tiltable bed assembly,
- a second bracket assembly connected to the frame assembly,
- a brake assembly connected between said first bracket assembly and said second bracket assembly for slowing relative motion between the tiltable bed assembly and the frame assembly when the tiltable bed assembly is moved from a horizontal orientation to a tilted orientation and for slowing relative motion between the tiltable bed assembly and the frame assembly when the tiltable bed assembly is moved from a tilted orientation to a horizontal orientation, wherein said brake assembly includes a fluid-based, motion damping assembly, and
- a lock assembly for locking the tiltable bed assembly to the frame assembly when the tiltable bed assembly is in a horizontal orientation, wherein said lock assembly includes a first lock member connected to the tiltable bed assembly and is located on said first bracket assembly, a second lock member connected to the frame assembly, such that said first lock member is placed in registration with said second lock member when the tiltable bed assembly is in a horizontal orientation, and a lock pin for securing said first lock member to said second lock mem-

ber when said first lock member and said second lock member are placed in registration, wherein said first bracket assembly includes a first hinge assembly for connecting to a first end of said brake assembly, and said second bracket assembly includes a second hinge assembly for connecting to a second end of said brake assembly.

5,411,285

## REAR SUSPENSION FOR VEHICLE

Unkoo Lee, Kyungki-do, Rep. of Korea, assignor to Hyundai Motor Company, Seoul, Rep. of Korea

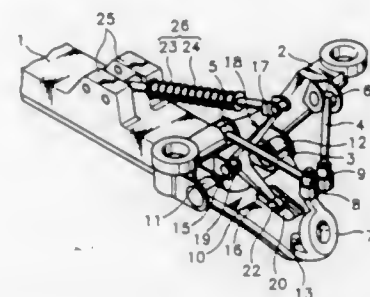
Filed Nov. 24, 1993, Ser. No. 156,717

Claims priority, application Rep. of Korea, Nov. 24, 1992, 92-22194

Int. Cl.<sup>6</sup> B60G 3/00

U.S. Cl. 280—701

5 Claims



1. A rear suspension for a vehicle, the vehicle having a front side, a rear side, a left side, a right side, and a longitudinal axis, the rear suspension comprising:

- a sub-frame having wing portions formed on both ends of the sub-frame;
- a wheel carrier for supporting a wheel;
- an upper arm for connecting an upper part of the wheel carrier to the wing portion of the sub-frame;
- a lower arm for connecting a lower part of the wheel carrier to a lower part of the sub-frame;
- a rotating member including a horizontal arm, a vertical arm, and a bent portion, the bent portion being connected with a bracket formed on a central part of the wing portion by a hinge, and a front end of the horizontal arm being connected with a central portion of the lower arm, wherein the lower arm comprises an operating hole penetrating a central portion of the lower arm; a sliding groove formed in the operating hole, and a roller slidably disposed on the sliding groove, the front end of the horizontal arm being connected with a central portion of the lower arm by the roller; and
- shock-absorbing means having a vehicle body-side end connected with a central portion of the sub-frame and a wheel-side end connected with an upper end of the vertical arm, the shock-absorbing means being disposed transversely with respect to the vehicle body.

5,411,286

## TORSION SPRING AXLE BEAM HAVING EMBOSSED CHANNEL PORTION

Jerry W. Plttman, P.O. Box 610149, Dallas, Tex. 75261  
Division of Ser. No. 790,688, Nov. 8, 1991, Pat. No. 5,215,331.

This application Mar. 16, 1993, Ser. No. 33,243

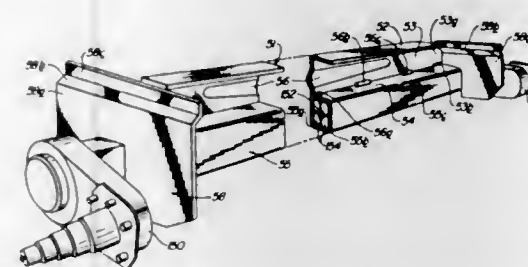
Int. Cl.<sup>6</sup> B60G 11/23

U.S. Cl. 280—717

11 Claims

1. A torsion spring bar axle for vehicle trailer wheels including a swing lever mounted on a torsion bar; a hollow axle tube, said torsion bar being supported in said hollow axle tube; resilient means securing said torsion bar to said axle tube to permit limited pivotal movement of said swing lever, said axle tube comprising: a composite member having a rolled edge

portion forming said hollow axle tube and a folded edge portion forming a channel member, said channel member having



an embossment formed thereon to arch said hollow axle tube; and spaced welds between said folded edge portion and said channel member.

5,411,287

## MULTIPLE STAGE TORSION AXLE

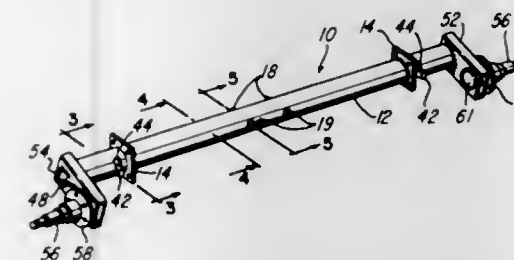
Curtiss W. Henschen, 6144 State Rte. 29E, Sidney, Ohio 45365  
Continuation-in-part of Ser. No. 918,351, Jul. 7, 1992, Pat. No. 5,277,450. This application Jan. 10, 1994, Ser. No. 179,301

The portion of the term of this patent subsequent to Jan. 11, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B60G 3/00

U.S. Cl. 280—717

21 Claims



1. A multiple stage torsion axle adapted for use on a trailer or other vehicle, comprising an elongated axle tube having a longitudinal axis, means for mounting said axle tube on the vehicle for rotation of said axle tube on said axis, means for rotating said axle tube, a first stage torsion shaft and a second stage torsion shaft disposed within said axle tube, first stage torsion means including a resilient rubber-like material and connected for torsionally resisting rotation of said first stage torsion shaft relative to said axle tube, second stage torsion means including a resilient rubber-like material and connected for torsionally resisting rotation of said second stage torsion shaft relative to said first stage torsion shaft, and a crank arm connected to said second stage torsion shaft and having eccentric means for attaching a wheel.

5,411,288

## AIR BAG MODULE DOOR ASSEMBLY

Charles E. Steffens, Jr., Washington, Mich., assignor to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Nov. 3, 1993, Ser. No. 146,950

Int. Cl.<sup>6</sup> B60R 21/16

U.S. Cl. 280—728.3

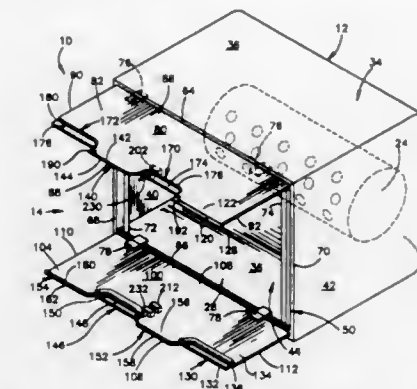
18 Claims

1. A door assembly for an opening of a housing for an inflatable vehicle occupant restraint module, which housing has a frame defining the opening attached thereto, said door assembly comprising:

- a first door for covering a first portion of the opening;
- first pivot means for connecting said first door with said frame for outward pivotal movement relative to said frame between a closed position and an open position;
- a second door for covering a second portion of the opening;
- second pivot means for connecting said second door with

said frame for outward pivotal movement relative to said frame between a closed position and an open position; and means for blocking inward pivotal movement of said first and second doors from the closed position comprising a first finger portion on said first door and a second finger portion on said second door, said first finger portion on said first door overlapping said second door and said second finger portion on said second door overlapping said first door when said first and second doors are in the closed position;

said first door having a third finger portion overlapping said



second door, said first and third finger portions on said first door being spaced apart from each other; said second door having a fourth finger portion overlapping said first door, said second and fourth finger portions on said second door being spaced apart from each other; said third finger portion on said first door being disposed intermediate said second and fourth finger portions on said second door when said doors are in the closed position, and said second finger portion on said second door being disposed intermediate said first and third finger portions of said first door when said doors are in the closed position.

5,411,289

## AIR BAG SYSTEM FOR A MOTOR VEHICLE

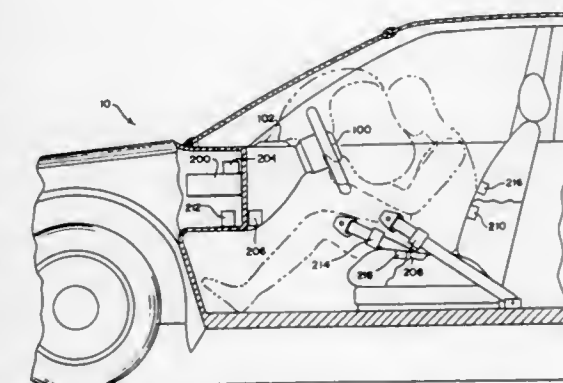
Bradley W. Smith, Odgen; James D. Erickson, North Ogden, both of Utah; Patrick D. Jamison, Ludwigsburg, Germany; Peter A. Tyroller, Kirchheim/T., Germany; Dietrich Bergfried, Boeblingen; Bernhard Mattes, Sachsenheim, Germany, and Werner Nitschke, Ditzingen, Germany, assignors to Morton International, Inc., Chicago, Ill.

Filed Oct. 29, 1993, Ser. No. 149,296

Int. Cl.<sup>6</sup> B60R 21/32

U.S. Cl. 280—735

14 Claims



13. An air bag system for a motor vehicle comprising: at least one air bag module; multiple level gas generation means coupled to each said at

least one air bag module for generating a multiple level gas applied to said air bag module; said multiple level gas generation means including at least one low level gas generator and at least one high level gas generator; electronic control means for controlling said multiple level gas generation means; AC firing means coupled between said electronic control means and said multiple level gas generation means operatively controlled by said electronic control means for selectively activating said at least one low level gas generator and at least one high level gas generator; temperature sensor means coupled to said electronic control means for sensing ambient temperature; seat belt sensor means coupled to said electronic control means for sensing seat belt usage; acceleration sensor means coupled to said electronic control means for sensing deceleration; said electronic control means being responsive to a combination of sensed inputs from said temperature sensor means, said seat belt sensor means and said acceleration sensor means for selectively activating only said low level gas generator; simultaneously activating both said low level gas generator and said high level gas generator or activating said low level gas generator, identifying a time delay and activating said high level gas generator after said identified time delay.

5,411,290

## HYBRID INFLATOR

Sek K. Chan, St Bruno, Canada; Steven J. Graham, Ayrshire, Scotland; Ian J. Kirby, Ayr, Scotland, and Graeme A. Leiper, Ayrshire, Scotland, assignors to Imperial Chemical Industries PLC, London, England and ICI Canada, Inc., North York, Canada

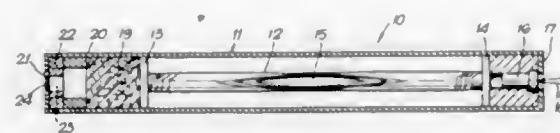
Filed Mar. 4, 1993, Ser. No. 26,128

Claims priority, application United Kingdom, Mar. 4, 1992, 9204712

Int. Cl.<sup>6</sup> B60R 21/26

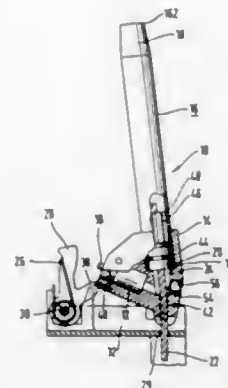
U.S. Cl. 280—737

10 Claims



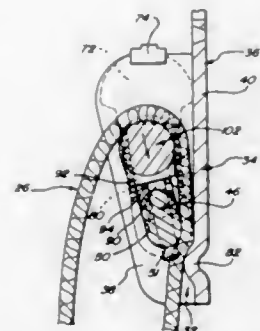
1. A hybrid inflator for a gas bag for a vehicle occupant restraint safety system comprising:  
a gas storage vessel having a sealed exit;  
a supply of gas stored under pressure in said vessel;  
a pyrotechnic material effective to heat and expand said supply of gas;  
initiation means to ignite said pyrotechnic material to heat the supply of gas; and  
means to open said sealed exit to permit heated gas to flow through said exit to a gas bag when the bag is required to be inflated;  
wherein said heat generating material comprises pyrotechnic material in sheet form, which on combustion gives products substantially in solid form.

5,411,291  
DRIVE UNIT FOR A BELT PRETENSIONER IN  
VEHICLE SAFETY BELT SYSTEMS  
Artur Föhl, Schorndorf, Germany, assignor to TRW Repa GmbH, Alfdorf, Germany  
Filed Mar. 3, 1994, Ser. No. 206,599  
Claims priority, application Germany, Mar. 6, 1993, 43 07 062.0  
Int. Cl.<sup>6</sup> B60R 22/46, 21/26; F42G 19/10  
U.S. Cl. 280—806 6 Claims



1. A drive unit for a safety belt pretensioner, comprising a base adapted to be secured on a vehicle bodywork, a vehicle-sensitive trigger mechanism comprising an inertial mass, a housing pivotally mounted in said base, a cylinder having a first end fixed in said housing block and a second, tapered end, a piston slidably received in the first end of said cylinder, a cable connected to said piston and a pyrotechnic gas generator accommodated in said housing block, said piston carrying a dampening member of a material which is plastically deformed upon impact of said dampening member on cylinder wall portions defining said tapered cylinder end, and said housing block with said cylinder, gas generator, piston and dampening member being part of said inertial mass.

5,411,292  
SEAT BELT SYSTEM WITH LOCKING GUIDE LOOP  
ASSEMBLY  
Cecil A. Collins, Shelby Township, Macomb County; Dagoberto Krambeck, Troy, and Steven J. Richter, St. Clair Shores, all of Mich., assignors to AlliedSignal, Inc., Morristown, N.J.  
Filed Apr. 15, 1994, Ser. No. 228,556  
Int. Cl.<sup>6</sup> B60R 22/36  
U.S. Cl. 280—806 11 Claims



10. A guide loop assembly anchored to a support pillar of a motor vehicle for guiding the seat belt webbing from a belt retractor, said guide loop assembly comprising:  
a frame anchored to the support pillar;  
a locking assembly supported on said frame for movement between an unlocked position and a locked position, said locking assembly comprising a clamp bar and a roller and

first biasing means for maintaining said clamp bar and said roller in a spaced-apart relationship when said locking assembly is in said unlocked position; and  
second biasing means for normally biasing said locking assembly toward said unlocked position;  
wherein the belt webbing is routed between said locking assembly and said frame such that under excessive vehicle deceleration conditions the belt webbing forcibly urges said locking assembly toward said locked position for frictionally clamping the belt webbing against said frame.

5,411,293  
DOUBLE COVER RING BINDER  
Debra Monzyk, Manchester, Mo., assignor to American Trading and Production Corporation, Baltimore, Md.  
Filed Jun. 7, 1994, Ser. No. 255,064  
Int. Cl.<sup>6</sup> B42D 3/00  
U.S. Cl. 281—31 7 Claims



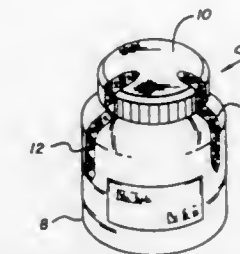
1. A double cover ring binder comprising:  
(a) a first cover including a front face and a rear face;  
(b) a second, inner cover overlying said first cover and including a front face and a rear face;  
(c) an elongate ring element;  
(d) attachment means attaching said elongate ring element and said first and second covers together to divide said covers into opposing side sections; and  
(e) means providing a pocket portion on at least one face of each side section of at least the second, inner cover.

5,411,294  
STRIP BAGGAGE TAG IN ENDLESS OR ROLL FORM  
FOR MACHINE PRINTING  
Kurt Diemert, Gleisweiler, Germany, assignor to Fix GmbH, Landau/Falz, Germany  
Filed Oct. 15, 1992, Ser. No. 961,472  
Claims priority, application Germany, Oct. 16, 1991, 41 34 252.6  
Int. Cl.<sup>6</sup> B42D 15/00  
U.S. Cl. 283—67 13 Claims



1. A strip baggage tag for machine printing, comprising in combination:  
an upper web which defines a tag part which is to be fastened to an item of baggage, and a control section, the control section comprising a tear-off part which can be detached from the tag part along a transversely extending separation line,  
both the tag part and the tear-off part being provided, on the back, on both sides of the separation line, with adhesive areas which are coated with pressure-sensitive adhesive, the adhesive areas being covered by a single-piece lower-web section which has been coated with a separating agent; the width of the lower-web section corresponding to that of the upper web; and the lower-web section having, at least in the region of the adhesive area on the tear-off part, at least one partial region which is free from active separating agent and provides a firm bond between the tear-off part and the lower-web section.

5,411,295  
TAMPER-EVIDENT LABEL  
Scott B. Bates, Ontario, and Jean E. Haghani, West Covina, both of Calif., assignors to Avery Dennison, Pasadena, Calif.  
Filed Oct. 19, 1992, Ser. No. 963,092  
Int. Cl.<sup>6</sup> B42D 15/00  
U.S. Cl. 283—81 25 Claims



1. A tamper-evident label for application to a container to indicate that tampering has occurred, comprising:  
a base label substrate having an upper surface and a lower surface;  
an adhesive applied directly on said lower surface for attachment to said container, the adhesive being a permanent pressure sensitive adhesive;  
warning graphics in substantially water insoluble ink printed directly on portions of said upper surface, other portions of said upper surface being free of said warning graphics, said warning graphics including indicia indicating that tampering has occurred;  
masking graphics of substantially water-soluble ink at least covering said warning graphics printed directly on said warning graphics  
a plurality of perforations through said base label substrate, such that removal of said label from said container will cause said label to fragment evidencing tampering before said permanent pressure sensitive adhesive detaches; and  
the paper content of said tamper evident label consisting solely of a paper layer forming said base label substrate.

5,411,296  
NON-CONTINUOUS HOLOGRAMS, METHODS OF  
MAKING THEM AND ARTICLES INCORPORATING  
THEM  
Donald W. Mallik, North Tarrytown, N.Y., assignor to American Banknote Holographics, Inc., Elmsford, N.Y.  
Continuation of Ser. No. 291,247, Dec. 23, 1988, Pat. No. 5,145,212, which is a continuation-in-part of Ser. No. 160,641, Feb. 26, 1988, abandoned, which is a continuation-in-part of Ser. No. 156,305, Feb. 12, 1988, abandoned. This application Sep. 2, 1992, Ser. No. 939,474  
Int. Cl.<sup>6</sup> B42D 15/00; G03H 1/02  
U.S. Cl. 283—86 12 Claims



1. A method of making a hologram or diffraction grating, comprising the steps of:  
forming in a surface of a substantially transparent substrate a continuous relief pattern over an area thereof that is capable of forming a recognizable image upon polychromatic viewing light being reflected from the surface relief pattern, and  
forming non-continuous, substantially opaque reflective layer areas over said surface relief area with a pattern that allows simultaneous viewing completely through the



substrate across said area and viewing of an image reconstructed from the portions thereof to which said reflective material is attached, said step forming the pattern of said discontinuous opaque reflective layer portions with a spacing in excess of 25 such portions per inch in at least one direction across said relief pattern.

5,411,297

## CONDUIT MOUNTING SYSTEM

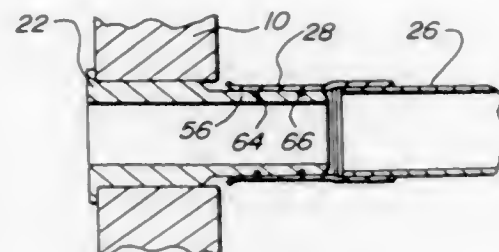
Lanny D. Brown, Lexington, Mich., assignor to Huron, Inc., Lexington, Mich.

Filed Mar. 9, 1994, Ser. No. 208,356

Int. Cl.<sup>6</sup> F16L 27/12

U.S. Cl. 285—62

14 Claims



1. A quick connector assembly comprising:
  - a male fitting having a projecting member and a securing portion to secure the male fitting to an engine or the like, said projecting member having a pair of spaced circumferential grooves;
  - a pair of O rings positioned in said grooves;
  - a female fitting, said female fitting including a conduit having two ends, an eyelet is affixed to one end of said conduit for coupling with the male fitting projecting member, and a bracket means coupled with the other end of the conduit to secure the female fitting on the engine said eyelet has a smooth interior surface for establishing a seal with said O rings and enabling axial movement of said female fitting on said male fitting projecting member while maintaining sealing with said O rings.

5,411,298

## HIGH PRESSURE SEAL ARRANGEMENT

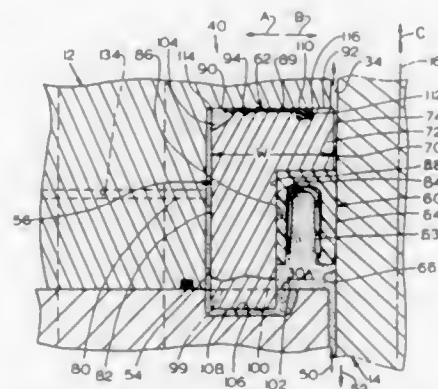
Jack Pollack, Camarillo, Calif., assignor to Imodeco, Inc., Calabasas Hills, Calif.

Filed May 18, 1993, Ser. No. 63,433

Int. Cl.<sup>6</sup> F16L 7/00

U.S. Cl. 285—94

23 Claims



1. A fluid swivel which can carry fluid flowing from a pressure source that supplies fluid at a pressure that may reach a high working pressure, wherein the fluid swivel includes inner and outer swivel parts and at least one bearing assembly that pivotally connects said swivel parts so one swivel part can

pivot about the other, wherein said swivel parts form a fluid-carrying annular chamber between them that is coupled to said pressure source and wherein said fluid swivel forms first and second gap passages between said swivel parts with said gap passages leading from opposite sides of the chamber, with a seal arrangement lying along said second gap passage to seal it and with a first of said swivel parts having a ring-shaped cavity along said first gap passage which holds a seal device and with the second of said swivel parts having a sealed surface lying substantially opposite said cavity, and including a conduit that is coupled to said pressure source and to said seal device to expose said seal device to a fluid pressure which is generally about the same as the pressure of fluid in said annular chamber, where said seal device seals against said sealed surface of the second of said swivel parts, and where said seal device includes a seal ring with portions that can slide within said cavity toward and away from said sealed surface, characterized by: said cavity has upstream and downstream cavity walls each extending toward and away from said sealed surface, and said seal ring has upstream and downstream ends each lying substantially against a corresponding one of said cavity walls to prevent cocking of said seal ring, with said seal ring being slidable toward said sealed surface relative to said first swivel part when said seal device is exposed to a fluid pressure which is about the same as said high working pressure.

5,411,299

## INTERCONNECTING APPARATUS AND METHOD FOR AIR HANDLING SYSTEMS

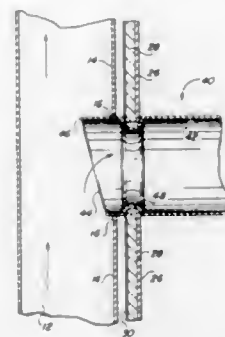
Robert K. Wagner, DeBarry, Fla., assignor to Environmental Technologies, Largo, Fla.

Filed Mar. 21, 1991, Ser. No. 672,923

Int. Cl.<sup>6</sup> F16L 41/00

U.S. Cl. 285—189

14 Claims



1. Apparatus for connecting a main air handling system with a subsystem, comprising:
  - a connecting member having an elongated passageway defined by a tubular wall extending from a first end to a second end, with the first end adapted to mate with the main air handling system;
  - an independent collar having a central opening, the central opening having a dimension corresponding to an outside dimension of the tubular wall at the first end;
  - means for securing the collar laterally about the tubular wall adjacent the first end, and with a portion of the tubular wall extending through the collar to the first end;
  - a gasket having an outer adhesive surface fixed to an outside surface of the collar which faces toward the first end of the tubular wall, with the portion of the tubular wall extending through and protecting the gasket from an air stream passing through the connecting member and wherein the tubular wall further comprises a lateral flange at the first end, the flange at the first end extending outwardly to a dimension which is substantially less than the lateral dimension of the collar.

5,411,300

## HOSE CONNECTING ASSEMBLY

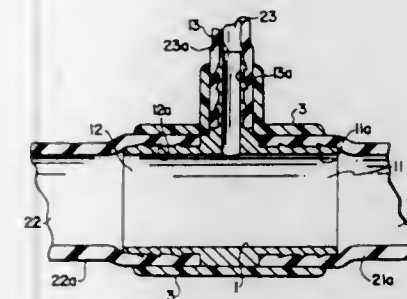
Kenichi Mitsui, Inazawa, Japan, assignor to Toyota Gosei Co., Ltd., Inazawa, Japan

Filed Mar. 16, 1993, Ser. No. 31,862

Int. Cl.<sup>6</sup> F16L 13/00

U.S. Cl. 285—292

19 Claims



1. A hose connecting assembly comprising: a connecting tube; a flexible hose having at least one open end into which an end portion of said connecting tube is inserted, whereby an end portion of said flexible hose covers said end portion of said connecting tube; a cover molded over and extending over said end portion of said flexible hose, such that said end portion of said flexible hose is snugly held between said molded cover and said end portion of said connecting tube; wherein a post-shrinkage factor of said molded cover is 0.2% to 0.9% and said end portion of said flexible hose has an inner diameter which is elastically increased by 10% to 30% by inserting said end portion of said connecting tube into said end portion of said hose.

5,411,301

## TUBING CONNECTION WITH EIGHT ROUNDED THREADS

Mark C. Moyer, Missouri City; James P. Powers, and Rick A. Ashley, both of Houston, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

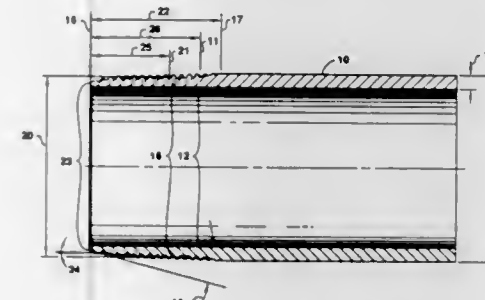
Continuation of Ser. No. 723,282, Jun. 28, 1991. This application

Nov. 24, 1993, Ser. No. 158,835

Int. Cl.<sup>6</sup> F16L 25/00

U.S. Cl. 285—333

26 Claims



1. A non-upset tubing section having an outer diameter of about 2 1/2 inches and a pin end with an externally tapered threaded surface; said externally tapered threaded surface having approximately eight API rounded threads per linear inch: said threads having a thread form in accordance with API Specification Std. 5B, Table 2.9 and FIG. 2.4 (13th ed. May 31, 1988), and a pitch diameter of about 2.314 inches; said pitch diameter measured at a plane located about 1.250 inches from a plane located at the end of the nose of said pin end.

5,411,302

## POWERED CLOSING DEVICE

Junichi Shimada, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Yokohama, Japan

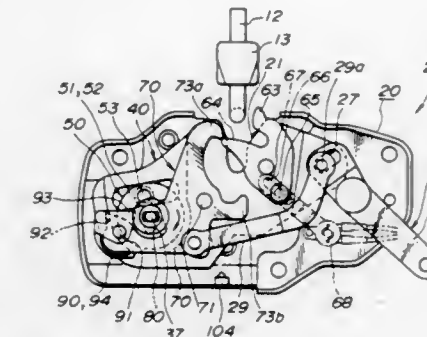
Filed Jun. 29, 1993, Ser. No. 83,181

Claims priority, application Japan, Jun. 29, 1992, 4-45044 U;

Int. Cl.<sup>6</sup> E05C 3/06

U.S. Cl. 292—201

13 Claims



1. A powered closing device for use in a structure wherein a first member is pivotally connected to a second member, comprising:
  - a striker secured to said first member to move therewith;
  - a drawing mechanism mounted on said second member for catching and pulling down said striker to a certain lower position, said drawing mechanism including a supporting base plate secured to said second member, a latch mounting plate pivotally connected to said supporting base plate, a latch plate pivotally connected to said latch mounting plate and pivoting between a latch position to latch said striker and an unlatch position to release said striker, and a locking plate pivotally connected to said latch mounting plate and pivoting between a locking position to lock said latch plate at said latch position and an unlocking position to release said latch plate;
  - a drive mechanism for driving said latch mounting plate to pivot between upper and lower positions by the force of electric power; and
  - an emergency mechanism which, during the time when said drawing mechanism is pulling down said striker with the aid of said driving mechanism, forces said locking plate to pivot from said locking position to said unlocking position thereby to release said striker from said drawing mechanism,
- wherein said emergency mechanism comprises:
  - a cam member powered by said drive mechanism, said cam member being rotatable about its axis in both one and the other directions;
  - a cam follower member pivotally connected to said locking plate, said cam follower member being actuated by said cam member in such a manner that when said cam member is rotated in one direction, said cam follower member forces said locking plate to keep said locking position and when said cam member is rotated in the other direction, said cam follower member forces said locking plate to pivot from said locking position to said unlocking position.

5,411,303

## GUIDE RING FOR A DOOR KNOB ASSEMBLY

Derrick To, Vancouver, Canada, assignor to Masco Corporation of Indiana, Indianapolis, Ind.

Filed May 10, 1993, Ser. No. 59,554

Int. Cl.<sup>6</sup> E05B 15/02

U.S. Cl. 292—357

6 Claims

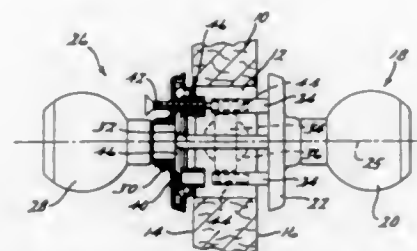
1. In a door latch assembly for a door which has an opening between an inside face and an outside face, the door having a bore extending from a side edge transversely into the opening;

an outside rose member for the outside face of the door with an outside knob member rotatably retained thereto, the outside rose member having two posts extending into the opening;

an inside rose member for the inside face of the door with an inside knob member rotatably mounted thereon, the inside rose member having holes therein for alignment with the two posts on the outside rose member;

fasteners for extending through the holes in the inside rose member to engage the posts on the outside rose member to clamp the rose members to the door;

the knob members having a common axis of rotation with a spindle piece at the axis rotatably connecting the two knob members, and



a latch bolt assembly in the bore having connection to the spindle piece so that rotation of at least one of the knob members operates the latch bolt assembly;

the improvement comprising:

a guide ring adapted to fit within the inside rose member, said guide ring having retaining means for connecting the guide ring to said inside rose member, the guide ring having an engagement shoulder to position the inside rose member substantially in the center of the opening of the door; and

protruding guide means on the guide ring to guide the fasteners extending through the two holes in the inside rose member toward engagement with the two posts on the outside rose member during installation of the door latch assembly to the door.

5,411,304

# GRAB BUCKET OF ELECTROHYDRAULIC PRESSURE TYPE WITH LIFTING MAGNET

Yoshitaka Muto, Fukushima, and Tadashi Mine, Yuki, both of Japan, assignors to Totetsu Koun Co., Ltd., Tokyo, Japan

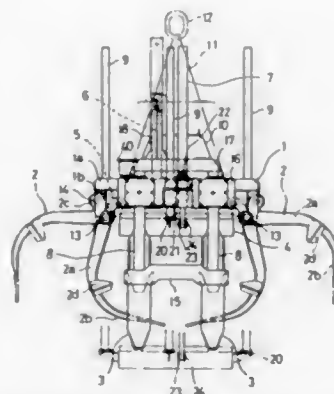
Filed Oct. 12, 1993, Ser. No. 134,832

Claims priority, application Japan, Oct. 15, 1992, 4-071951 U

Int. Cl.<sup>6</sup> B66C 1/06, 3/04

U.S. Cl. 294—2

5 Claims



1. An electrohydraulic grab bucket with a lifting magnet and a main body adapted to be suspended by a crane with a suspending chain, said grab bucket retrieving magnetically at-

tracted material disposed upon a surface, said bucket comprising:

at least one pair of grabbing claws rotatably supported on said main body and operable by hydraulic means for rotating said grabbing claws between an opened and closed position, said pair of grabbing claws defining opposite sides of a housing interspace adapted to receive said magnetically attracted material;

a magnetic means for magnetically attracting said material, said magnetic means being provided at an underside of said main body in a direction facing said surface and adapted to be moved from a raised position proximate said main body to a dredging position toward said surface; and

at least one pair of side claws adapted to move in a linear direction toward said surface in a descended condition and away from said surface in an ascended condition, and defining opposed sides of said housing interspace, wherein said opposed sides are positioned transverse to said opposite sides, and wherein a bottom end of said at least one pair of side claws in the descended condition being located below said at least one pair of grabbing claws in the closed position.

5,411,305

# DOUBLE HANDLE SNOW SHOVEL

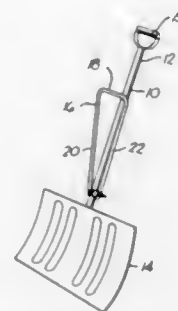
Paul L. Revoldt, 49535 South Dr., Plymouth, Mich. 48170

Filed Mar. 14, 1994, Ser. No. 209,263

Int. Cl.<sup>6</sup> A01B 1/22; B25G 3/38

U.S. Cl. 294—58

2 Claims



1. A long-handled implement for manually lifting a load, comprising:

an elongated first handle having a longitudinal axis, an upper end, a lower end, and a generally uniform cross section along a portion of its length;

lifting structure carried on the lower end of the first handle;

an elongated generally U-shaped member having a pair of short legs having upper ends, and a second handle formed between said upper ends, said legs having lower apertured ends disposed on opposite sides of the first handle in a selected position thereon along the portion thereof having said uniform cross section;

removable pivot means for connecting the lower ends of the short legs of the second handle to the first handle in said selected position for pivotal motion either toward or away from a position in which the second handle is adjacent the first handle, the pivot means being disposed between the lifting structure and the upper end of the first handle, the pivot means including a pair of generally C-shaped clamping elements each having a pair of ends each of said ends forming a flattened apertured tab, the C-shaped clamping elements having concave sides embracing the first handle on opposite sides of the first handle in an opposed relationship such that the apertured tabs on one of said C-shaped clamping elements are disposed in face-to-face relationship with the tabs on the other of the C-shaped clamping elements, and fastener means for engaging the face-to-face tabs such that the C-shaped clamping elements clampingly engage the first handle, the mid-section of each of the C-shaped clamping elements having a pivot opening, an

elongated pivot member disposed in each of said pivot openings along a common pivot axis passing through and generally transverse to the longitudinal axis of the first handle, each of the pivot members having an inner end and an outer end, means connecting the inner end of each of the pivot members to the respective C-shaped clamping element, and

the apertured lower ends of said legs receiving the pivot members such that the second handle is pivotal about said pivot members, and fastener means mounted on the outer ends of the pivot members to retain the lower ends of the short legs on the pivot members.

5,411,306

# METHOD AND DEVICE FOR INVERTING A TURBINE CYLINDER COVER

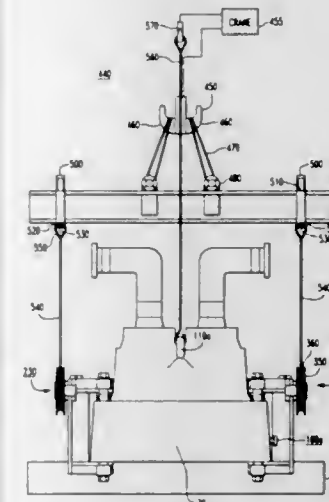
Ira J. Campbell, East Bradford, Pa.; Cletus L. Schartner, St. Petersburg, Fla.; David A. Daugherty, Upper Chichester; Walter B. Vogel, Brookhaven, both of Pa., and Lawrence J. Coyle, Wilmington, Del., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1993, Ser. No. 110,033

Int. Cl.<sup>6</sup> B66C 1/16, 13/08

U.S. Cl. 294—81.4

11 Claims



1. A device for inverting a turbine cylinder cover with a predetermined weight from a horizontal position to an inverted position, the device comprising:

a) a lifting means for lifting the turbine cylinder cover;

b) at least two pivotable brackets each attached to both the turbine cylinder cover and said lifting means for suspending a majority of the weight of the turbine cylinder cover and for pivoting the turbine cover; and

c) a cable attached at its first end to a first position on the cylinder cover and at its second end to said lifting means during a first portion of the inversion of the cylinder cover and the first end attached to a second position on the cylinder cover during completion of the inversion of the cylinder cover for assisting in inversion of the turbine cylinder cover.

5,411,307

# GRIP FOR USE ON BAGS HAVING HANDHOLD

Mark J. Roberts, 409 W. Mercer Way #404, Seattle, Wash. 98119

Filed May 9, 1994, Ser. No. 239,917

Int. Cl.<sup>6</sup> A45C 13/22; B65D 33/06

U.S. Cl. 294—171

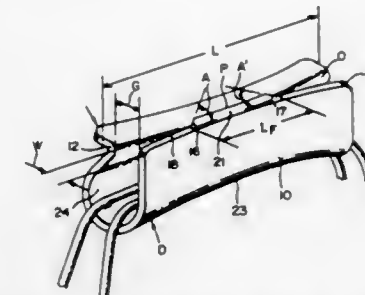
1 Claim

1. A grip for use on bags having handholds, said handholds comprising bails, said grip being a channel having a U-shaped cross sectional shape and having first and second sides, a bottom, a

length, first and second ends and an intermediate length point,

said first and second sides having first and second edges respectively,

said grip further comprising a flange extending from said first edge of said first side toward said second side and centered on said length and extending over a portion of said length, said portion being in a range of 0.1 to 0.9 of said grip length,



said second side extending past said flange and curving away from said first side to form a ledge at an angle to said first second side, said angle being in a range of 10° to 50°, said ledge having a width in a range of 1/8 to 1/2 of an inch, at least one of said edges being curved such that said flange and said ledge are in contact at said intermediate length point and such that said flange and said ledge extend away from each other toward said first and second ends, said bottom being arched between said first and second ends at a radius in a range of 3 to 6 times said length.

5,411,308

# GIRDER ASSEMBLY FOR A LIGHT ALLOY MOTOR VEHICLE BODY

Gundolf Kreis, Oberstimm; Heinrich Timm, and Alois Feldschmid, both of Ingolstadt, all of Germany, assignors to Audi A.G., Ingolstadt, Germany.

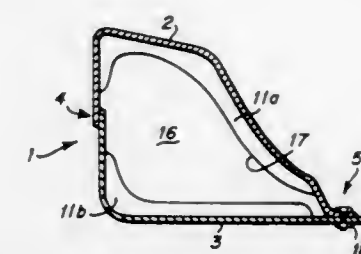
Filed Dec. 10, 1993, Ser. No. 165,973

Claims priority, application Germany, Jun. 14, 1991, 41 19 598.1

Int. Cl.<sup>6</sup> B62D 27/02

U.S. Cl. 296—30

12 Claims



1. In a light-metal vehicle body, a girder assembly for joining a first longitudinal girder member to a second longitudinal girder member disposed rearwardly of the first girder member, said girder assembly comprising in operative combination:

a) a pair of shell-shaped light-metal castings each having a concave open face region, said shell-shaped castings forming a hollow section enclosure when brought together along their mutual open face regions, wherein said hollow section enclosure includes:

i) a first opening sized for receivingly engaging a rearward end of the first longitudinal girder; and

ii) a second opening sized for receivingly engaging a forward end of the second longitudinal girder;



- b) means for securing the respective open face regions of said pair of shell-shaped castings to one another; and
- c) a plurality of spaced and coordinately aligned stiffening rib members integrally formed along said concave open face regions of each of said shell-shaped castings, wherein said rib members are oriented transverse to a longitudinal center axis of said girder assembly;
- d) said stiffening rib members of each of said shell-shaped castings being arranged in coordinate pairs such that they form a series of substantially continuous webs along an interior cross section of said girder assembly, said webs providing resistance to plastic deformation of the girder assembly and preventing collapse of said hollow section enclosure in the event of an impact to the vehicle.

5,411,309

## AUTOMOBILE SUN VISOR

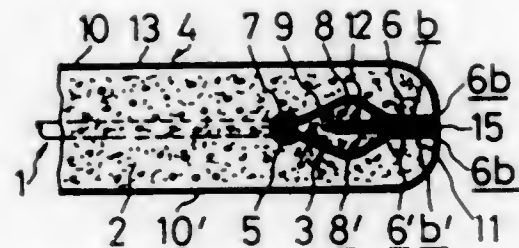
José Aymerich, and Jesús Prat, both of Rubí, Spain, assignors to Fico I.T.M. S.A., Barcelona, Spain  
PCT No. PCT/ES93/00005, § 371 Date Oct. 4, 1993, § 102(e) Date Oct. 4, 1993, PCT Pub. No. WO93/14950, PCT Pub. Date Aug. 5, 1993

PCT Filed Jan. 28, 1993, Ser. No. 129,142

Claims priority, application Spain, Feb. 4, 1992, 9200217  
Int. Cl.<sup>6</sup> B60J 3/00

U.S. Cl. 296—97.1

5 Claims



1. An automobile sun visor, comprising a visor body; an internal structural member arranged in said visor body and having shorter sides; a retaining clip attached to one of said shorter sides of said internal structural member, said retaining clip having arms provided with front edges which are flush with an outer surface of a side of said sun visor body; and a longitudinal bag-shaped sheath which covers an outer surface of said visor body and has a free end which forms a joint line on said front edges of said arms of said retaining clip, said retaining clip being formed as a one-piece substantially U-shaped member having a substantially circular housing which receives one side of said structural member, two projections extending from both sides of said housing and forming a passage therebetween, said two arms extending from said projections toward said side of said visor body.

5,411,310

## OUTER SUPPORT BRACKET FOR VEHICLE SUN VISOR

Lothar Viertel, Altforweiler, Germany, and Patrick Welter, La Chambre, France, assignors to Gebr. Happich GmbH, Wuppertal, Germany  
Filed Aug. 4, 1994, Ser. No. 285,944

Claims priority, application Germany, Aug. 9, 1993, 43 26 661.4

Int. Cl.<sup>6</sup> B60J 3/02

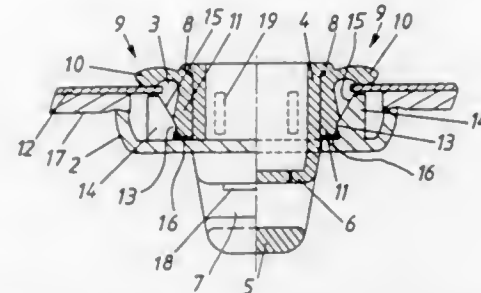
U.S. Cl. 296—97.9

18 Claims

1. An outer support bracket for a vehicle sun visor, the bracket comprising a first portion thereof in the form of a fastening pin to be installed in an opening in the body of the vehicle and a second portion which is supported on the pin for supporting the outer support shaft of the sun visor, the second portion comprising two arms which are shaped and oriented

for defining a slot into which the outer support shaft of the visor may be laterally slid and removed;

an angle lever which is swingably attached to the fastening pin, the angle lever including a first leg which in the unlocked position of the fastening pin extends generally along the direction of the pin and a second leg generally transverse to the first leg and extending outward from the fastening pin, the first and second legs being so placed that when the fastening pin is installed in the opening in the vehicle body, the first leg also passes into the opening,



until the second leg contacts the vehicle body, and the swingable connection of the angle lever to the fastening pin being for enabling the contact of the second leg of the angle lever with the vehicle body and the continued movement of the fastening pin into the body to cause the angle lever to swing with respect to the fastening pin so that upon the swinging of the angle lever, the first leg engages behind the portion of the vehicle body having the opening through which the fastening pin is installed, for retaining the fastening pin in the opening of the vehicle.

5,411,311

## ATTACHMENT APPARATUS FOR AUTOMOTIVE STRUCTURE BRACE

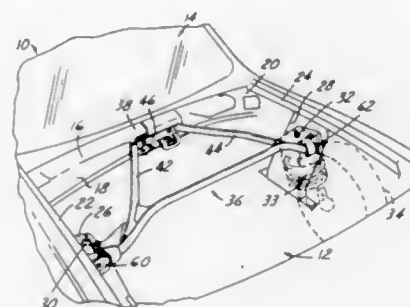
Roger A. Shimmell, Plymouth; Donald L. Gibboney, Dearborn Heights, and Roy S. Salisbury, Jr., all of Rochester, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jul. 5, 1994, Ser. No. 270,871

Int. Cl.<sup>6</sup> B62D 25/08

U.S. Cl. 296—194

16 Claims



11. A structural brace for an automotive vehicle of the type having a front end and a front pair of steerable road wheels located adjacent said front end, a cowl disposed between said front end and a passenger compartment, right and left rails extending longitudinally forward from respective right and left ends of the cowl, and right and left strut towers depending downwardly from right and left rails, said structural brace comprising:

a transverse member to extend between the right and left strut towers and right and left members attached to said transverse member adjacent to said right and left strut towers, said right and left members extending rearward to attach to said cowl;

multi-planar asymmetric right and left attachments disposed

at right and left ends of said transverse member for attaching said structural brace to said right and left strut towers; whereby said right and left attachments transfer axial, torsional and bending loads into said structural brace from said strut towers, thereby increasing the efficiency of said structural brace to minimize deflections of the strut tower during vehicle cornering maneuvers.

5,411,312

## TAILGATE WIND DEFLECTOR APPARATUS

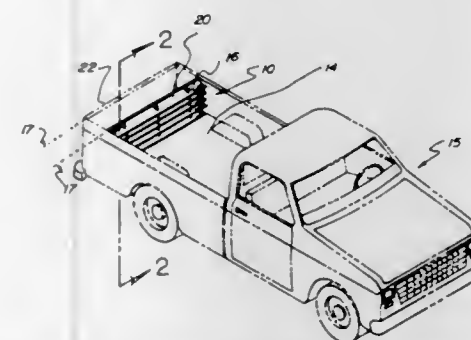
Thomas G. Stallings, 26 Hahn Rd., Westminster, Md. 21157

Filed Dec. 27, 1993, Ser. No. 172,920

Int. Cl.<sup>6</sup> B62D 35/00

U.S. Cl. 296—180.1

4 Claims



1. A tailgate wind deflector apparatus for use with a truck that has a truck bed and a tailgate, comprising:

a base assembly adapted to be connected to a bed of a truck, a plurality of vertical support assemblies supported by said base assembly, said vertical support assemblies including a wind-deflecting leading edge, wherein said vertical support assemblies are triangular in shape, wherein an apex of said triangular shape corresponds to a respective wind-deflecting leading edge of a respective vertical support assembly, and wherein said base assembly includes triangular receptacles for receiving respective triangular-shaped vertical support assemblies, and

a plurality of horizontally oriented, wind-deflecting assemblies supported by said vertical support assemblies, said horizontally oriented, wind-deflecting assemblies adapted for deflecting wind away from a tailgate of the truck, wherein said horizontally oriented, wind-deflecting assemblies are curved and are supported on said vertical support assemblies such that a leading edge of a respective horizontally oriented, wind-deflecting assembly is oriented lower than a trailing edge of said respective horizontally oriented, wind-deflecting assembly, wherein said horizontally oriented, wind-deflecting assemblies include support-receiving apertures that are triangular in shape for receiving and encompassing said respective triangular-shaped vertical support assemblies, and wherein said base assembly, said vertical support assemblies, and said horizontally oriented, wind-deflecting assemblies are located on and supported by the truck bed a predetermined distance forward of the tailgate such that wind is deflected up and over the tailgate when wind contacts said horizontally oriented, wind-deflecting assemblies.

5,411,313

## PORTABLE SEATING DEVICE

Noel Counihan, and Paul Counihan, both of Montana, Pipers-town, Tallaght, Dublin 24, Ireland

Filed Oct. 29, 1993, Ser. No. 142,989

Claims priority, application United Kingdom, Oct. 29, 1992, 9223765; Ireland, Feb. 10, 1993, 930092

Int. Cl.<sup>6</sup> A45B 5/00

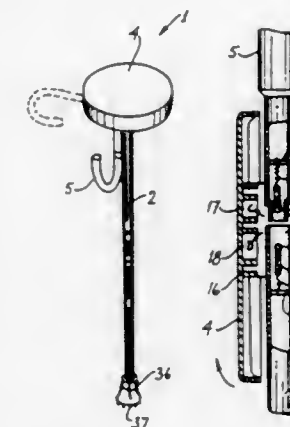
U.S. Cl. 297—118

16 Claims

1. A portable seating device which is convertible from a

walking cane configuration to a seating configuration comprising:

- a shaft having a lower ground engaging portion and an upper end portion;
- a handle having a lower end portion;
- a seat having an upper seating surface and an underside;
- a mounting element on the underside of the seat, the mounting element having handle receiving means for receiving the lower end portion of the handle in the seating configuration and shaft receiving means for receiving the upper end portion of the shaft, in the seating configuration;



wherein the shaft upper end portion and the handle lower end portion are pivotally mounted on the mounting element; and

wherein the handle and shaft are movable relative to the mounting element, from the walking cane configuration, in which the lower end portion of the handle is engaged with the upper end portion of the shaft, to the seating configuration, in which the lower end portion of the handle is engaged with the handle receiving means of the mounting element and the upper end portion of the shaft is engaged with the shaft receiving means of the mounting element on the underside of the seat.

5,411,314

## FOLDABLE TABLE

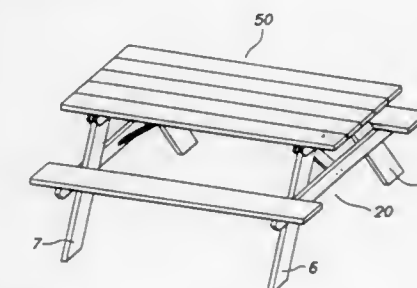
Millard Wallace, 18 Little John Dr., Medford, N.J. 08055

Filed Nov. 2, 1993, Ser. No. 148,212

Int. Cl.<sup>6</sup> A47B 3/14

U.S. Cl. 297—158.4

3 Claims



1. A foldable table structure, comprising:

- a table top assembly, said table top assembly including:
- a generally rectangular table top;
- a plurality of table braces attached to said table top; and
- at least two structural braces hinged to at least two of said table braces so that said structural braces can be manipulated between a folded and unfolded position;
- a bench assembly, said bench assembly including:
- two bench brace members which are transversely positioned with respect to said table top;

two seat members which are longitudinally positioned with respect to said table top and which are mounted at corresponding ends of said bench brace members; and four bench stops, one each coupled to each intersection of said bench braces with said seat members, so that one end of each of said bench stops extends inward towards said table top beyond the inner edge of each seat member; and four leg assemblies, each leg assembly pivotally attached to said table top assembly and comprising:

- a generally parallelogram-shaped leg body, having a rounded heel end for facilitating the pivoting of said leg assembly with respect to said table top;
- a spring slot cut in the heel end of said leg body,
- said spring rod inserted through said spring slot;
- a notch for engagement with one of said bench stops when the table structure is unfolded; and
- a spring, attached at one end to said spring rod and at the other end to said table top, said table structure operating such that when all four leg assemblies are folded up underneath said table top assembly and the springs are under tension, the table top assembly rests on top of said bench braces with said structural braces in said folded position, so that an anchoring means can be inserted through said table braces, bench braces, and leg assemblies to anchor said table structure in said folded position; and when said anchoring means is removed and the entire table structure is lifted by lifting up on the bench assembly, the leg assemblies, forced by the tension of the springs and by gravity, automatically swing out to an unfolded position, and the bench assembly is then lowered into a position such that the bench stops engage the notches, placing the table structure in the unfolded position.

5,411,315

## INFANT BOUNCE CHAIR

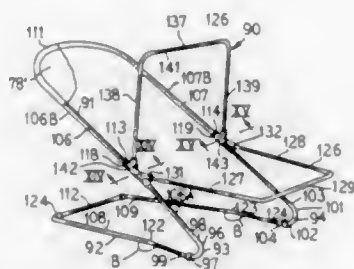
Mark H. Greenwood, Arlington Heights, Ill., assignor to Children On The Go, Inc., Wheeling, Ill.

Filed Apr. 6, 1993, Ser. No. 43,518

Int. Cl.<sup>6</sup> A47C 7/02

U.S. Cl. 297—440.24

11 Claims



1. An infant bouncer chair comprising:

- an upper, generally U-configured, peripherally extending, rearwardly upwardly inclined frame member having a pair of opposed edge legs and a rear edge leg interconnecting section, each of said opposed edge legs having a forward end that is transversely spaced from the other thereof;
- a lower, generally U-configured, peripherally extending, floor engagable frame member having a pair of opposed bottom legs and a rear bottom leg interconnecting section, each of said opposed bottom legs having a forward end that is transversely spaced from the other thereof;
- a pair of U-configured, transversely spaced frame segments, each one having a pair of segment legs, each of said segment legs having a rearward end that is vertically spaced from the other, said rearward ends of each one of said frame segments being interconnected with a different vertically adjacent one of said forward ends of each of said upper and said lower frame members, whereby said upper frame member said lower frame member and said pair of frame segments combine to define a peripheral frame for said chair wherein said forward end of each said

edge leg is in a terminally interconnected relationship with said rearward end of a different one of each of said segment legs thereby to define a pair of rearwardly upwardly inclined transversely opposed side legs in said peripheral frame;

- a pair of discontinuities defined in said peripheral frame, each one of said discontinuities being in transversely spaced relationship relative to the other thereof, and a pair of sleeve retaining means, each one of said sleeve retaining means being positioned circumferentially about adjacent portions of a different one of said discontinuities and cooperating therewith for disengagably supporting said peripheral frame at each of one of said discontinuities;

two pairs of V-configured sleeve connector means, each individual sleeve connector means of each said pair thereof being unitarily formed and having:

- two tubular intersecting sleeves,
- one said sleeve having open opposed ends and a longitudinal side slot extending between said opposed ends, and the second said sleeve having one open end and an opposite end that is abuttingly associated with said one sleeve adjacent one said open end thereof;

each said pair of sleeve connector means being engaged with a different one of said opposed side legs so that each individual said sleeve connector means of each said pair thereof being space from the other thereof along each said so engaged side leg whereby said one sleeve of each said sleeve connector means is extended about said so engaged side leg through said side slot and circumferentially so engages said so engaged side leg, and whereby, in each one of said so engaged sleeve connector pairs, one said sleeve connector means is upper most and the other thereof is lowermost, and said uppermost one of said sleeve connector means has said open end of said second sleeve thereof oriented upwards, while said lowermost one of said sleeve connector means has said open end of said second sleeve thereof oriented sideways and longitudinally;

- a generally U-shaped, peripherally extending forwardly projecting leg support frame member having a pair of opposed support legs and a forward support leg interconnecting section, each of said opposed support legs having a rearward end that is transversely spaced from the other, and each said rearward end is inserted into said open end of a different one of each of said lowermost second sleeves;

- a generally U-shaped, upwardly arching toy bar having a pair of opposed bar side legs and an upper bar side leg interconnecting section, each of said opposed bar side legs having a downward end that is transversely spaced from the other, and each said downward end is inserted into said open end of a different one of each of said uppermost second sleeves; and

- a body supporting removable chair covering means for said leg support frame member and for adjoining portions of said upper frame member located above said sleeve connector means;

whereby decentralized connections are achieved between said opposed side legs and each of said leg support frame member and said toy bar.

5,411,316

## SINGLE PIECE CHAIR SHELL

Ross Lovegrove, London, England; Alvin D. Schmidt, Reinholds, and Jeffrey D. Crawford, Allentown, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 13, 1993, Ser. No. 136,433

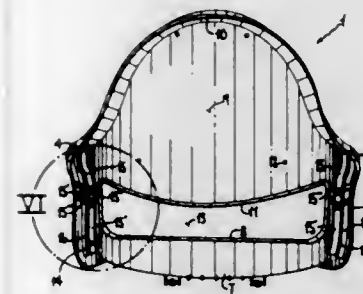
Int. Cl.<sup>6</sup> A47C 3/12

U.S. Cl. 297—452.15

13 Claims

- 1. A single piece molded resin chair shell comprising a seat member, a back member, and a pair of integral connecting torsion links, the back of said seat member and the bottom of said back member being separated by a collapsed elliptical

opening extending between said connecting torsion links, each connecting torsion link being comprised of a curved, substan-



tially U-shaped channel adapted to control the deflection of said back member relative to said seat member when pressure is applied against said back member.

5,411,317

## VEHICLE SEAT

Eberhard Faust, Stuttgart; Ulrich Maier, Rottenburg; Volker Speck, Sindelfingen, and Josef Klink, Nagold, all of Germany, assignors to Mercedes-Benz AG, Germany

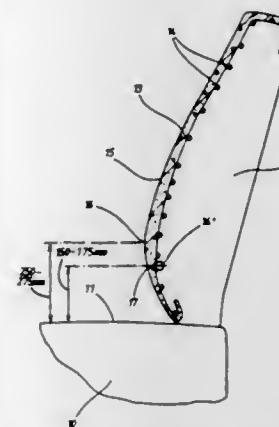
Filed Jan. 18, 1994, Ser. No. 182,547

Claims priority, application Germany, Jan. 16, 1993, 43 01 054.7

Int. Cl.<sup>6</sup> A47C 7/02

U.S. Cl. 297—452.3

2 Claims



- 1. A vehicle seat, comprising a sitting surface and a backrest having a backrest upholstery supported by springs with a forward upholstery arching arranged in a region of a seat user's lumbar vertebrae for relieving the seat user's intervertebral discs, wherein forward upholstery arching is configured so that its contour vertex is located approximately 250 to 275 mm above the sitting surface, the forward upholstery arching is sufficiently flexible in the region of the contour vertex that it easily matches the shape of the back of the seat user, and a relatively rigid pelvic support is formed in the forward upholstery arching approximately 150 to 175 mm above the sitting surface.

5,411,318

## EXTENDED VENTILATING SEAT COVERING ASSEMBLY

Ignace K. Law, P.O. Box 6803, Alhambra, Calif. 91802

Filed Aug. 24, 1993, Ser. No. 110,846

Int. Cl.<sup>6</sup> A47C 7/02

U.S. Cl. 297—452.45

16 Claims

- 1. An extended ventilated seat covering and bucket seat assembly comprising:

a bucket seat having a back with a central area for support-

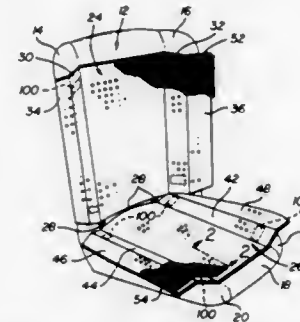
ing the back of a user, and forwardly extending side portions or wings;

a base sheet extending over said central area of said bucket seat and substantially beyond said area;

a plurality of spacing members extending out from said base sheet generally perpendicular with respect to said base sheet, with said spacing members and the outer ends thereof providing means for spacing the body of the user away from the bucket seat and said base sheet;

said spacing members being at least  $\frac{1}{4}$  inch long and being spaced apart from one-another by at least  $\frac{1}{4}$  inch;

said base sheet and said spacing members forming an assembly which is fully open at the sides thereof, to permit the



free circulation of air in from the edges of said assembly to cool the user of the bucket seat;

said ventilated seat covering having a central area extending over said central area of said bucket seat, side areas angled forward from said central area and extending along the forwardly extending portions of the bucket seat, and additional wing portions angled outwardly from said side portions beyond said side portion of said bucket seats, to ensure the free flow of air inward, unblocked by the body of the user; and

said base sheet being clearly visible from the front of the ventilated seat covering, to assure free flow of air through the surface of said seat covering away from said base sheet.

5,411,319

## VEHICLE SEAT

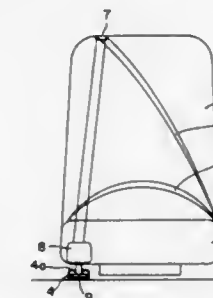
Teijo Kuiri, Luopioinen, Finland, assignor to Hameen Autosistamo Oy, Luopioinen, Finland

Filed Oct. 1, 1993, Ser. No. 130,184

Int. Cl.<sup>6</sup> B60R 22/22

U.S. Cl. 297—483

8 Claims



- 1. A vehicle seat having a horizontal seat part and a backrest, and which is mounted movably on a slide rail and having attachment points for a safety belt comprising a lap belt portion and a shoulder belt portion arranged in the seat such that the attachment points of the lap belt portion are positioned on both sides of the seat and a retractor roll of the safety belt is attached to a frame of said horizontal seat part, the shoulder belt portion of the safety belt extending from the retractor roll and along



said backrest upwards and continuing via a guide at an upper end of the backrest to the front of the backrest, said retractor roll comprising a support piece projecting below a part of said slide rail to cause the inter-engagement of the support piece and the slide rail so that the support piece can move in the longitudinal direction of the slide rail as the seat moves back and forth, but it is prevented from being lifted upwards.

5,411,320

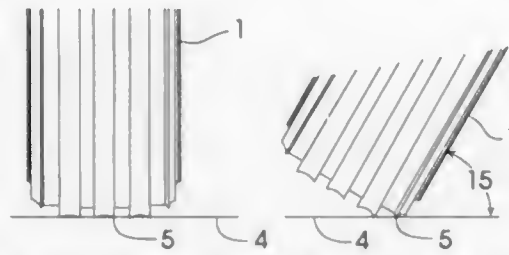
**WHEELS THAT PROVIDE LATERAL FRICTION ON ICE**  
Richard L. Alderman, 3580 Breckenridge Ct. Apt. 3, Madison, Wis. 53713, and Donald C. Hue, 4827 Helgeland Dr., Sun Prairie, Wis. 53590

Filed Jan. 21, 1994, Ser. No. 183,862

Int. Cl.<sup>6</sup> B60B 15/00

U.S. Cl. 301—5.3

6 Claims



1. A wheel for a roller skate for use on a surface of ice comprising:

- a hub portion and an outer circumferential ice-engaging surface;
- said circumferential ice-engaging surface comprising a plurality of circumferential contact means and at least one circumferential relief groove disposed between said contact surfaces;
- said circumferential contact means being configured to reduce the area of contact with the ice and to form a groove in the ice surface deep enough to develop lateral friction between the ice surface and the wheel;
- said wheel being made of a material that is substantially harder than ice;
- said circumferential contact means being arranged on said outer circumferential ice-engaging surface of the wheel such that at least two of said contact means are in contact with the ice surface when said wheel is perpendicular to the ice and also when said wheel is at a predetermined angle from the perpendicular to the ice.

5,411,321

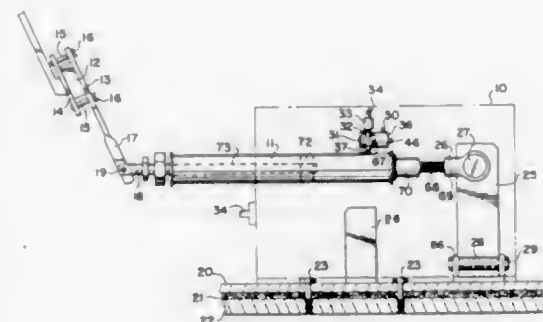
**TOWED VEHICLE BRAKE CONTROL**

Harry N. Harness, R.R. 2, Holly Isles, Donalsonville, Ga. 31745  
Filed May 6, 1993, Ser. No. 57,375

Int. Cl.<sup>6</sup> G05G 15/00; B60T 7/00

U.S. Cl. 303—7

18 Claims



1. A system for actuating brakes of a towed vehicle having a driver's seat and a brake pedal by electric signal from the towing vehicle having an electric battery, which comprises a

pneumatic cylinder with a movable piston and a piston rod connected directly to the brake pedal of the towed vehicle and adapted to depress the brake pedal when pneumatic pressure is applied to the piston; a portable air compressor removably installable in said towed vehicle and manually connectable via conduits to said cylinder; a solenoid valve means adapted to selectively permit the buildup of compressed air from said compressor to said cylinder or to discharge said compressed air to the surrounding atmosphere; an adjustable relief valve to automatically relieve the development of higher pressures by said compressor than selected; an electric switch means in said towing vehicle to activate said compressor and said solenoid valve means; and electric battery means in said towed vehicle to provide power for said compressor and said solenoid valve means.

5,411,322

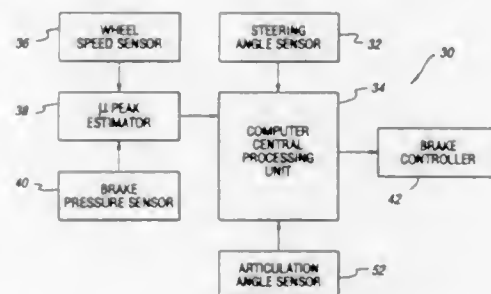
**METHOD AND APPARATUS FOR MAXIMIZING VEHICLE BRAKING EFFECTIVENESS AND CONTROL**  
Michael T. Breen, Garden City, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 31, 1993, Ser. No. 114,653

Int. Cl.<sup>6</sup> B60T 13/00

U.S. Cl. 303—7

5 Claims



1. A method for determining and applying optimum effective braking force to brakes of a vehicle negotiating a curve, when lateral and longitudinal forces are acting on the vehicle, the vehicle having a plurality of wheels, at least two of the wheels being steer wheels, the method comprising the steps of: sensing the angular disposition of at least one of the steer wheels; generating a turning radius signal representative of a turning radius associated with the angular disposition of the at least one of the steer wheels; sensing the angular velocity of a wheel; generating a wheel speed signal representative of the angular velocity of the wheel; sensing actual brake pressure; generating an actual brake pressure signal representative of the actual brake pressure; determining, as a function of wheel deceleration and the actual brake pressure signal, an estimated value  $\mu_{PEAK}$  for road-tire coefficient of friction; generating a  $\mu_{PEAK}$  signal representative of the value of road-tire coefficient of friction; determining, in response to the turning radius signal and the  $\mu_{PEAK}$  signal, an estimated value for a brake pressure that will apply the brakes to provide optimum braking effectiveness while maintaining vehicle control under prevailing conditions by determining, prior to vehicle deceleration, an initial value of critical vehicle velocity  $V_c$  above which control of the vehicle cannot be maintained in the curve, the critical vehicle velocity being determined according to the following, initial equation therefor:

$$V_c = \sqrt{R \cdot \mu \cdot g}$$

where:

$R$ =the radius of the curve,  
 $\mu$ =the total coefficient of road-tire friction, and  
 $g$ =acceleration due to gravity;  
adjusting the brake pressure to provide a vehicle velocity just below that of the initial value of critical vehicle velocity just determined;  
determining a value of the longitudinal coefficient of friction component  $\mu_b$  associated with brake force according to the following equation:

$$\mu_b = \sqrt{\mu_{PEAK}^2 - \left(\frac{V_c^2}{R \cdot g}\right)^2}$$

determining, after a time interval  $t$  from the beginning of vehicle deceleration, a subsequent value of critical vehicle velocity by multiplying the value of the previously determined longitudinal coefficient of friction component  $\mu_b$  by the value of gravity  $g$  and by a time interval  $t$  and subtracting the product from the previously determined value of critical vehicle velocity;  
adjusting the brake pressure to provide a vehicle velocity just below that of the subsequent value of critical vehicle velocity just determined;  
determining a subsequent value of the longitudinal coefficient of friction component associated with brake force according to the equation therefor;  
determining, at the end of another time interval  $t$ , a subsequent value of critical vehicle velocity by multiplying the previously determined value of the longitudinal coefficient of friction component  $\mu_b$  by the value of gravity  $g$  and by a time interval  $t$  and subtracting the product from the previously determined value of critical vehicle velocity;  
adjusting the brake pressure to provide a vehicle velocity just below that of the subsequent value of critical vehicle velocity just determined; and  
repeating the immediately preceding three steps until the brake pressure is released or until the vehicle has stopped, thereby providing optimum braking effectiveness while maintaining vehicle control under prevailing conditions by increasing brake pressure as decreasing vehicle velocity results in an increasing coefficient of friction.

5,411,323

**AUTOMATIC BRAKE CONTROL APPARATUS AND A BRAKE PRESSURE CONTROL VALVE**

Norio Takahashi, and Mitsuhiro Tsujita, both of Hyogo, Japan, assignors to Sumitomo Precision Products Co., Ltd., Amagasaki, Japan

Continuation of Ser. No. 32,787, Mar. 17, 1993, abandoned. This application Aug. 4, 1994, Ser. No. 285,433

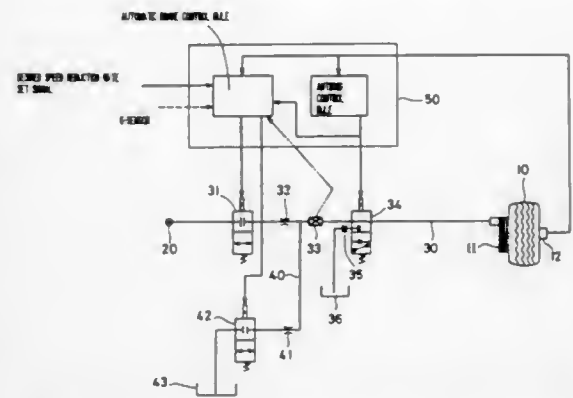
Int. Cl.<sup>6</sup> B60T 13/18, 17/20

U.S. Cl. 303—20

5 Claims

1. An automatic brake control apparatus, comprising:  
a hydraulic brake line connecting a source of hydraulic pressure with a brake;  
a pressure intensifying solenoid valve in said brake line and operative to selectively open said brake line;  
a relief line branched from said brake line and connected to a low pressure reservoir;  
a pressure reducing solenoid valve in said relief line and operative to selectively drain hydraulic fluid from said brake line to the reservoir;  
a pressure sensor positioned to sense a hydraulic pressure in said brake line at a position downstream of a point where said relief line branches from said brake line;  
a controller receiving a signal from said pressure sensor and

including means for determining desired brake pressure for producing a desired speed reduction rate, and means for outputting control signals to said pressure intensifying



solenoid valve and said pressure reducing solenoid valve such that a detected brake pressure corresponds to said desired brake pressure.

5,411,324

**CIRCUIT CONFIGURATION FOR A CONTROLLER**

Michael Zydek, Frankfurt/Hoechst, and Wolfgang Fey, Woerrstadt, both of Germany, assignors to Alfred Teves GmbH, Germany

PCT No. PCT/EP92/00600, § 371 Date Sep. 30, 1993, § 102(e) Date Sep. 30, 1993, PCT Pub. No. WO92/17358, PCT Pub. Date Oct. 5, 1992

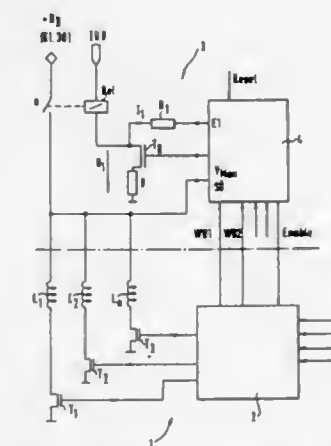
PCT Filed Mar. 19, 1993, Ser. No. 122,564

Claims priority, application Germany, Mar. 30, 1991, 41 10 497.8; May 25, 1991, 41 17 099.7

Int. Cl.<sup>6</sup> B60T 8/60, 13/66; B60R 16/02; B60K 28/16

U.S. Cl. 303—92

20 Claims



20. A circuit for an electronic controller which excites actuatable elements, said circuit comprising:

- a power supply;
- a power supply relay connected to said power supply and having a relay contact which, during actuation of the controller, is closed and connects a supply voltage to the actuatable elements of the controller; and
- a monitoring circuit for:
  - (a) detecting a defective condition, malfunction, defective power supply,
  - (b) maintaining the actuatable elements excited by the controller in their initial positions and restoring the actuatable elements excited by the controller to their initial positions,
  - (c) first checking, during actuation of the controller before

closing of said relay contact: (1) the connection of said relay to said power supply, and (2) the opening and separating position of said relay contact,  
 (d) subsequently exciting said power supply relay,  
 (e) checking the supply voltage supplied through the closed relay contact,  
 (f) generating a release signal for at least one of the controller and the excitation of the actuator elements after checking the supply voltage.

5,411,325

# TWO WHEELED VEHICLE BRAKING SYSTEM USING A TARGET SLIPPAGE RATIO FOR CONTROL

Keishin Tanaka; Toichiro Hikichi, and Chiaki Kumagai, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

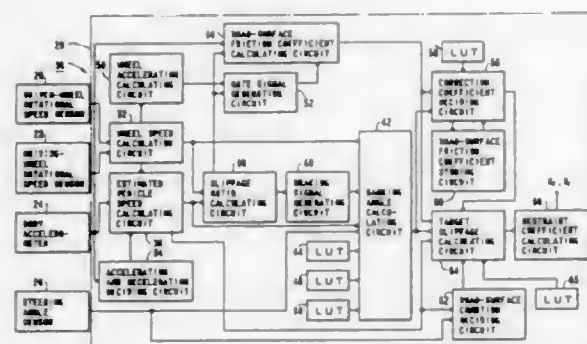
Filed Jun. 24, 1993, Ser. No. 80,786

Claims priority, application Japan, Jun. 24, 1992, 4-166369; Jun. 26, 1992, 4-169270; Jun. 29, 1992, 4-171114; Jun. 30, 1992, 4-173405

Int. Cl.<sup>6</sup> B60T 8/32

U.S. Cl. 303—100

11 Claims



1. A system for obtaining a target slippage ratio for stable braking of a vehicle having two wheels, comprising:  
 a pair of vehicle speed sensors disposed respectively on the wheels of said vehicle for detecting respective peripheral velocities of said wheels;  
 slippage ratio calculation means for calculating a slippage ratio between said wheels and a road surface based on signals output from said vehicle speed sensors;  
 friction coefficient calculating means for calculating a coefficient of friction between at least one of said wheels and a road surface based on a detected acceleration of said vehicle and said slippage ratio;  
 target slippage ratio setting means for setting a target slippage ratio for said at least one wheel based on said coefficient of friction;  
 first correction coefficient setting means for detecting a rate of change in said coefficient of friction and setting a first correction coefficient based on said rate of change;  
 target slippage ratio correcting means for multiplying the target slippage ratio by first correction coefficient thereby to provide a corrected target slippage ratio; and  
 means for applying a braking force to said at least one wheel until said corrected target slippage ratio is reached, and for controlling said braking force so as to maintain said corrected target slippage ratio.

# 5,411,326 BRAKE SYSTEM FOR CONTROLLING WHEEL BRAKE PRESSURE DURING BRAKE SLIP CONTROL AND TRACTION SLIP CONTROL

Paul Linhoff, Keikheim-Eppenhain, Germany, assignor to ITT Automotive Europe GmbH, Germany  
 PCT No. PCT/EP92/02166, § 371 Date Apr. 26, 1994, § 102(e)  
 Date Apr. 26, 1994, PCT Pub. No. WO93/09010, PCT Pub. Date May 13, 1993

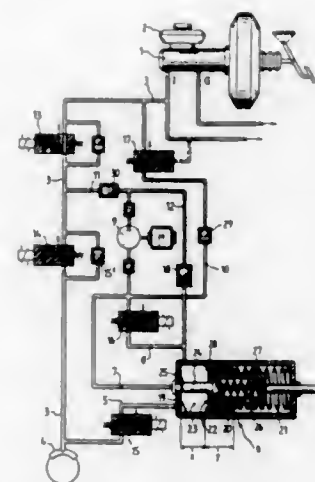
PCT Filed Sep. 19, 1992, Ser. No. 232,130

Claims priority, application Germany, Nov. 2, 1991, 41 36 109.1

Int. Cl.<sup>6</sup> B60T 8/34, 8/48, 8/42; B60K 28/16

U.S. Cl. 303—116.2

8 Claims



1. A slip-controlled hydraulic brake system comprising a master cylinder and a pressure fluid reservoir connected thereto, further comprising a brake conduit connecting the master cylinder to a wheel cylinder of a driven wheel, a low-pressure accumulator connected, through a return conduit, to the wheel cylinder, a self-priming pump which, with the intake side thereof, is connected to the low-pressure accumulator and, through an intake conduit and the master cylinder, is connected to the pressure fluid reservoir and which, with the pressure side thereof, is in communication with the brake conduit, further comprising an inlet and outlet valve arrangement controlling the pressure within the wheel cylinders, and comprising another valve arrangement which, in a pedal-actuated braking operation, separates the intake side of the pump from the master cylinder and, during traction slip control, discontinues the connection between the master cylinder and the wheel cylinder, characterized in that the communication between the intake side of the pump and the low-pressure accumulator comprises one ABS-intake channel and one ASR-intake channel each, with the ABS-intake channel being closed as long as the pressure fluid volume stored within the low-pressure accumulator is less than a predetermined standby volume, and with the ASR-intake channel being opened and closed by an ASR-loading valve independently of the stored pressure fluid volume.

5,411,327

# LATERAL FILE ANTI-TILT MECHANISM WITH PIVOTAL ACTIVATOR RAIL

Allen Norton, Salamanca, N.Y., assignor to Signore Incorporated, Ellicottville, N.Y.

Filed Jan. 6, 1994, Ser. No. 177,967

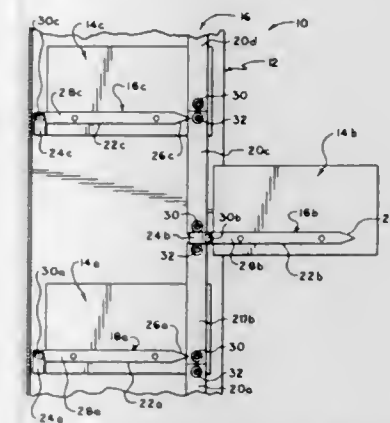
Int. Cl.<sup>6</sup> E05C 7/06; E05B 65/46; A47B 88/00

U.S. Cl. 312—221

2 Claims

1. In a cabinet of the type having at least two vertically spaced components mounted by the cabinet for horizontally extending movement outwardly and inwardly thereof and an anti-tip mechanism, wherein said anti-tip mechanism includes a

vertically extending segmented locking bar having vertically aligned, snubber elements tending to reside in a reference position with adjacent ones of said snubber elements being disposed in end-to-end abutment and a plurality of activator rail means carried one by each of said components, each of said activator rail means having a leading end portion arranged in the direction of said movement of said component outwardly of said cabinet, said leading end portion of each said activator rail means being arranged for insertion between ends of an adjacent pair of said snubber elements when in said reference position for purposes of moving same into a locking position for preventing more than one of said components from being moved outwardly of said cabinet at any one time, the improvement wherein each of said activator rail means comprises in combination:



a main portion non-movably fixed to said component on which same is mounted to extend horizontally thereof, said main portion defining said leading end portion and a trailing end portion in the direction of movement of said component outwardly of said cabinet; and  
 a continuation portion supported for vertical pivotal movement adjacent said trailing end portion between a downwardly extending rest position and an operative position arranged in horizontal alignment with said main portion, said main portion and said continuation portion cooperating while inserted between said ends of an adjacent pair of said snubber elements to maintain said snubber elements in said locking position throughout the range of movement of said one of said components outwardly and inwardly of said cabinet.

5,411,328

# REFRIGERATOR HAVING A COOL AIR LEAK-PREVENTION DEVICE

Hyun S. You, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyungki, Rep. of Korea

Filed Nov. 5, 1993, Ser. No. 147,574

Claims priority, application Rep. of Korea, Nov. 9, 1992, 92-21935 U

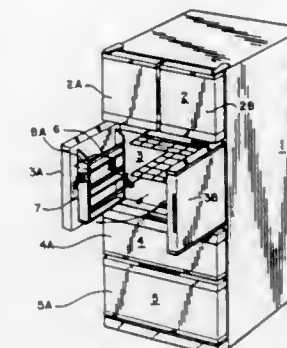
Int. Cl.<sup>6</sup> E06B 7/16

U.S. Cl. 312—405

14 Claims

1. A refrigerator comprising:  
 a body defining a compartment;  
 first and second doors mounted in side-by-side relationship on said body for closing said compartment, each door having two vertical edges and being hinged along one of said vertical edges, so that the other vertical edges of the doors are disposed adjacent one another when the doors are closed to form a gap therebetween;  
 leak preventing means including:  
 a leak prevention member mounted on a rear side of said first door for movement between retracted and operative positions, said leak prevention member, when in its operative position, extending across said gap formed by

the closed doors for blocking the escape of cold air through said gap, and  
 locking means for locking said leak prevention member in its retracted position when said first door is in an open position, said locking means comprising a first locking surface on said leak prevention member, and a second locking surface on said first door, said locking means being disposable in an unlocking state in which said leak



prevention member is movable to said operative position, and in a locked state in which said second locking surface is arranged in the path of travel of said first locking surface for blocking movement of said leak prevention member to said operative position; and  
 guiding means mounted on said body for guiding said leak prevention member to its operative position in response to closing of said first door when said locking means is in said unlocking state.

5,411,329

# PORTABLE LARGE VOLUME CEMENT MIXER FOR BATCH OPERATIONS

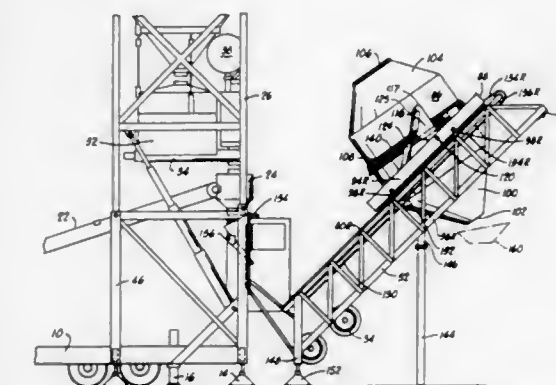
L. F. Perry, Rte. 3, Box 28, Olney, Tex. 76374

Filed Jun. 28, 1993, Ser. No. 82,725

Int. Cl.<sup>6</sup> B28C 5/20

U.S. Cl. 366—26

16 Claims



1. A portable cement mixer installation, comprising:  
 a frame supported at a first end by a wheel assembly and having a hauling connection at the second end, the frame being adapted to be upended on the first end during operation;  
 first and second rails disposed over opposite sides of the frame in parallel alignment, each rail being rigidly supported by said frame;  
 a support carriage including opposite side wheels movably supported on said first and second rails, and normally disposed proximate the frame first end;  
 a yoke ring pivotally supported on said support carriage;  
 a cement mixer drum positioned in said yoke ring on said



support carriage and controllable to rotate around a longitudinal axis of the drum;  
 a hydraulic motor assembly secured on said yoke ring and connected to rotate said cement mixer drum;  
 first hydraulic means connected by a cable to said support carriage and actuable to pull the support carriage up along the first and second rails to a dump position; and  
 second hydraulic means actuable to rotate the cement mixer drum downward to dump the mixed content.

5,411,330

## MOEBIUS SHAPED MIXING ACCESSORY

Yury A. (born Ryabokonil') Arutyunov, and Lyudmila A. (born Ryabokonil') Gorislavskaya, both of Zhukovsky, Russian Federation, assignors to Novecoo Technologies, L.P., Washington, D.C.

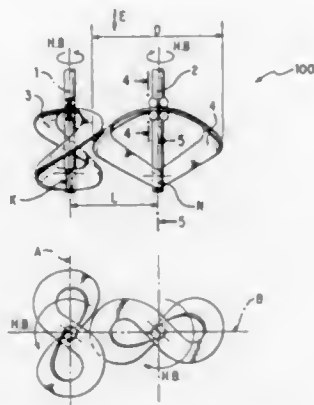
Filed Apr. 6, 1993, Ser. No. 43,763

Claims priority, application Russian Federation, Apr. 29, 1992, 5040219

Int. Cl.<sup>6</sup> B01F 5/12, 7/16

U.S. Cl. 366—270

1 Claim



1. An accessory for mixers of the type for driving two parallel shafts, each carrying a mixing blade, in a container of ingredients to be mixed comprising:

- a first shaft having a first-shaft longitudinal axis;
- a first Moebius-type mixing blade mounted to said first shaft at a first-shaft first location and at a first-shaft second location; said first blade at said first-shaft first location being positioned at an angle with respect to said first blade at said first-shaft second location such that the projection of said first blade onto a plane normal to said first-shaft axis forms a figure eight-type shape; and said first mixing blade being twisted between said first-shaft first and first-shaft second locations such that said first mixing blade at said first-shaft first location is oriented normal to said first-shaft axis and said mixing blade at said first-shaft second location is oriented parallel to said first-shaft axis;
- a second shaft having a second-shaft longitudinal axis;
- a second Moebius-type mixing blade mounted to said second shaft at a second-shaft first location and at a second-shaft second location; said second blade at said second-shaft first location being positioned at an angle with respect to said second blade at said second-shaft second location such that the projection of said second blade onto a plane normal to said second-shaft axis forms a figure eight-type shape; and said second mixing blade being twisted between said second-shaft first and second-shaft second locations such that said second mixing blade at said second-shaft first location is oriented normal to said second-shaft axis and said mixing blade at said second-shaft second location is oriented parallel to said second-shaft axis;
- said second mixing blade being a mirror image of said first mixing blade;

wherein said mixing blades are mounted with said first-shaft axis parallel to said second shaft axis such that said first

mixing blade intermeshes with said second mixing blade during rotation of the mixing blades and such that rotation of said mixing blades in the ingredients causes vortices in the ingredients that collide with one another and cause said ingredients to flow in the container in a direction generally parallel to said axes to circulate through the container and back through said mixing blades.

5,411,331

## DEVICE FOR PROMOTING GRAVITY FLOW OF NON-FREE-FLOWING SOLIDS

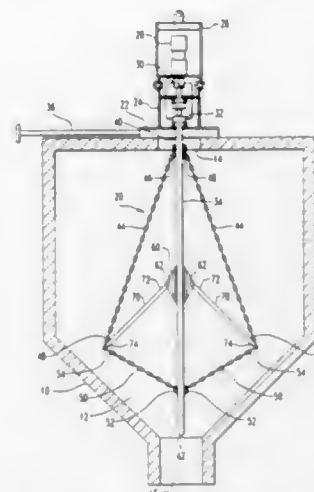
Rodney L. Griffin, Kaysville, Utah, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jun. 1, 1993, Ser. No. 69,488

Int. Cl.<sup>6</sup> B01F 7/00; B65G 1/00; G01F 11/20

U.S. Cl. 366—286

6 Claims



1. In a container with inlet and outlet connections, a device for promoting gravity flow of non-free flowing material from said outlet connection of said container, comprising:

- a vertical rotatable shaft having an axial length and a circumferential surface disposed within said container, at least a portion of said axial length extending from said inlet connection to a location adjacent said outlet connection;
- means for supporting said shaft at said inlet connection, said shaft having a free end adjacent said outlet connection;
- at least two flexible means having respective first ends attached to said shaft at spaced locations along said axial length and having respective second ends;
- a collar mounted on said shaft between said attached first ends of said flexible means for axial and rotational movement on said circumferential surface of said shaft;
- at least one arm having a first end pivotally attached to said collar and having a second end attached to said respective second ends of said flexible means; and
- means for rotating said shaft, flexible means and arm, wherein said axial and rotational movement of said collar on said circumferential surface of said shaft is produced by resistance encountered by rotation of said arm and said flexible means within said material in said container.

5,411,332

## BLENDER WITH VIRTUAL BAFFLE OF PARTICULATE MATERIAL

Hugh E. Avery, Jr., 3764 Lake St., Houston, Tex. 77098  
 Continuation-in-part of Ser. No. 683,320, Apr. 10, 1991, Pat. No. 5,123,749. This application Mar. 27, 1992, Ser. No. 858,704

Int. Cl.<sup>6</sup> B01F 5/24

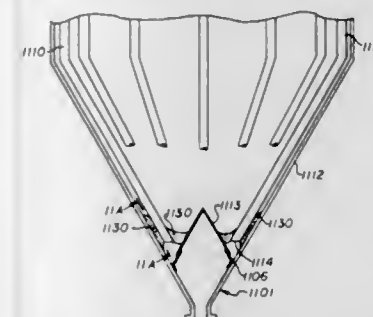
U.S. Cl. 366—336

1 Claim

1. A gravity blender apparatus having an upper portion and

a lower portion, both portions centered on a single vertical axis, the blender comprising:

- (a) the upper portion, defining a generally cylindrical bin means operable to receive and store a mass of particulate material;
- (b) the lower portion, defining a downwardly converging conical section sealed to the lower cylindrical edge of the upper portion;
- (c) a plurality of blending conduits extending downward from the upper portion of said bin means, said conduits mounted internally and vertically within said upper portion, said blending conduits continuing downwardly adjacent said converging conical section, said blending conduits converging downwardly toward said vertical axis of said blender said conduits each having a lower open end, terminating in a generally circular and horizontal pattern;
- (d) an upwardly converging conical surface, having a maximum diameter substantially that of the diameter of the circular pattern of said lower open ends of said conduits, the conical surface projecting upward toward said circle of said open conduit lower ends, said conduits being spaced above a bottom of said conical surface;



said convergence of said blending conduits, said conical walls of said lower section and said conical surface projecting upward, creating and supporting in operation a virtual baffle of particulate material, in combination, said baffle consisting of voussoir-like accumulations of particulate material in said converging channels between said conduits and between said conical walls and said conduits; said voussoir-like accumulations serving additionally as the base of a virtual baffle, said virtual baffle being formed solely of said particulate material supported upon a matrix of said converging blending conduits, said conical lower portion of said bin walls, and said conical surface projecting upward toward said circle of said open conduit ends; said blending conduits operable to convey particulate material from regions of said blender above a top of said virtual baffle to discharge from said blender; and said baffle of particulate material remaining in position until said blending tubes have begun to release said final portions of said particulate material through said blending tubes to blend with said particulate material of said virtual baffle as both pass through said lower portion of said bin.

5,411,333

## RECYCLABLE DRAWER SLIDE

Keith A. Hoffman, Hudsonville, Mich., assignor to Knap & Vogt Manufacturing Company, Grand Rapids, Mich.

Continuation-in-part of Ser. No. 934,423, Aug. 24, 1992, Pat. No. 5,316,389, and a continuation-in-part of Ser. No. 932,718, Aug. 20, 1992, abandoned. This application Aug. 20, 1993, Ser. No. 109,689

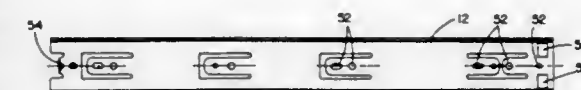
Int. Cl.<sup>6</sup> F16C 29/04

U.S. Cl. 384—18

21 Claims

1. A drawer slide assembly comprising:  
 telescopically interconnected metal channels, respective ones of which are adapted to be connected to a drawer and a cabinet;

polymeric stop elements on each of said channels, said channels and said stop elements being resiliently connectable



and releasable with one another whereby said stop elements can be removed from said channels and recycled.

5,411,334

## ROLLING GUIDE UNIT

Seiji Takel, and Takehiko Hara, both of Kanagawa, Japan, assignors to Nippon Thompson Co., Ltd., Tokyo, Japan

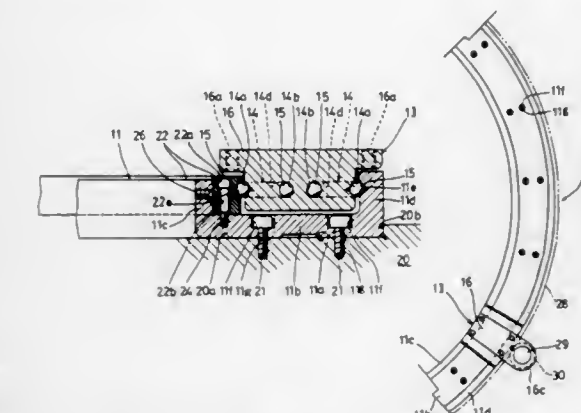
Filed Apr. 20, 1994, Ser. No. 230,686

Claims priority, application Japan, Apr. 23, 1993, 5-120531

Int. Cl.<sup>6</sup> F16C 29/06; F16H 19/04

U.S. Cl. 384—45

8 Claims



1. A rolling guide unit comprising:

a track rail, equipped with a pair of side walls extending roughly perpendicular to a bottom in which a mounting surface is formed, said side walls extending from both sides of said bottom respectively, and in which a track is formed in one of either inside surface along the lengthwise direction, and having a constant curvature in the lengthwise direction; an additional rail arranged along the inside surface of the other outside wall in which a track is formed in the inside surface along the lengthwise direction; a slider that is inserted so as to be sandwiched between one of said side walls and said additional rail, and which is able to move relative to said track rail and said additional rail, in which a rolling element circulating path is formed that includes load bearing tracks corresponding to each of said tracks; and, a plurality of rolling elements arranged and contained within said rolling element circulating path which bear the load by circulating while rolling over said tracks.

5,411,335

## BEARING WITH DUAL RING SEATS

Richard C. Driver, Kettering, England, assignor to The Timken Company, Canton, Ohio

Filed Jul. 7, 1993, Ser. No. 88,444

Claims priority, application United Kingdom, Jul. 9, 1992, 9214639

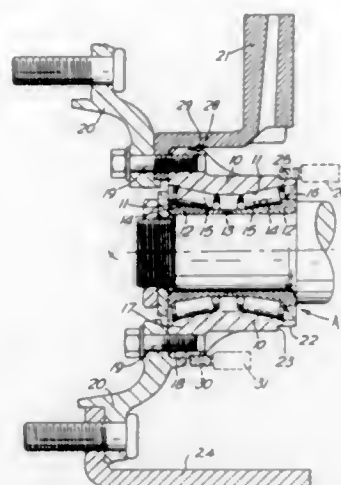
Int. Cl.<sup>6</sup> F16C 41/00

U.S. Cl. 384—448

22 Claims

1. A wheel bearing for a motor vehicle comprising: radially inner and outer race rings and rolling elements in rolling contact with raceways in said race rings, the outer race ring having a flange which is directed radially outwardly, the outer

race ring also having at two axially spaced locations on its radially outer surface machined surfaces for providing axial



and radial locations for an excitor ring, thereby to provide two mounting positions for excitor rings, the machined surfaces being located at one side of the flange.

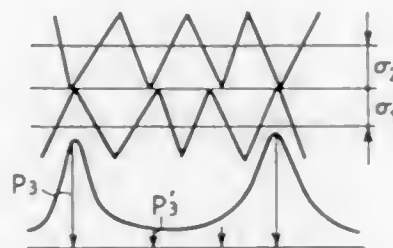
5,411,336

## ROLLING BEARING

Hiromichi Takemura, and Yasuo Murakami, both of Kanagawa, Japan, assignors to NSK Ltd., Tokyo, Japan  
Filed Jul. 30, 1993, Ser. No. 99,549  
Claims priority, application Japan, Jul. 30, 1992, 4-203920  
Int. Cl.<sup>6</sup> F16C 33/58

U.S. Cl. 384—492

4 Claims



1. A rolling bearing in which rolling elements rolls on a mating member thereof through oil films formed between said mating member and rolling elements, under the condition that an oil film parameter  $\Lambda$  is not more than 1.5, wherein a ratio  $\sigma_1/\sigma_2$  or  $\sigma_2/\sigma_1$  is not more than 3 where the surface roughnesses  $\sigma_1$  and  $\sigma_2$  of the rolling contact surfaces of said mating member and each rolling element are represented by central line average roughness.

5,411,337

## AXIALLY GUIDED LOCKING RING ASSEMBLY

Edward P. Bianco, Flatrock; Thomas A. Focht, Gibraltar; Howard Jackson, Taylor, and Daniel L. DeCamina, Romulus, all of Mich., assignors to Anlock Products and Machine Co., South Rockwood, Mich.

Filed Apr. 26, 1994, Ser. No. 233,342

Int. Cl.<sup>6</sup> F16C 19/06

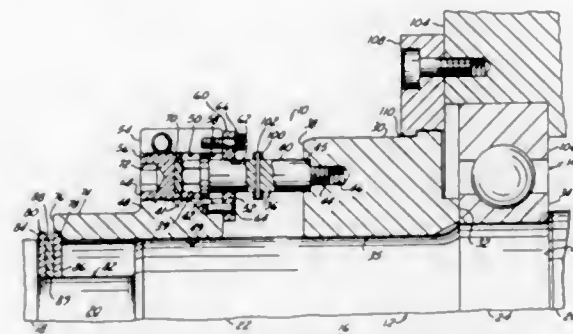
U.S. Cl. 384—519

11 Claims

1. A locking ring assembly for retaining a bearing to a shaft rotatably supported on a first axis of rotation comprising:  
a bearing retainer of annular shape slidably disposed over the shaft having a loading face on a first side disposed toward the bearing and an oppositely facing second side; a pressure ring of annular shape slidably disposed over the

shaft having a first side disposed toward the bearing retainer and an oppositely facing second side and defining a plurality of adjusting apertures parallel to the axis of rotation, the apertures having a threaded portion between the second side of the pressure ring and a point between the first side and the second side and a substantially smooth guide portion between the threaded portion and the first side of the pressure ring;

a plurality of guide pins fixedly projecting from a second side of the bearing retainer opposite the first side and parallel to the shaft axis with a head at a first end slidably disposed and captured within the guide portion of the adjusting apertures;



a reaction means fixed to the shaft on the second side of the pressure ring thereby limiting axial translation of the pressure ring along the shaft away from the bearing and bearing retainer;

a plurality of pressure screws, threadingly disposed in the threaded portion of the adjusting apertures thereby entirely enclosing the heads of the guide pins within the adjusting apertures and protecting the head and smooth guide portion from contamination by dirt wherein turning of the screws to engage the guide pin produces axial displacement of the pressure ring relative to the bearing retainer and a compressive force therebetween when the pressure ring engages the reaction means.

5,411,338

## MOTOR BEARING DEVICE

Noriatsu Goto, Yonago, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

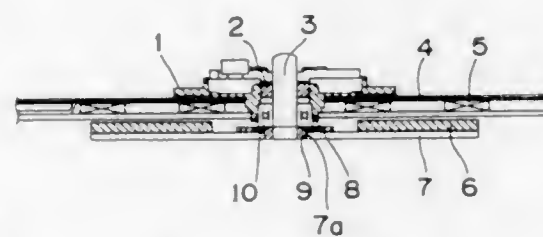
Filed Jan. 28, 1994, Ser. No. 187,535

Claims priority, application Japan, Jan. 29, 1993, 5-002144 U

Int. Cl.<sup>6</sup> F16C 43/04

U.S. Cl. 384—537

8 Claims



1. A motor bearing device, comprising:  
a rotary shaft;

a bearing housing having a hole therein, said hole being defined by an inner surface of said bearing housing, and said bearing housing further having a bearing insertion side;

a ball bearing arranged in said hole of said bearing housing, and said ball bearing including an outer ring fixed in said hole of said bearing housing with an adhesive; and  
an adhesive puddle formed at said inner surface of said

bearing housing and located on said bearing insertion side of said bearing housing, a part of said adhesive being trapped in said adhesive puddle.

5,411,339

## PORTABLE PRINTER AND CARTRIDGE THEREFOR

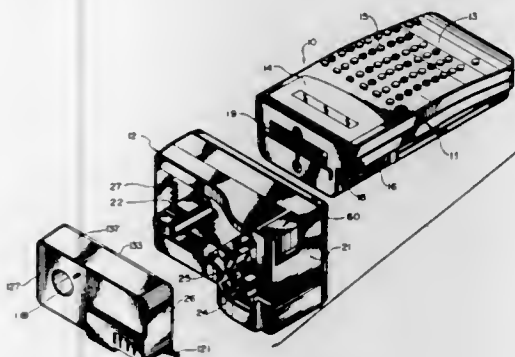
Casey K. Bahrabadi, Phoenix, Ariz., and Arthur J. Paulson, Minneapolis, Minn., assignors to Kroy, Inc., Scottsdale, Ariz.

Filed Dec. 9, 1993, Ser. No. 164,358

Int. Cl.<sup>6</sup> B41J 11/20, 35/28, 11/04

U.S. Cl. 400—56

14 Claims



1. A thermal printing device comprising:

a device housing;  
a cartridge receiving cavity for receiving a tape supply cartridge;  
a platen roller support post fixed relative to said device housing;  
a platen roller assembly including a platen roller disposed outside of said tape supply cartridge and rotatably mounted on said platen roller support post; and  
a print head movable toward and away from said platen roller between a print position and a non-print position, respectively.

5,411,340

## "MILEPOST" SINGLE-CHANNEL ENCODER, SCALE, AND METHOD, FOR MIDSCAN TURN AROUND IN A SCANNING-HEAD PRINTER OR READER

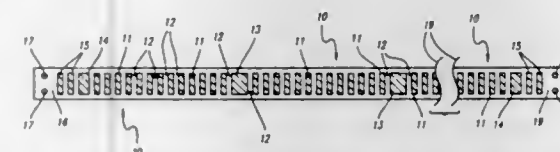
Steven B. Elgee, Portland, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 17, 1993, Ser. No. 122,833

Int. Cl.<sup>6</sup> B41J 21/14, 19/30

U.S. Cl. 400—279

20 Claims



1. A single-channel encoder scale for use in positioning a carriage of an automatic image related device that has a single-channel sensor, in conjunction with use of a visual-image-bearing sheet that has a transverse usable image dimension; said encoder scale comprising:

a scale substrate corresponding to a distance longer than such transverse usable image dimension of such a visual-image-bearing sheet;  
means, associated with the substrate, for mounting of the scale to such an image-related device;  
means for automatic reading by such a single-channel sensor of an automatic image-related device to determine position of such a carriage, comprising:

a first multiplicity of graduations defined in a single row along the substrate, and  
a second multiplicity of graduations, defined in the same row along the substrate and interspersed among the first multiplicity of graduations, in said same row over at least a distance approximately corresponding to such transverse usable image dimension of such visual-image-bearing sheet;

means for enabling such single-channel sensor of such image-related device to automatically distinguish between the graduations of the first multiplicity and those of the second multiplicity; said distinguishing-enabling means comprising, for each of said second multiplicity of graduations, a feature that is distinctive in relation to the graduations of said first multiplicity.

5,411,341

## KEYBOARD FOR CHOICE OF SYMBOLS HAVING HAND SUPPORTS

Johan M. Ullman, Johannebergsgat. 32B, Göteborg, Sweden S-412 55

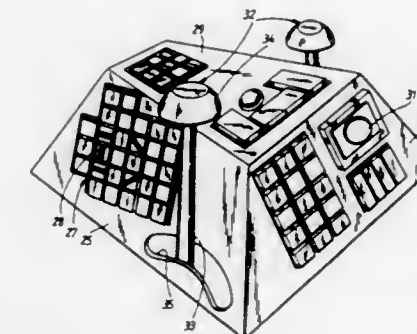
Continuation of Ser. No. 838,261, May 19, 1992, abandoned.

This application Mar. 3, 1994, Ser. No. 206,035

Claims priority, application Sweden, Nov. 23, 1989, 8903939 Int. Cl.<sup>6</sup> B41J 5/10

U.S. Cl. 400—489

18 Claims



1. A keyboard comprising:

a body comprising at least two side surfaces symmetrically disposed on opposite sides of a center plane perpendicular to a horizontal plane when said keyboard is placed in its intended position in front of an operator, said at least two side surfaces being disposed along side surface planes;  
a plurality of keys disposed on said body; and  
at least one hand displacement surface means connecting said hand displacement surface to said body, said hand displacement surface allowing for movement of a hand of an operator relative to said body in a substantially straight line along a hand displacement plane, said hand displacement surface having means for supporting a hand of an operator in a plurality of supported positions above said body and said at least two side surfaces said hand displacement plane being substantially coextensive with said side surface planes for manipulation of said plurality of keys by an operator as a hand is moved along said hand displacement planes.

5,411,342

## TERMINAL DEVICE

Kenzo Horie, and Toshiaki Yamauchi, both of Yokohama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 9, 1993, Ser. No. 44,610

Claims priority, application Japan, Apr. 20, 1992, 4-099175

Int. Cl.<sup>6</sup> B41J 11/58

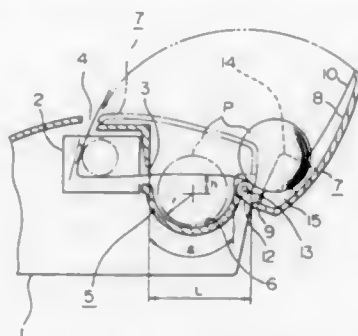
U.S. Cl. 400—613

8 Claims

1. A terminal device comprising:  
a terminal device body having a paper insertion slot;



- a paper roll receptacle portion provided on said terminal device body for receiving a paper roll of radius  $r$ , said paper roll receptacle portion having an open top and having a surface which is in contact with said paper roll when said paper roll is received in said paper roll receptacle portion, said surface having a circumferential length  $A$  measured in a direction in which paper is wound on said paper roll; and
- a paper roll cover having a proximal end portion pivotally mounted on a rear end portion of said paper roll receptacle portion so as to pivotally move between an open position where said paper roll cover opens the open top of said paper roll receptacle portion and a closed position where said paper roll cover closes the open top of said paper roll



receptacle portion, said paper roll cover having means for supporting the paper roll thereon when said paper roll cover is in the open position to define a drawing path of length  $L$  between said paper roll and said paper insertion slot and means for rolling said paper roll supported on said paper roll cover into said paper roll receptacle portion as said paper roll cover is moved to its closed position, said paper roll receptacle portion being positioned such that said drawing path is separated by a distance  $h$  from a location occupied by an axis of said paper roll when said paper roll is disposed in said paper roll receptacle portion, with  $r$ ,  $A$ ,  $L$  and  $h$  being selected to satisfy

$$L < A = \pi r + 2h.$$

5,411,343

# REDUNDANT MAKE/BREAK INTERCONNECT FOR A PRINT HEAD

Winthrop D. Childers, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
Continuation of Ser. No. 923,287, Jul. 31, 1992, abandoned. This application Jun. 8, 1993, Ser. No. 73,641  
Int. Cl.<sup>6</sup> B41J 29/00, 2/01

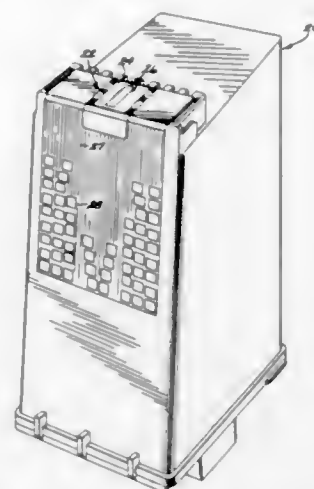
U.S. Cl. 400—692

20 Claims

1. A printer and removable print head cartridge, comprising:
  - a printer having a printer electrical connector trace, the printer electrical connector trace comprising an electrically common conductor;
  - a print head cartridge that requires an electrical interconnect to the printer, the print head cartridge having a print head electrical connector trace, the print head electrical connector trace comprising an electrically common conductor; and
  - means for electrically connecting the printer and the print head cartridge, the means for connecting including
    - a first printer contact and a second printer contact on the printer electrical connector trace, the first printer contact and the second printer contact being electrically common, and
    - a first print head cartridge contact and a second print head cartridge contact on the print head, the first print head cartridge contact and the second print head cartridge contact being electrically common through, and arranged serially along, the print head electrical connector

tor trace with an inter-contact electrically conductive trace segment extending between the first print head cartridge contact and the second print head cartridge contact,

the first print head cartridge contact and the second print head



cartridge contact being positioned to engage the first printer contact and the second printer contact, respectively, when the print head cartridge is removably inserted into the printer, without any intervening conductive member between the first and second printer contacts on the one hand and the first and second print head cartridge contacts on the other hand.

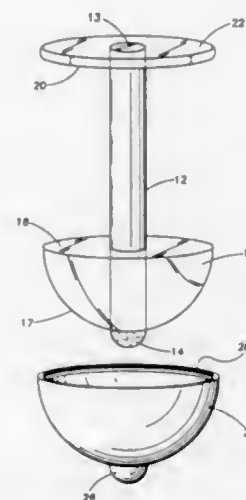
5,411,344

# SAFETY MARKING PEN FOR SMALL CHILDREN

Mary L. Gagne, P.O. Box 213, North Chatham, N.Y. 12132  
Filed Apr. 20, 1994, Ser. No. 230,514  
Int. Cl.<sup>6</sup> B43K 9/00, 8/02, 23/00

U.S. Cl. 401—202

10 Claims



1. A safety marking pen for young children comprising:
  - a cylindrical hollow body containing an ink reservoir at an end of the cylindrical hollow body and marking nib communicating with the reservoir at another end of the cylindrical hollow body;
  - a first protective disk shaped member secured to the end of said hollow body,
  - a second protective semi-hemispheric member having a passageway therethrough to securely accept the cylindrical hollow body, said second protective semi-hemispheric

- member being secured to the cylindrical hollow body at a point distal the first protective disk shaped member;
- a third protective means comprising a hollow semi-hemispheric cover, releasably secured to said second protective semi-hemispheric member, distal from said first protective disk shaped member proximate the marking nib; and
- a semi-hemispheric protective adaptor attached to the semi-hemispheric cover to releasably engage the marking nib.

5,411,345

# FELT-TIPPED PEN TYPE ADHESIVE APPLIER

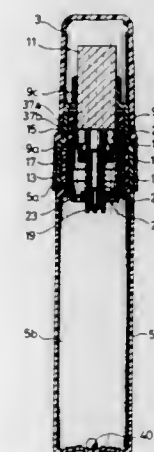
Kenji Ueji; Kiichi Ito, both of Sakai, and Masakazu Komemushi, Hirakata, all of Japan, assignors to Konishi Co., Ltd., Osaka, Japan

Continuation of Ser. No. 907,809, Jul. 2, 1992, abandoned. This application Oct. 28, 1993, Ser. No. 144,218

Int. Cl.<sup>6</sup> B43K 8/02

U.S. Cl. 401—206

18 Claims



15. An adhesive applier comprising:
  - a container for receiving an adhesive having at least a 50% by weight solids content and containing emulsion micelles of a diameter within a range of 0.005  $\mu$ m to 0.5  $\mu$ m; and
  - a wick permeable to the adhesive, the permeable wick being adapted to the container and extending from the inside of the container to the outside thereof so that the adhesive can penetrate the permeable wick to discharge from the container.

5,411,346

# BLIND CABLE TIE CUTOUT

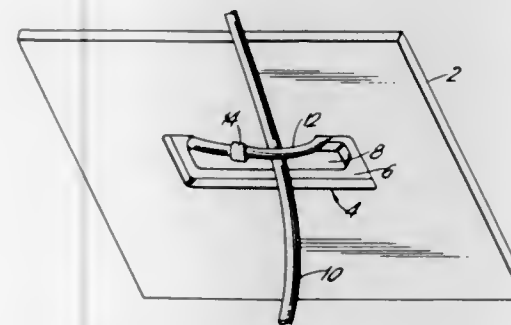
Mark Kozlowski, Muncie, Ind., assignor to Siemens Stromberg-Carlson, Boca Raton, Fla.

Filed May 26, 1993, Ser. No. 67,313

Int. Cl.<sup>6</sup> F16B 5/00

U.S. Cl. 403—6

14 Claims



1. A blind cable tie for permitting tie wraps or tie straps to be secured to a mounting surface without requiring access to the

opposite side of the mounting surface, for in turn securing components to the mounting surface, comprising:

- a cleat having a neck and arms that project from one end of the neck and that are surrounded by a closed channel or slot, said cleat being formed in the mounting surface in coplanar fashion;
- said channel or slot permitting a midportion of said tie strap to be partially pushed through one side of said mounting surface and slid into a position partially around an opposite side of said cleat, whereafter the ends of said tie strap protruding from said mounting surface are wrapped tightly around a component positioned proximate said cleat and connected together, for securing the component to the mounting surface without requiring access to the opposite side of said mounting surface.

5,411,347

# HIGH DYNAMIC STRENGTH REINFORCING BAR SPLICE AND METHOD OF MAKING

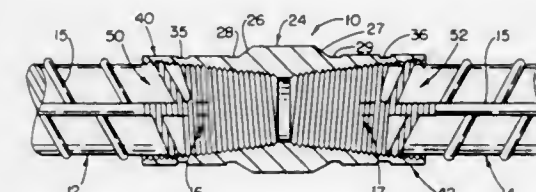
Geoffrey M. Bowmer, Al Oisterwijk, and Paulus W. T. Gruson, St Tilburg, both of Netherlands, assignors to Erico International Corporation, Solon, Ohio

Continuation of Ser. No. 825,626, Jan. 24, 1992, abandoned. This application Mar. 10, 1994, Ser. No. 209,595

Int. Cl.<sup>6</sup> F16B 7/18

U.S. Cl. 403—305

40 Claims



1. A concrete reinforcing bar splice having improved fatigue resistance comprising substantially aligned reinforcing bars, each bar having a taper threaded end, a sleeve having an exterior and corresponding tapered internal threads at each end, said each end of said sleeve threaded on the corresponding thread of the joined reinforcing bars, said exterior of said sleeve being circular in transverse section at said each end and including a wall thickness radially outwardly enlarged central portion, and at least one annular attenuation groove in said sleeve, said sleeve axially beyond said central portion tapering to a thin wall thickness at said each end, whereby an elastic elongation of the sleeve will more closely match that of the taper threaded bar ends providing a high dynamic strength splice.

5,411,348

# SPRING MECHANISM TO CONNECT, LOCK AND UNLOCK, MEMBERS

Peter J. Balsells, Santa Ana, Calif., assignor to Bal Seal Engineering Company, Inc., Santa Ana, Calif.

Filed Oct. 26, 1993, Ser. No. 142,984

Int. Cl.<sup>6</sup> B25G 3/00

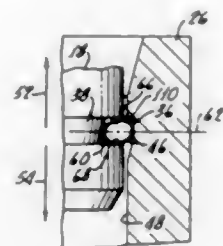
U.S. Cl. 403—326

16 Claims

1. A connect/disconnect, lock/unlock and hold mechanism for mechanical, electromagnetic shielding, electrical conductivity, and thermal dissipation coupling with environmental sealing, the mechanism comprising:

- a body having a groove therein with generally parallel side walls;
- a coil spring disposed in said groove with a portion thereof protruding from said groove;
- a housing having a means, defining an opening for accommodating said body and groove means, disposed in an inside surface of said opening, for receiving the protruding

spring portion and for enabling assembly of the body within the opening when the body and housing are moved in one direction with respect to one another; and means, defining a tapered bottom in said groove, said ta-



pered bottom being tapered with respect to the side walls, for preventing the spring from turning past a vertical line when the body and housing are moved in another direction with respect to one another in order to prevent disassembly of the body and housing.

5,411,349

**APPARATUS FOR COUPLING CYLINDRICAL STRUCTURAL COMPONENTS TO EACH OTHER**  
Ernst Hornung, Stuhl; Huba Oery, Aachen; Stefan Hornung, Aachen, and Andreas Rittweger, Aachen, all of Germany, assignors to ERNO Raumfahrttechnik GmbH, Bremen, Germany

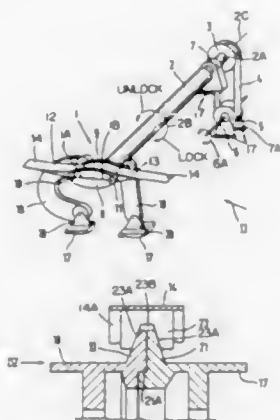
Filed Jun. 30, 1993, Ser. No. 85,756

Claims priority, application Germany, Jul. 1, 1992, 42 21 525.0

Int. Cl.<sup>6</sup> F16L 23/04, 23/06

U.S. Cl. 403—338

15 Claims



1. A coupling apparatus for the releasable connection of cylindrical structural components to each other, said components having coupling flanges facing each other, said apparatus comprising flexible tensioning means for encircling said flanges and at least one clamping device for interconnecting ends of said flexible tensioning means, said clamping device comprising a two-armed lever having two ends, first means connecting a first end of said flexible tensioning means to one end of said two-armed lever, second means connecting a second end of said flexible tensioning means to the other end of said two-armed lever, a rotatable drive shaft connected to said two-armed lever, and a shaft drive connected to said rotatable drive shaft for rotating said two-armed lever in one direction for tightening said flexible tensioning means and locking said coupling apparatus, and for rotating said two-armed lever in an opposite direction for unlocking said coupling apparatus and removing tension from said flexible tensioning means.

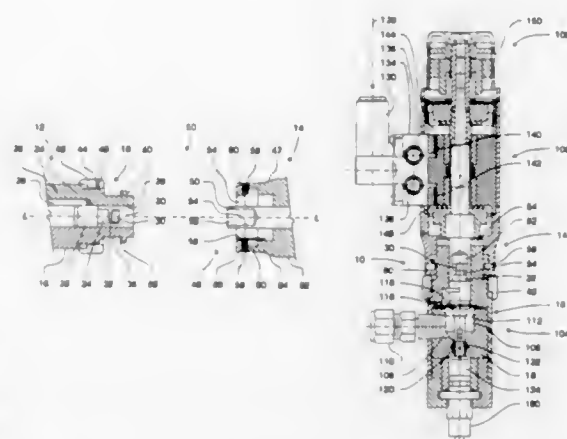
5,411,350  
**QUICK CONNECT/DISCONNECT DEVICE, AND DISPENSING APPARATUS COMPRISING SAME**  
John P. Breault, New Britain, Conn., assignor to Loctite Corporation, Hartford, Conn.

Filed Nov. 3, 1993, Ser. No. 147,220

Int. Cl.<sup>6</sup> F16D 1/00

U.S. Cl. 403—350

20 Claims



1. A matable connector assembly, comprising:

a male connector comprising a housing defining an outer male coupling distal portion and having an axial bore containing therein an inner male coupling element which is axially bidirectionally slidable in the axial bore, and means for maintaining said inner male coupling element in selected alignment during coupling of the male connector and female connector, said outer male coupling distal portion comprising at least one transversely protruding tang element thereon, and a manually securable locking member; and

a female connector comprising a housing defining a cavity therein, wherein the cavity contains an enclosing wall member defining a first cavity compartment therewithin, and a second cavity compartment exterior to the enclosing wall member within the cavity, said first cavity compartment being of a size and shape to couplingly receive said inner male coupling element therein, and said second cavity compartment (i) being of a size and shape to couplingly receive said outer male coupling distal portion therein, (ii) including guide stop means for alignment of the male and female connectors during coupling thereof, and upon insertion of the male connector into the female connector, limiting the rotation of the male connector relative to the female connector, and (iii) including means for securing the male connector in the female connector in a final coupled position;

the male connector and female connector being engageably positionable with the inner male coupling element axially inserted into the first cavity compartment, and the outer male coupling distal portion axially inserted into the second cavity compartment, so that upon subsequent rotation of the male connector relative to the female connector, the at least one tang element engages the means for securing the male connector in the female connector in a final coupled position, to permit the manually securable locking member to be manually secured to abuttingly engage the at least one tang element and the means for securing the male connector in the female connector in a final coupled position.

5,411,351  
**CONFORMING A MICROPOROUS SHEET TO A SOLID SURFACE**

James E. Lasch, Oakdale; James M. Kaczmarczik, Maplewood; James A. Klein, Minneapolis, and James M. Jonza, Shoreview, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 721,314, Jun. 26, 1991, Pat. No. 5,120,154, which is a continuation of Ser. No. 398,971, Aug. 28, 1989, Pat. No. 5,082,715. This application Jun. 5, 1992, Ser. No. 894,439

Int. Cl.<sup>6</sup> B32B 27/00; D02J 3/00

U.S. Cl. 404—14

20 Claims



1. A method of conforming a double layer construction to a solid surface, the method comprising the steps of:

- providing a conformable base sheet comprising a microporous thermoplastic polymer, a sample of which has an inelastic deformation of at least 25% after having been stretched once to 115% of its original length;
- bonding a layer of material to the conformable base sheet so as to provide the double layer construction; and
- conformably applying the base sheet of the double layer construction to the solid surface.

5,411,352  
**LAMINATED SPORTS FLOOR AND METHOD OF MAKING THE SAME**

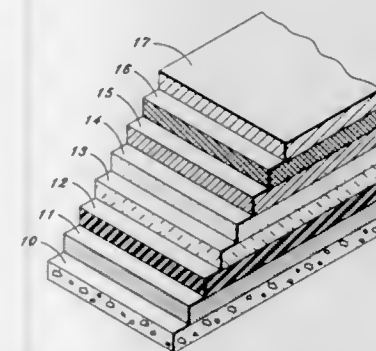
Tumer H. Eren, 28 Leavenworth St., Woodbury, Conn. 06798

Filed Mar. 23, 1994, Ser. No. 216,444

Int. Cl.<sup>6</sup> E01C 3/00

U.S. Cl. 404—31

8 Claims



1. A flexible, anti-skid sports surface installed over an existing support surfaced in combination comprising:

- a prefabricated basemat secured to the support surface;
- a primer layer consisting of a mixture of sand and a urethane based adhesive applied over and adhered to a portion of said basemat;
- a grip layer consisting of sand applied over and adhered to said primer layer;
- a leveling/texture layer consisting of a sand filled acrylic latex compound applied over and adhered to said grip layer;
- a color/paint layer applied over and adhered to said leveling/texture layer.

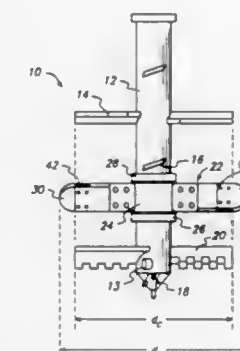
5,411,353  
**SOIL SOLIDIFICATION APPARATUS WITH A SHEAR BLADE OF ADJUSTABLE LENGTH AND ROTATION SPEED FOR CREATING A RIBBED SOIL-CEMENT PILE**  
Osamu Taki, P.O. Box 1297, Belmont, Calif. 94002

Filed Sep. 1, 1993, Ser. No. 115,228

Int. Cl.<sup>6</sup> E02D 3/12

U.S. Cl. 405—241

21 Claims



1. A drilling apparatus for producing a pile with ribs, the drilling apparatus comprising:

- a hollow shaft having a first and second ends, and a port proximate the first end;
- an auger bit attached at the first end of the shaft to rotate with the shaft;
- an excavation blade attached to rotate with the shaft, the excavation blade attached proximate the auger bit;
- a cutting blade attached to rotate with the shaft; and
- a shear blade having a first end and a second end, the shear blade mounted about the shaft at a fixed longitudinal position such that the shear blade can rotate about a longitudinal axis of the shaft independent of rotation of the shaft, the first and second ends of the shear blade adapted for mounting a finger, the length of the shear blade and finger being variable between a length equal to the excavation blade and lengths greater than the excavation blade; and
- a plurality of pairs of fingers, each pair of fingers having a different length.

5,411,354  
**TOOL PROVIDED WITH AN INSERT FOR CUT-OFF OR SIMILAR TURNING OPERATIONS, AND SPACER ELEMENT FOR AN INSERT IN SUCH A TOOL**

Lars-Erik Gustafsson, Sandviken, Sweden, assignor to Sandvik AB, Sweden

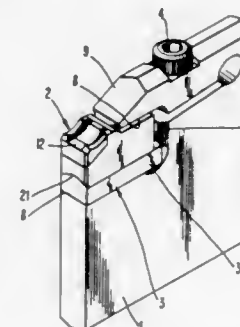
Filed Apr. 28, 1993, Ser. No. 53,268

Claims priority, application Sweden, Apr. 28, 1992, 9201324

Int. Cl.<sup>6</sup> B23B 27/08, 29/12

U.S. Cl. 407—110

21 Claims



1. A tool for cut-off or similar turning operations comprising:



a holder plate, the holder plate having a main portion and a portion forming a clamping arm elastically joined to the main portion, the holder plate having, in at least one free end thereof, an outwardly opening recess extending into a forward end of the holder plate in a first direction, the recess being substantially defined by a bottom wall, an inner wall, and an upper wall, the bottom wall and the inner wall forming at least a part of the main portion, and the upper wall forming part of the clamping arm;

a cutting insert disposed in the recess in the holder plate;

a spacer disposed between the insert and the bottom wall of the recess;

an upper side of the spacer being formed as a V-shaped ridge and an underside of the insert being formed as a V-shaped groove, the V-shaped ridge and the V-shaped groove extending along an axis in the first direction, the upper side of the spacer engaging with the underside of the insert by the V-shaped ridge being received in the V-shaped groove;

means for engaging the spacer to the holder plate in the area of the bottom wall;

a rear end of the spacer engaging with the inner wall; and

an upper side of the insert engaging with an underside of the clamping arm.

20. A tool for cut-off or similar turning operations comprising:

a holder plate, the holder plate having a main portion and a portion forming a clamping arm elastically joined to the main portion, the holder plate having, in at least one free end thereof, an outwardly opening recess extending into a forward end of the holder plate in a first direction, the recess being substantially defined by a bottom wall, an inner wall, and an upper wall, the bottom wall and the inner wall forming at least a part of the main portion, and the upper wall forming part of the clamping arm;

a cutting insert disposed in the recess in the holder plate;

a spacer disposed between the insert and the bottom wall of the recess;

an underside of the insert being engageable with an upper side of the spacer;

means for engaging the spacer to the holder plate in the area of the bottom wall;

a rear end of the spacer engaging with the inner wall; and

an upper side of the insert engaging with an underside of the clamping arm,

wherein the clamping arm has, at a forward end thereof, a substantially planar surface formed at an oblique angle to the axis extending in the first direction, and the insert has a substantially planar surface formed at an oblique angle to the axis extending in the first direction and complementary to the surface at the forward end of the clamping arm, that abuts against the surface at the forward end of the clamping arm to restrict movement of the insert in the first direction.

5,411,355

#### UTILITY VEHICLE BED PARTITION

Raymond H. Gosnell, 47526 Clipper Dr., Plymouth Twp., Wayne County, Mich. 48170, and Daniel A. Cannon, 12787 Catalpa, Southgate, Mich. 48195

Filed Jul. 19, 1993, Ser. No. 95,572

Int. Cl.<sup>6</sup> B61D 45/00; B60P 7/00

U.S. Cl. 410—139

18 Claims

1. A bed partition arrangement for utility vehicles comprising:

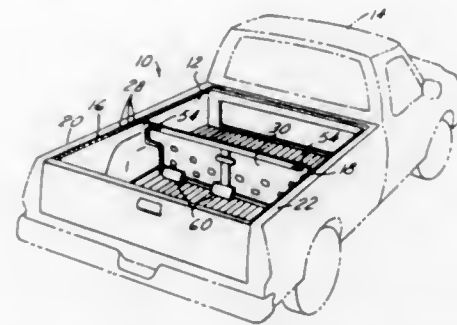
a pair of rails for mounting along opposed sidewalls of the vehicle bed, said rails having longitudinally spaced openings adapted to be disposed in laterally aligned pairs when said rails are mounted to the vehicle bed sidewalls,

a flat panel having laterally opposed side edges and a bottom edge,

a pair of latches disposed at said side edges of said panel, each of said latches including a latch bar and means for

moving said bar into locking engagement with an opposed opening in one of said rails, and

at least one foot of resilient elastomeric construction



mounted at said bottom edge of said panel for frictional engagement with the floor of the vehicle bed to restrain motion of said panel when said latches are in locking engagement with said rails.

5,411,356

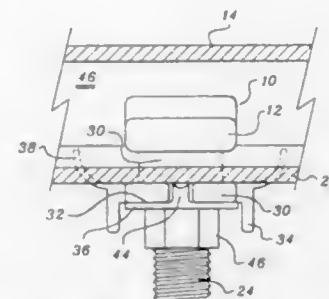
#### SELF-LOCKING STRUT NUT SYSTEM

Harry Travis, Beloit, and Gordon J. Grice, Janesville, both of Wis., assignors to Custom Industrial Products, Beloit, Wis. Continuation-in-part of Ser. No. 907,513, Jul. 1, 1992, Pat. No. 5,251,857. This application Sep. 20, 1993, Ser. No. 124,589

Int. Cl.<sup>6</sup> F16B 27/00, 37/00; F16L 3/08

U.S. Cl. 411—85

3 Claims



1. A self-locking strut-nut system for securement within a rectangular constructional channel, the strut-nut system comprising:

- upper means proportioned for selectable lockable engagement within said rectangular channel, an upper surface of said means defining an upper plane of said strut-nut system, an said engagement means also defining a major axis and a minor axis, each co-parallel with said upper plane;
  - connecting means depending integrally downwardly from a lower surface of said upper means, said connecting means including a bore for threadable receipt of a complementally threaded rod, said bore having an axis normal to said upper plane, said bore extending along a length of said strut-nut system co-linear with said normal axis;
  - lower means proportioned for selectable lockable engagement externally against and beneath said rectangular channel, said lower engagement means extending integrally downwardly and outwardly from said connecting means and defining, co-parallel to said upper plane of said upper means, a lower plane upon a surface of said lower means opposite from said integral dependency of said lower plane defining major and minor axes each respectively co-parallel to said major and minor axes of said upper means; and
- (d) two deformable locking fins depending integrally out-

wardly, and oppositely, along said major axis of said lower engagement means.

5,411,357

#### SCREW THREAD LOCKING INSERT

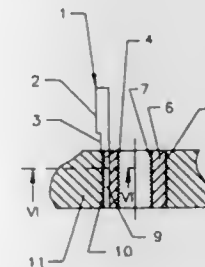
Donald P. Viscio, Danbury; Robert A. Gentile, New Milford, both of Conn., and Peter E. Kraus, Sarasota, Fla., assignors to Emhart Inc., Newark, Del.

Filed Dec. 2, 1993, Ser. No. 160,617

Int. Cl.<sup>6</sup> F16B 37/12, 39/28

U.S. Cl. 411—110

6 Claims



1. A locking pin for use in locking an insert to an aperture in a parent body comprising
  - a first, break-away portion, said portion being sufficiently elongated to enable it to be held in a given location by human fingers;
  - a second cutting portion extending from said break-away portion, said cutting portion terminating in a flat surface having sharp edges to facilitate entry into a parent body by punching into the parent material; and
  - a locating finger extending from said flat surface to extend into an aperture in the insert adjacent the parent body.

5,411,358

#### DISPATCHING APPARATUS WITH A GAS SUPPLY DISTRIBUTION SYSTEM FOR HANDLING AND STORING PRESSURIZED SEALABLE TRANSPORTABLE CONTAINERS

George Garric, Perthes, and André Lafond, Nemours, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

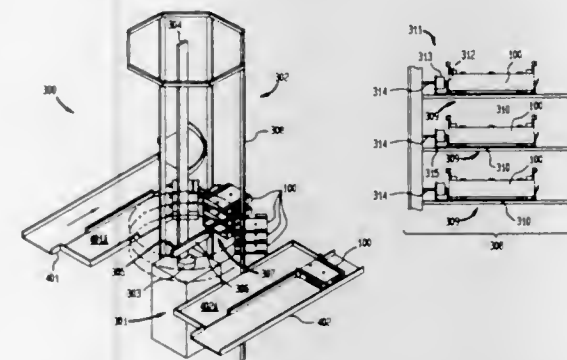
Filed Aug. 3, 1993, Ser. No. 102,075

Claims priority, application Hague Agreement, Aug. 4, 1992, 92480110.3

Int. Cl.<sup>6</sup> B65G 1/04

U.S. Cl. 414—277

9 Claims



1. A dispatching apparatus (300) with a gas supply distribution system for handling and storing a plurality of pressurized sealable transportable containers (100) of the type consisting of a box-shaped housing (102) provided with an access opening (104) sealed by releasable door means (124) and gas injection valve means (129) including:

an automatic handler (301) comprising:

a base member with a rotatable head (303);

an elevator arm (304) fixed thereon;

a handling robot (305) affixed on said elevator comprising an extension arm (306) and container gripping means (307); and,

a vertical stocker (302) comprising:

a frame (308) formed by a plurality of hollow vertical tubes, said frame having a plurality of support stations or bins (309) attached thereon; wherein each bin is provided with gas injector means (311) connected on the one hand, to said gas injection valve means and on the other hand to a compressed ultra pure neutral gas supply installation (700) for maintaining a positive differential pressure  $\Delta p$  within the container with respect to the outside ambient during the storage time wherein said hollow vertical tubes are used for gas transportation.

5,411,359

#### TRANSPORT TRAILER FOR LIFTING AND MOVING A LOAD AND METHOD FOR EFFECTING SUCH MOVEMENTS

Pekka Kossila, Kouvola, Finland, assignor to Lifttec Products OY, Tampere, Finland

PCT No. PCT/FI92/00113, § 371 Date Dec. 17, 1992, § 102(e) Date Dec. 17, 1992, PCT Pub. No. WO92/18350, PCT Pub. Date Oct. 29, 1992

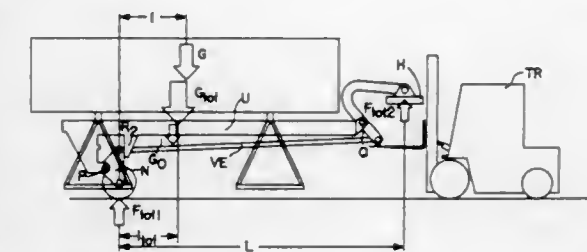
PCT Filed Jun. 19, 1991, Ser. No. 965,361

Claims priority, application Finland, Apr. 18, 1991, 911870; Jun. 19, 1991, 912985

Int. Cl.<sup>6</sup> B60P 1/64

U.S. Cl. 414—498

12 Claims



1. A lifting transport trailer comprising:
  - a frame having an essentially horizontal carrying surface for supporting a load and a lever mechanism for changing the elevation of said frame, said lever mechanism comprising:
    - a first frame lever pivotally connected to said frame to pivot in a vertical plane, said first frame lever being connectable to apparatus for moving said first frame lever vertically;
    - a second frame lever spaced apart from said first frame lever and pivotally connected to said frame to pivot in a vertical plane, said second frame lever being provided with at least one supporting wheel, said at least one supporting wheel being positioned at a lower elevation than said carrying surface;
  - at least one force transmitting element interconnecting said first and second frame levers for transmitting vertical pivoting motion of said first frame lever into vertical pivoting motion of said second frame lever and thereby changing the vertical distance between said horizontal carrying surface and said supporting wheel(s);
  - first and second limiter means provided on said frame for restricting the pivoting movement of said second frame lever, thereby restricting the change in vertical distance between said horizontal carrying surface and said supporting wheel(s);
  - means connected between said second frame lever and said second limiter means for limiting the lifting position of the frame according to the weight applied to said carrying surface by the load therein, wherein;

when said lever mechanism is in a first position supported by said first limiter means, said frame is supported by said wheel(s) in a lower position and when said lever mechanism is in a second position supported by said second limiter means, said frame is supported by said wheel(s) in an upper position, and in both positions said lifting transport trailer forms a functionally stiff body which is pivoted around a connecting point between said wheel(s) and said second frame lever during a change of the height position of said first frame lever.

5,411,360

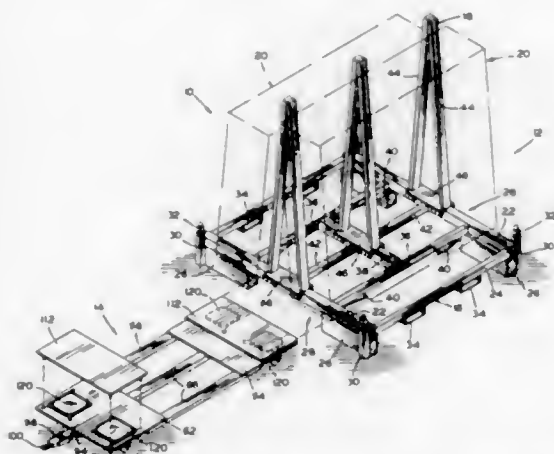
**APPARATUS FOR TRANSPORTING SHEET MATERIAL**  
Lon R. Hilliker, Rockford, Mich., and John P. Malley, Cedar Falls, Iowa, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed Oct. 19, 1993, Ser. No. 138,921

Int. Cl.<sup>6</sup> B60P 1/02

U.S. Cl. 414—608

7 Claims



1. A system for transporting sheets of material comprising a rack including a base section, the base section including a framework comprising opposite transversely extending first and second end members interconnected by longitudinally extending side members, a separated pair of spacer sections disposed beneath each said end member for maintaining said base section spaced from a supporting surface, the separated spacer sections beneath the opposite end members defining a corridor beneath the base section, and a wheeled transport dolly adapted for reception with the corridor beneath the base section, the transport dolly including a front lift platform positioned beneath the first end member and a rear lift platform positioned beneath the second end member with the transport dolly positioned within the corridor, a front carrier plate, a rear carrier plate, frame members interconnecting the front and rear carrier plates, the front and rear lift platforms being carried upon the front and rear carrier plates, respectively, means for raising the front and rear lift platforms from the respective front and rear carrier plates to engage said end members and raise the rack off the supporting surface for transport on the dolly, the front and rear carrier plates having undersides facing the supporting surface, spaced wheels on the underside of said rear carrier plate for rollingly engaging the supporting surface, a transversely spaced pair of swivel plates mounted for pivoting movement on the underside of the front carrier plate, wheels mounted beneath each said swivel plate for rollingly engaging the supporting surface, a tongue pivotally affixed to the front carrier plate, and tie bar means connecting each swivel plate to the tongue whereby the swivel plates pivot in unison in response to pivoting swinging movement of the tongue for steering the transport dolly.

5,411,361

**TRUCK FOR HANDLING PALLETS**

Armando Neri, Bologna, and Verter Cesari, Granarolo Emilia, both of Italy, assignors to G.D. S.p.A., Bologna, Italy

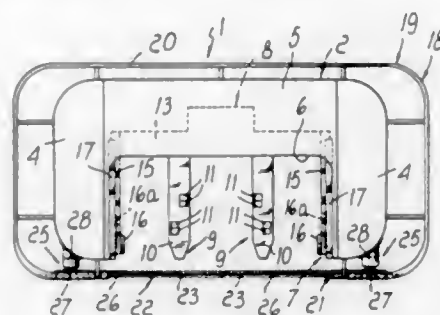
Filed Oct. 18, 1993, Ser. No. 136,860

Claims priority, application Italy, Oct. 28, 1992, BO92A0377

Int. Cl.<sup>6</sup> B60P 1/44; B66F 9/12

U.S. Cl. 414—664

13 Claims



7. Lift truck for handling pallets comprising:

- a motorized chassis adapted for movement on a supporting surface, said chassis having a rear U-shaped configuration with a front open end, said configuration forming a cavity, said cavity being laterally delimited by two lateral shoulders, said lateral shoulders being joined at an end thereof by a cross-member;
- a bumper means surrounding at least partially said chassis, said bumper means comprising a rear fixed portion extending around said rear U-shaped configuration and a front portion facing said front open end, said front portion being movable between a closure position for closing said cavity at said front open end and an open position;
- a fork, said fork being longitudinally and vertically movable with respect to said chassis, said fork comprising wheel means arranged proximate to a free end thereof, said wheel means being adapted to contact said supporting surface in a lowered position of said fork;
- a slider which supports said fork, said slider being slidably coupled to the chassis and adapted to move said fork longitudinally with respect to the chassis between a retracted position inside said cavity and an extracted position outside said cavity; wherein said slider comprises two parallel lateral arms arranged at sides of said fork, said arms being extendable for being positioned adjacent to said supporting surface, rest means being further provided at a free end of said arms, said rest means being movable toward and away from an operating position in contact with said supporting surface.

5,411,362

**METHOD OF PICKING UP STACKED BLANKS**

Armando Neri, Bologna, and Mario Turra, Casalecchio Di Reno, both of Italy, assignors to G. D. Societa' Per Azioni, Bologna, Italy

Filed Jul. 19, 1993, Ser. No. 92,995

Claims priority, application Italy, Jul. 28, 1992, BO92A0029

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Int. Cl.<sup>6</sup> B25J 13/08; B65G 61/00

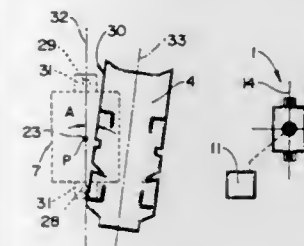
U.S. Cl. 414—796.9

6 Claims

1. A method for picking up stacks of blanks from a supporting surface by a movable pickup head mounted for rotation about an axis and translation relative to said stacks, said method comprising:

- locating a first and second sensor on a first reference axis of said pickup head, said first reference axis being a longitudinal axis of said pickup head substantially perpendicularly intersecting said axis of rotation and having a predetermined orientation;
- translating said pickup head towards one of said stacks in a

predetermined direction until one of said first and second sensors intercepts a reference edge of said one stack; moving said pickup head until both said first and second sensors simultaneously intercept said reference edge of said one stack;



moving said pickup head into engagement with said one stack; and moving said pickup head, with said one stack, until said first reference axis is at said predetermined orientation.

5,411,363

**CASE UNLOADING APPARATUS**

Toru Ishii, 66 Takaokacho, Matsuyama, Ehime-Pref., Japan

Continuation of Ser. No. 955,490, Oct. 2, 1992, abandoned. This

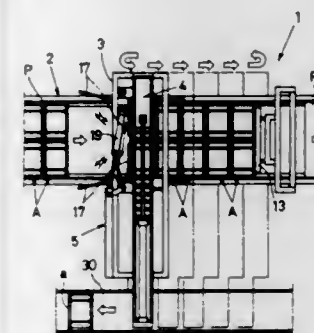
application Jan. 18, 1994, Ser. No. 228,327

Claims priority, application Japan, Oct. 2, 1991, 3-088881 U

Int. Cl.<sup>6</sup> B65G 59/06

U.S. Cl. 414—797.5

5 Claims



1. A system for unstacking at least one case from a pallet on which are disposed a plurality of units disposed in an array of a plurality of rows and columns, each of said units comprising a plurality of cases vertically stacked on each other, said columns being defined in a first horizontal direction of movement of a first conveyor means, and said rows being defined in a direction perpendicular to said first horizontal direction of movement of said first conveyor means, said system comprising, in combination

a first conveyor means for holding said pallet, said first conveyor means being movable in said first horizontal direction;

a second conveyor means for holding only a single row of said units of vertically stacked cases immediately after removal thereof from said pallet on said first conveyor means, said second conveyor means being located adjacent to said first conveyor means and being movable in a horizontal direction perpendicular to said first horizontal direction in which said first conveyor means is movable; means for moving horizontally at a time a single row of said units of vertically stacked cases disposed on said pallet from said first conveyor means onto said second conveyor means, said means for moving comprising an arm movable in a direction perpendicular to said first horizontal direction and having a vertical dimension greater than the total dimension of the vertically stacked cases of each said unit, and means for moving the arm to move said single row of

stacked cases from said first conveyor means onto said second conveyor means; means for selectively holding the vertically stacked cases in each unit of said single row when said single row of units is on said second conveyor means; means for vertically moving said second conveyor means to separate at least one case in each unit of said single row when said single row is on said second conveyor means; means for operating said second conveyor means to move horizontally said at least one case in each unit not held by said means for selectively holding onto a third conveyor means; and a third conveyor means for holding said at least one case in each unit of said single row moved from said second conveyor means.

5,411,364

**GAS TURBINE ENGINE FAILURE DETECTION SYSTEM**

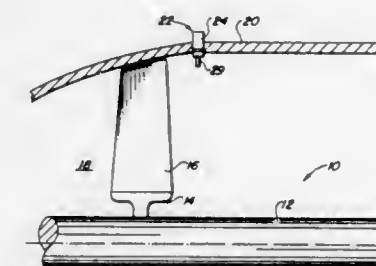
Robert O. Aberg, and Stephen J. Hoeland, both of Phoenix, Ariz., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Filed Dec. 22, 1993, Ser. No. 172,465

Int. Cl.<sup>6</sup> F01D 21/06

U.S. Cl. 415—9

17 Claims



1. Gas turbomachinery comprising:

- a casing;
- a rotor journaled for rotation within the casing and having blading thereon disposed in momentum exchange relation with a flow of compressible fluid in the casing; and
- means for detecting axial movement of said rotor away from its normal position in the casing comprising a sensor housing having a pair of fiber optic wave guides therewithin, said wave guides extending outwardly from one end of said housing and being joined to complete an optical circuit and present a frangible element disposed axially adjacent said rotor to be contacted by said blading and open said optical circuit upon axial movement of said rotor away from its normal position, and light emitting and light activated diodes respectively connected to one and the other of said pair of wave guides.

5,411,365

**HIGH PRESSURE/INTERMEDIATE PRESSURE SECTION DIVIDER FOR AN OPPOSED FLOW STEAM TURBINE**

Mario A. Mazzola, Ballston Lake; Thomas J. Farinean, Schenectady; George Schlottner, Delanson, and Earl H. Brinkman, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 3, 1993, Ser. No. 161,117

Int. Cl.<sup>6</sup> F01D 3/02

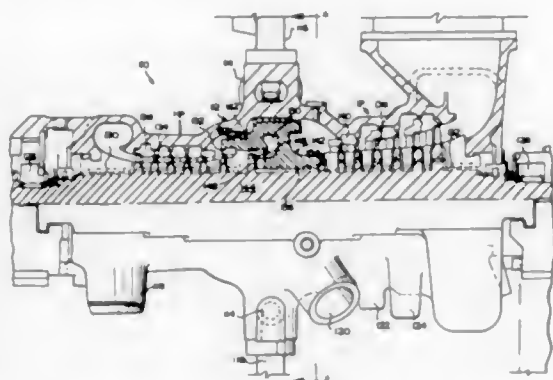
U.S. Cl. 415—93

9 Claims

1. An opposed flow steam turbine comprising a high pressure section and intermediate section enclosed within a single outer shell and separated axially by an annular section divider, said section divider provided with a plurality of steam chambers for feeding steam to at least the high pressure section of the turbine, said section divider having steam packing for controlling steam leakage between the high pressure section and the intermediate section along an interface with said rotor,



and wherein turbine blades in said high pressure section and said intermediate pressure section on either side of said divider



are operatively sealed directly with portions of said single outer shell.

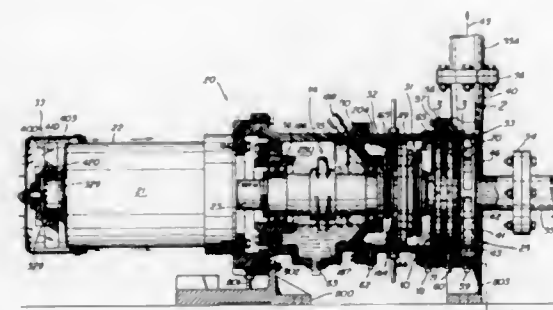
5,411,366

**MOTOR DRIVEN ENVIRONMENTALLY SAFE PUMP**  
Robert E. Rockwood, Windham, N.H., assignor to Environamics Corporation, Hudson, N.H.

Division of Ser. No. 101,940, Aug. 4, 1993, Pat. No. 5,340,273, which is a division of Ser. No. 803,007, Dec. 4, 1991, Pat. No. 5,261,676. This application Jun. 3, 1994, Ser. No. 253,664  
Int. Cl.<sup>6</sup> F04D 29/14

U.S. Cl. 415-113

4 Claims



1. A motor driven pump comprising:

an environmentally leak-proof motor housing having disposed therein a motor for rotatably driving a rotating shaft, said rotating shaft extending from said motor and being sealed within a pump housing;

said pump housing being sealably connected to said motor housing, said pump housing including a pump chamber in which fluid to be pumped is pumped between a fluid inlet and a fluid outlet;

a fluid impeller disposed within said pump chamber, said impeller for pumping said fluid to be pumped from said fluid inlet to said fluid outlet, said impeller being affixed to said rotating shaft;

a fluid passageway disposed between and connecting said pump chamber and a first annular fluid chamber, said first annular fluid chamber surrounding said rotating shaft, said impeller being disposed between said fluid inlet and said first annular fluid chamber;

a first annular rotating seal disposed along and circumferentially surrounding said rotating shaft within said first annular fluid chamber, said first annular rotating seal for inhibiting the flow of said fluid to be pumped from said pump chamber rearward toward said motor, said first annular rotating seal including a rotating member affixed to said shaft for rotation therewith and a stationary annular engaging member, said stationary member having sealing portions for engagement with sealing surfaces of

said rotating member so as to seal said fluid to be pumped within said first annular fluid chamber and prevent it from migrating along said rotating shaft toward said motor;

a second annular fluid chamber disposed circumferentially around said rotating shaft and between said first fluid chamber and said motor housing;

a drainage orifice defined in said pump housing, said drainage orifice being located in the bottom portion of said second annular fluid chamber so as to allow fluid passing into said second fluid chamber to flow out of said second fluid chamber by way of gravity through said drainage orifice thereby preventing said fluid to be pumped from making its way into said motor housing;

a second annular rotating seal disposed along and circumferentially surrounding said rotating shaft, said second annular rotating seal being located between said motor and said second fluid chamber for preventing fluid from entering said motor housing from said second fluid chamber; and

annular bearing means for supporting said shaft, said bearing means being disposed between said motor and said second annular rotating seal.

5,411,367

**IMPELLER ANNULAR SEAL**

Craig I. Walker, Sydney, Australia, assignor to Warman International Ltd., Australia

Continuation of Ser. No. 855,773, Mar. 23, 1992, abandoned.

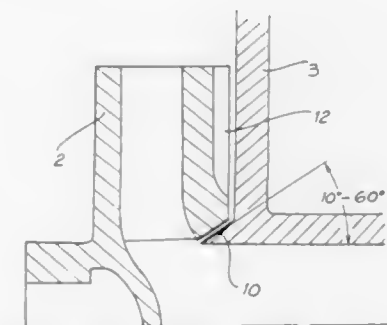
This application Oct. 12, 1993, Ser. No. 136,712

Claims priority, application Australia, Mar. 22, 1991, PKS249

Int. Cl.<sup>6</sup> F04D 29/08

U.S. Cl. 415-170.1

12 Claims



1. A centrifugal slurry pump comprising:

an impeller having two substantially parallel rotatable members aligned to rotate about a common axis of rotation and defining a central intake opening in one of the rotatable members aligned along the axis of rotation,

a plurality of substantially radially extending primary vanes extending between the rotatable members, and extending generally radially from the axis of rotation, so as to, when said impeller is installed, pump liquid through the pump, and

an annular area around the central intake opening of said impeller, said area having its surface at least adjacent the intake opening sloping towards the intake opening in the direction of the fluid flow at an angle from between 20° to 45° to that of the axis of rotation of said impeller; and

a liner enclosing said impeller and having an inlet aligned with the central intake opening of said one of the rotatable members;

wherein said liner has an annular area overlaying and substantially complementary in shape to said annular area of said impeller to thereby form an annular seal having a minimum width (X) of not less than 0.05 of the diameter (D) of said intake opening.

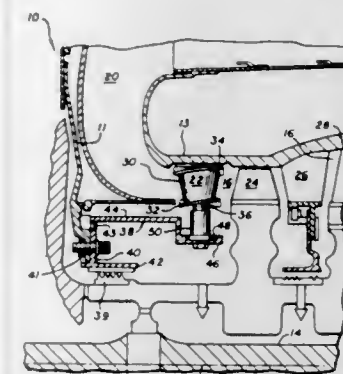
5,411,368

**CERAMIC-TO-METAL STATOR VANE ASSEMBLY WITH BRAZE**

Donna J. Chase; Ho T. Fang, both of Scottsdale; Craig W. Irwin, Tempe, and James L. Schienle, Phoenix, all of Ariz., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.  
Filed Nov. 8, 1993, Ser. No. 148,483  
Int. Cl.<sup>6</sup> E01D 9/04

U.S. Cl. 415-189

4 Claims



1. A stator vane assembly for a gas turbine engine comprising:

a plurality of circumferentially spaced ceramic vanes, each of said vanes having a ceramic post extending therefrom; a plurality of metal sleeves configured for receiving respective ones of said ceramic posts;

a braze alloy disposed between said sleeves and said posts; a support member having a plurality of circumferentially spaced recesses for receiving each of said sleeves; and means for attaching said sleeves to said recesses.

3. A method for mounting ceramic stator vanes in a gas turbine engine having a metallic casing circumscribing a metallic shaft, comprising the steps of:

providing each of said ceramic stator vanes with a ceramic post extending therefrom;

providing a metallic platform having a plurality of circumferentially spaced recesses;

inserting each of said posts into a metallic sleeve;

brazing said posts to said sleeves; and

mounting said brazed sleeves in said recesses.

5,411,369

**GAS TURBINE ENGINE COMPONENT RETENTION**  
Jean G. Bouchard, Mont-St-Hilaire, Canada, assignor to Pratt & Whitney Canada, Inc., Longueuil, Canada

Filed Feb. 22, 1994, Ser. No. 164,335

Int. Cl.<sup>6</sup> E01D 9/04

U.S. Cl. 415-189

6 Claims

1. A retention arrangement for axially retaining a static component from downstream movement in a gas turbine engine, comprising:

a static housing having a base diameter at an upstream location, a circumferential groove having a groove diameter larger than said base diameter downstream of said base diameter, and

an inwardly extending lip downstream of said groove having an inside intermediate lip diameter;

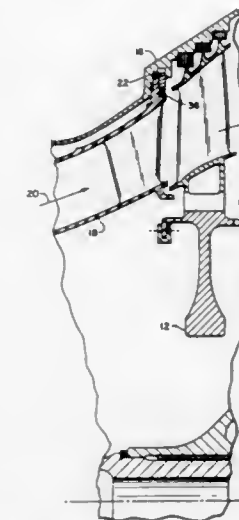
said static component fitting within said housing and having a rim diameter greater than said base diameter;

axially projecting lugs on said static component, the outer edges of said lugs forming an outside diameter less than said lip diameter;

a split retaining ring having a plurality of deep scallops and

a plurality of shallow scallops located on the inside edge of said ring and at least some of said scallops separated by ridges;

said deep scallops spaced to clock with and sized to clear said lugs when said ring is opened to an outside diameter equal to the inside intermediate lip diameter;



said ridges sized to clear the outside diameter formed by said lugs with said ring fitting in said circumferential groove; and

said shallow scallops spaced to clock with and sized to rest on said lugs with the outside diameter of said ring greater than said inside intermediate lip diameter.

5,411,370

**VIBRATION DAMPING SHROUD FOR A TURBOMACHINE VANE**

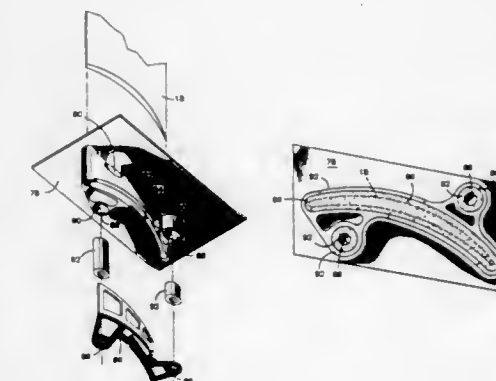
David A. Varsik, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 1, 1994, Ser. No. 283,883

Int. Cl.<sup>6</sup> F01D 25/04, 9/02

U.S. Cl. 415-209.4

6 Claims



1. In a turbomachine having a row of stator vanes extending radially across an annular flow path formed between an inner case and an outer case, each vane having a fixed end securely joined to one of said inner and outer cases, each vane also having a free end capable of relative radial displacement with respect to the other of said inner and outer cases and anchored thereto by a vibration damping shroud, said shroud having a chamber for receiving said free end and also having a primary vibration damping material disposed in said chamber for securing said free end to said shroud and for damping vibrations of said vane, said other case also having at least one radially

extending support pin corresponding to each of said vanes, said shroud characterized by:

- a cavity independent of said chamber for receiving each corresponding support pin; and
- a secondary vibration damping material disposed in said cavity and slidably engaging said pin for anchoring said shroud to said other case while accommodating relative radial displacement therebetween.

5,411,371

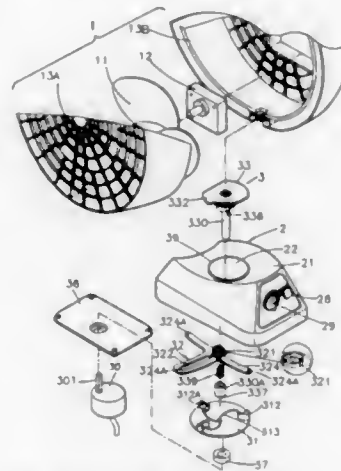
## SWIVELING ELECTRIC FAN

Cheng-Ho Chen, No. 12, Lane 296, Chung-Ching N. Rd., Sec. 3, Taipei, Taiwan, Prov. of China

Continuation-in-part of Ser. No. 980,567, Nov. 23, 1992, Pat. No. 5,310,313. This application Mar. 1, 1994, Ser. No. 203,979 Int. Cl.<sup>6</sup> F04D 29/36

U.S. Cl. 416—100

8 Claims



## 1. A swiveling electric fan comprising:

- a housing comprised of a front section and a rear section associated therewith, a vane member driven by a first motor disposed in said housing, said housing having the shape of a truncated sphere;
- a base having a curved top surface with a diameter equal to that of a bottom section of said housing, a circular hole being in said top surface of said housing, a downward extending restricting pin being disposed on an inner side of said top surface of said base between said circular hole and a rear wall of said base;
- a swiveling mechanism including a second motor fixed in said base having an upward extending rotary shaft, and further including
- a guiding disk member curved corresponding to said top surface of said base, having a downward extending sleeve section and a disk section formed with a plurality of guiding means, said sleeve section of said guiding disk member being fixedly fitted with said rotary shaft of said second motor, so that said guiding disk member is rotated by said second motor;
- an arch guiding board member curved corresponding to said top surface of said base, formed with a central insert hole, and having a laterally extending arch guiding slot, said restricting pin of said base being extended through said guiding slot, causing said guiding slot to slide along the circumference of the circular hole in the top surface of said base in an elliptical pattern;
- a supporting disk member having a disk section and a shaft section extending downward therefrom, said disk section being secured under said bottom section of said housing while said shaft section of said supporting disk member extends through said central insert hole of the arch guiding member;
- a cap member receiving a spring member being fitted with a lower end of said shaft section with said spring member

resiliently compressed between said cap member and said shaft section, a lower end of said cap member abutting against and engaging with the guiding disk so as to bear the weight of the fan and rotate when the guiding disk is rotated, thus causing the fan to swivel, the construction of said swiveling mechanism causing the fan to rotate in more than one plane of motion.

5,411,372

## POLE MOUNTED REVOLVING AIR CIRCULATING FAN

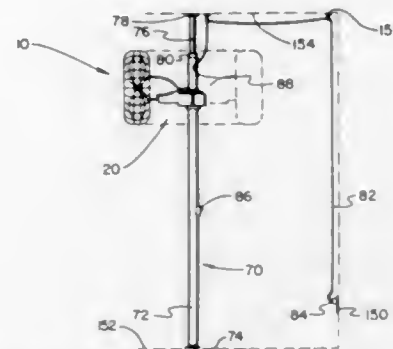
Michael L. Clark, 906 Highway 54 South, Fulton, Mo. 65251

Filed Mar. 18, 1994, Ser. No. 214,577

Int. Cl.<sup>6</sup> F04D 29/36

U.S. Cl. 416—110

13 Claims



## 1. A pole mounted revolving air circulating fan for inducing air movement within an air mass by use of a rotating impeller which simultaneously revolves around a vertical axis, the pole mounted revolving air circulating fan comprising:

- a support pole extending substantially vertically upwardly from a mounting floor surface to a mounting ceiling surface, the support pole comprising: a hollow round tube having a rigid wall, the wall having a first aperture therethrough proximal the upper end thereof, the wall additionally having a second aperture therethrough intermediate the ends thereof, the tube further having a third aperture therethrough intermediate the first and second apertures; a planar foot fixedly connected to the lower end of the tube, the foot frictionally engaging the floor surface; a telescoping extensible rod longitudinally mounted to the upper end of the tube, the telescoping rod having locking means whereby longitudinal movement of the rod relative to the tube may be prevented, the free end of the rod having a planar pad fixedly connected thereto, the pad frictionally engaging the ceiling surface; manually actuated circuit switching means including a set of toggling switch contacts, the switching means also including terminal means operatively connected to the contacts, the switching means being fixedly mounted on the wall of the tube such that the terminal means extends inside the tube through the second aperture; electrical power cord means operatively connected at one end to a source of electrical energy, the power cord means extending through the first aperture, the power cord means also extending downwardly inside the tube adjacent the switching means, the power cord means being operatively connected at the other end to the circuit switching terminal means;
- a fan comprising: a rotary air impeller having a hub with a plurality of blades extending radially therefrom, the hub also having an axial hole therethrough where to a drive shaft may be coupled; a generally cylindrical motor housing, the housing having a blunt front end and a substantially conical back end; an electric motor mounted within the housing, the motor having electric power supply leads extending therefrom, the motor also having a longitudinal drive shaft projecting horizontally from both ends thereof, the shaft also projecting from both ends of the

motor housing such that a first end of the shaft projects from the front end of the housing and a second end of the shaft projects from the back end of the housing, the first end of the shaft being fixedly connected to the axial hole through the impeller hub such that rotation of the shaft drives the impeller to induce movement in the surrounding air; a blade guard enclosing the impeller to prevent injury from contact therewith, the blade guard being constructed of wire rods forming a substantially annularly shaped wire cage with essentially planar front and back ends, the ends being parallel with each other, the back end having a central hole therethrough where through the front end of the motor housing extends such that the motor housing is partially enclosed within the blade guard, the blade guard having bracket means formed thereon adjacent the central hole whereby the blade guard is connected to the motor housing; a slightly compressible rubber drive wheel fixedly coaxially connected to the second end of the drive shaft;

- a rotatable electrical contact assembly mounted on the fan comprising: a contact housing integrally formed on the motor housing, the contact housing projecting longitudinally rearwardly from the motor housing, the contact housing being a horizontally situated hollow generally toroidal structure with an open bottom radially connected to the motor housing spaced below the rubber drive wheel; an opening extending from inside the motor housing to inside the contact housing, the opening having the motor power supply leads passing therethrough; a rotary bushing formed of rigid electrically insulating material, the bushing being fixedly coaxially mounted inside the contact housing, the bushing also being rotationally mounted on the exterior of the vertical support pole tube such that the bushing and attached fan may rotate freely about the support pole, the bushing having an integrally formed flat arm projecting radially outwardly therefrom, the arm being located inside the contact housing adjacent the opening to the motor housing; a pair of electrical wiper contacts fixedly attached to the underside of the radial arm, the wiper contacts each having an electrical terminal fixedly connected thereto, the terminals extending upwardly through the radial arm to project slightly above the top of the radial arm, the terminals each being operatively connected to one of the motor power supply leads;

- a stationary electrical contact assembly mounted on the vertical support pole in cooperating relationship with the rotatable electrical contact assembly, the stationary electrical contact assembly comprising: a round flange formed of rigid electrically insulating material, the flange having a central longitudinal hole therethrough encircling the vertical support pole tube, the flange being fixedly attached to the tube adjacent the third aperture such that the upper surface of the flange is in touching weight bearing relationship with the bottom surface of the rotary bushing whereby supporting the fan and rotatable contact assembly while simultaneously allowing the fan to revolve freely around the support pole; a pair of spaced apart concentric electrical contact tracks concentrically mounted to the upper surface of the flange such that a track is contacted by a wiper to maintain electrical continuity regardless of the angular position of the rotatable contact assembly relative to the stationary contact assembly, each contact track having terminal means extending therefrom, the terminal means also extending through the third aperture of the vertical support pole tube wall, the track terminal means being operatively connected to the power cord such that closing the switching means contacts allows electrical current to flow through the contact tracks to the wiper contacts then through the power supply leads to energize the motor; and
- a stationary rail coaxially encircling the vertical support pole tube, the rail being in cooperative frictional contact with the rubber drive wheel of the fan whereby rotation of the

drive wheel causes the fan and rotatable electrical contact assembly to revolve around the vertical support post.

5,411,373

## CONVERTIBLE FLOOR FAN

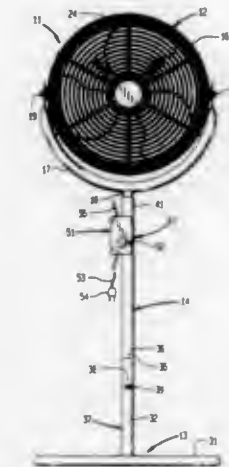
Bernard Chiu, Ashland, Mass., and Jui-Shang Wang, Taipei, Taiwan, Prov. of China, assignors to Duracraft Corporation, Whitinsville, Mass.

Filed Jun. 7, 1993, Ser. No. 72,374

Int. Cl.<sup>6</sup> F01D 5/00

U.S. Cl. 416—246

19 Claims



## 1. A portable electrical fan comprising:

- housing means defining inlet and outlet openings for transmitting air;
- a fan blade disposed in said housing means;
- a motor supported by said housing means and rotatably coupled to said fan blade;
- base means for placement on a support surface and having coupling means adapted for detachable connection to said housing means, said base means defining base receiving means and base locator means;
- an elongated standard having one end detachably secured to said coupling means and an opposite end detachably secured to said housing means, said standard defining standard receiving means and standard locator means;
- electrical control means connected to said motor;
- an enclosure retaining said electrical control means and adapted to be removably received by either said base receiving means or said standard receiving means in relative positions determined by, respectively, said base locator means and said standard locator means; and
- retainer means for securing said enclosure to either said base receiving means or said standard receiving means.

5,411,374

## CRYOGENIC FLUID PUMP SYSTEM AND METHOD OF PUMPING CRYOGENIC FLUID

Anker Gram, Vancouver, Canada, assignor to Process Systems International, Inc., Westborough, Mass.

Filed Mar. 30, 1993, Ser. No. 39,908

Int. Cl.<sup>6</sup> F04B 15/08

U.S. Cl. 417—53

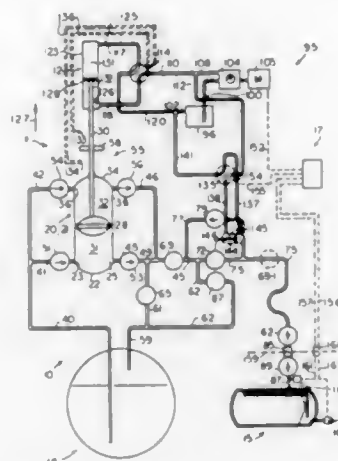
40 Claims

## 1. A cryogenic fluid pump comprising:

- a) a pump body having a hollow cylinder, inlet conduit, an inlet port, an outlet conduit and an outlet port and communicating with the cylinder;
- b) a pump piston reciprocable within the cylinder between a first chamber to receive cryogenic fluid from the inlet port during an induction stroke, and a second chamber to discharge fluid through the outlet port during a discharge stroke;



- c) a drive means for driving the pump piston to execute the reciprocating and discharge strokes;
- d) fluid inducting means for inducting fluid in the inlet conduit extending from a source of cryogenic fluid through the inlet port into the chamber to generate a reduced suction pressure and to remove cryogenic fluid vapor from the cryogenic fluid liquid in the inlet conduit at a rate faster than the cryogenic fluid liquid in the inlet conduit can vaporize thereby creating a pressure below the pressure of the source to induct the fluid into the pump;
- e) the inlet conduit leading from the cryogenic fluid source to the inlet port and having a volume which is generally



smaller than the stroke displacement volume of the chamber;

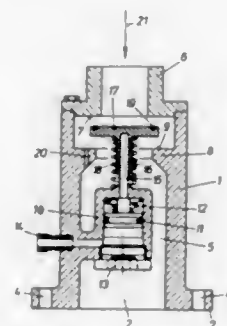
- f) a cryogenic fluid-receiving container connected to the outlet conduit, the container having a liquid compartment to contain the cryogenic fluid liquid and a vapor compartment to contain related cryogenic fluid vapor;
- g) a liquid overflow conduit extending between the liquid compartment and the vapor compartment; and
- h) an inlet conduit having an inlet discharge opening disposed within the liquid compartment to inject cryogenic fluid liquid into the liquid compartment in a dispersal pattern to contact and condense most cryogenic fluid vapor in the liquid compartment.

#### 5,411,375 INTAKE CONTROL VALVE

Friedrich Bauer, Wien, Austria, assignor to Hoerbiger Ventilwerke Aktiengesellschaft, Wien, Austria  
Filed Jun. 1, 1993, Ser. No. 69,386  
Claims priority, application Austria, Jun. 2, 1992, 1137/92  
Int. Cl.<sup>6</sup> F04B 49/00

U.S. Cl. 417—295

5 Claims



1. A non-return intake valve which is attachable to a screw compressor, said intake valve comprising:
- a body which defines a first portion, a second portion and an

internal fluid flow channel that extends from said first portion to said second portion to enable fluid to flow therethrough in an intake direction into a screw compressor, first valve seat means in said fluid flow channel in said first portion of said body, second valve seat means in said fluid flow channel between said first valve seat means and said second portion of said body, a control cylinder located in said fluid flow channel, and a control fluid passage leading to said control cylinder, and

a valve element which includes a control piston movable in said control cylinder, a locking element located in said fluid flow channel between said first valve seat means and said second valve seat means, and a rod extending between said control piston and said locking element, flow of control fluid through said control fluid passage into and out of said control cylinder determining the positioning of said control piston in said control cylinder and, with fluid flowing through said fluid flow channel in said intake direction from said first portion to said second portion of said body, whether said locking element is located against said second valve seat to tend to block fluid through said fluid flow channel or at a predetermined position between said first valve seat and said second valve seat to allow approximately the largest cross-sectional area of fluid flow through said fluid flow channel, stop means in the form of interengaging surfaces on said control piston and a portion of said body for limiting movement of said control piston and said rod in a direction toward said first valve seat means, said predetermined position being established by said stop means, said locking element being axially movable relative to said rod to enable said locking element to move against said first valve seat and prevent fluid flow through said fluid flow channel in a direction reverse to said intake direction.

#### 5,411,376 FUEL PUMP WITH NOISE SUPPRESSION

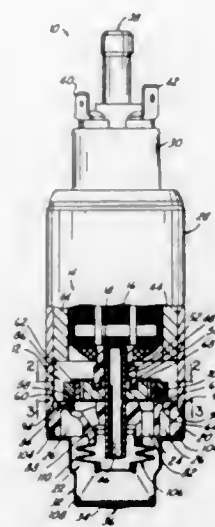
Kirk D. Fournier, Essexville; Ronald B. Kuenzli, Deford, and Charles H. Tuckey, Cass City, all of Mich., assignors to Walbro Corporation, Cass City, Mich.

Filed Dec. 15, 1993, Ser. No. 167,743

Int. Cl.<sup>6</sup> F04B 53/00

U.S. Cl. 417—312

21 Claims



1. A gear rotor pump comprising: an inner and an outer gear rotor having intermeshing teeth that define circumferentially disposed enlarging and ensmalling pumping chambers, an inlet end of the pump having spaced fluid inlet and outlet ports opening between said rotors into said enlarging and ensmalling chambers, respectively, a cantilever bearing received in said inlet end of the pump, and an electric motor having an arma-

ture with a shaft journaled for rotation and rotatably supported at only one end about its axis of rotation by said cantilever bearing and the armature being rotatably unsupported at its other end, and said armature being connected with at least one of said gear rotors for rotating them.

#### 5,411,377 MASS DISPLACEMENT WAVE ENERGY CONVERSION SYSTEM

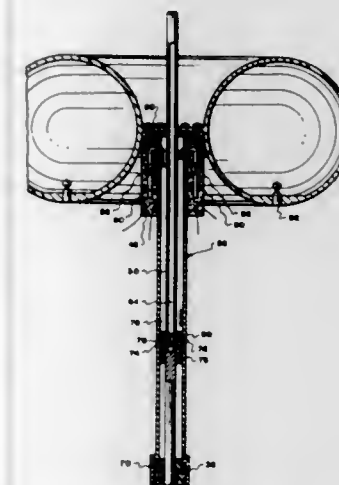
Michael P. Houser, 525 Kern Ave., Morro Bay, Calif. 93442, and Dwight F. Houser, 835 Wells Fargo Loop, Jacksonville, Ore. 97530

Filed Mar. 17, 1993, Ser. No. 33,643

Int. Cl.<sup>6</sup> F03B 3/12

U.S. Cl. 417—333

12 Claims



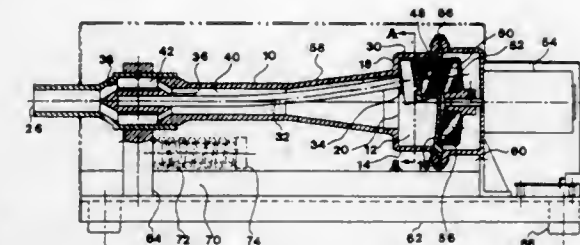
1. A mass displacement wave energy conversion system comprising:
- a platform;
- mounting means mounting said platform in a body of water above the water level;
- manifold means;
- reciprocating pump means mounted beneath said platform, said reciprocating pump means comprising:
- a shaft anchored to the floor of said body of water at a lower end;
- a passageway in said shaft connected to said manifold means;
- a piston mounted on said shaft;
- a sleeve slidably mounted on said shaft surrounding said piston to form a pumping chamber, said pumping chamber being connected to said passageway in said shaft;
- valve means connecting an inlet to supply water to said pumping chamber;
- buoyancy vessel means mounted to reciprocate said slidable sleeve on said shaft in response to a rise and fall of the level of said body of water;
- ballast ram means connected to pull said buoyancy vessel means downward with a predetermined force, the mass of said ballast ram means forcing water under pressure from said pumping chamber through said shaft passageway and into said manifold means;
- whereby said pump means creates a volume of water at a predetermined pressure.

#### 5,411,378 ORBITING FLUID PUMP

Anatole J. Sipin, 221 E. 78th St., New York, N.Y. 10021  
Filed Sep. 8, 1992, Ser. No. 16,207  
Int. Cl.<sup>6</sup> F04B 17/00

U.S. Cl. 417—360

17 Claims



1. An orbiting fluid pump, comprising:
- (a) a housing with a longitudinal axis, said housing having a first end and a second end spaced apart on the axis.
- (b) a pumping chamber at the first end of said housing, said pumping chamber being defined by a longitudinal co-axial wall, a first, continuous, transverse wall to close said pumping chamber at said first end of the housing, and a second transverse wall with a central opening, axially spaced from said first transverse wall.
- (c) an outlet in the longitudinal wall of said pumping chamber,
- (d) an inlet in said housing, outside of, and axially spaced, from said pumping chamber, said housing being free of bearings, flexing seals or apertures leading to the exterior of the housing except for said inlet and outlet,
- (e) a circulator in said pumping chamber, said circulator being mounted on a support, which is free of rotating elements, and which provides freedom of motion for said circulator to revolve in an orbital path about the longitudinal axis of said housing, and magnetic means external to the housing to drive the circulator in an orbital path within the pumping chamber by magnetic action through the walls of the housing.

#### 5,411,379 PNEUMATIC FAN

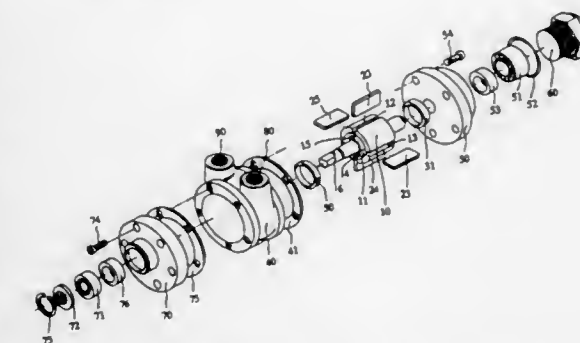
A-Fa Luo, No. 22, Shu-Yi 1 Lane, South Area, Taichung, Taiwan, Prov. of China

Filed Aug. 10, 1993, Ser. No. 104,982

Int. Cl.<sup>6</sup> F04B 9/08

U.S. Cl. 417—390

2 Claims



1. A pneumatic fan comprising
- a pneumatic motor, an air transporting means, and an air compressor,
- wherein said pneumatic motor has a motor seat and a revolving wheel with a rotary main shaft, said rotary main shaft being provided respectively at both ends thereof with a stepped fillet into which a collar is fitted;
- said revolving wheel having a plurality of slots, in each of

which an impeller is movably disposed such that said impeller can extend out of one of said slots to urge said collar so as to cause another impeller opposite said impeller to change the length thereof extending out of another one of said slots as a result of an eccentric relationship by which said pneumatic motor is disposed within said motor seat, and close contacts respectively, therebetween; and said pneumatic motor is in communication with said air compressor via said air transporting means; said rotary fan further comprising a plurality of fan blades affixed to said rotary main shaft so as to function as a fan when said rotatory main shaft rotates as a result of a compressed air passing through said motor seat.

5,411,380

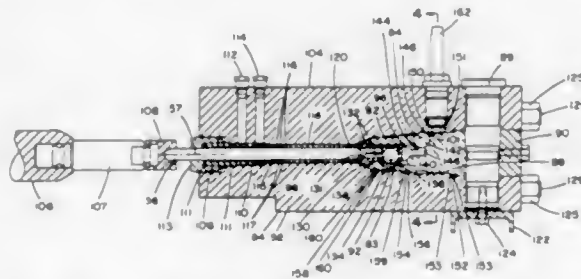
# HIGH PRESSURE HOMOGENIZING PUMP HAVING REMOVABLE CHECK VALVE MODULES

John M. Bristol, Rye, N.H., and Robert A. Drainoni, Lexington, Mass., assignors to APV Gaulin, Inc., Wilmington, Mass. Continuation of Ser. No. 97,665, Jul. 27, 1993, abandoned. This application Jul. 25, 1994, Ser. No. 279,687

Int. Cl.<sup>6</sup> F04B 21/02; F16K 15/04

U.S. Cl. 417—454

60 Claims



1. A pump comprising: a pump block; a pump chamber formed in the pump block along a substantially horizontal pump axis; a horizontal bore formed in the pump block to intersect a distal end of the pump chamber; a removable valve module positioned in the bore, the module comprising a suction valve assembly and a discharge valve assembly, each being in communication with the distal end of the pump chamber, each valve assembly disposed along a substantially vertical axis angled relative to the pump axis; and a retaining pin for mounting the module to the pump block, the retaining pin extending transversely to the pump axis through the module.

5,411,381

# RECIPROCATING PUMP

Philip E. Perrodin, 1030 D Delcambre Rd., Breaux Bridge, La. 70517

Filed Mar. 8, 1994, Ser. No. 207,073

Int. Cl.<sup>6</sup> F04B 45/033

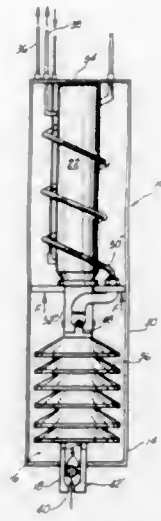
U.S. Cl. 417—472

5 Claims

1. A pumping apparatus for a well comprising: (a) a sealed pump housing adapted to be suspended within a well casing wherein at least a lower region of said pump housing is submerged below the level of the fluid to be pumped from said well; (b) movable cylinder means secured within said pump housing, said movable cylinder means being operatively connected to flexible bellows means for containing said fluid pump from said wall to within said pumping house; (c) intake valve means secured to said lower region of said pump housing for permitting one-way fluid flow into said bellow means; (d) discharge port in fluid communication with said bellow

means for permitting discharge of said fluid from said bellows means;

- (e) discharge tubing coupled to said discharge port and extending helically upwardly within said pump housing before exiting an upper region of said pump housing and piercing the upper region of said well casing;



- (f) exit valve means provided in said discharge tubing for permitting one-way flow along said discharge tubing; and, (g) control means for activating said movable cylinder means, whereby fluid in said well casing is alternately drawn into said bellows means via said intake valve means and discharged therefrom through said discharge port and tubing.

5,411,382

# OIL PUMP, MORE PARTICULARLY FOR A CHAIN SAW

Hermann Duensing, Hamburg, Germany, assignor to Domar GmbH, Hamburg, Germany

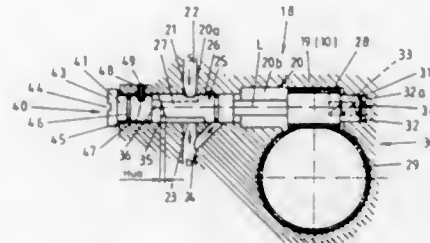
Filed Mar. 4, 1993, Ser. No. 26,378

Claims priority, application Germany, Mar. 13, 1992, 9203378 U

Int. Cl.<sup>6</sup> F04B 7/06

U.S. Cl. 417—500

8 Claims



1. An oil pump (18) which comprises: (a) a cylindrical pump chamber (20) constructed in a pump casing (19), the pump chamber having an intake slot (21) and an outlet slot (23); (b) a pump piston (25) slidably and rotatably located in the pump chamber (20), wherein the piston is rotatable by means of a gearing (30); and (c) a sloping surface area (35) on the pump piston (25), said surface area (35) being springably supported against a stop (36) which is disposed in the direction of a central longitudinal axis (L) of the pump piston (25) at a fixed distance (R) from the central longitudinal axis, wherein the fixed distance (R) predetermines the pump stroke; wherein the sloping surface area (35) wobbles when the pump piston (25) rotates, producing an axial reciprocating

movement of the pump piston (25) that produces the pumping effect; and wherein the angular position of the stop (36) about the central longitudinal axis (L) of the pump piston is adjustable about an axis of rotation whereby a change in the angular position of the stop causes a greater or lesser flow volume by decreasing or increasing, respectively, the amount of time during each stroke of the pump piston in which both the inlet slot and the outlet slot are open simultaneously.

5,411,383

# ROTOR AND FLEXIBLE DRIVE SHAFT ASSEMBLY

Aron T. Parnell, Blackley, and Gareth D. Thomas, Hadfield, both of United Kingdom, assignors to Mono Pumps Limited, Manchester, United Kingdom

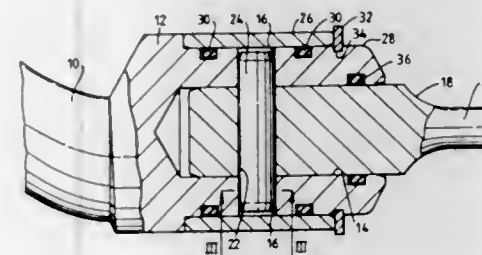
Filed Apr. 12, 1994, Ser. No. 226,713

Claims priority, application United Kingdom, Dec. 9, 1993, 9325248

Int. Cl.<sup>6</sup> F01C 5/00

U.S. Cl. 418—48

8 Claims



1. A rotor and flexible drive shaft assembly for a progressive cavity pump or motor, said rotor comprising a rotor body with a helical gear formation thereon, an end portion of said rotor having an axial blind bore in said end portion, a flexible drive shaft, a head portion of said drive shaft closely engageable in said axial blind bore, two aligned parts of a first transverse through passage in the end portion of said rotor intersecting the blind bore therein, a second transverse through passage in said head portion of said drive shaft, said first and second passages being aligned with one another and being of substantially the same diameter, a pin engaged in said first and second passages, a retaining sleeve surrounding said end portion, at least one sealing ring mounted on said end portion and within said sleeve effective to provide a seal portion and within said sleeve effective to provide a seal between the retaining sleeve and the end portion of the rotor and means for holding said sleeve on said end portion.

5,411,384

# SCROLL COMPRESSOR HAVING UPPER AND LOWER BEARING HOUSINGS AND A METHOD OF TESTING AND ASSEMBLING THE COMPRESSOR

Mark Bass, Sidney; Jean-Luc Caillat, Dayton, and Gary J. Anderson, Sidney, all of Ohio, assignors to Copeland Corporation, Sidney, Ohio

Continuation of Ser. No. 7,613, Jan. 22, 1993, abandoned, which is a continuation-in-part of Ser. No. 863,949, Apr. 6, 1992, abandoned, which is a continuation-in-part of Ser. No. 591,444, Oct. 1, 1990, Pat. No. 5,102,316, which is a continuation-in-part of Ser. No. 387,699, Jul. 31, 1989, Pat. No. 4,992,033, which is a division of Ser. No. 189,485, May 2, 1988, Pat. No. 4,877,382, which is a division of Ser. No. 899,033, Aug. 22, 1986, Pat. No. 4,767,293. This application May 5, 1994, Ser. No. 238,586

Int. Cl.<sup>6</sup> F01C 1/04, 21/02; B23P 19/02; G01M 19/00

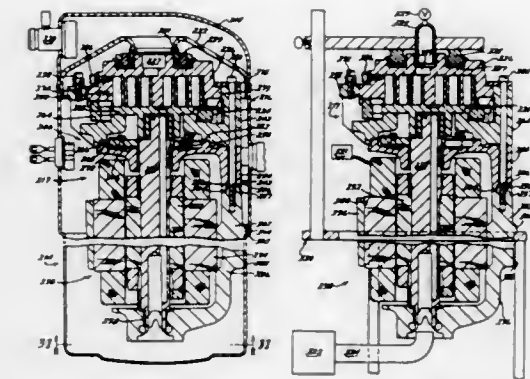
U.S. Cl. 418—55.1

28 Claims

1. A method of testing a hermetic scroll-type compressor prior to final assembly of said compressor in said shell, said method comprising: assembling a scroll-type compressor including a driving motor,

connecting said driving motor to a power source, energizing said motor to operate said compressor, and thereafter installing said compressor in a hermetically sealed shell.

6. A scroll-type machine comprising: a first scroll member including a first end plate having a first spiral wrap disposed on said first end plate; a second scroll member including a second end plate having a second spiral wrap disposed on said second end plate; a drive shaft drivingly coupled to said second scroll member for effecting orbital movement of said second scroll member relative to said first scroll member;



- motor means including a rotor secured to said drive shaft and a stator surrounding said rotor; a stationary body, said stationary body including a first member supporting said first and second scroll members for relative orbital movement, a second member for supporting said stator in a surrounding position relative to said rotor, said first and second members including interengaging locating means for accurately radially and axially positioning said first and second members relative to each other; and fastening means for securing said first and second members together.

5,411,385

# ROTARY COMPRESSOR HAVING OIL PASSAGE TO THE BEARINGS

Shinya Eto; Yoichi Okawa; Shoichi Simada, all of Tokyo, and Makoto Ijiri, Narashino, all of Japan, assignors to Calsonic Corporation, Tokyo and Seiko Seiki Co., Ltd., Narashino, both of Japan

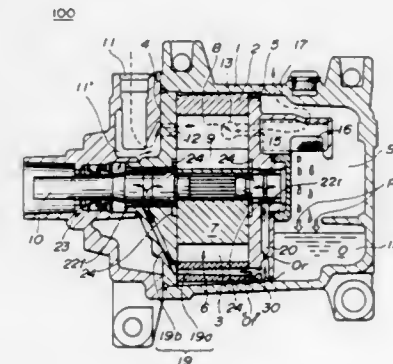
Filed Nov. 18, 1993, Ser. No. 154,027

Claims priority, application Japan, Nov. 20, 1992, 4-080531 U

Int. Cl.<sup>6</sup> F04C 18/344, 29/02

U.S. Cl. 418—96

7 Claims



1. A rotary compressor comprising: a casing;



a cylinder unit tightly installed in said casing, said cylinder unit having an enclosed rounded bore formed therein, said cylinder unit including a cylinder, a front side block and a rear side block wherein said cylinder is between said front side block and said rear side block to define said enclosed rounded bore;

a rotor unit including a shaft and a rotor proper mounted on the shaft, said shaft extending along the axis of said rounded bore in such a manner that the rotor proper is rotatably disposed in said rounded bore;

a plurality of sliding vanes slidably received in radially extending grooves formed in said rotor proper;

means defining in said front side block an inlet port exposed to compressor chambers, each compressor chamber being defined by two adjacent sliding vanes, an inner wall of said rounded bore, and an outer wall of said rotor proper;

means defining in said rear side block an outlet port exposed to said compressor chambers;

bearing means for bearing said shaft relative to said front side block and said rear side block of said cylinder unit;

means for defining in said casing an oil reservoir in which lubrication oil is reserved; and

means defining in said cylinder, said front side block and said rear side block of said cylinder unit respective oil passages to constitute front and rear oil passages through which said lubrication oil flows from said oil reservoir to both the bearing means at said front side block and said rear side block,

wherein said front oil passage is formed with a diametrically reduced portion which acts as an orifice, said diametrically reduced portion being defined by only said rear side block of said cylinder unit.

5,411,386

## RANDOM ORBITAL SANDER

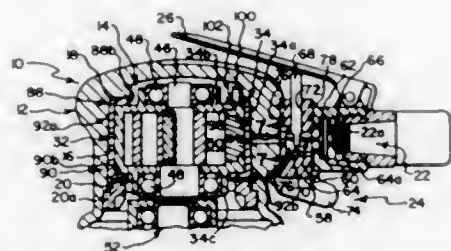
Paul W. Huber, Lancaster, and David G. Heckmiller, Jr., Orchard Park, both of N.Y., assignors to Dynabrade, Inc., Clarence, N.Y.

Division of Ser. No. 976,434, Nov. 13, 1992, Pat. No. 5,319,888. This application Nov. 8, 1993, Ser. No. 148,569

Int. Cl.<sup>6</sup> F01C 19/00; F03C 2/00

U.S. Cl. 418—149

30 Claims



1. In an air driven device having a housing formed with a motor mounting chamber and air supply and exhaust passageways communicating with said chamber and spaced apart annularly thereof, and a pneumatic motor including a motor casing non-rotatably supported within said chamber and having annularly spaced air supply and exhaust ports opening through a side wall of said casing intermediate first and second end portions thereof and for communication with said air supply and exhaust passageways, respectively, the improvement comprising:

resiliently deformable means for resiliently mounting said casing within said chamber and for fluid sealing said air supply passageway and air supply port from said air exhaust passageway and said air exhaust port.

5,411,387  
ROTARY DISPLACEMENT COMPRESSOR HAVING  
ADJUSTABLE INTERNAL VOLUME RATIO AND A  
METHOD FOR REGULATING THE INTERNAL  
VOLUME RATIO

Stig Lundin, Värmdö, and Hakan Saletti, Tyresö, both of Sweden, assignors to Svenska Rotor Maskiner AB, Stockholm, Sweden

PCT No. PCT/SE92/00306, § 371 Date Oct. 29, 1993, § 102(e) Date Oct. 29, 1993, PCT Pub. No. WO92/20924, PCT Pub. Date Nov. 26, 1992

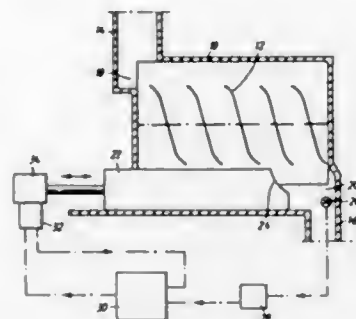
PCT Filed May 12, 1992, Ser. No. 140,051

Claims priority, application Sweden, May 14, 1991, 9101448

Int. Cl.<sup>6</sup> F01C 1/16

U.S. Cl. 418—201.2

14 Claims



1. In a rotary displacement compressor having an inlet port (18), an outlet port (20), working chambers arranged to receive a working medium from said inlet port (18) and for outputting compressed working medium to said outlet port (20), an adjustable regulator (22) for determining the internal volume ratio of the compressor,

the improvement comprising:

a sound sensor (26) arranged adjacent to the outlet port (20) of the compressor for sensing a sound of the compressed working medium;

registering means (28,30) for registering a sound level of the sound of the compressed working medium as sensed by said sound sensor (26); and

a governor (32) coupled to said registering means (28,30) for controlling said adjustable regulator (22) in response to a registered sound level of said sensed sound of said compressed working medium, to thereby control the internal volume ratio of the compressor in response to the registered sound level of said sensed sound.

5,411,388

## ROTARY SCREW MACHINE WITH THRUST BALANCED BEARINGS

Frits Söderlund, Saltsjöbaden, Sweden, assignor to Svenska Rotor Maskiner AB, Stockholm, Sweden

PCT No. PCT/SE92/00767, § 371 Date Apr. 12, 1994, § 102(e) Date Apr. 12, 1994, PCT Pub. No. WO93/10333, PCT Pub. Date May 27, 1993

PCT Filed Nov. 5, 1992, Ser. No. 211,677

Claims priority, application Sweden, Nov. 13, 1991, 9103337

Int. Cl.<sup>6</sup> F04L 18/16

U.S. Cl. 418—203

12 Claims

1. A rotary screw machine having a low pressure side and a high pressure side, for use with a gaseous working medium, comprising:

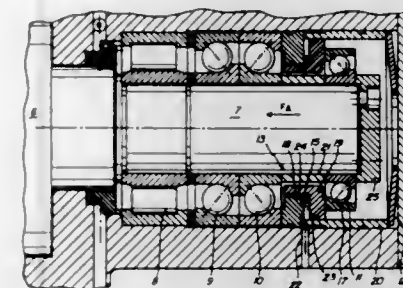
a casing (1) having a low pressure end section (2) and a high pressure end section (3);

at least one screw rotor (6) operating in said casing, said at least one rotor (6) at operation being exposed to axial gas forces ( $F_A$ ) in a positive axial direction from said high pressure end section (3) towards said low pressure end section (2), and said at least one rotor (6) having at least one shaft journal (7) mounted in bearings (8, 9, 10, 11) in

one of said end sections of said casing (1), said at least one shaft journal (7) having an outer end;

said bearings (8, 9, 10, 11) including thrust bearing means (9, 10, 11) with main thrust bearing means (9, 10) adjacent to said at least one rotor (6) and balancing thrust bearing means (11) adjacent said outer end of said at least one shaft journal (7);

said thrust bearing means (9, 10, 11) including thrust balancing means (13) located axially between said main thrust bearing means (9, 10) and said balancing thrust bearing means (11) and exerting a positively directed axial force on said main thrust bearing means (9, 10) in said positive



axial direction, and a negatively directed axial force on said balancing thrust bearing means (11) in a negative axial direction which is opposite to said positive axial direction; clamping means (12) acting on said thrust bearing means (9, 10, 11) in said positive axial direction, said clamping means (12) acting only on said main thrust bearing means (9, 10) of said thrust bearing means (9, 10, 11); and

said main thrust bearing means (9, 10) transferring axial forces in both of said positive and negative axial directions, and said balancing thrust bearing means (11) only transferring forces which act on said shaft journal (7) in said positive axial direction.

5,411,389

## APPARATUS FOR THE CONTINUOUS PRODUCTION OF FOAMED PLASTICS

Ingo Kellerhof, Seelscheid; Hans-Dieter Pfeil, Wuppertal, and Kurt Krippel, Monheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

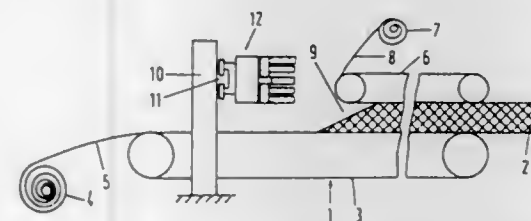
Filed Dec. 10, 1993, Ser. No. 165,122

Claims priority, application Germany, Dec. 21, 1992, 42 43 277.4

Int. Cl.<sup>6</sup> B29C 44/20, 44/50

U.S. Cl. 425—4 C

6 Claims



1. An apparatus for the continuous production of foamed plastics comprising

i) a continuous conveyor belt,

ii) a transversely reciprocating applicator device located over said belt for applying a foam-forming reaction mixture, said applicator device comprising:

a) a mix head where the components of said mixture are mixed, said mix head having an outlet channel, said outlet channel pointing towards

b) a detachably mounted magazine plate has several openings thereon, each of said openings having a casting tube connected thereto, wherein each of said casting tubes points in the conveying direction of the conveyor

belt and has discharge holes on the underside, and wherein said plate is adjustable in such a way that said casting tubes can be connected successively via the corresponding openings with said outlet channel.

5,411,390

## APPARATUS FOR PRODUCING SHAPED PRODUCTS

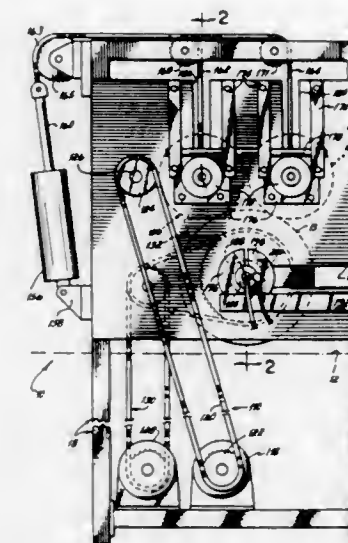
Rudolph J. Fay, 6911 Wildflower Trail, Cincinnati, Ohio 45230

Filed Nov. 15, 1993, Ser. No. 152,858

Int. Cl.<sup>6</sup> B29C 43/00

U.S. Cl. 425—145

36 Claims



1. Apparatus for producing configured products comprising:

a frame;

a rotary die roll rotatably supported by said frame and having a plurality of die cavities arranged in a predetermined pattern in an outer surface thereof, and

a pair of feed rolls rotatably supported by said frame and disposed adjacent said die roll and adjacent one another so as to define a nip between each of said feed rolls and said die roll and further defining a generally triangular cross section product material pressure chamber between peripheral surfaces of said feed rolls and said die roll for receiving viscous fluid product from between said feed rolls, at least one of said feed rolls having a feed roll shaft extending through first slots in said frame and supported in feed roll bearings attached to opposite ends of said feed roll shaft, said feed roll bearings being slidably mounted in tracks fixed to said frame adjacent said first slots and disposed on opposite ends of said one feed roll to allow movement of said one feed roll toward and away from said die roll and said die roll having a die roll shaft extending through second slots in said frame and supported in die roll bearings attached to opposite ends of said die roll shaft, said die roll bearings being supported for rolling movement on rails fixed to said frame adjacent said second slots such that said die roll may be rolled out of said apparatus while said die roll bearings are supported on said rails and after said one feed roll is moved away from said die roll, said die roll bearings being selectively locked in place proximate inner ends of said second slots but unlockable to allow said die roll bearings to roll along said rails.

5,411,391

## PRESTRESS DEVICE

Peter Albrecht, Hamburg; Michael Linke, Ahrensburg, and Marek Peterko, Tornesch, all of Germany, assignors to Krupp Corpoplast Maschinenbau GmbH, Germany

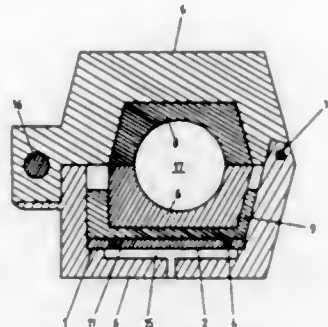
Filed Apr. 7, 1993, Ser. No. 44,305

Claims priority, application Germany, Apr. 15, 1992, 42 12 584.7

Int. Cl.<sup>6</sup> B29C 49/56

U.S. Cl. 425—451.9

17 Claims



14. A device for applying a prestress to structural elements which are positioned adjacent to each other in the area of a mould seam, said structural elements together defining an internal space for forming an article, said device comprising:

- a positioning element with means for applying a prestressing force to said structural element, said positioning element having a front surface and a back surface;
- a peripheral element surrounding said positioning element and positioned in spaced relationship to said positioning element, said peripheral element having a front surface and a back surface; and
- an elastomeric member positioned in said space between said positioning element and said peripheral element, said elastomeric member forming an elastic interconnection between said peripheral element and said positioning element, said elastomeric member overlying said front and back surfaces of said positioning element and said peripheral element.

5,411,392

## HEATED NOZZLE INCLUDING A HEATER CLAMP ARRANGEMENT

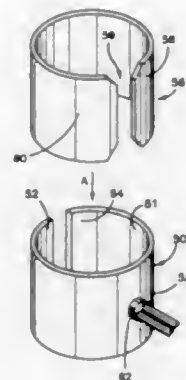
Stefan Von Buren, Toronto, Canada, assignor to Husky Injection Molding Systems Ltd., Bolton, Canada

Filed Nov. 15, 1993, Ser. No. 151,941

Int. Cl.<sup>6</sup> B29C 45/20

U.S. Cl. 425—549

19 Claims



1. A heated nozzle assembly for use in plastic molding, including: a nozzle having a channel means for transferring molten plastic; an electrically activated, band heater having an

outside diameter around at least a portion of said nozzle for heating said channel means and said molten plastic; and means adjacent said band heater placing continuous pressure on said band heater to urge said band heater towards said nozzle, said continuous pressure means comprised of a material which exhibits spring characteristics, formed with a diameter less than the outer diameter of said heater, and such that said continuous pressure means places continuous pressure on said heater to urge the heater towards said nozzle when the heater is electrically activated or deactivated.

5,411,393

## PREMIX BURNER FOR FURNACE WITH GAS ENRICHMENT

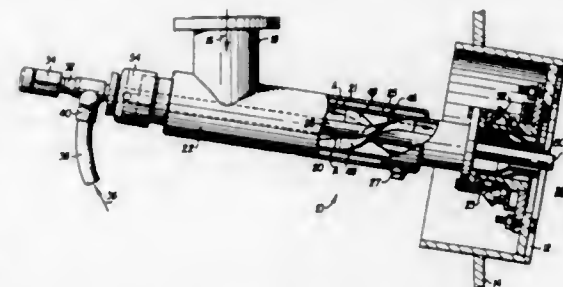
Kerim Askin, and John D. Butler, both of Carroll County, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Jan. 4, 1993, Ser. No. 46

Int. Cl.<sup>6</sup> F23D 21/00

U.S. Cl. 431—8

6 Claims



1. A method of operating a burner apparatus for use with a metal processing furnace having a combustion chamber fired by a premixed gaseous fuel, said burner apparatus comprising a burner body having a fuel inlet and an outlet and a central bore communicating said inlet with said outlet, a supply tube disposed in said burner body for directing a secondary gas flow into said combustion chamber, said supply tube having a first end adjacent said outlet and means coupled to said supply tube and operable from outside the burner body for adjusting the axial position of the first end of said supply tube in relation to said outlet, the method comprising:

- directing a flow of premixed gaseous fuel through the inlet of the burner body and into the combustion chamber;
- igniting the fuel flow passing into said combustion chamber to create a flame therein;
- directing said secondary gas flow through said supply tube and into the flame in the combustion chamber; and
- adjusting the axial position of the first end of said supply tube from outside the furnace during operation thereof to adjust the burner flame in the combustion chamber.

5,411,394

## COMBUSTION SYSTEM FOR REDUCTION OF NITROGEN OXIDES

Janos M. Beer, Winchester, Mass.; Alessandro Marotta, Milan, Italy, and Majed A. Toqan, Wellesley, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 771,739, Oct. 4, 1991, abandoned, which is a continuation-in-part of Ser. No. 593,679, Oct. 5, 1990, abandoned. This application Oct. 5, 1993, Ser. No. 131,867

Int. Cl.<sup>6</sup> F23D 1/00, 11/00

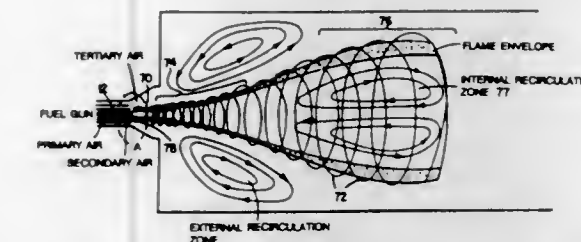
U.S. Cl. 431—9

46 Claims

34. A method for low NO<sub>x</sub>-emission burning of a fuel, comprising the steps:

- providing a fuel flow along an axis and a stratifying flow, including oxidant gases, formed by multiple component flows concentrically disposed about said fuel flow,

stratifying to limit mixing of oxidant gases with said fuel flow to maintain a high temperature fuel rich core zone near said insertion region and induce mixing in a lower temperature zone spaced from said insertion region, said stratifying being achieved by providing the combination of a radial density gradient from low density, high temper-



ature in said core zone close to said axis to higher density, lower temperature spaced radially from said core zone and swirling said stratifying flow; determining the degree of stratification by determining the modified Richardson number; controlling the stratification to effect low NO<sub>x</sub> emission.

5,411,395

## FUEL JET BURNER

Hisashi Kobayashi, Putnam Valley, and Arthur W. Francis, Jr., Monroe, both of N.Y., assignors to Praxair Technology, Inc., Danbury, Conn.

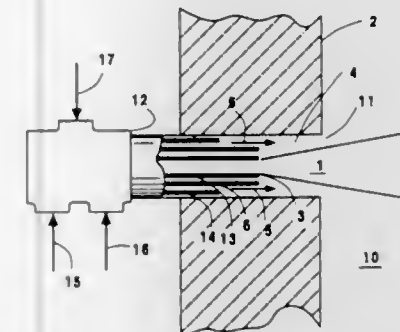
Division of Ser. No. 893,830, Jun. 4, 1992, Pat. No. 5,267,850.

This application Nov. 12, 1993, Ser. No. 150,908

Int. Cl.<sup>6</sup> F23C 7/00

U.S. Cl. 431—187

6 Claims



1. A fuel jet burner system comprising:

- (A) a substantially cylindrical cavity within a combustion zone wall having an opening with a diameter D communicating with the combustion zone;
- (B) a central conduit having a nozzle for injecting a high velocity fuel stream at a velocity not less than 200 feet per second into the cavity toward the opening said central conduit and nozzle communicating with a source of fuel and having a tip positioned at a recess from the opening, said recess having a length L such that L/D is at least 1.0 but not more than 4.0; and
- (C) an annular injector for providing low velocity oxidant at a velocity not more than 100 feet per second into the cavity coaxially with the central conduit and nozzle, said annular injector communicating with a source of oxidant having an oxygen concentration of at least 30 percent, said cylindrical cavity, central conduit and annular injector establishing a stable flame attached to the nozzle.

5,411,396

## METHOD OF AND IMPLEMENT FOR EXTRACTION OF DENTAL PROSTHESES

Siegfried Frel, Teufen, Switzerland, assignor to ATD S.A.R.L., Cedex, France

Filed Jan. 28, 1994, Ser. No. 188,086

Claims priority, application Switzerland, Jan. 28, 1993, 00246/93

Int. Cl.<sup>6</sup> A61C 3/00

U.S. Cl. 433—153

27 Claims



1. An implement for nondestructive extraction of a dental prosthesis of the type affixed to at least one tooth and having an external surface, comprising two discrete jaws bondable to spaced-apart portions of the external surface of a prosthesis; an extracting tool; and elongated flexible coupling means for separably connecting said jaws with said tool, said extracting tool comprising a follower movable longitudinally of said coupling means.

5,411,397

## AIRCRAFT FIRE FIGHTING TRAINER HAVING A MIXTURE OF LIQUID AND AGGREGATE PARTICLES AS A FUEL DIFFUSER

William Rogers, Hopatcong; James J. Ernst, Livingston; Steven Williamson, Haledon, and Dominick J. Musto, Middlesex, all of N.J., assignors to Symtron Systems, Inc., Fair Lawn, N.J.

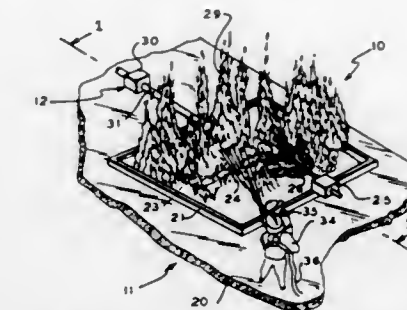
Filed Jan. 22, 1993, Ser. No. 7,474

The portion of the term of this patent subsequent to Oct. 8, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> G09B 19/00

U.S. Cl. 434—226

10 Claims



1. In a fire fighting trainer comprising supply means for supplying a pressurized liquid fuel, distribution means connected to the supply means for distributing the liquid fuel into liquid fuel jets, a diffuser means having an upper surface and ignition means for igniting the liquid fuel vapor on the diffuser means upper surface to simulate a gasoline or similar fire, the improvement which comprises utilizing as said diffuser means a mixture of liquid and aggregate particles.



5,411,398

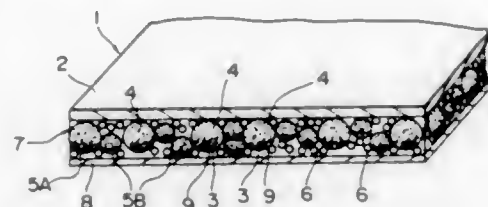
## MAGNETIC DISPLAY SYSTEM

Masayuki Nakanishi, Kanagawa, and Yasuyuki Kanno, Hiratsuka, both of Japan, assignors to Japan Capsular Products, Inc., Chiyoda, Japan

Continuation-in-part of Ser. No. 892,123, Jun. 2, 1992, abandoned. This application Jan. 14, 1994, Ser. No. 181,442 Int. Cl.<sup>6</sup> B43L 1/00

U.S. Cl. 434-409

11 Claims



1. A magnetic display arrangement, comprising:  
a substantially transparent non-magnetic substrate sheet; and  
a layer formed from a composition containing a mixture of microcapsules coated on said substrate, said layer of microcapsules comprising a mixture of microcapsules with a substantially transparent wall containing both light-absorptive magnetic particles and light-reflective non-magnetic particles dispersed in an oily liquid therein, wherein said oily liquid having said magnetic particles and said non-magnetic particles dispersed therein has the characteristics of having a viscosity at 20° C. of 3-50 cP and a specific gravity at 20° C. of 0.85-1.05 and microcapsules with a substantially transparent wall containing only an oily liquid therein;

wherein said microcapsules containing both said light-absorptive magnetic particles and said light-reflective non-magnetic particles are provided in said mixture in at least two different sizes ranging from a minimum diameter of 100 microns to a maximum diameter of 1,000 microns; and

wherein said microcapsules containing only an oily liquid therein have an average diameter smaller than the average diameter of said microcapsules containing both said light-absorptive magnetic particles and said light-reflective non-magnetic particles therein.

5,411,399

## CIRCUIT BOARD CONNECTOR

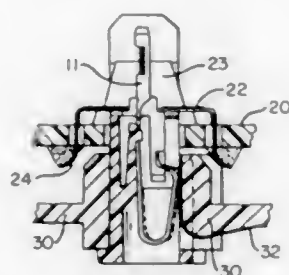
Hideki Okuyama, Kariya; Masahiro Yamamoto, Yokohama, and Toshimitsu Sonobe, Tokyo, all of Japan, assignors to Thomas & Betts Corporation, Memphis, Tenn.

Filed Feb. 11, 1993, Ser. No. 16,332

Claims priority, application Japan, Feb. 13, 1992, 4-026715 Int. Cl.<sup>6</sup> H01R 9/09

U.S. Cl. 439-67

6 Claims



1. A connector comprising:  
an insulative male housing (10) supporting therein a plurality of conductive plug contacts (11);  
a substrate (20) engaged with said male housing, said substrate having a plurality of conductive receptacle contacts

(21) making electrical connection with the plug contacts in said housing; and

a case member (30) engaged with said male housing, said case member having a conductor (31) making electrical connection with said plug contacts, each of said receptacle contacts (21) comprising a main part (22) attached to said substrate spacedly from a surface thereof, a plate-shaped spring contact (23) projecting upwardly from said main part and pinching said plug contact thereby making connection with said conductor (31), and a leg (24) projecting downward from the main part and soldered on a rear surface of said substrate.

5,411,400

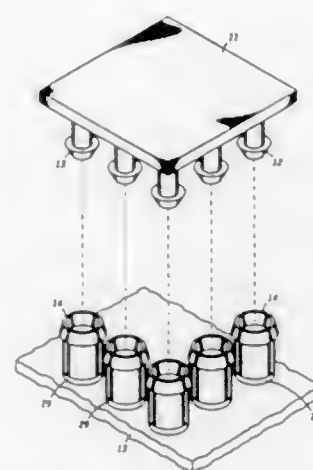
## INTERCONNECT SYSTEM FOR A SEMICONDUCTOR CHIP AND A SUBSTRATE

Ravichandran Subrahmanyam, Scottsdale; Ravinder K. Sharma, Mesa; William H. Lytle, Chandler, and Barry C. Johnson, Scottsdale, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 952,008, Sep. 28, 1992, abandoned. This application Mar. 14, 1994, Ser. No. 209,353 Int. Cl.<sup>6</sup> H01R 9/09

U.S. Cl. 439-68

19 Claims



13. An electrical and physical interconnect comprising:

a semiconductor substrate;

a plurality of external connection terminals formed on said semiconductor substrate;

a socket formed on each external connection terminal of said semiconductor substrate, wherein said socket and wherein said socket comprises a sectioned ring, each section of said sectioned ring having a flanged head formed thereon.

5,411,401

## STRUCTURE OF ELECTRICAL CONNECTOR

Charles Chiou, Taipei, Taiwan, Prov. of China, assignor to Silltek Corporation, Taipei, Taiwan, Prov. of China

Filed Mar. 8, 1994, Ser. No. 207,470

Int. Cl.<sup>6</sup> H01R 13/627

U.S. Cl. 439-76

2 Claims

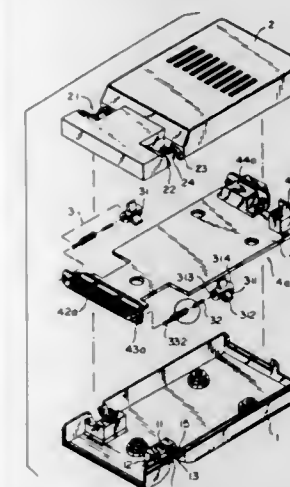
1. An electrical connector comprising:

a bottom shell having two mounting blocks bilaterally disposed at a top near a front side thereof, each mounting block having a front circularly recessed arm and a rear circularly recessed arm spaced by an opening and a stop rib raised from the rear circularly recessed arm;

a cover shell covered on said bottom shell and having two mounting block bilaterally disposed at a bottom and fitting over the mounting blocks on said bottom shell respectively, each mounting block of said cover shell comprising two circularly recessed arms spaced by an opening;

a PC board received within said cover shell and said bottom shell and having a male connector with two opposite mounting holes for connecting to a parallel port on a mainframe of a computer;

two fasteners respectively mounted on the mounting blocks of said bottom shell and said cover shell for fastening the male connector of said PC board to the parallel port on the mainframe of the computer, each fastener comprising of a rotary driving roller, a spring, and a bolt, said rotary driving roller comprising a plurality of wings equally spaced around a circle and disposed in the openings on the mounting blocks on said bottom shell and said cover shell



at a said side, a front axle supported on the circularly recessed front arms of the respective mounting blocks and having a polygonal center hole, and a rear axle supported on the circularly recessed rear arms of the respective mounting blocks, said bolt having a rear end terminating in a polygonal tube inserted into the polygonal center hole on said front axle and a front end terminating in a screw rod inserted through either mounting hole on the male connector of said PC board and driven by said rotary driving roller into a respective screw hole on the mainframe of the computer, said spring being received in said polygonal tube to support said bolt on said rotary driving roller.

5,411,402

## CONNECTOR ASSEMBLY FOR IC CARD

Gary C. Bethurum, Laguna Niguel, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Dec. 17, 1993, Ser. No. 169,682

Int. Cl.<sup>6</sup> H01R 13/627

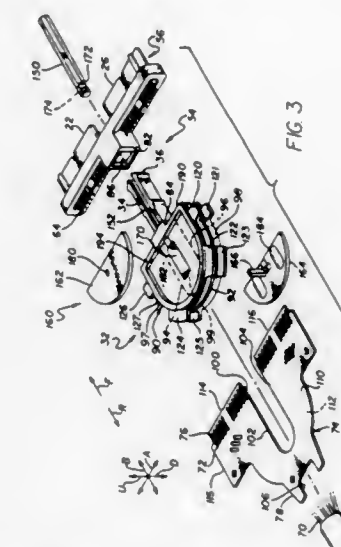
U.S. Cl. 439-77

20 Claims

1. A connector assembly which includes a frame having a forward portion with a lateral width and with a laterally extending row of passages, a board mounted to said frame and extending rearwardly of said frame forward portion, a cable having a stripped front portion lying at a rear portion of said board, said cable having a plurality of insulated wires extending at least partially forwardly along said board with said wires having wire front ends, and a plurality of contacts with forward portions lying in said passages and with rearward tails lying substantially on said board and connected to said wire front ends, characterized by:

said frame includes a rearward extension extending rearwardly from said frame forward portion, said rearward extension having a lateral width that is less than the width of said frame forward portion, said rearward extension having opposite sides, and said rearward extension having a groove with said groove having groove sides extending

along said opposite sides of said rearward extension and exposed thereat;  
said board having a front portion that is wider than said rearward extension, said board front portion having a part



that is closely received in said groove sides of said frame rearward extension, with said board having opposite side portions projecting beyond opposite sides of said rearward extension.

5,411,403

## BRIDGED ELECTRICAL PLUG

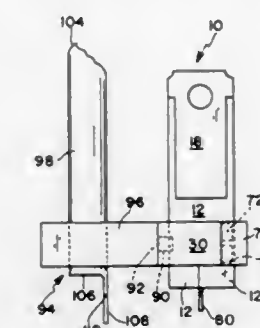
Stephen A. Blanche, Warwick, R.I., assignor to ETCO Incorporated, Warwick, R.I.

Filed Jun. 2, 1994, Ser. No. 252,679

Int. Cl.<sup>6</sup> H01R 19/08

U.S. Cl. 439-106

11 Claims



1. An electrical plug comprising a plastic insulative bridge, said bridge including a ground bridge portion and a power bridge portion,  
said ground bridge portion being secured to said power bridge portion non-integrally, and  
in which a single ground pin is held on all sides thereof in said ground bridge portion, and a single pair of power blades are each held on all sides thereof, respectively, in said power bridge portion.

5,411,404

**ELECTRICAL CONNECTOR HAVING BUS BARS PROVIDING CIRCUIT BOARD RETENTION**

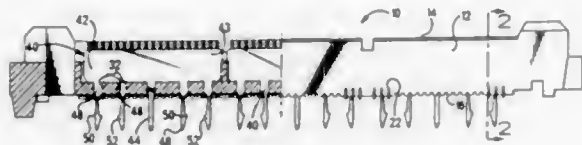
Iosif Korsunsky, Harrisburg; Tod M. Harlan, Mechanicsburg, and Joanne E. Shipe, Harrisburg, all of Pa., assignors to The Whitaker Corporation, Wilmington, Del.

Filed Oct. 29, 1993, Ser. No. 145,018

Int. Cl.<sup>6</sup> H01R 13/652, 13/73

U.S. Cl. 439—108

19 Claims



1. A ground bus for an electrical connector of the type mountable onto a circuit board and including an array of signal terminals having solder tails electrically connectable to circuits of the circuit board and further including contact sections exposed at the connector mating face, the ground bus having a mating section exposed at a mating face of the connector and a plurality of ground posts extending from a board mounting face of the connector adapted to be inserted into respective through holes of the circuit board and soldered, the ground bus comprising:

a body section disposed within a dielectric housing of the connector and including a mating section exposed at a mating face of the connector, and a plurality of pairs of said ground posts extending from the body section, each of said ground posts being spaced apart from the others for insertion into a respective through hole of the circuit board, each said ground post including a base section disposed within a respective passageway of the housing, and a beam section extending beyond the mounting face of the housing to a free end adapted to be inserted into a respective said through hole of the circuit board to be soldered therewithin,

one of said ground posts of each of said pairs including a protuberance extending from an edge of a respective said beam section proximate said free end in a first direction parallel to said ground bus body section, and the other of said ground posts of each of said pairs including a protuberance extending from an edge of a respective said beam section proximate said free end in a direction opposite said first direction,

said protuberances extending from an edge of a respective said beam section to engage side walls of said respective through holes and deflect said beam section toward opposing side walls of said through holes with the thus-deflected beam sections bearing against the engaged side walls under spring bias sufficient to provide a modest mechanical retention of the connector to the circuit board until soldering.

5,411,405

**MINIATURE ELECTRICAL COMMUNICATIONS CONNECTORS**

Steve R. McDaniels; Paul H. Glad; David Naegle, and Jon R. Hinto, all of Salt Lake City, Utah, assignors to Angia Communications, Inc., Provo, Utah

Filed Nov. 12, 1993, Ser. No. 151,249

Int. Cl.<sup>6</sup> H01R 13/50

U.S. Cl. 439—131

19 Claims

1. An apparatus for receiving an RJ series plug having a biased clip and for making electrical connection with at least first and second electrical contacts provided on the plug and conveying any signals on the first and second electrical contacts to a communications device, the apparatus comprising:

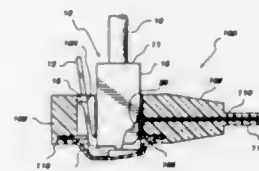
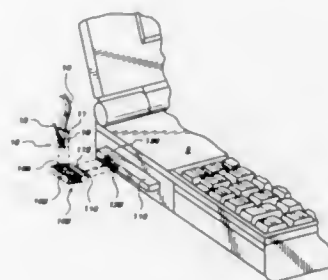
body means, the body means having a thickness; recess means provided in the body, the recess means having

an open first end and a closed second end, the recess means having dimensions such that the plug is closely received therein;

means for releasably engaging the biased clip such that the plug is releasably held in the recess means;

a first electrical conductor provided in the recess means, the first electrical conductor being positioned such that it makes electrical continuity with the first electrical contact in the plug when the plug is received by the recess means and when the means for releasably engaging the biased clip engages the biased clip;

a second electrical conductor provided in the recess means, the second electrical conductor being positioned such that it makes electrical continuity with the first electrical contact in the plug when the plug is received by the recess means and when the means for releasably engaging the biased clip engages the biased clip;



means for conveying any electrical signal present on the first and second electrical contacts to the communications device; and

expandable means, located at the second end of the recess means, for isolating the first and second electrical contacts from electrical contact with an object in a surrounding environment such that passage of current from one or more of the first and second electrical contacts to an object present in the surrounding environment is prevented, the expandable means having a first position within the thickness of the body and a second expanded position which is outside the thickness of the body, the expandable means being movable to, and tending to return to, the first position when the plug is removed from the recess means.

5,411,406

**ELECTRICAL CONNECTOR REQUIRING LOW INSERTION FORCE**

Hiroki Kondo, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Filed Nov. 26, 1993, Ser. No. 157,323

Claims priority, application Japan, Nov. 30, 1992, 4-320589

Int. Cl.<sup>6</sup> H01R 13/15

U.S. Cl. 439—263

7 Claims

1. An electrical connector requiring low insertion force comprising:

a connector housing having a terminal accommodating chamber and a side wall; and

a first terminal contained in the terminal accommodating chamber for engaging a second terminal of a mating connector to be engaged with the electrical connector, said first terminal having an elastic contact portion which is deflected towards one side having a slide-contact with the

5,411,408

**ELECTRICAL CONNECTOR FOR PRINTED CIRCUIT BOARDS**

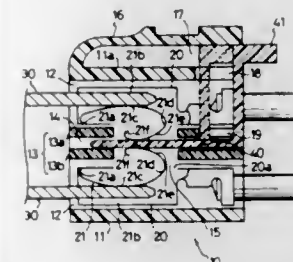
Anthony M. DiViesti, Arlington Heights, and Kent E. Regnier, Lombard, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Aug. 19, 1994, Ser. No. 293,364

Int. Cl.<sup>6</sup> H01R 13/00

U.S. Cl. 439—326

17 Claims



the flexure accepting space to urge the elastic contact portion towards the second terminal;

wherein said connector housing further includes a locking arm which is deflected during engagement of said electrical connector and said mating connector, and said locking arm is restored after a completion of the engagement to provide a locking state therebetween, said urging member preventing said locking arm from being deflected when it is inserted into the guide groove.

5,411,407

**LAMP SOCKET**

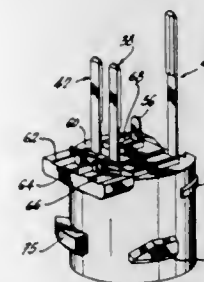
Ronald E. Thomas, Warren, Pa., assignor to Osram Sylvania Inc., Danvers, Mass.

Filed Sep. 2, 1994, Ser. No. 300,625

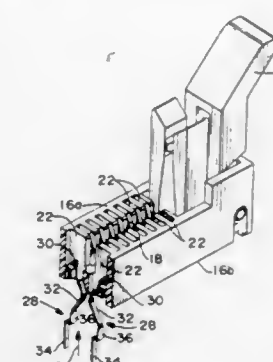
Int. Cl.<sup>6</sup> H01R 13/52

U.S. Cl. 439—271

5 Claims



1. A lamp socket comprising: a body disposed about a longitudinal axis and having a cavity therein for receiving a plurality of electrical contacts; a bottom to said cavity; a plurality of apertures in said bottom; a plurality of electrical contacts in said cavity, each of said contacts having a lamp receiving portion within said cavity and an elongated terminal portion extending through said apertures and being bent at substantially 90 degrees to said longitudinal axis, said elongated terminal portions extending beyond the periphery of said body; and one of said electrical contacts having a second portion which does not extend beyond said periphery, latching tabs formed on said body adjacent said bottom; and a housing having a body receiving compartment and an elongated terminal portion receiving shroud joined to said housing, said body receiving compartment including latching slots for cooperative engagement with said latching tabs, said body being mounted in said body receiving compartment with said latching tabs being engaged with said latching slots.



1. An electrical connector for receiving an edge of a printed circuit board having contact pads adjacent the edge of the board, comprising:

an elongated dielectric housing having a board-receiving face and a terminating face, an elongated slot disposed in the board-receiving face generally along a longitudinal axis of the housing for receiving said edge of the printed circuit board, and a plurality of terminal receiving passages communicating between the faces along at least one side of the slot, said terminal receiving passages each having a terminal retention section into which a press-fit portion of a terminal is inserted, said terminal retention section having a pair of opposed end walls generally perpendicular to said longitudinal axis and first and second opposed side wall means generally parallel to said longitudinal axis, said opposed side wall means being generally parallel and spaced apart a predetermined first distance;

a plurality of terminals, each terminal being insertable into one of said terminal receiving passages through the terminating face of the housing and secured therein, each terminal including a tail portion projecting from the housing, a press-fit portion press-fit into said terminal retention section of a respective passage in an insertion direction, said press-fit portion being generally planar and generally parallel to said longitudinal axis and having a predetermined thickness, said predetermined thickness being greater than said predetermined first distance, and a cantilevered spring contact portion extending between said press-fit portion and a free end of said terminal and projecting into the slot for engaging a contact pad on the printed circuit board, said spring contact portion being spaced from said housing along its entire length between said press-fit portion and said free end;

said first side wall means of each terminal retention section being located nearest said slot and defining a surface means against which the press-fit portion of the terminal is engageable and which is substantially open to allow insertion of a respective terminal into the respective passage through the terminating face of the housing; and

said second side wall means being located furthest from said slot and being generally planar and providing means for guiding, locating and supporting the generally planar press-fit portion of the terminal, said second side wall means providing a substantially greater surface area in contact with said press-fit portion of said terminal than said first side wall means.



5,411,409

## COMPONENT MOUNTING ARRANGEMENT

Ian J. S. Gray, Nr. Winchester, and Peter J. Brumwell, Portsmouth, both of United Kingdom, assignors to IIT Corporation, New York, N.Y.

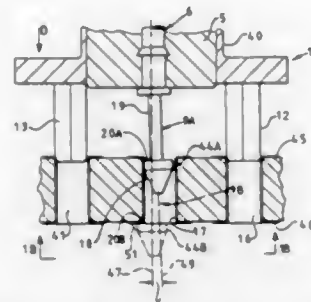
Filed Apr. 25, 1994, Ser. No. 232,902

Claims priority, application United Kingdom, Apr. 30, 1993, 9308960

Int. Cl.<sup>6</sup> H01R 13/62

U.S. Cl. 439—329

14 Claims



11. A combination of an electrical component and a circuit board that has a center hole and at least three outer holes lying on an imaginary circle that surrounds and is concentric with said center hole, wherein said component comprises:

- a housing having at least three legs projecting into said outer holes of said circuit board;
- an insulator lying within said housing and having a passageway said insulator having a lower end;
- a contact lying in said passageway and having a lower pin portion extending downwardly below said insulator and projecting through said center hole in said circuit board, said lower portion having a lower part forming an enlargement with a shoulder surface that faces at least partially in an upward direction and that presses against the bottom of the circuit board to resist its upward movement out of the board, said contact lower portion lying on a substantially vertical axis which is horizontally displaced from the center of said imaginary circle.

5,411,410

## TERMINAL

Shinji Ogawa, Yokkaichi, and Masayoshi Matsumoto, Isehara, both of Japan, assignors to Sumitomo Wiring Systems, Ltd., Yokkaichi and Ichikoh Industries, Ltd., Tokyo, both of Japan

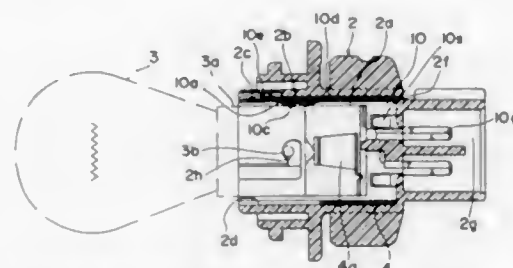
Filed Sep. 29, 1993, Ser. No. 128,150

Claims priority, application Japan, Oct. 23, 1992, 4-074180 U

Int. Cl.<sup>6</sup> H01R 4/50

U.S. Cl. 439—336

3 Claims



1. A terminal formed by a single piece for use in a bulb socket having a bulb insertion opening for accommodating a bulb, said bulb having a sealed envelope containing a filament, wherein said terminal makes an electric connection with a base electrode surrounding an outer perimeter of a base portion of said sealed envelope upon insertion of said bulb, said base electrode being electrically connected to said filament, said insertion opening having a first location for accommodating

said base electrode and a second location spaced from said first location, said terminal comprising:

- a flat plate portion; and
- a contact portion raised from said flat plate portion for contacting said base electrode, said contact portion integrally connected to said flat plate portion through a base portion, said base portion being located at said second location in said insertion opening remote from said base electrode.

5,411,411

## BULB SOCKET

Shinji Ogawa, Yokkaichi, and Masayoshi Matsumoto, Isehara, both of Japan, assignors to Sumitomo Wiring Systems, Ltd., Yokkaichi and Ichikoh Industries, Ltd., Tokyo, both of Japan

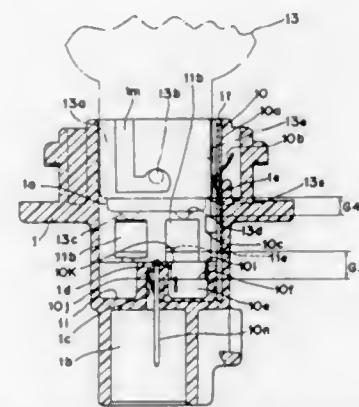
Filed Nov. 4, 1993, Ser. No. 145,638

Claims priority, application Japan, Nov. 13, 1992, 4-078229 U

Int. Cl.<sup>6</sup> H01R 4/50

U.S. Cl. 439—336

6 Claims



1. A bulb socket for receiving a bulb having a base electrode formed on an outer perimeter of a base thereof and a bottom electrode formed on a bottom surface of said base, said bulb socket comprising:

- a first terminal having a first contacting member for electric connection with said bottom electrode; and
- a second terminal comprising:
  - a second contacting member for electric connection with said base electrode;
  - a projection extending toward a center of the socket below said base; and
  - a base member extending below said first terminal, said base member having a recess formed in a top surface thereof so that said second terminal does not contact said first terminal in a position when said projection contacts the bottom surface of said base.

5,411,412

BULB SOCKET AND TERMINAL INSTALLED THEREON  
Shinji Ogawa, Suzuka, and Masayoshi Matsumoto, Atsugi, both of Japan, assignors to Sumitomo Wiring Systems, Ltd., Mie and Ichikoh Industries, Ltd., Tokyo, both of Japan

Division of Ser. No. 896,661, Jun. 10, 1992, Pat. No. 5,320,553.

This application Mar. 7, 1994, Ser. No. 206,946

Claims priority, application Japan, Jun. 11, 1991, 3-43541 U; Jun. 11, 1991, 3-43542 U; Jun. 12, 1991, 3-43922 U

Int. Cl.<sup>6</sup> H01R 4/48

U.S. Cl. 439—336

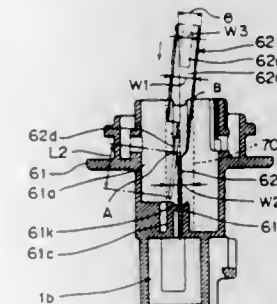
1 Claim

- 1. A bulb socket comprising:
  - a bulb inserting hole disposed at an upper portion thereof,
  - a connector inserting opening disposed at a lower portion thereof with a partitioning wall interposed between said bulb inserting hole and said connector inserting opening,
  - a sectionally T-shaped cathode terminal inserting groove

extending downwardly from the upper end of a peripheral wall of said bulb inserting hole to said partitioning wall, in which a cathode terminal formed by a bent metal plate is inserted into said sectionally T-shaped cathode terminal inserting groove from an opening thereof disposed at the upper end thereof,

- a first connection strip formed at one end portion of said cathode terminal and which is projected inwardly from said opening of said cathode terminal inserting groove toward the center of said bulb socket so as to connect said first connection strip with a cathode surface of a bulb,
- and a second connection strip formed at another end portion of said cathode terminal and which is projected downwardly into said connector inserting opening through an inserting opening formed through said partitioning wall to be connected with a connector,

said cathode terminal inserting groove including: a larger-width, upper portion having a width which is slightly



larger than a width of said first connection strip, said larger-width, upper portion of said cathode terminal inserting groove extending from an upper end of said cathode terminal inserting groove to approximately halfway between the upper end of said cathode terminal inserting groove and said partitioning wall; a correcting guide means disposed below said larger-width, upper portion and tapered inwardly from a lower end of said larger-width, upper portion; and a smaller-width, lower portion ranging from a lower end of said correcting guide means to said partitioning wall and having a width which is slightly larger than a width of said second connection strip, so that said second connection strip is operative to be inserted therethrough, so that when said cathode terminal is diagonally inserted into said cathode terminal inserting groove, said cathode terminal becomes vertical as a result of contact between said correcting guide means and said second connection strip of said cathode terminal.

5,411,413

## CONNECTOR

Masaya Yamamoto, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Feb. 7, 1994, Ser. No. 192,814

Claims priority, application Japan, Feb. 8, 1993, 5-008271 U

Int. Cl.<sup>6</sup> H01R 13/58

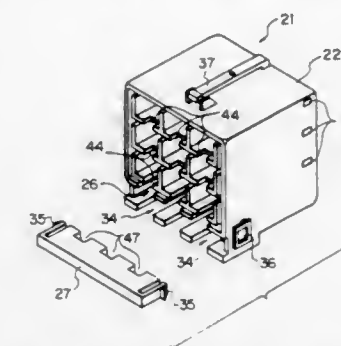
U.S. Cl. 439—470

7 Claims

1. In a connector wherein a slide housing having a crimp terminal received therein is slidably received in a connector housing, said crimp terminal being crimped on a cable so as to be electrically connected to said crimp terminal, and said cable having said crimp terminal crimped thereon is drawn out of said slide housing, the improvement comprising:

- a cable receiving groove formed at one end of said slide housing from which said cable is drawn out,
- a cable receiving portion disposed on the bottom wall of said connector housing in operative association with said cable receiving groove of said slide housing,
- a cable extension groove formed on said cable receiving portion at the position located in alignment with said cable receiving groove of said slide housing, and
- a cable retainer adapted to be inserted into said connector

housing on said cable receiving portion, said cable retainer serving to firmly hold said cable drawn outside of said connector housing in the squeezed state in cooperation



with said cable receiving groove of said slide housing and extending through said cable extension groove of said receiving portion in a predetermined direction.

5,411,414

## ELECTRICAL CONNECTOR

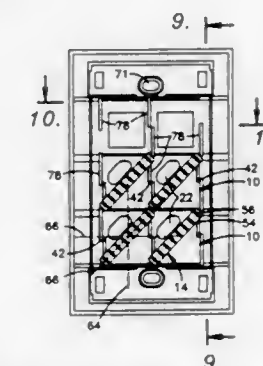
Jeff House, Olathe; David McCormick, Lenexa, and George McCoy, Olathe, all of Kans., assignors to Premier Telecom Products, Inc., Industrial Airport, Kans.

Filed Aug. 17, 1993, Ser. No. 107,932

Int. Cl.<sup>6</sup> H01R 13/60

U.S. Cl. 439—540

18 Claims



1. An electrical modular connector for use with a connecting block, said modular connector comprising:

- a socket member having a face with a single opening therein, said opening adapted to receive a modular data communication plug, said socket member having a first axis and a second axis, whereby said first axis is perpendicular to said second axis;
- retaining means for retaining said socket member such that said socket opening is accessible at a first side of said modular connector, said retaining means including a rear surface opposite said first side of said modular connector; and
- support means for supporting said connecting block, said supporting means being mounted on said rear surface and having opposite ends located immediately adjacent opposite sides of said single opening, said supporting means having a longitudinal axis extending between said ends and oriented at an acute angle relative to each of said first axis and said second axis.

5,411,415

## SHIELDED PLUG CONNECTOR

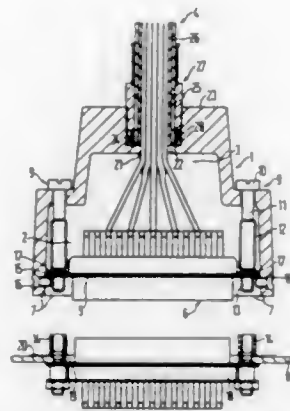
Georges Embo, Langemark, Belgium; Horst Schiefele, München, Germany; Anton Schröcker, Munich, Germany; Hans Voss, Sauerlach, Germany; Albert Wiedemann, München, Germany, and Reinhold Reich, Schäftlarn, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 21, 1994, Ser. No. 230,635  
Claims priority, application Germany, Oct. 21, 1991, 91 13 082 U

Int. Cl.<sup>6</sup> H01R 13/658

U.S. Cl. 439—610

16 Claims



1. A shielded plug connector, comprising:
  - a) at least one shielded cable having a cable shielding;
  - b) a plug or socket insert having a metal collar; and
  - c) a one-piece, one-shell, metal shielding housing, said shielding housing having a plug side at which said plug or socket insert is disposed, said plug side having an end surface and bearing points for said metal collar being recessed inwardly relative to said plug-side end surface, for end-surface contacting of said shielding housing with an appliance wall only at said plug-side end surface, and
  - said shielding housing having a connection side with a connection region for connecting said at least one shielded cable, said connection region having a connection-side end and a transverse wall, said transverse wall being recessed inwardly relative to said connection-side end, having at least one lead-through formed therein and being in direct end contact with said cable shielding.

5,411,416

## DOCKING CONNECTOR UNIT

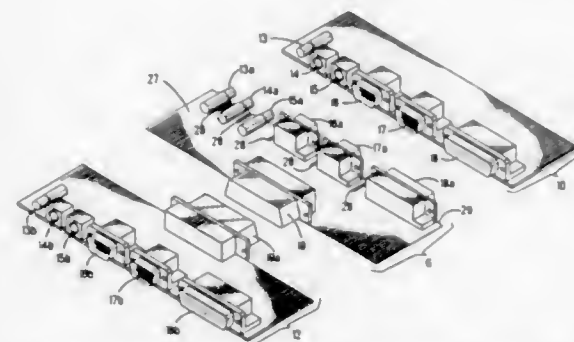
Gary D. Balon, Hershey, and Ira J. Wells, York, both of Pa., assignors to The Whitaker Corporation, Wilmington, Del.

Filed Jul. 29, 1994, Ser. No. 283,111

Int. Cl.<sup>6</sup> H01R 25/00

U.S. Cl. 439—639

14 Claims



1. A docking connector unit for connecting a personal com-

puter provided with input/output ports to input/output devices, comprising:

- (a) a proximal docking unit assembly, comprising
    - (1) input/output ports which match the input/output ports of the computer, and
    - (2) a first component of a two-component consolidated electrical connector, the matching input/output ports being permanently physically and electrically connected to the first component of the two-component consolidated electrical connector; and
  - (b) a distal docking unit assembly, comprising
    - (1) the second component of the two-component consolidated electrical connector, and
    - (2) input/output ports which duplicate the input/output ports of the computer, the second component of the two-component consolidated electrical connector being permanently physically and electrically connected to the duplicating input/output ports;
- the permanent electrical connections of the proximal and distal docking unit assemblies being arranged in such a manner as to electrically connect each conductor of each input/output port which duplicates an input/output port of the computer, to the corresponding conductor of the corresponding duplicated input/output port of the computer, when the two components of the two-component consolidated electrical connector are connected.

5,411,417

## TERMINAL BLOCK ARRANGEMENT WITH OVERVOLTAGE PROTECTION COMPONENT

Dietmar Horn, and Klaus Strate, both of Detmold, Germany, assignors to Weldmueller Interface GmbH & Co., Detmold, Germany

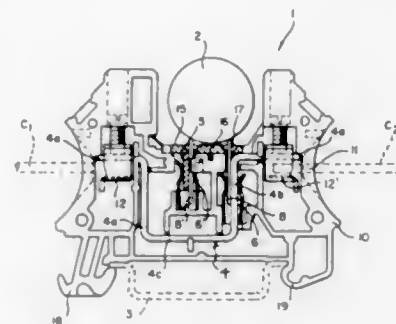
Filed Jul. 28, 1994, Ser. No. 281,618

Claims priority, application Germany, Jul. 30, 1993, 43 25 614.7

Int. Cl.<sup>6</sup> H01R 9/22

U.S. Cl. 439—709

13 Claims



1. A terminal block arrangement, comprising:
  - (a) a terminal block body (1, 1') formed from a non-conducting insulating material;
  - (b) a pair of electrical terminals (12, 12') mounted in spaced relation on said terminal block body;
  - (c) a conductive terminal bus bar (4) mounted in said terminal block body for electrically connecting together said electrical terminals, said terminal bus bar having at least one bare portion;
  - (d) an electrical overvoltage protective component (2) having a pair of parallel linear conductive leads (8, 8'); and
  - (e) connecting means removably connecting said overvoltage component with said terminal block body, said connecting means including a first resilient member (6) biasing a first one (8) of said component leads into lateral frictional and electrical engagement with said bare portion of said terminal bus bar.

5,411,418

## REPAIRABLE SOLDERLESS CONNECTOR ARRANGEMENT

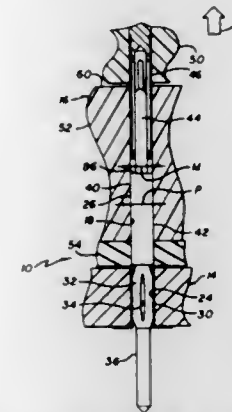
David E. Welsh, Tustin, and Peter J. Hyzin, Lake Forest, both of Calif., assignors to ITT Corporation, Secaucus, N.J.

Filed Sep. 1, 1993, Ser. No. 115,488

Int. Cl.<sup>6</sup> H01R 13/42

U.S. Cl. 439—751

7 Claims



1. A combination of a circuit board which has a plurality of holes, and a connector which lies adjacent to said circuit board and which has an insulator with passages therein aligned with said circuit board holes and a plurality of contacts, wherein each contact has a compliant board-received contact part which lies in a solderless interference fit in one of said circuit board holes and each contact has a forward contact part lying in one of said insulator passages, characterized by:

said board-received contact part and said forward contact part of each contact is of no greater width than each corresponding insulator passage, so each contact can be individually pulled in a forward direction out through said circuit board and insulator;

each insulator passage has a smallest width which is at least as great as the greatest width of said forward contact part of the corresponding contact, to enable the insulator to be moved rearwardly substantially against said circuit board and receive said forward contact part, after said board-received contact part has been installed in one of said circuit board holes.

5,411,419

## MULTIPOLE CONNECTION TERMINAL AND METHOD FOR PRODUCING SAME

Hiroyuki Ochi, Mie, Japan, assignor to Sumitomo Wiring Systems, Ltd., Mie, Japan

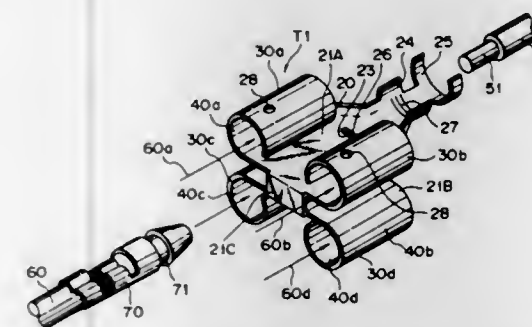
Filed Aug. 20, 1993, Ser. No. 109,444

Claims priority, application Japan, Sep. 3, 1992, 4-262895

Int. Cl.<sup>6</sup> H01R 13/11

U.S. Cl. 439—787

4 Claims



1. A multipole connecting terminal formed by bending a metal plate having a first strip piece including a positioning

hole, a second strip piece including a positioning tongue integral at one side thereof, said first strip piece and said second strip piece being initially coplanar with each other, and a coupling piece which interconnects intermediate areas of said first and second strip pieces, further comprising:

first and second cylindrical portions formed by circularly bent opposite end areas of said first strip piece and which are bent toward one side of said metal plate so that the axes of said cylindrical portions are arranged in parallel; third and fourth cylindrical portions formed by circularly bent opposite end areas of said second strip piece and which are bent toward one side of said metal plate so that the axes of said third and fourth cylindrical portions are arranged in parallel; and

first through fourth terminal receiving parts formed by bending said second strip piece at said coupling piece toward the other side of said metal plate so that end openings of said first through fourth cylindrical portions are aligned in a plane and said first and second strip pieces are parallel to one another;

wherein said positioning tongue is inserted into said positioning hole when said first strip piece and said second strip piece are arranged in parallel with each other thereby to secure said first and second strip pieces together.

5,411,420

## SOLDER TERMINAL STRIP

Richard K. Dennis, Etters, Pa., assignor to Die Tech, Inc., York Haven, Pa.

Filed May 27, 1993, Ser. No. 68,062

Int. Cl.<sup>6</sup> H01R 4/02, 9/09

U.S. Cl. 439—876

34 Claims



1. A solder terminal strip comprising:
  - A) an elongate carrier strip;
  - B) a set of first solder terminals spaced at intervals along the carrier strip, first connections integrally joining the first solder terminals to the carrier strip, each first solder terminal including,
    - i) a first contact tail extending away from the carrier strip to an end remote from the carrier strip,
    - ii) a first arm integrally joined to the first contact tail at a distance away from the carrier strip, and
    - iii) a first contact base on the first arm;
  - C) a set of second solder terminals spaced at intervals along the carrier strip between the set of first solder terminals, second connections integrally joining such solder terminals to the carrier strip, each second solder terminal including,
    - i) a second contact tail extending away from the carrier strip to an end remote from the carrier strip,
    - ii) a second arm located a distance away from the carrier strip and to one side of the second contact tail,
    - iii) a second contact base on the second arm facing away from the second contact tail and,



- iv) a reverse bend portion integrally joining said second contact tail and second arm so that the arm overlies a portion of the contact tail and the second contact base faces away from such tail; and
- D) an integral solder mass comprising a thin solder layer integrally bonded to the second contact base, a solder reservoir extending along an edge of the contact base and joined to the thin solder layer and a solder recess located on a side of the second arm facing the second contact tail.

5,411,421

## MICROPIN CONNECTOR SYSTEM

Willard B. McCardell, Jr., Rochester, Mich., assignor to Cardell Corporation, Rochester Hills, Mich.

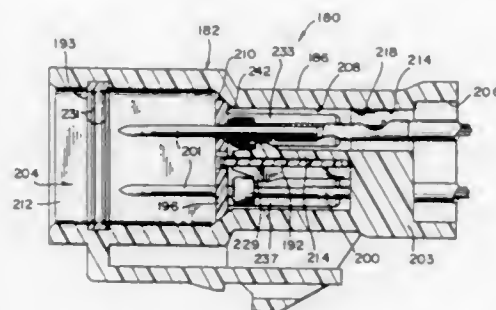
Continuation of Ser. No. 13,231, Feb. 3, 1993, Pat. No. 5,295,875, which is a continuation of Ser. No. 767,636, Sep. 30, 1991, abandoned, which is a division of Ser. No. 670,751, Mar. 15, 1991, Pat. No. 5,100,346. This application Jan. 31, 1994, Ser. No. 188,792

The portion of the term of this patent subsequent to May 18, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H01R 4/10

U.S. Cl. 439—879

27 Claims



1. An electrical connector system having at least a first electrical wire carrying a pin terminal comprising:
- a sheet metal body portion which is precision formed to receive the electrical wire at a rearward end, said rearward end of said body portion being fastened to the electrical wire for securing the pin terminal thereto and for making electrical contact therewith, said precision formed body portion being further shaped to have a forward portion folded back on itself at a distal end thereof to form a double-walled head having a rearwardly-facing locking surface; and
  - a solid metal pin secured in said terminal body forward portion and extending forwardly from said distal end double-walled head.

5,411,422

## SPIRAL PROPELLER HAVING AXIAL VOID

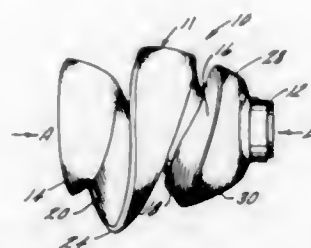
David H. Robertson, R 18 Hayden Rd., Blandford, Mass. 01008

Continuation of Ser. No. 93,555, Jul. 19, 1993, abandoned. This application Jul. 15, 1994, Ser. No. 275,813

Int. Cl.<sup>6</sup> B63H 1/26

U.S. Cl. 440—48

5 Claims



1. A propeller comprising:

- a) a hub;
- b) a blade including a series of winds each wind having a convex outer region, said blade having a first end adjacent said hub and a second end at a point of termination of said blade remote from said hub, said blade extending helically from said hub in a radially expanding peripheral dimension to about a midpoint between said first and said second end of said blade whereabout said blade contracts in radial peripheral dimension until the blade terminates at said second end of said blade, said blade defining an axial void over a length thereof.

5,411,423

## MARINE PROPULSION DEVICE WITH RELEASABLY COUPLED DRIVE SHAFT ASSEMBLY

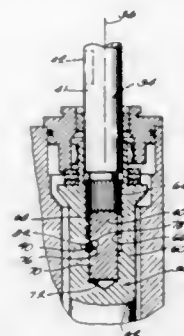
Jeffrey P. Higby, 17604 W. Summit Dr., Wildwood, Ill. 60030

Filed Sep. 8, 1993, Ser. No. 118,413

Int. Cl.<sup>6</sup> B63H 23/34

U.S. Cl. 440—83

3 Claims



1. An outboard motor comprising a propulsion unit including a power head including an engine having a crankshaft, and a lower unit including a drive shaft housing and a gear case including a propeller shaft, a propeller on said propeller shaft, and a reversing transmission connected to said propeller shaft, and a drive shaft assembly having a vertically extending axis and comprising a lower shaft drivingly connected to said transmission and having an upper end portion including an upper end, and an axial bore extending downwardly from said upper end, an upper shaft drivingly connected to said crankshaft and including a lower end portion received in said axial bore and including a lower end and an outer surface extending axially from said lower end, means on said outer end portions of said upper and lower shafts for preventing rotary movement therebetween, and means for selectively permitting assembly and disassembly of said upper and lower shafts and for preventing disassembly of said upper and lower shafts comprising an annular groove in said axial bore in said lower shaft, an inclined bore located in said end portion of said upper shaft, extending upwardly at an acute angle to said axis, and having an opening located wholly in said outer surface, and a ball movable in said inclined bore and in said annular groove between a locked position wherein, when said axis is vertical, said ball is partially located in said annular groove and partially located in said inclined bore, thereby preventing disassembly of said shafts, and an unlocked position wherein said ball is wholly located in said inclined bore, thereby permitting assembly and disassembly of said shafts by permitting insertion and withdrawal of said end portion of said upper shaft relative to said axial bore of said lower shaft.

5,411,424

## REPLACEABLE BUOY COVER

Jeffrey S. Hill, P.O. Box 245, Shell Knob, Mo. 65747

Filed Jun. 2, 1993, Ser. No. 71,320

Int. Cl.<sup>6</sup> B63B 22/16

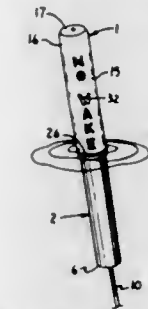
U.S. Cl. 441—11

15 Claims

1. A replaceable buoy cover and buoy wherein said buoy is

adapted to be anchored in a body of water by an anchoring line connected to a lower end of said buoy, said cover and buoy comprising:

- (a) sleeve means of a size and shape to cover only a portion of said buoy;



- (b) said sleeve means being sized and shaped to be replaceably positioned in covering relation to said portion of said buoy with said buoy received therein without disconnecting said anchoring line from said buoy;
- (c) retaining means for releasably retaining said cover on said buoy; and
- (d) indicia applied to said sleeve means.

5,411,425

## FLOATATION APPARATUS AND METHODS

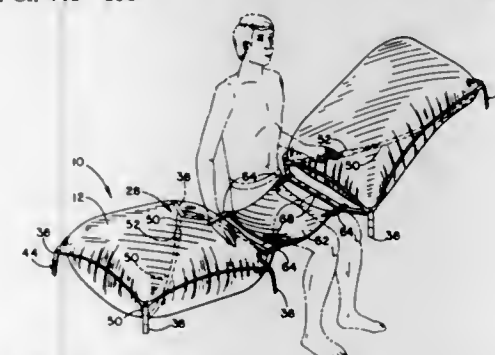
David E. Rinker, P.O. Box 5206, Cottonwood, Calif. 96022

Filed Dec. 20, 1991, Ser. No. 812,879

Int. Cl.<sup>6</sup> B63C 9/08

U.S. Cl. 441—130

30 Claims



1. A floatation unit, comprising:
- a. a generally rectangular air bag having four generally defined corners;
  - b. means for inflating said air bag;
  - c. a grab loop fastened to each of said air bag's four corners;
  - d. a hook fitted to each of two of said air bag's directly opposed corners;
  - e. a cinch strap fastened to each of those two of said air bag's corners not having a hook, said corners with cinch straps being directly opposed to one another; and
  - f. means bound to an end of one of said cinch straps for attachment to a free end of the other of said straps.

5,411,426

## VACUUM MICROELECTRONICS DEVICE AND METHOD FOR BUILDING THE SAME

R. Mark Boyse, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 144,159, Oct. 27, 1993, Pat. No. 5,349,217, which is a continuation of Ser. No. 739,268, Aug. 1, 1991, abandoned. This application Jun. 23, 1994, Ser. No. 264,544

Int. Cl.<sup>6</sup> H01J 1/30, 9/02

U.S. Cl. 445—25

9 Claims

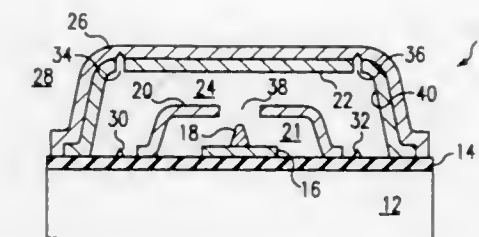
1. A method of building a vacuum microelectronics device on a substrate base of a substrate material and an insulating dielectric, comprising the steps of:
- forming an electrode base on the insulating dielectric;

covering said electrode base with a first organic spacer, said first organic spacer having an aperture for exposing a portion of said electrode base;

applying a metal over said first organic spacer such that said metal enters said aperture to form an emitter in contact with said electrode base;

removing said metal from said first organic spacer;

forming a second organic spacer over said emitter and electrode base;



applying a grid metal over said second organic spacer so as to expose a portion of said second organic spacer over said emitter and electrode base;

forming a third organic spacer over said grid metal in said exposed second organic spacer;

applying an anode metal over said third organic spacer, said anode metal comprising a plurality of access apertures to expose said third organic spacer;

evacuating said third and second organic spacers from within said anode metal and said grid metal to create a space between said anode metal and said grid metal and between said grid metal and said emitter; and

sealing said access aperture with a metal seal.

5,411,427

## BALLOON WEIGHT AND LATCH ASSEMBLY

David C. Nelson, Akron; Robert L. Waldo, Southington, and Martin A. Meluch, Newton Falls, all of Ohio, assignors to Premium Balloon Accessories, Akron, Ohio

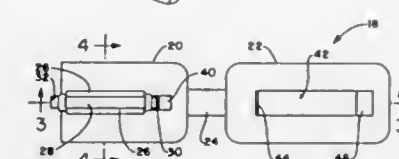
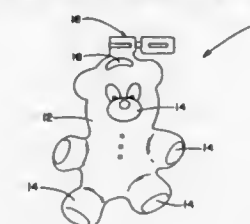
Filed Apr. 26, 1993, Ser. No. 52,760

Int. Cl.<sup>6</sup> A63H 33/00; A44B 21/00

U.S. Cl. 446—71

11 Claims

1. A balloon weight, comprising:
- a body portion; and
  - a latch assembly extending from an edge of said body portion, said latch assembly being adapted to securely engage a ribbon, said latch assembly comprising a base plate, a latch plate, and a hinge interconnecting said base and latch plate, said base plate having a pair of deflectable lugs thereon and said latch plate having a window therein, said window securely receiving said lugs when said latch plate is folded onto said base plate about said hinge, said



deflectable lugs extending from opposite ends of a bar

interconnected with said base plate, and said bar being received by a base member, said bar having a lesser width than said base member.

5,411,428

## BLOCK UNITS FOR A BLOCK TOY

Makoto Orii, and Katsuhiko Hayashi, both of Nagano, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

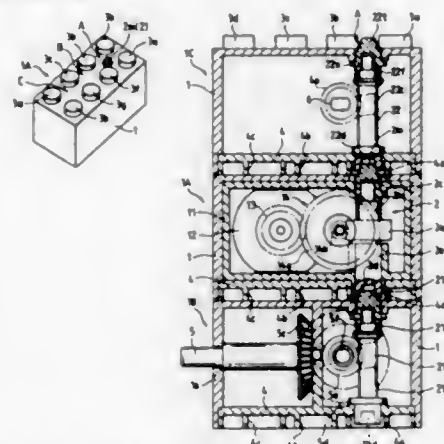
Filed Sep. 13, 1993, Ser. No. 119,389

Claims priority, application Japan, Sep. 16, 1992, 4-246344

Int. Cl.<sup>6</sup> A63H 33/08

U.S. Cl. 446—90

11 Claims



1. A block unit for a block toy, comprising:
  - a block body comprising an upper side and a lower side, said upper side including a plurality of protrusions which define at least one space therebetween, said lower side defining a recess portion, said block body being freely connectable to other block units through said plurality of protrusions and said recess portion;
  - a rotary shaft having opposite ends and being rotatably supported in the block body in such a manner that the rotary shaft is extended along an axis between said upper side and said lower side in a block coupling direction in which the block unit is coupled to other block units through said plurality of protrusions and said recess portion thereof; and
  - rotation transmitting means for transmitting the rotation of the rotary shaft to other block bodies coupled to the block unit body, the rotation transmitting means provided at said opposite ends of the rotary shaft, the rotation transmitting means being freely connectable to rotation transmitting means of other block units,
- wherein said opposite ends of said rotary shaft, including said rotation transmitting means provided thereon, are set back so as not to protrude beyond end faces of said plurality of protrusions at said upper side nor beyond an exterior lower surface of said block body at said lower side, respectively.

5,411,429

## LIGHT DISPLAY APPARATUS FOR A CHILD'S TOY

Ronald R. Klawiter, Berger, Mo., assignor to Handi-Pac, Inc., Hermann, Mo.

Filed Feb. 15, 1994, Ser. No. 196,949

Int. Cl.<sup>6</sup> A63H 33/26

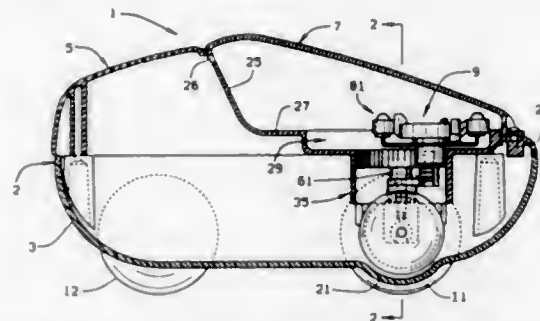
U.S. Cl. 446—242

20 Claims

1. A wheeled toy adapted to be operated by a child, the toy comprising
  - a body having a chassis, a chassis cover, and a translucent cover covering at least a part of said body;
  - axle rotatably journaled in said chassis;
  - ground engaging wheels mounted at opposite ends of said axle, said axle being rotationally fixed to said wheels to rotate when said wheels are turned;

a gear fixedly mounted on said axle within said chassis, to be rotated when said wheels are turned;

said chassis cover having a surface defining an opening having a toothed edge defining a chassis gear; said chassis cover surface defining a well including a wall and a floor, said wall defining said chassis gear at an upper part thereof and said floor defining an opening through which said axle gear extends;



- a light display mechanism including an arm rotatably mounted in said body and a light bracket rotatably mounted on said arm,
- said arm including a pinion gear which meshes with said axle gear;
- said light bracket being rotatably mounted to said arm at an end thereof spaced from said pinion gear, said light bracket including, a pinion gear in meshing contact with said chassis gear and an electric circuit including at least one electric light means, a source of electricity, and a centrifugal switch, said centrifugal switch being normally open;
- whereby, as said wheels are rotated, said axle gear drives said arm pinion gear to caused said light bracket to orbit in said toy, and said light display mechanism is rotated on said arm by the interaction of the light display mechanism pinion gear with said chassis gear, said rotating motion of said light bracket closing said centrifugal switch to close said circuit to light said electric light means.

5,411,430

## SCANNING OPTICAL DEVICE AND METHOD FOR MAKING A HYBRID SCANNING LENS USED THEREFOR

Takashi Nishimura, Hachioji; Akira Arimoto, Kodaira; Yoshinori Miyamura, Tokyo; Yumiko Anzai, Tachikawa; Yoshimasa Kondo, Koganei; Fumihiko Uchida, Hachioji, and Shigeo Moriyama, Tama, all of Japan, assignors to Hitachi Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

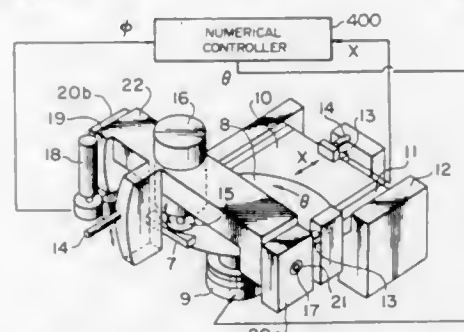
Filed Sep. 25, 1992, Ser. No. 950,687

Claims priority, application Japan, Sep. 25, 1991, 3-245498; Dec. 9, 1991, 3-324225; Jul. 8, 1992, 4-180725

Int. Cl.<sup>6</sup> B24B 49/00

U.S. Cl. 451—1

10 Claims



1. A method of fabricating an axially asymmetrical non-spherical female die to be used for transcribing a shape of an axially asymmetrical non-spherical scanning lens, said method comprising the steps of:
  - rotating an object to be worked; and

at the same time, processing said object to be worked, while moving a grinding wheel spindle shaft serving as a rotation axis of a grinding wheel spindle, with a grinding wheel thereon, along an arc in a plane including a rotation axis of said object to be worked;

wherein said grinding wheel spindle shaft, at its rest position, is substantially parallel with the rotation axis of said object to be worked; said grinding wheel spindle shaft is located between the rotation axis of said object to be worked and said object to be worked; a plane of rotation of said grinding wheel is parallel with a plane of rotation of the object to be worked; and the spatial positional relation between said grinding wheel spindle shaft and said object to be worked varies in accordance with variations in rotational angular position of said object to be worked.

5,411,431

## METHOD FOR CROWN GEAR GRINDING BY GENERATION

Augustinus F. H. Basstein, Prinsenbeek, and Gustaaf A. Uittenbogaart, Overveen, both of Netherlands, assignors to Crown Gear, B.V., Rotterdam, Netherlands

PCT No. PCT/NL92/00004, § 371 Date Jul. 8, 1993, § 102(e) Date Jul. 8, 1993, PCT Pub. No. WO92/11967, PCT Pub. Date Jul. 23, 1992

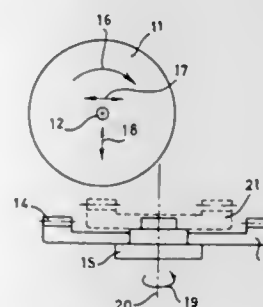
PCT Filed Jan. 9, 1991, Ser. No. 84,272

Claims priority, application Netherlands, Jan. 9, 1991, 9100023

Int. Cl.<sup>6</sup> B24B 53/075

U.S. Cl. 451—47

6 Claims



1. Method for grinding crown wheels, with the aid of a hobbing grinding disc, comprising the following steps:

- forming the hobbing grinding disc as follows:
  - causing to rotate about its axis a previously produced grinding disc element of ceramic material whose external dimensions correspond essentially to the external dimensions of the hobbing grinding disc to be formed, and which is mounted on the grinding wheel shaft of a grinding machine;
  - rotating at least one crown wheel tooth mounted on the rotary workpieceholder of the grinding machine, which tooth is in principle the same shape as the teeth of a crown wheel to be ground and is of such length that the crown wheel tooth contains at least all pressure angles which are present on the teeth of the crown wheel to be ground, while the surface of the crown wheel tooth is provided with a dressing material, and the crown wheel tooth is mounted in such a way on the workholder that the axis of a crown wheel of which the crown wheel tooth could form part coincides with the axis of rotation of the workpieceholder;
  - the axes of rotation of the grinding disc element and the workpieceholder, and thus of the crown wheel tooth intersecting each other at right angles;
  - and the speeds of rotation of the grinding disc element and of the crown wheel tooth being such that per revolution of the grinding disc element the crown wheel tooth rotates over one or more tooth pitches about the axis of the workholder;
  - positioning relative to each other and moving the rotating grinding disc element and the rotary crown wheel tooth

in such a way that the crown wheel tooth works the peripheral surface of the rotating grinding disc element, while the crown wheel tooth comes into contact over its entire length and height with the grinding disc element, and a hobbing grinding disc with an essentially helical peripheral profile of a shape required for grinding the crown wheel is formed;

- with the thus formed hobbing grinding disc, grinding the crown wheel mounted on the earlier mentioned workpieceholder, the hobbing grinding disc and the crown wheel being rotated and moved relative to each other in principle in the same way as the grinding disc element and the earlier mentioned crown wheel tooth during the formation of the hobbing grinding disc;
- resharpening (dressing) the hobbing grinding disc when it has become blunt, using the crown wheel tooth provided with a dressing material and mounted on the workpieceholder, in the same way as forming of the hobbing grinding disc.

5,411,432

## PROGRAMMABLE OSCILLATING LIQUID JET CUTTING SYSTEM

Peter Wyatt, and Matthew Peterson, both of NED JET Cutting Systems Inc. 18 Grafton St., Worcester, Mass. 01604-4992

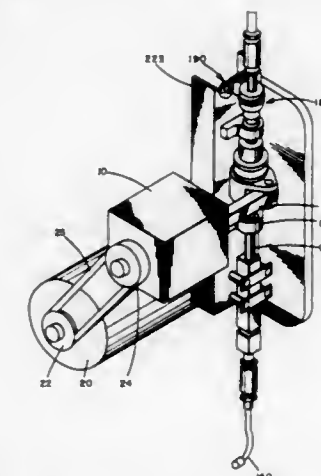
PCT No. PCT/US92/07961, § 371 Date Jan. 11, 1993, § 102(e) Date Jan. 11, 1993, PCT Pub. No. WO94/07001, PCT Pub. Date Mar. 31, 1994

PCT Filed Sep. 9, 1992, Ser. No. 972,475

Int. Cl.<sup>6</sup> B24C 3/06

U.S. Cl. 451—92

5 Claims



1. A balanced oscillator for oscillating the liquid jet in a programmable oscillating liquid jet cutting system particularly adopted for cutting granite on-site at quarries comprising:

- a frame
- a cam housing mounted on said frame;
- a bent cam shaft mounted in said cam housing;
- a drive housing mounted on said frame and connected to said cam housing;
- a drive shaft mounted in said drive housing; and
- a means for adjusting the balance of the balanced oscillator;
- the centerline of said drive shaft intersects with the centerline of said cam housing;
- the drive housing is fixed to said frame;
- said cam housing is free to move to and fro but not rotate;
- said cam shaft comprises a first threaded rod end;
- said drive shaft comprises a second threaded rod end;
- said cam housing has threads inside to match the threads on said first threaded rod end of said cam shaft; and
- said means for adjusting the balance comprises a spring tensioning means.



5,411,433

## DUST-COLLECTING APPARATUS

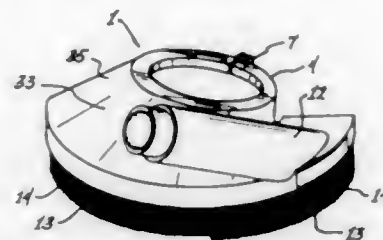
Robert L. Keller, Tonawanda, N.Y., assignor to Dynabrade, Inc., Clarence, N.Y.

Filed Jun. 13, 1994, Ser. No. 258,840

Int. Cl.<sup>6</sup> B24B 55/02

U.S. Cl. 451-451

18 Claims



1. A shield for an abrading machine comprising a roof portion and a substantially continuous skirt portion, said skirt portion structured to encircle at least a portion of an abrading disc having a rotating arbor, said rotating abrading disc having means to cause movement of debris in said shield, said roof portion having a ring clamp connecting means which has adjusting means and has a relatively large diameter and is positioned at an angle to and not parallel with a plane of a lower circular edge of said skirt, an exhaust suction conduit extending through said roof portion from within said skirt to a vacuum exhaust source, and said skirt having a lower circular edge for containing at least one flexible surface contact means.

5,411,434

## POULTRY SHOULDER AND BREAST SEVERING MACHINE

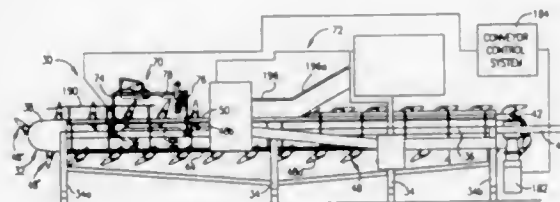
David B. McGoon, Springfield, and Charles R. Kirby, Sweet Springs, both of Mo., assignors to Kays Engineering, Marshall, Mo.

Filed Mar. 24, 1992, Ser. No. 856,632

Int. Cl.<sup>6</sup> A22C 21/00

U.S. Cl. 452-166

18 Claims



1. In a poultry processing apparatus for separating the shoulder-wing joints and for severing connective shoulder muscle and tendons of a poultry carcass being processed to facilitate subsequent removal of the wings and breast meat from the carcass, the improvement which comprises:

- a means for supporting the carcass in accessible disposition for separation and severing of each shoulder-wing joint made up of a wing bone and a shoulder socket joined by connective tendons and shoulder muscle;
- shoulder-wing joint locating and separating means on each side of the carcass supporting means,
- each of said joint locating and separating means including an upright member having an edge positioned to engage the carcass in general nesting relationship to the notch where a respective wing bone is received in a corresponding shoulder socket, and an extension foot means projecting from said edge of a respective member and cooperable with said edge to define a wing-shoulder joint receiving indentation; and
- a cutter means operably associated with each of said locating and separating members,

each of said cutter means being shiftable through a displace-

ment path from an initial position on the side of a respective wing-shoulder joint of the carcass remote from the locating and separating member, toward and past the edge of the said member to cooperate with the latter in displacing a respective wing joint from its shoulder receiving socket and to sever the connective shoulder muscle and tendons of the shoulder-wing joint thereby effecting partial separation of a corresponding wing from the carcass for facilitating said subsequent removal of the breast meat and wings from the carcass rib cage.

5,411,435

## MACHINE AND PROCESS FOR APPLYING SANITARY STAMPS ON AN ANIMAL

Lucien Durand, Lyaas, France, assignor to Durand International, Chomerae, France

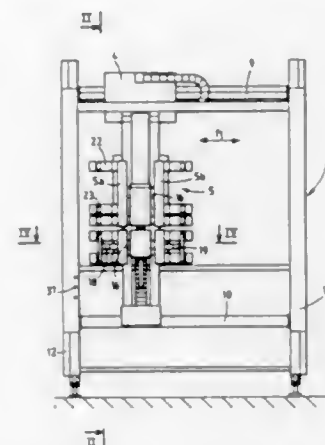
Filed Oct. 27, 1993, Ser. No. 141,508

Claims priority, application France, Oct. 27, 1992, 92 13127

Int. Cl.<sup>6</sup> A22C 17/10

U.S. Cl. 452-198

12 Claims



1. A machine for applying stamps on the skin of a slaughtered animal suspended from a conveyor comprising:

- a frame intended to be positioned laterally with respect to an advance direction of the conveyor, said frame including a bearing structure;
- a gripping and ramming chassiss supported by said bearing structure, said gripping and ramming chassiss including a bearing and centering structure extending in a substantially vertical plane along a major part of the length of the animal, at least one pair of presser arms that are movable towards and away from each other and at least one pair of ramming arms each of which is equipped with a pad for marking the animal;

first drive means for displacing, in a substantially horizontal direction, said gripping and ramming chassiss to a position outside a plane of extension of said bearing structure wherein the bearing and centering structure is positioned between two carcass portions of the animal;

second drive means for shifting said at least one pair of presser arms, relative to said bearing and centering structure, into engagement with said two carcass portions of the animal in order to ensure, in combination with said bearing and centering structure, immobilization of the animal; and

third drive means for moving each of said at least one pair of ramming arms between a first position remote from the animal and a second position in which the pad carried the ramming arm engages a predetermined one of the two carcass portions of the animal.

5,411,436

## CURRENCY DISPENSER

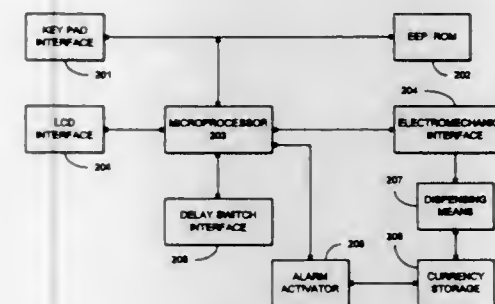
Jeffrey I. Kaplan, 18 Buck Rd., East Brunswick, N.J. 08816

Continuation of Ser. No. 709,651, Jun. 3, 1991, abandoned. This application Oct. 14, 1992, Ser. No. 961,063

Int. Cl.<sup>6</sup> G07D 1/08

U.S. Cl. 453-17

17 Claims



1. A currency dispenser capable of being used in a vehicle, said currency dispenser comprising:

- a plurality of switches, each switch being associated with a predetermined amount of currency;
- means for dispensing the currency if the associated switch is activated, where the amount of currency dispensed may include pieces of currency of different values;
- and means for allowing a user to select and store values indicative of particular amounts of currency to be associated with each switch said means for allowing including a plurality of user accessible switches.

5,411,437

## MEDICAL TRAINING AID

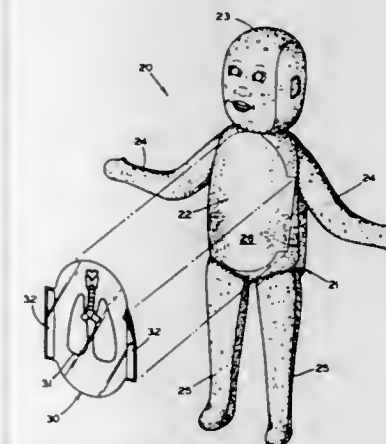
Alice H. Weber, Toledo, Ohio, and Katherine L. Miller, Cambridge City, Ind., assignors to Legacy Products, Inc., Toledo, Ohio

Filed Sep. 17, 1993, Ser. No. 122,155

Int. Cl.<sup>6</sup> G09B 23/28

U.S. Cl. 434-269

23 Claims



1. A medical training aid including:

- a) a soft-bodied portion,
- b) a fastener accepting fabric covering at least a portion of said soft-bodied portion, and
- c) an overlay for attachment to said fastener accepting fabric, said overlay including:
  - i) a first sheet,
  - ii) a two or three dimensional object, and
  - iii) a second sheet heat fused to the first sheet and having the two or three dimensional object interposed between the first sheet and the second sheet.

5,411,438

## HEATING, VENTILATING AND AIR-CONDITIONING SYSTEMS

David White, Selsey; Colin Sawyer, Maldstone, and Pater Bartingale, Margate, all of England, assignors to Hunter Technical Developments Limited, Jersey, Channel Islands

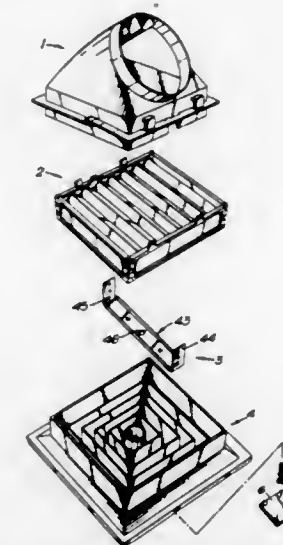
Filed Mar. 22, 1993, Ser. No. 35,385

Claims priority, application United Kingdom, Dec. 3, 1992, 9225345

Int. Cl.<sup>6</sup> F24F 13/062

U.S. Cl. 454-300

38 Claims



1. A plenum chamber for use adjacent an outlet of a heating, ventilating or air conditioning system, the chamber being defined by a peripheral wall and having an inlet, the inlet being adapted for connection to ducting of the heating, ventilating or air conditioning system so as to receive air supplied via the ducting and to direct air into the chamber, the chamber having an outlet extending in a different direction to that of the inlet, the plenum chamber incorporating a plurality of substantially planar vanes which extend inwardly from the peripheral wall of the chamber, the vanes being disposed parallel with each other on one side of the chamber and acting to guide a flow of air through the chamber between the inlet and the outlet.

5,411,439

## TORSIONAL VIBRATION DAMPER

Christoph Sacber, Sauerlach/Arget, Germany, assignor to HURTH Getriebe und Zahnraeder G.m.b.H., Munich, Germany

Filed Jan. 11, 1993, Ser. No. 2,153

Claims priority, application Germany, Jan. 20, 1992, 42 01 370.4

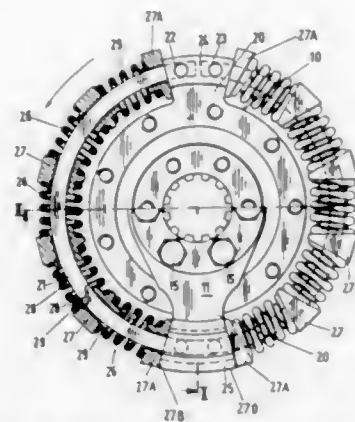
Int. Cl.<sup>6</sup> F16D 3/12; F16F 15/121

U.S. Cl. 464-67

3 Claims

1. In a torsional vibration damper comprising a driving part adapted to be coupled to a driven shaft of an internal combustion engine, a driven part adapted to be coupled to an input shaft of a transmission device, said driven part being arranged coaxially with respect to said driving part and is relatively rotatable to a limited extent relative thereto, a series of compression springs arranged coaxially with respect to said driving part and said driven part and successively in a circumferential direction, a guide ring on which said series of compression springs are movably supported, with said guide ring being supported on one of said driving part and said driven part, at least one driving abutment rotationally fixedly connected to said driving part, said driving abutment resting on an end of said series of compression springs, which end is a rearwardly facing end relative to the direction of rotation, and at least one

driven abutment rotationally fixedly connected to the driven part, said driven abutment resting on a further end of said series of compression springs, which further end is a frontwardly facing end relative to the direction of rotation, the improvement wherein first and second circular-segment-shaped spacers having an opening the diameter of which being slightly larger than the diameter of a rod forming said guide ring are arranged on said guide ring and movable in a circumferential direction



thereof, said first spacers having two lateral shoulders the diameter of which being slightly less than the inside diameter of said compression springs for keeping said compression springs spaced from said guide ring, said second spacers having essentially the shape of one-half of said first spacers with respect to a radial plane and resting with a dividing planar surface thereof against said driving abutment and said driven abutment, respectively.

5,411,440

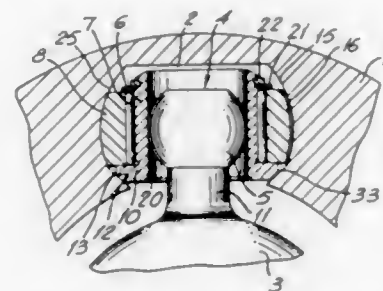
# CONSTANT VELOCITY UNIVERSAL JOINT HAVING AN INNER JOINT PART WITH SPHERICAL TRUNNIONS PROVIDED WITH ROLLER MEMBERS GUIDED IN AN OUTER PART

Jörg Bensinger, Hennef; Krude Werner, Neunkirchen-Seelscheid, and Dieter Jost, Troisdorf, all of Germany, assignors to GKN Automotive AG, Lohmar, Germany  
Continuation of Ser. No. 940,234, Sep. 3, 1992, abandoned, which is a continuation of Ser. No. 607,232, Oct. 31, 1990, Pat. No. 5,167,583. This application Jun. 10, 1993, Ser. No. 74,721  
Claims priority, application Germany, Nov. 3, 1990, 39 36 601.4

The portion of the term of this patent subsequent to Dec. 1, 2009, has been disclaimed.  
Int. Cl.<sup>6</sup> F16D 3/205

U.S. Cl. 464—111

18 Claims



1. A constant velocity universal joint of a tripod type, comprising: an outer joint part provided with three circumferentially distributed, axially extending longitudinal recesses with circumferentially opposed running faces; and an inner joint part provided with three circumferentially distributed radial journals engaging the longitudinal recesses, each of the journals being provided with roller members which are held sub-

stantially isogonally in the longitudinal recesses and which are held relative to the journals so as to be radially displaceable and angularly movable, each of the roller members being rotatably supported on a roller carrier, the journals, at their ends, each having spherical heads fixed thereto so as to engage a radial cylindrical inner recess of the roller carrier so as to be radially movable and angularly movable into any position as a result of being movable around two axes perpendicular to one another.

5,411,441

# POOL CUE WITH SPRING LOADED TIP

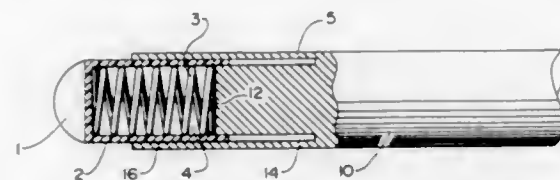
Albert S. Detka, 1304 - 4th St., Beaver Falls, Pa. 15010

Filed Jun. 27, 1994, Ser. No. 265,775

Int. Cl.<sup>6</sup> A63D 15/08

U.S. Cl. 473—44

2 Claims



1. An improved billiard cue comprising: a shaft having a front end and a back end, said front end having an outer wall extending from a point near said front end of said shaft to a point forward of said shaft, said outer wall about parallel to said front end so as to create a narrow space between said outer wall and said front end and an enclosed space forward of said front end, a tip having a back side and a rear wall extending from said back side so as to form a small space enclosed by said back side and said rear wall, a biasing means in connection with said back end, said rear wall of size adapted to slide within said enclosed space and said narrow space, a silicone substance located in said small space and in connection with said biasing means.

5,411,442

# BOWLING ALLEY MASKING UNIT

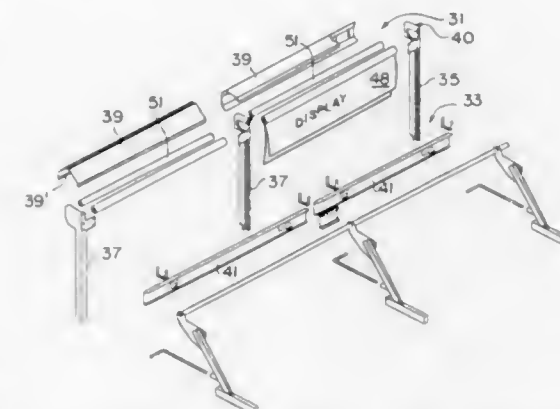
Michael W. Stephens; William M. Riley, both of Richmond; Robert L. Morin, Glen Allen, and Steven A. Bumbara, Richmond, all of Va., assignors to AMF Bowling, Inc., Mechanicsville, Va.

Filed Jun. 28, 1994, Ser. No. 266,653

Int. Cl.<sup>6</sup> A63D 5/04

U.S. Cl. 473—54

7 Claims



1. In a bowling alley of the type having a longitudinally extending lane having two sides, an approach section, an intermediate lane section and a foul line disposed at one end of said lane between the approach and the intermediate lane sections,

and a pin deck for receiving a plurality of bowling pins thereon disposed at the opposite end of the alley, a pair of elongated concave gutters extending along and substantially abutting the sides of said lane between the ends thereof for receiving a bowling ball which falls off of the lane, means for returning spent bowling balls to a bowler and a pin spotting mechanism disposed above the pin deck for delivering bowling pins to the pin deck in a predetermined pattern, the improvement comprising a bowling alley masking unit which provides a visual barrier that covers a forward portion of the pin spotting mechanism when in a first position and which provides ready access to the pin spotting mechanism when in a second position, said masking unit including a generally rectangular frame having a pair of generally vertical and parallel guide members spaced apart by a distance which is about equal to the width of the bowling alley, a first cross member cooperating with said guide members to form a three sided frame, a generally horizontal cartridge adjacent to one of said cross members and said guide members each including means defining a vertical channel and clamping means disposed within said channel, roller means disposed within said cartridge and a generally rectangular flexible masking member having a first side with a display thereon, said masking member disposed on said roller means and attached thereto along one edge thereof and having a pair of side edges disposed in said channel means and held in place therein by said clamping means, and a forward edge of said masking member extending beyond said roller means when said flexible masking member is in its extended position, releasable latch means for maintaining said masking member in its extended position and means for returning said masking member to its first position upon release of said latch means.

5,411,443

# DRAGCHAIN SUBSTITUTE

Karl Meier, Westendstr. 12, 8548 Heideck; Josef Steff, Hagenbuchring 19, 8831 Meinheim, and Karl-Heinz Trieb, Lindenstr. 15, 8820 Gunzenhausen, all of Germany  
Division of Ser. No. 805,685, Dec. 10, 1991, Pat. No. 5,322,480.

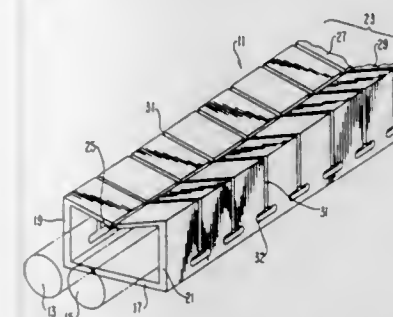
This application Jun. 9, 1994, Ser. No. 257,660

Claims priority, application European Pat. Off., Nov. 26, 1991, 91120167

Int. Cl.<sup>6</sup> F16H 57/02

U.S. Cl. 474—145

15 Claims



1. A line receiving channel for a dragchain substitute comprising a continuous, uninterrupted floor portion, a cover portion and sidewall portions capable of containing at least one single-core or multi-core line loosely disposed therein, the line receiving channel being composed of material with good slidability so that an upper length of the channel is slidable on a lower length of the channel, said channel also provided with a multiplicity of transverse separations spaced from each other in the longitudinal direction of the channel and extending through the cover portion and continuing in the sidewall portions at least to a location near the floor permitting the line channel to be able to form a loop characterized in that, of the cover portion and the sidewall portions at least one of these portions is designed in a projecting manner and is resilient towards the channel interior relative to a channel wall portion supporting said portion, such that a line can be urged from

outside of the line receiving channel into the interior of the channel through said resilient portion and is enclosed therein.

5,411,444

# BELT TRANSMISSION MECHANISM

Takayuki Nakamura, and Tsukasa Ono, both of Kanagawa, Japan, assignors to Fujl Photo Film Co., Ltd., Kanagawa, Japan

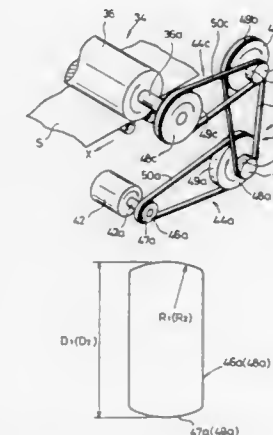
Filed Jun. 29, 1994, Ser. No. 267,234

Claims priority, application Japan, Jun. 29, 1993, 5-158736

Int. Cl.<sup>6</sup> F16H 7/00

U.S. Cl. 474—148

3 Claims



1. A belt transmission mechanism comprising:  
a crowned drive pulley;  
a crowned driven pulley; and  
a belt trained under tension around said crowned drive pulley and said crowned driven pulley;  
said crowned drive pulley and said crowned driven pulley being dimensioned to satisfy the equation:

$$D2/D1 = k \cdot R1/R2$$

where D1 is the diameter of said crowned drive pulley, D2 is the diameter of said crowned driven pulley, R1 is the radius of the crown of said crowned drive pulley, R2 is the radius of the crown of said crowned driven pulley, and k is a constant which is approximately 1.

5,411,445

# BALL CHAIN AND SPLICING MEANS THEREFOR

Kiyoshi Oda, Namerikawa, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

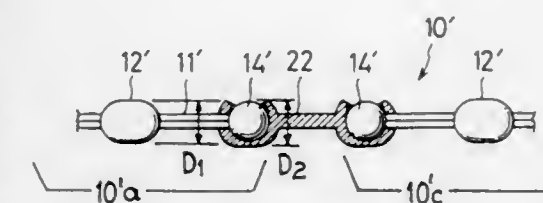
Filed Mar. 24, 1993, Ser. No. 36,286

Claims priority, application Japan, Apr. 9, 1992, 4-118370

Int. Cl.<sup>6</sup> F16H 7/02; F16G 11/09, 11/02

U.S. Cl. 474—154

6 Claims



1. A splicing means for splicing a ball chain having a connecting means, a multiplicity of chain balls secured in place at substantially equally spaced intervals along a length of said connecting means, a plurality of coupling means each secured to said connecting means at predetermined intervals there-



along and interposed equi-distantly between adjacent balls, said splicing means comprising:

- a socket dimensioned and configured having an outside length and width substantially equal to one of said chain balls, and provided with a cavity dimensioned to receive one of said coupling means and openings communicating with said cavity for inserting said connecting means there-through.

5,411,446

# HYDRAULIC CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

Ikuo Hirose, Fujl, Japan, assignor to Jatco Corporation, Fujl, Japan

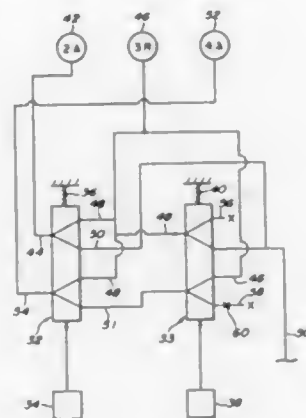
Filed May 26, 1993, Ser. No. 67,580

Claims priority, application Japan, Jun. 3, 1992, 4-168497

Int. Cl.<sup>6</sup> F16H 5/60

U.S. Cl. 475-120

1 Claim



1. In an automatic transmission, the automatic transmission having a brake to be engaged at an N speed and an N+2 speed and released at an N+1 speed, said automatic transmission comprising:

- a hydraulic servo apparatus arranged to control the brake, said hydraulic servo apparatus having an N speed apply chamber which engages the brake when undergoing hydraulic pressure, an N+1 speed release chamber which releases the brake when undergoing hydraulic pressure even with said N speed apply chamber undergoing hydraulic pressure and an N+2 speed apply chamber which engages the brake when undergoing hydraulic pressure regardless of the state of hydraulic pressure within said N speed apply chamber and said N+1 speed release chamber;
  - a plurality of shift valves hydraulically connected to said N speed apply chamber, said N+1 speed release chamber and said N+2 speed apply chamber, said plurality of shift valves controlling hydraulic pressure to be supplied to and discharged from said N speed apply chamber, said N+1 speed release chamber and said N+2 speed apply chamber;
  - a first hydraulic passage hydraulically connected to said N+2 speed apply chamber; and
  - a second hydraulic passage hydraulically connected to said N+1 speed release chamber;
- wherein said plurality of shift valves connect said first hydraulic passage to said second hydraulic passage to drain hydraulic pressure through a drain port upon the N speed; and
- wherein N is a whole number equal to or greater than 1.

## 5,411,447 FULL-TIME INTEGRATED PLANETARY FOUR-WHEEL DRIVE TRANSFER CASE WITH TRACTION

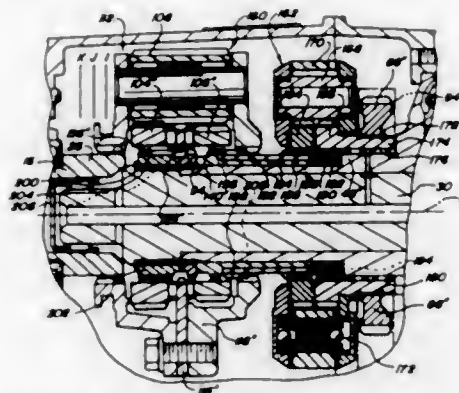
Barry L. Frost, Waterford, Mich., assignor to New Venture Gear, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 961,486, Oct. 15, 1992, Pat. No. 5,284,068. This application Nov. 5, 1993, Ser. No. 148,470

Int. Cl.<sup>6</sup> F16H 1/42

U.S. Cl. 475-223

20 Claims



1. A transfer case for a four-wheel drive vehicle comprising: a housing; an input member supported for rotation in the housing; first and second output means supported for rotation in the housing; a planetary gear assembly that is axially moveable relative to the input member and the first and second output means between a plurality of positions for selectively transferring torque to the front and rear output means thereby establishing drive modes at least one of which is a full-time four-wheel high-range mode wherein differentiation is provided between the first and second output means; and means for modifying the torque output of the planetary gear assembly as a function of relative rotation between the first and second output means.

5,411,448

## GEAR SHIFTING MECHANISM FOR A TRANSMISSION

Yoshiyuki Horii, and Masashi Amano, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

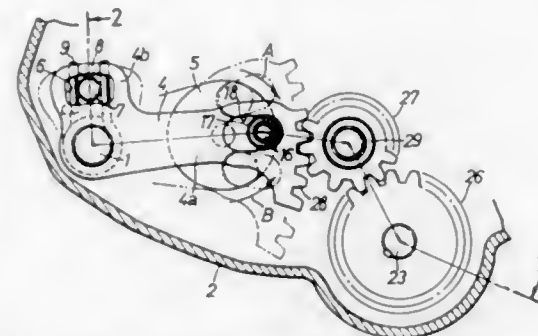
Filed Oct. 6, 1993, Ser. No. 132,324

Claims priority, application Japan, Oct. 6, 1992, 4-267674; Mar. 24, 1993, 5-089301

Int. Cl.<sup>6</sup> F16H 59/04; B60K 20/00; B62K 23/00

U.S. Cl. 477-102

19 Claims



1. A gear shifting mechanism for a transmission, comprising: a transmission case for positioning a gear shift mechanism; a gearshift pedal; a gearshift spindle supported on the transmission case of the transmission for rotation by said gearshift pedal;

a gearshift arm fixed to the gearshift spindle, said gearshift arm being operatively connected to a gearshift drum journaled on the transmission case for imparting rotation thereto; and

a sector gear being formed on the gearshift arm, said sector gear being operatively driven by a driving gear mounted on a rotary shaft of a reversible rotary actuator, said rotary actuator being attached to said transmission case; whereby imparting movement to said gearshift pedal provides rotation to said gearshift spindle for providing rotation to said gearshift drum for effecting a gear shift and, similarly, actuating said reversible rotary actuator imparts rotation to said driving gear for providing rotation to said gearshift drum and said gearshift pedal for effecting a gear shift.

5,411,449

## GEAR SHIFT CONTROL APPARATUS

Hiroshi Takahashi, Komae, and Shinsuke Sakaue, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

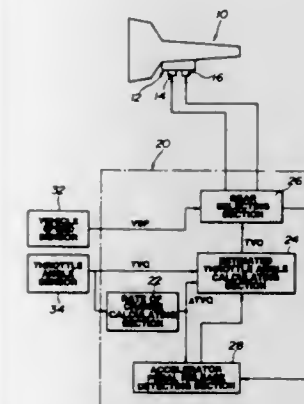
Filed Sep. 30, 1993, Ser. No. 128,777

Claims priority, application Japan, Oct. 2, 1992, 4-264674

Int. Cl.<sup>6</sup> F16H 59/24

U.S. Cl. 477-120

9 Claims



1. A gear shift control apparatus for use with an automotive vehicle having an engine and an automatic transmission to control gear shift operation in the automatic transmission, comprising:

- a vehicle speed sensor sensitive to vehicle speed for producing a first sensor signal indicative of a sensed vehicle speed;
- an engine load sensor sensitive to engine load for producing a second sensor signal indicative of a sensed engine load;
- means responsive to the second sensor signal for calculating a rate of change of the engine load;
- means for calculating an estimated engine load as a function of the sensed engine load and the calculated engine load rate of change to reflect a driver's expectation for gear shift operation on the gear shift control; and
- means for selecting a gear position based upon the sensed vehicle speed and the estimated engine load.

5,411,450

## TRANSIT CLUTCHLESS SHIFTING OF AN AUXILIARY TRANSMISSION

Andrew B. Gratton; Anthony A. Bachhuber; LeRoy A. Maxfield, all of Oshkosh, and Jeffrey M. Miller, Larsen, all of Wis., assignors to Oshkosh Truck Corporation, Oshkosh, Wis.

Filed Apr. 1, 1993, Ser. No. 41,253

Int. Cl.<sup>6</sup> F16H 61/04

U.S. Cl. 477-124

11 Claims

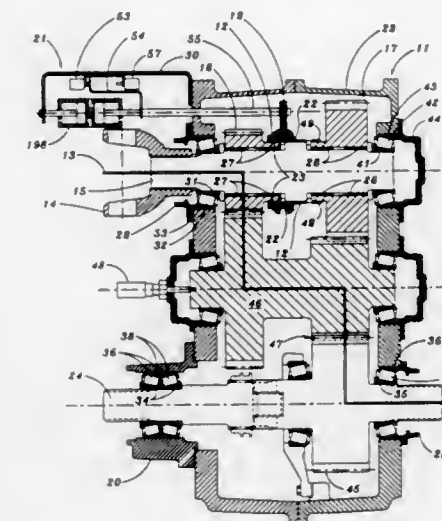
1. A system for shifting gears of an auxiliary transmission of a vehicle while the vehicle is moving, the system comprising: means for sensing a rotational velocity of an input shaft and

means for transmitting a signal relative thereto to a control means,

means for sensing a rotational velocity of an output shaft and means for transmitting a signal relative thereto to the control means,

actuation means for shifting a shift collar from a first low gear to a neutral position, from the neutral position to a first high gear, from the first high gear to the neutral position and from the neutral position to the first low gear, control means including

means for comparing the rotational velocities of the input and output shafts to determine a difference in the rotational velocities of the input and output shafts,



means for activating a throttle to increase the rotational velocity of the input shaft to approximate the rotational velocity of the output shaft in order to shift the shift collar from the first high gear to the neutral position to the first low gear,

means for deactivating the throttle to reduce the rotational velocity of the input shaft to approximate the rotational velocity of the output shaft in order to shift the shift collar from the first low gear to the neutral position to the first high gear,

limit means preventing the shifting of the shift collar from the first high gear to the neutral position when the rotational velocity of the output shaft speed is above a first preset value.

5,411,451

## CONTROL SYSTEM FOR CONTROLLING THE PRESSURE OF THE ONCOMING SERVO HYDRAULIC PRESSURE BASED ON A PREDICTED TIME TO SYNC FROM OUTPUT SHAFT ACCELERATION IN AUTOMATIC TRANSMISSION

Masahiko Ando, Okazaki; Koji Noda, Anjo; Yoshihisa Yamamoto, Nishio; Masahiro Hayabuchi, Anjo; Kazumasa Tsukamoto, Toyota; Yasuo Hojo, Nagoya; Yutaka Taga; Hidehiro Oba, both of Aichi, and Seitoku Kubo, Toyota, all of Japan, assignors to Aisin AW Co., Ltd., Japan

Filed Nov. 27, 1992, Ser. No. 982,673

Claims priority, application Japan, Dec. 3, 1991, 3-344123

Int. Cl.<sup>6</sup> F16H 5/40

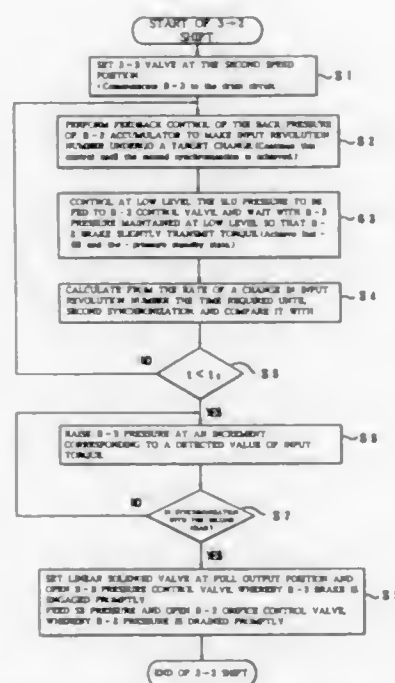
U.S. Cl. 477-144

4 Claims

1. A control system for an automatic transmission having a planetary gear mechanism disposed between an input shaft and an output shaft and first and second frictional engagement elements, said first frictional engagement element being released while said second frictional engagement element is

engaged upon downshift from a given speed stage to another speed stage, said control system comprising:

- a first hydraulic servo for engaging the first frictional engagement element;
- a second hydraulic servo for engaging the second frictional engagement element;
- change-over means for selectively feeding or draining servo hydraulic pressure to/from the first and second hydraulic servos;
- regulator means for regulating the hydraulic servo pressure of the second hydraulic servo, said regulator means being interposed between said change-over means and the second hydraulic servo;
- first solenoid valve means for controlling said regulating means;
- first detecting means for detecting input rotational speed of the planetary gear mechanism; and
- an electronic control unit for outputting control signals to the first solenoid valve means, in accordance with the detected input rotational speed, said electronic control unit including:



calculating means for calculating, responsive to initiation of draining of said first hydraulic servo, a time  $t$  remaining until synchronization of the another speed stage, on the basis of the rate of change in the detected input rotational speed;

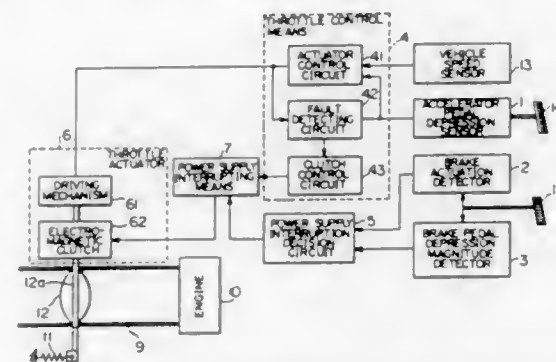
first signal outputting means for outputting a first signal to the first solenoid valve means to keep the hydraulic pressure to the second hydraulic servo at a constant low level when said time  $t$  calculated by the calculating means is more than a predetermined time  $t_0$ ;

second signal outputting means for outputting a second signal to the first solenoid valve means to gradually raise the hydraulic pressure to the second hydraulic servo when said time  $t$  calculated by the calculating means is less than the predetermined time  $t_0$ ; and

third signal outputting means for outputting a third signal the first solenoid valve means to rapidly raise, at a rate higher than the gradual raise, the hydraulic pressure to the second hydraulic servo when the synchronization of the another speed stage is confirmed.

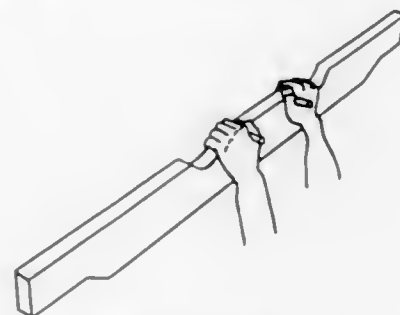
# 5,411,452 RUNNING CONTROL APPARATUS FOR MOTOR VEHICLE

Kazuyori Katayama, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Aug. 25, 1993, Ser. No. 111,574  
Claims priority, application Japan, Aug. 27, 1992, 4-228466  
Int. Cl.<sup>6</sup> F02D 9/06; B60K 41/20  
U.S. Cl. 477-206 11 Claims



1. A running control apparatus for a motor vehicle driven by an internal combustion engine, comprising:
  - accelerator pedal actuation detecting means for detecting magnitude of actuation of an accelerator pedal;
  - brake pedal depression magnitude detecting means for detecting magnitude of depression of a brake pedal;
  - throttle control means for driving a throttle valve actuator by calculating a control quantity for controlling a throttle valve on the basis of an accelerator pedal actuation signal supplied from said accelerator pedal actuation detecting means; and
  - power supply interrupting means for interrupting an electric power supply to said throttle valve actuator when the magnitude of brake pedal depression detected by said brake pedal depression magnitude detecting means exceeds a predetermined value, to thereby cause said throttle valve to assume a fully closed state, wherein said predetermined value is selected greater than a braking force applied in the state where said accelerator pedal is being actuated and smaller than a braking force applied in the state where said accelerator pedal is released.

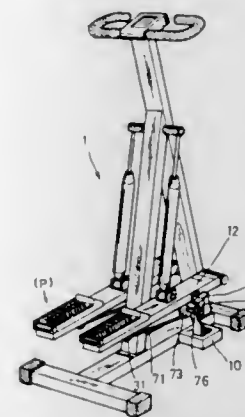
5,411,453  
PULL UP DEVICE WITH THUMB GRASPING KNOBS  
Charles Wilson, 1472 S. Evergreen Ave., Clearwater, Fla. 34616  
Filed Jul. 21, 1994, Ser. No. 278,606  
Int. Cl.<sup>6</sup> A63B 1/00  
U.S. Cl. 482-38 1 Claim



1. A pull up device for performing pull up exercises comprising:
  - an elongated rectangular body;

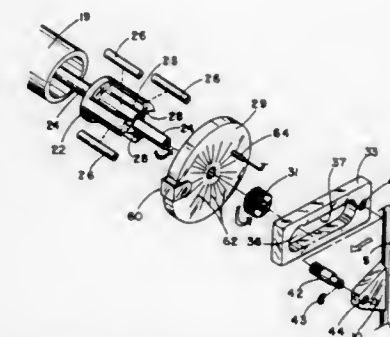
- a pair of curved openings located at the top surface of said body near its center;
- a pair of knobs which extend out from the upper front surface of said body, said knobs located between said curved openings;
- whereby a user grasps said body at said curved locations with the user's thumbs engaging said knobs while performing pull up exercises.

5,411,454  
PEDAL FOR SPORTING EQUIPMENT  
John Chang, No. 1-2, Lane 975, Chun-Jih Road, Tao-Yuan City, Taiwan, Prov. of China  
Filed Jul. 26, 1994, Ser. No. 280,446  
Int. Cl.<sup>6</sup> A63B 21/00  
U.S. Cl. 482-53 3 Claims



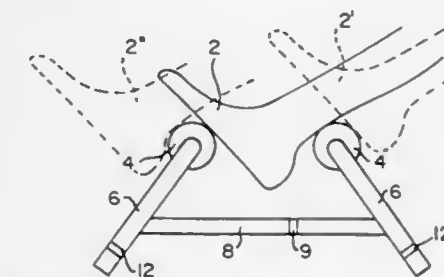
1. An improved massaging pedal assembly for sporting equipment, comprising:
  - a housing having a recess with an elongated slotted through opening formed therein, a receiving recess disposed between outside portions of the recess and a pair of side plates disposed on opposing sides of said housing, a positioning boss being disposed at a rear end of the receiving recess of the housing;
  - a sliding plate capable of sliding reciprocally within the recess of the housing, the bottom of the sliding plate being provided with a pivoting lug extending through the slotted opening, a plurality of projecting rails being disposed at the top of the sliding plate;
  - a pedal covering the recess of the housing and being affixed thereto by screw members, the upper surface of the pedal being provided with a plurality of through holes, the bottom side of the pedal being provided with a plurality of retaining slots for respective receipt of the plurality of projecting rails of the sliding plate, the projecting rails being slidably received by the retaining slots;
  - a plurality of massaging members disposed within the through holes of the pedal, each massaging member being capable of being projected above the pedal responsive to reciprocal displacement of the projecting rails of the sliding plate, each massaging member being lifted or lowered within a respective through hole; and
  - a pair of covers attached to a portion of the housing located between a front portion thereof and a respective positioning boss of the housing by screws, each of the covers being provided with a positioning slot, a locking member of each of the screws being inserted into the positioning slot, the bottom side of the cover being provided with a space for projection of the massaging members therein.

5,411,455  
USER PROPELLED TREADMILL  
Terry M. Haber, 25011 Castlewood, El Toro, Calif. 92630; William H. Smedley, 33285 Blanche Dr., Lake Elsinore, Calif. 92530, and Clark B. Foster, 23631 Wakefield Ct., Laguna Niguel, Calif. 92677  
Filed Mar. 18, 1994, Ser. No. 210,679  
Int. Cl.<sup>6</sup> A63B 22/02  
U.S. Cl. 482-54 20 Claims



1. A treadmill comprising a housing, a tread supported for rotation relative to said housing, support means connected to said housing and adapted to be grasped by a user and moved in back and forth directions, a clutch assembly including a rotatable clutch to couple said support means to said tread so that at least one of the back and forth movements of said support means is translated into a corresponding rotation of said tread, and a hollow drum to support said tread for rotation relative to said housing, said rotatable clutch adapted to be coupled to said hollow drum, such that the rotation of said clutch is imparted to said drum for causing a corresponding rotation of said tread.

5,411,456  
FOOT CRADLE EXERCISE APPARATUS  
Kenneth G. Lay, P.O. Box 800, Edgartown, Mass. 02539  
Filed Jun. 18, 1993, Ser. No. 79,327  
Int. Cl.<sup>6</sup> A63B 23/00, 23/02  
U.S. Cl. 482-79 4 Claims



1. Exercise apparatus comprising:
  - first support means arranged and constructed for receiving the bottom of one or both feet,
  - second support means arranged and constructed for receiving the back of the lower leg of one or both legs,
  - adjustable means for horizontally spacing the second support means from the first support means such that the bottom of one or both feet and the back of one or both lower legs simultaneously contact the first and second support means, said spacing being less than about one and one-half lengths of a human foot, and
  - first adjustable means for holding the first support means above the floor, where the first adjustable means is constructed and arranged to vertically raise or lower the first support means, and second adjustable means for holding the second support means above the floor, where the second adjustable means is constructed and arranged to vertically raise or lower the second support means.



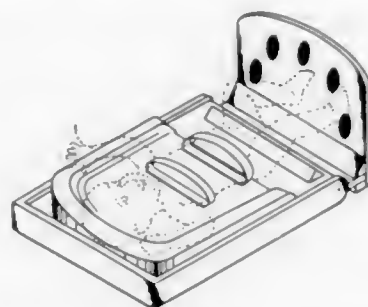
second adjustable means is constructed and arranged to vertically raise or lower the second support means, wherein either support means may be positioned higher than the other support means, and  
 where each adjustable means for holding has one end in contact with the floor and another end contacting the support means, and where both support means are held at about ankle height above the floor, and  
 where one or both feet may exert pressure downward into the floor, outward away from the body, inward toward the body, and where one or both legs may be lifted above said apparatus.

5,411,457

**INFANT EXERCISE AND ENTERTAINMENT DEVICE**  
 George Hartdegen, III, Box 44, Bellevue, Id. 83313, and George Hartdegen, Jr., deceased, late of Bellevue, Id. by George Hartdegen, III, personal representative  
 Continuation of Ser. No. 968,295, Oct. 29, 1992, Pat. No. 5,242,338. This application Sep. 7, 1993, Ser. No. 116,987  
 Int. Cl.<sup>6</sup> A63B 21/00

U.S. Cl. 482-96

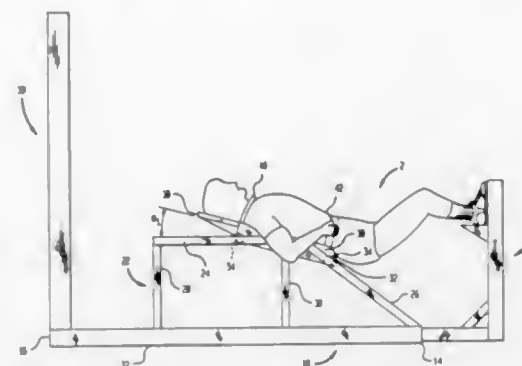
1 Claim



1. An exercise and entertainment apparatus for infants which comprises:

- carriage bed frame means including an inclined frame member, a kick board being perpendicularly disposed with respect to the inclined frame member and a support member for holding the inclined frame member in an inclined position;
- a carriage bed being configured to receive an infant in a relatively horizontal position lying on its back;
- bearing means slidably attaching the carriage bed to the carriage bed frame means;
- the carriage bed includes a bed board having a top surface and a bottom surface where the bottom surface has a plurality of bearing races formed therein;
- the inclined frame member comprises a base board having a plurality of bearing races formed in a top surface and disposed in linear offset alignment with respect to the bearing races formed in the bottom surface of the bed board; and
- a plurality of ball bearings, one each of which is positioned between a bearing race in the bed board and a bearing race in the base board, the bearings; whereby the infant may extend the carriage bed away from the kickboard by an extension of his legs, the carriage bed returning to a position close to the kickboard via the incline of the incline frame member to a position close to the kickboard means being defined by the combination of the bearing races and the ball bearings.

5,411,458  
**ANGLED TRACK SQUAT EXERCISE APPARATUS**  
 Jeffrey Glust, 16 Rooney St., Clifton, N.J. 07011  
 Filed Mar. 22, 1994, Ser. No. 215,819  
 Int. Cl.<sup>6</sup> A63B 21/06, 23/04  
 U.S. Cl. 482-101 13 Claims



1. Squat exercise apparatus, comprising:
  - a substantially horizontally disposed base frame having a front end and a rear end, said frame supported on a supporting surface;
  - a substantially vertically disposed foot plate frame displaceably supported by the base frame at the front end of said base frame, and displaceable away from and toward said front end;
  - means for locking said foot plate frame to said base frame in a selected displaced position;
  - a substantially vertically disposed weight rack fixedly supported by the base frame at the rear end of said base frame, said weight rack carrying a plurality of selectable weights;
  - means for selecting weights from said plurality of selectable weights;
  - a track frame supported by the base frame between said front and rear ends of said base frame, said track frame including first substantially horizontal track and second track inclined downwardly from the first track toward the front end of the base frame;
  - carriage means for supporting an exerciser, and disposed on the track frame so as to be displaceable along said first and second tracks, so that said carriage means is displaceable first upwardly along said second track and then rearwardly along said first track upon the exerciser pushing with his/her feet against the foot plate frame; and
  - means for coupling the plurality of weights to the carriage means so that the selected weights of said plurality of weights are lifted upon said exerciser pushing with his/her feet against said foot plate frame for displacing said carriage.

5,411,459

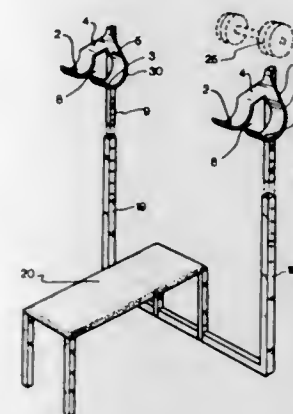
**DUMBBELL RACK ATTACHMENT FOR EXERCISE WEIGHT BENCH COLUMN**  
 Richard C. Hayden, 1576 Heatherwood Dr., Decatur, Ga. 30033-1705  
 Filed Dec. 3, 1990, Ser. No. 620,702  
 Int. Cl.<sup>6</sup> A63B 13/00

U.S. Cl. 482-104

4 Claims

1. A dumbbell support for use with a barbell exercise weight bench having a pair of vertical tubular members between which the bench is disposed, said support comprising a single rod for insertion into the upper end of one of the tubular members, a grooved rack assembly which is attached to the rod, the rack assembly having two body members for supporting a standard dumbbell which extend downwardly from the points

of attachment of the grooved rack assembly to the rod, the body members being spaced sufficiently far apart from each

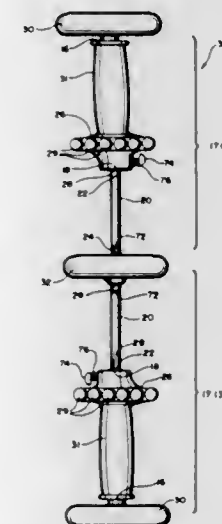


other to permit the insertion of a hand therebetween to allow for a person to manipulate the dumbbell.

5,411,460  
**MODULAR EXERCISE DEVICE WITH SELECTABLE RESISTANCE**  
 Ricky Karlson, and Robert Karlson, both of 5852 Sunrise Dr., Minneapolis, Minn. 55419  
 Filed Dec. 1, 1993, Ser. No. 160,891  
 Int. Cl.<sup>6</sup> A63B 21/008

U.S. Cl. 482-112

13 Claims



1. In an exercise device of the type comprising:
  - a reciprocal pressurized gas unit including a pressurized gas-containing cylinder having a first end and a second end, said gas-containing cylinder receiving a piston rod slidingly therethrough, said piston rod having a first end retaining a piston for gas-tight reciprocal sliding within said cylinder and said piston rod having a second distal end;
  - a pair of handles releasably attached to said first end of said cylinder and said second distal end of said piston rod, respectively;
  - said unit reciprocal between a compressed position and an expanded position, wherein said compressed position is achieved by application of compressive force on said first end of said cylinder against the second distal end of the piston rod toward each other, thereby urging said piston to compress said pressurized gas within said cylinder, and wherein said expanded position is achieved by release of said compressive force from said compressed position,

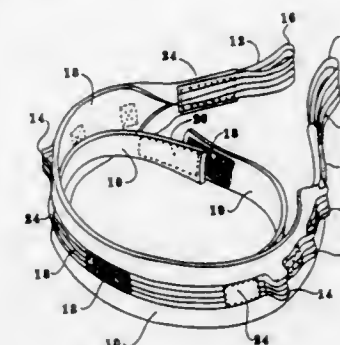
thereby allowing said pressurized gas to expand against said piston;  
 the improvement comprising:  
 said second end of said cylinder and said second distal end of said piston rod, respectively, are further provided with interengaging locking means for locking said unit in said compressed position;  
 wherein one of said pair of handles is fixed with respect to rotation of said unit and another of said pair of handles is rotatably mounted with respect to said unit; and  
 wherein one of the pair of handles of the unit releasably receives either (a) a first end of a cylinder of a second pressurized gas unit or (b) a second distal end of a piston rod of a second pressurized gas unit, so that said exercise device has two pressurized gas units attached to each other in longitudinal alignment with each other.

5,411,461  
**SKIJOR BELT**

Terrance A. Thomascik, P.O. Box 308, Chugiak, Ak. 99567  
 Filed Apr. 6, 1993, Ser. No. 44,580  
 Int. Cl.<sup>6</sup> A63B 21/02

U.S. Cl. 482-124

10 Claims



1. A user worn pulling force dispersing device for skijorers, persons jogging with dogs, victims being rescued by towing, comprising:

- an inner band of stretchable material sufficiently long to encircle the user, sufficiently wide not to cut into the user when being pulled and having two ends which by a fastening means closes said inner band,
- an outer band of stretchable material encircling the user and attached to said inner band opposite said ends,
- a stretching limitation means comprising a band of relatively inelastic material sufficiently long to extend the entire length of said outer band and to form a loop extending beyond each end of said outer band and a plurality of loops on either side of the portion of said outer band which is not attached to said inner band, said stretching limitation means attached to said outer band along its full length except where it forms said plurality of loops extending beyond said outer band.

5,411,462

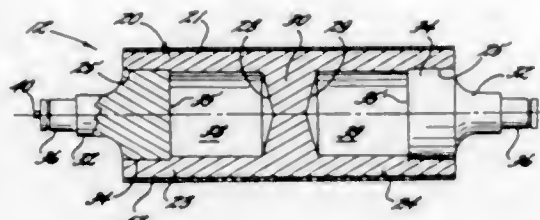
**LIGHTWEIGHT INK TRANSFER ROLL**  
 Terry G. Link, 421 Hempstead Pl., Charlotte, N.C. 28207  
 Filed Aug. 30, 1993, Ser. No. 114,136  
 Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 492-30

16 Claims

1. A lightweight roll comprising
  - a body member formed of a monolithic piece of metallic material and which includes an outer cylindrical surface, tubular opposite end portions, and a solid medial portion which forms a closed inner end wall for each of said tubular end portions, and
  - a header fixed in each of said tubular end portions and with each of said headers including an external journal, with

the journals of said headers being coaxially aligned with each other and with said outer cylindrical surface of said body member, and wherein each of said headers includes a closed inner end surface which opposes said inner end



wall of the associated tubular end portion, and with said inner end surface of each of said headers being axially spaced from the inner end wall of the associated tubular end portion a substantial distance so as to leave a void therebetween.

5,411,463

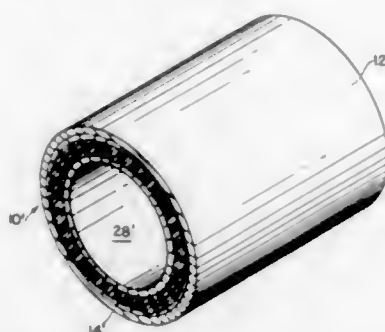
**COMPOSITE ROLL AND METHOD OF MAKING**  
David S. Brookstein, Wellesley, Mass., assignor to Albany International Corp., Albany, N.Y.

Filed Oct. 13, 1993, Ser. No. 135,887

Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 492—38

21 Claims



1. A roll comprising:  
a tubular shell having a hollow interior area;  
a plurality of fiber reinforced elongated elements contained in said interior area, each of said elements extending longitudinally the length of said shell; and  
resin bonding said elements together so as to be fixed in said interior area.

5,411,464

**MACHINE FOR ERECTING CARTONS HAVING COLLAPSIBLE BOTTOMS**

Rodney K. Calvert, Dunwoody, and Alton J. Fishback, Austell, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Nov. 16, 1993, Ser. No. 153,209

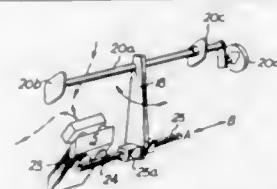
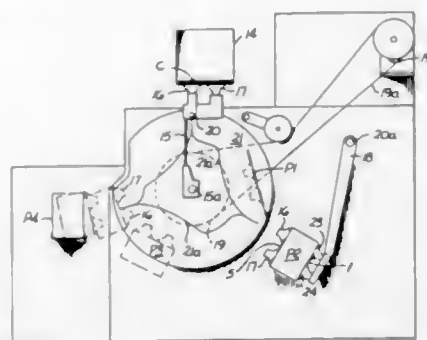
Int. Cl.<sup>6</sup> B31B 3/80, 5/78, 3/50

U.S. Cl. 493—315

9 Claims

1. A machine for erecting a collapsed carton having first foldably interconnected side and end walls and collapsed so that one side and one adjacent end wall extend in one plane and are disposed in face contacting relation with a second side and end wall which are disposed in an adjacent plane, and a composite bottom formed of bottom wall portions hinged to the bottom edges of said first and second side and end walls, fold lines in said bottom wall portions at diagonally disposed corners of the carton so that the bottom is automatically erected when a collapsed carton is expanded, the machine comprising revolving carton pick up means for engaging said first side

walls of said collapsed cartons in sequence and transporting said cartons along a generally orbital path, movable means engageable with said second side walls at a location along said path generally offset from said pick up means for imparting movement to said second side walls in a direction away from said first side walls generally radially to the axis revolution of said pickup means, and



reciprocating means for imparting movement to said movable means in a direction generally parallel to the axis of revolution of said pickup means, whereby said second side walls are moved generally transversely of said path relative to said first side walls as the carton is expanded.

5,411,465

**SEGMENTED COMPOSITE CENTRIFUGE ROTOR WITH A SUPPORT RING INTERFERENCE FIT ABOUT CORE SEGMENTS**

Stefan J. Glen, Grants Pass, Oreg., and Bradley D. Carstens, Mountain View, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 780,656, Oct. 21, 1991, abandoned.

This application Oct. 21, 1993, Ser. No. 141,435

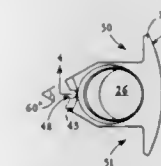
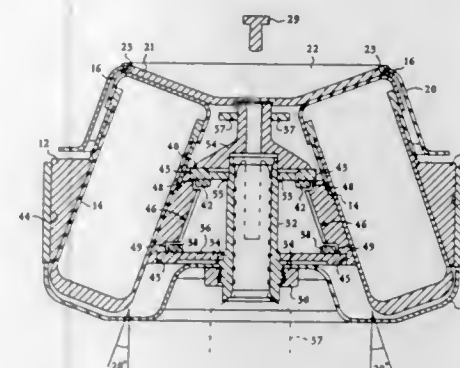
Int. Cl.<sup>6</sup> B04B 5/02

U.S. Cl. 494—16

20 Claims

1. A centrifuge rotor comprising:  
a hub;  
core segments movably coupled to the hub and extending radially outward beyond the hub to define a periphery, the core segments having means for supporting a sample to be centrifuged; and  
a ring fitted around the periphery of the core segments, said ring having a radius with respect to the hub which is sized relative to the core segments provide an interference fit between the ring and the periphery of the core segments such that the ring biases the core segments radially inwardly against the hub in a static non-centrifuging condition and supports the core segments against radially out-

ward centrifugal forces upon centrifugation and there being no fixed structural connection between the ring and



hub which would be subject to tensile stress upon centrifugation.

5,411,467

**IMPLANTABLE HEARING AID**

Gunter Hortmann, Neckartenzlingen, and Hans Leysieffer, Taufkirchen, both of Germany, assignors to Implex GmbH Spezialhorgerate, Germany

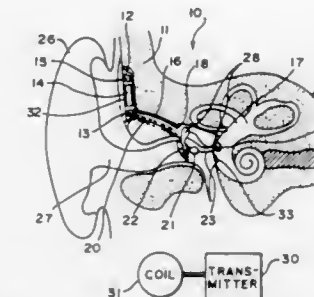
Filed May 30, 1990, Ser. No. 530,582

Claims priority, application Germany, Jun. 2, 1989, 39 18 086.7

Int. Cl.<sup>6</sup> H04R 25/00

U.S. Cl. 600—25

28 Claims



1. Implantable hearing aid for stimulation of the inner ear, comprising means for converting incoming sound waves into electrical signals, an electromechanical converter for receiving said electrical signals and converting them into mechanical vibrations, and a hydromechanical coupling element which has an input side connected to the electromechanical converter and an output side which is connected to the inner ear as a means for transmitting mechanical vibrations generated by the converter directly to fluid-filled spaces of the inner ear.

5,411,468

**MASSAGING PILLOW DEVICE USED IN A CAR**

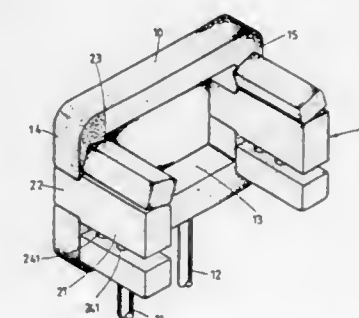
K. C. Chen, No. 22, Lane 10, Sec. 4, Cheng Te Road, Taipei, Taiwan, Prov. of China

Filed Apr. 23, 1993, Ser. No. 52,155

Int. Cl.<sup>6</sup> A61H 1/00

U.S. Cl. 601—57

2 Claims



1. A massaging cushion device used in a car comprising:  
a hollowed frame which connects to the top of a seat in the car;  
at least two massaging devices pivotally connected on the lateral sides of said frame, with the ends of each of said massaging devices extending into corresponding lateral sides respectively for pivotal connection;  
a plurality of driving structures being provided on said massaging devices, said driving structures including circuitry activated by pressure, said circuitry triggering a vibration when activated;  
said massaging devices being spread out about a pivot center for said pivotal connection when in use, and are folded into said hollowed frame when not in use;  
said massaging devices each include a middle section, and upper and lower massaging pads provided respectively above and below said middle section, and an end of said

5,411,466

**APPARATUS FOR RESTENOSIS TREATMENT**

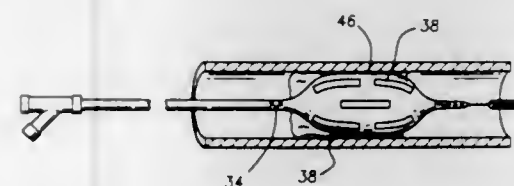
Robert L. Hess, 222 Wyndham Dr., Portola Valley, Calif. 94025, assignor to Robert L. Hess, Menlo Park, Calif.

Continuation of Ser. No. 755,480, Sep. 5, 1991, Pat. No. 5,302,168. This application Mar. 28, 1994, Ser. No. 219,179

Int. Cl.<sup>6</sup> A61N 5/00

U.S. Cl. 600—3

5 Claims



1. Apparatus for post-treatment of stenosed region of an artery that has been reduced by angioplasty or other means comprising:  
radioactive dose means for emitting radiation; and  
positioning means operatively connected to said dose means for advancing said dose means and positioning said dose means within the stenosed region of an artery that has been reduced by angioplasty or other means, said positioning means also being operatively connected to said dose means for withdrawing said dose means from the artery, the positioning means further including an angioplasty balloon, said radioactive dose means being connected to said balloon and moveable into contact with the stenosed region by expansion of said balloon.



middle section being pivotably connected with said hollowed frame;  
said middle sections each include a hole on a top surface thereof for loading in sequence a spring and a steel ball; said upper massaging pads each having an axle extended into said hole, and having a plurality of arched notches on said upper massaging pad to receive said steel ball to adjust the angular position of said upper massaging pad.

5,411,469

## SUSPENSION TYPE FOOT MASSAGER

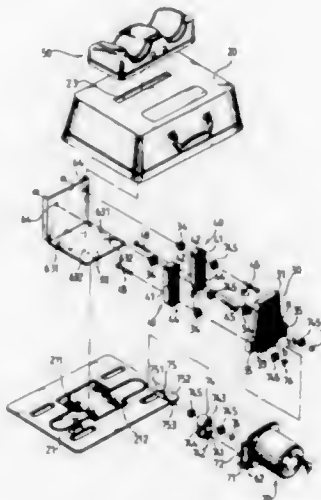
Hong-Shang Wang, No. 12, Dah Hwu, Hwu Pel Lee, Dah Lin Chen, Chia I Hsien, Taiwan, Prov. of China

Filed Mar. 21, 1994, Ser. No. 215,255

Int. Cl.<sup>6</sup> A61H 7/00

U.S. Cl. 601-92

7 Claims



1. A foot massager comprising:
  - a) a casing including a bottom portion;
  - b) an L-shaped mount including a horizontal wall secured to the bottom portion of the casing and an upstanding vertical wall;
  - c) a motor mounted on the L-shaped mount, the motor including a speed reducing gear and a mandrel rotated by the motor;
  - d) a foot rest disposed above the casing;
  - e) a transmission assembly drivingly connecting the foot rest with the mandrel for oscillating the foot rest along a substantially U-shaped path during operation of the motor, the transmission assembly including:
    1. an eccentric wheel connected to the mandrel,
    2. an oscillating member including an elongated guide groove and a top portion, the foot rest being mounted to the top portion,
    3. a pair of links, each link including a top end pivotally secured to the vertical wall of the L-shaped mount and a bottom end pivotally secured to the oscillating member, and at a point closer to the horizontal wall than the top end pivot point
    4. a transmission shaft including a first end connected to the eccentric wheel and a second end slidably engaged within the elongated guide groove of the oscillating member; and
  - f) whereby during rotation of the mandrel by the motor, the second end of the transmission shaft is caused to slidably reciprocate along the elongated guide groove between an upper dead point and a lower dead point therein and cause the links to pivot about their top ends while maintained in a parallel disposition, thereby causing the oscillating member to oscillate the foot rest back and forth along a substantially U-shaped path.

5,411,470  
FOOT MASSAGER

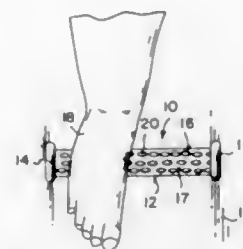
Michal M. Liptak, 43 Winston Dr., Somerset, N.J. 08873, and George Spector, 233 Broadway Rm 702, New York, N.Y. 10279

Filed May 5, 1994, Ser. No. 238,530

Int. Cl.<sup>6</sup> A61H 15/00

U.S. Cl. 601-118

2 Claims



1. A foot massager device which comprises:
  - a) an elongated cylindrical rod;
  - b) a pair of rollers, each larger in diameter than said rod and concentrically connected to one end of said rod;
  - c) a plurality of bumps randomly arranged upon an outer surface of said rod, so as to engage and massage the sole of a foot under pressure when said rollers are rolled along a flat support surface; wherein said bumps on the outer surface of said rod are comprised of rigid ovoidal shaped projections sized to stimulate the sole of the foot; further including:
    - d) said rod being divided into a plurality of segments;
    - e) a shaft extending through a center of said segments of said rod, so that said segments can rotate about said shaft;
    - f) an abutting end of said first segment having a plurality of sockets radially positioned about said shaft; and
    - g) an abutting end of said second segment having one spring biased ball plug to engage with any one of said sockets, so that said segments can be rotated and retained to change the random pattern of said ovoidal shaped projections when massaging the sole of the foot.

5,411,471

## NECK RELAXER

Luis Terrazas, 157 Jeweled Mesa Rd., Santa Teresa, N. Mex. 88008

Filed Oct. 22, 1993, Ser. No. 141,395

Int. Cl.<sup>6</sup> A61F 5/04

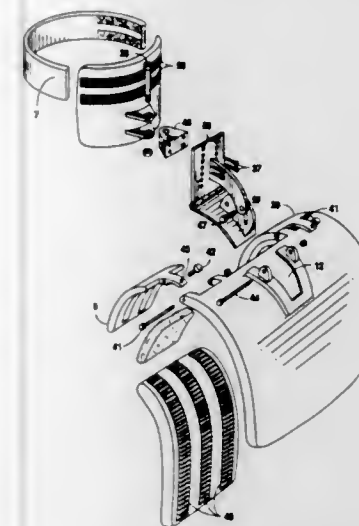
U.S. Cl. 602-18

15 Claims

1. An apparatus for supporting the head, neck and back area of a human patient comprising:
  - a. an upper support element for supporting the head, of the human patient;
  - b. a lower support element for supporting the back of the human patient; and
  - c. a means for attaching said upper support element to said lower support element which allows said upper support mechanism to rotate in both lateral directions relative to the head of said human patient about an axis of rotation which is situated in alignment and juxtaposed with the posterior region of the head of the human patient when

said apparatus is worn by the human patient while restraining the upper support element in the posterior and

of said second conduit at a velocity greater than said low velocity.



anterior directions relative to the head of said human patient.

5,411,472

## LOW TRAUMA BLOOD RECOVERY SYSTEM

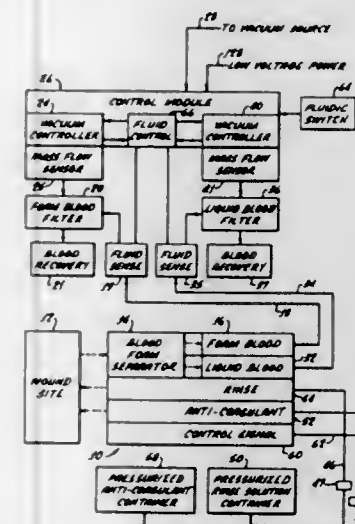
Robert F. Steg, Jr., Dean M. Peterson, both of Escondido, Calif., and Dante S. Cusi, Mexico City, Mexico, assignors to Galen Medical, Inc., Escondido, Calif.

Filed Jul. 30, 1992, Ser. No. 922,566

Int. Cl.<sup>6</sup> A61M 1/00

U.S. Cl. 604-4

47 Claims



1. A low trauma blood recovery system comprising:
  - first and second conduits having open ends attached to one another and that terminate closely adjacent to one another and are configured and arranged to be placed at a wound site with both said closely adjacent open ends at the wound site and open to the wound site,
  - first means for applying a discrete negative gauge pressure to said first conduit to cause blood to flow through the end of said first conduit at a low velocity, and
  - second means for applying a discrete negative gauge pressure to said second conduit to cause flow through the end

5,411,473

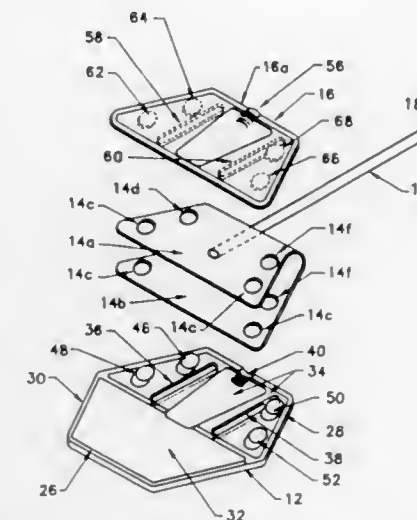
## MEDICAL VALVE

A. Mateen Ahmed, 928 E. Juanita Ave., La Verne, Calif. 91750  
Division of Ser. No. 478,655, Feb. 12, 1990, Pat. No. 5,071,408, which is a continuation of Ser. No. 255,070, Oct. 7, 1988, abandoned. This application Oct. 1, 1991, Ser. No. 786,734

Int. Cl.<sup>6</sup> A61M 5/00

U.S. Cl. 604-8

9 Claims



1. A medical valve including means holding in tension a pair of overlying elastic membranes which form therebetween a chamber having an elongated, slit-like opening along adjoining, overlapping edges of the membranes, said opening expanding and contracting in response to changes in pressure in the chamber, and an inlet tube in communication with the chamber at a point remote from the opening.

5,411,474

## METHOD AND APPARATUS FOR CONDITIONING INSUFFLATION GAS FOR LAPAROSCOPIC SURGERY

Douglas E. Ott, 682 Foster Rd., Macon, Ga. 31210; John F. Schaefer, and Robert I. Gray, both of Macon, Ga., assignors to Douglas E. Ott, Macon, Ga.

Filed Jul. 14, 1993, Ser. No. 91,658

Int. Cl.<sup>6</sup> A61M 37/00

U.S. Cl. 604-26

15 Claims



1. An apparatus for treating gas prior to the use of the gas in a medical procedure involving a patient, the gas being received into the apparatus from an insufflator which receives gas from a gas source, and the gas exiting the apparatus being in flow communication with a means for delivering the gas to the interior of the patient, wherein the gas is pressure- and volumetric flow rate-controlled by the insufflator, comprising:
  - a) a housing having an inlet and an outlet;
  - b) means for communicating the outlet of the insufflator with the inlet of the housing, wherein a portion of the

- communicating means is positioned proximal to the controlling means, whereby the gas cools the controlling means and the controlling means preheats the gas;
- c) a chamber within the housing and having an entry port and an exit port, the entry port of the chamber being in flow communication with the inlet of the housing;
- d) a humidification means in the chamber that is in the path of travel of the gas through the chamber;
- (e) heating means disposed within the humidification means for heating the gas to a predetermined temperature;
- (f) means in the housing adjacent the exit port of the chamber for sensing the temperature of the gas; and
- (g) means connected to the sensing means for controlling the heating means, whereby upon the determination by the sensing means of the temperature of the gas being at a predetermined level, the controlling means regulates the amount of heat applied by the heating means to the gas within the chamber.

5,411,475

# **DIRECTLY VISUALIZED METHOD FOR DEPLOYING A DETACHABLE BALLOON AT A TARGET SITE IN VIVO**

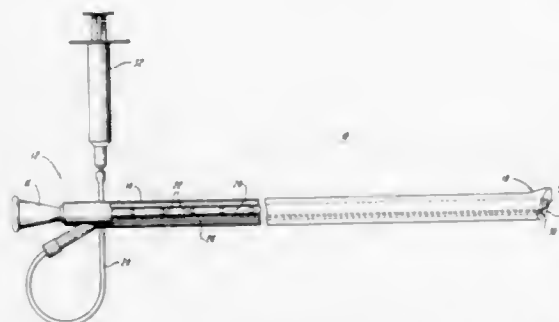
Anthony Atala, Newton, and James Mandell, Brookline, both of Mass., assignors to Children's Medical Center Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 782,058, Oct. 24, 1991, Pat. No. 5,304,123. This application Apr. 28, 1993, Ser. No. 54,375. The portion of the term of this patent subsequent to Apr. 19, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61M 29/02

U.S. Cl. 604—54

21 Claims



1. A directly, visualized method for deploying a detachable balloon to a target site in vivo, comprising:
- providing a scope for directly visualizing a target site in vivo, the scope comprising a sheath a viewing means for viewing the target site and a positioning element extending longitudinally through the sheath;
- passing an uninflated, detachable balloon attached to a catheter through a lumen of a positioning element of the scope to a target site in vivo; and
- inflating and detaching the balloon at the target site in vivo while directly visualizing the detachment of the balloon and/or the effects of the detached balloon on the target site in vivo.

5,411,476

# **SUPERELASTIC GUIDING MEMBER**

Robert M. Abrams, Mountain View, and Sepehr Fariabi, Fremont, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Continuation of Ser. No. 629,381, Dec. 18, 1990, abandoned. This application Jun. 2, 1993, Ser. No. 71,322

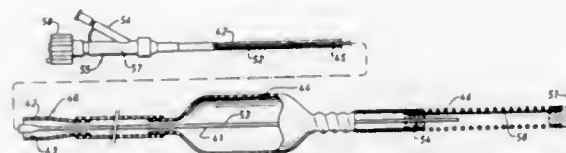
Int. Cl.<sup>6</sup> A61M 37/00

U.S. Cl. 604—95

28 Claims

1. An intravascular guidewire comprising
- a) an elongated member having a proximal portion and a distal portion and being formed at least in part of a superelastic NiTi alloy in an austenite phase which is stable

at a temperature at or below body temperature, which transforms to a martensite phase upon the application thereto of stress at a relatively constant level above about 70 ksi, which exhibits a strain of about 2 to about 8% when sufficient stress is applied to transform the austenite phase to the martensite phase and which has longitudinal residual stresses and a straight memory therein which result from cold working followed by heat treating at a tempera-



- ture from about 350° to about 600° C. while being subjected to a longitudinal tension of up to 50% of the ultimate tensile strength of the portion;
- b) a flexible body disposed about the distal portion of the elongated member; and
- c) means on the proximal end of the elongated member to torque this member and transmit such torque to the distal end of the guidewire.

5,411,477

# **HIGH-STRENGTH, THIN-WALLED SINGLE PIECE CATHETERS**

Mark A. Saab, 396 Andover St., Lowell, Mass. 01852

Continuation of Ser. No. 522,178, May 11, 1990, abandoned. This application May 10, 1993, Ser. No. 59,725

Int. Cl.<sup>6</sup> A61M 29/00

U.S. Cl. 604—96

28 Claims



1. A unitary, integral and seamless catheter comprising self supporting robing having one closed end, said tubing comprising a tubular wall wherein at least a part of said tubular wall defines a balloon portion having a wall thickness on the order of 1.5 mils or less, and another part of said tubular wall defines said closed end portion, both of said portions being integrally formed with said tubular wall, further wherein said tubing consists essentially of an orientable polymeric material which has been biaxially oriented along substantially the entire length of said tubular wall and said closed end portion, said catheter having an overall longitudinal dimension at least double the longitudinal dimension of said balloon wall portion and also being sufficiently thin-walled so that said tubing is flexible, inflatable and collapsible.

5,411,478

# **ANGIOPLASTY APPARATUS AND PROCESS**

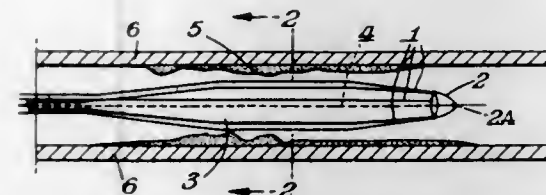
Michael E. Stillabower, 1211 Barley Mill Rd., Wilmington, Del. 19807, assignor to Michael E. Stillabower, Wilmington, Del.

Filed Jul. 12, 1993, Ser. No. 89,187

Int. Cl.<sup>6</sup> A61M 29/00

U.S. Cl. 604—96

9 Claims



1. In an angioplasty apparatus comprising a balloon catheter for applying radial pressure to a vascular stenosis, and extending at least from a point of insertion to the stenosis, the improvement wherein the apparatus further comprises at least two longitudinal force focusing wires having a substantially circular cross section, each wire having a proximal and a distal end, the proximal end of each wire extending proximal to the balloon catheter and the wires positioned radially exterior to the balloon.

5,411,480

# **FLUID DELIVERY APPARATUS**

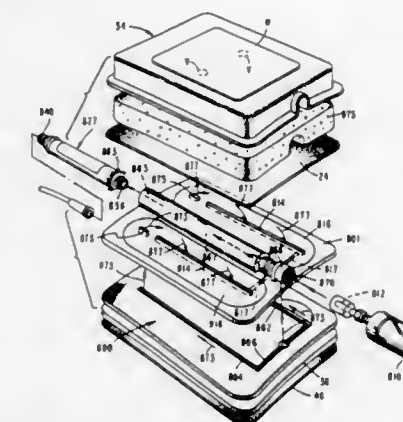
Marshall S. Kriesel, Saint Paul, Minn., assignor to Science Incorporated, Bloomington, Minn.

Continuation-in-part of Ser. No. 987,021, Dec. 7, 1992, Pat. No. 5,279,558, which is a continuation of Ser. No. 870,269, Apr. 17, 1992, Pat. No. 5,205,820, which is a continuation-in-part of Ser. No. 642,208, Jan. 16, 1991, Pat. No. 5,169,389, which is a continuation-in-part of Ser. No. 367,304, Jun. 16, 1989, Pat. No. 5,019,047. This application May 18, 1993, Ser. No. 46,438

Int. Cl.<sup>6</sup> A61M 37/00

U.S. Cl. 604—133

17 Claims



1. A fluid delivery device for delivering fluids to a patient extracorporeal at a controlled rate comprising:
- (a) a base having an ullage protuberance, a fluid inlet and a spaced-apart fluid outlet, said fluid inlet and said fluid outlet being interconnected by a fluid flow path;
- (b) valve means disposed intermediate said fluid inlet and said fluid outlet for controlling fluid flow through said flow path;
- (c) filling means for introducing fluid into said fluid inlet;
- (d) a deformable membrane which is fitted over said base to define a chamber in communication with said fluid inlet and said fluid outlet, said ullage protuberance extending into said chamber said membrane being movable from a first position to a second position whereby fluid within said chamber will be expelled through said fluid outlet;
- (e) an expandable member disposed in contact with said membrane for moving said membrane from said first position to said second position.

5,411,481

# **SURGICAL PURSE STRING SUTURING INSTRUMENT AND METHOD**

William J. Allen, Stratford; George Jessup, Brookfield; Frederick F. Ahari, Southport, all of Conn.; Robert A. Rabiner, Middletown, N.J., and John E. Burbank, III, Ridgefield, Conn., assignors to American Cyanamid Co., Wayne, N.J.

Continuation-in-part of Ser. No. 865,234, Apr. 8, 1992, abandoned, and Ser. No. 927,969, Aug. 11, 1992, abandoned.

This application Oct. 27, 1992, Ser. No. 967,033

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—144

16 Claims

2. A surgical suturing instrument for placing a purse string suture in a tubular tissue, said instrument comprising:
- a pair of relatively movable jaws for clamping the tubular tissue therebetween, a first jaw of said pair of jaws being pivotable with respect to a second jaw about a first pivot axis, each jaw having a row of spaced-apart, uniform-size teeth;
- actuating means for actuating said pair of jaws between an open position for receiving the tubular tissue and a clamping position where the row of teeth of said first jaw meshes with the row of teeth of said second jaw, said

5,411,479

# **CANCER TREATMENT AND CATHETER FOR USE IN TREATMENT**

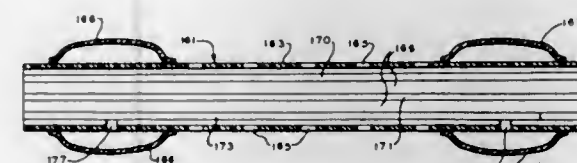
William L. Bodden, 5 Fifth Ave., Branford, Conn. 06405

Continuation of Ser. No. 718,809, Jun. 21, 1991, abandoned, which is a continuation of Ser. No. 260,623, Oct. 21, 1988, Pat. No. 5,069,662. This application Apr. 30, 1993, Ser. No. 56,583

Int. Cl.<sup>6</sup> A61B 1/00

U.S. Cl. 604—98

18 Claims



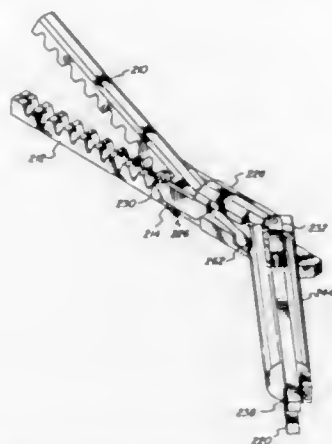
1. Apparatus for isolation and treatment of a portion of the body comprising a first catheter adapted for percutaneous insertion into a vein or artery, comprising (a) a plastic tube having a cranial end and a caudal end, said plastic tube defining a main lumen for outflowing blood, two balloons, fixedly spaced apart about said plastic tube and bonded thereto for inflation thereabout, one being contiguous to said cranial end, and said balloons, when inflated, having a size sufficient to block the flow of blood in a vein or artery into which said catheter is designed to be inserted; fenestrations in said plastic tube between said balloons to said main lumen; second and third lumina within said plastic tube, said second lumen connecting to one of said balloons and said third lumen connecting to the other of said balloons for effecting inflation or deflation of said balloons, said cranial end of said plastic tube being closed to any appreciable inflow of blood and (2) a second catheter for returning blood removed through said main lumen to the patient.



actuating means including a toggle linkage having a rigid lever pivotally connected to one of said jaws about a second pivot axis parallel to the first pivot axis, a link pivotally connected to said lever and a driving rod pivotally connected to said link; and

articulating means, positioned to contact one of said jaws, for pivoting said pair of jaws about a third pivot axis transverse to the first pivot axis, wherein

each tooth includes a base and a crest, the two rows being opposed and offset with respect to each other in the clamping position so that the rows of teeth mesh when the jaws are closed, thereby bending the tubular tissue between the rows of teeth into a wavelike configuration



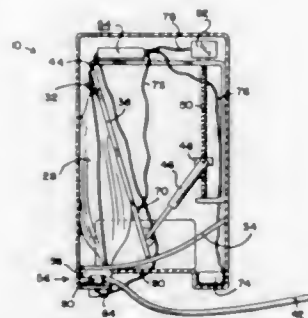
with a two-wall thickness of the tissue overlying the crest of each tooth, and wherein

the crest of each tooth includes a channel therein running parallel to the direction of the row, all of the channels in each row being aligned so as to define at their bases a substantially straight passageway for the transit of a thread-pulling needle through all of the teeth in the row, the base of each channel being sufficiently close to the base of the tooth that a needle forced through the passageway when said jaws are clamped across the tissue can run through only the wall of the wave of tissue contacting and overlying the crest of each tooth without penetrating the next adjacent wall of the tissue.

#### 5,411,482 VALVE SYSTEM AND METHOD FOR CONTROL OF AN INFUSION PUMP

Robert E. Campbell, Chicago, Ill., assignor to Infusion Technologies Corporation, Minnetonka, Minn.  
Continuation-in-part of Ser. No. 969,981, Nov. 2, 1992, Pat. No. 5,232,439, and a continuation-in-part of Ser. No. 970,104, Nov. 2, 1992, Pat. No. 5,342,313. This application Jun. 3, 1993, Ser. No. 71,684

Int. Cl.<sup>6</sup> A61M 1/00  
U.S. Cl. 604—153 22 Claims



1. A system to control fluid flow from a fluid-containing

reservoir in an infusion pump to a patient through a tube, the system comprising:

pressure sensing means for sensing the pressure of the fluid within the reservoir;

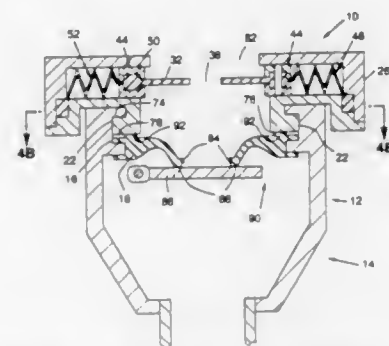
valve means associated with the tube for reversibly restricting fluid flow through the tube, the valve means communicating with the pressure sensing means and being actuated between an open position and a closed position as a result of changes in the pressure of the fluid within the reservoir as detected by the sensing means.

#### 5,411,483 GAS-TIGHT SEAL ACCOMMODATING SURGICAL INSTRUMENTS WITH A WIDE RANGE OF DIAMETERS

Bryan E. Loomas, Santa Clara; John P. Lunsford, San Carlos, and Edwin J. Hlavka, Palo Alto, all of Calif., assignors to Origin Medsystems, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 15,765, Feb. 10, 1993. This application Mar. 30, 1993, Ser. No. 40,373  
The portion of the term of this patent subsequent to Apr. 18, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> A61M 5/00  
U.S. Cl. 604—167 46 Claims



1. Apparatus for use in a surgical instrument to provide a gas-tight seal with an instrument passed therethrough, the instrument having a diameter in a wide range of diameters, the apparatus comprising:

a seal body including a bore wherethrough the instrument is passed, the bore defining an axis; and

an instrument seal assembly, including:

a rigid annulus, and

an instrument seal comprising an elastic material, the instrument seal extending axially and radially outwards from an instrument port therein to the rigid annulus whereto the instrument seal is fixedly attached, the instrument being passed through the instrument port in an insertion direction, the instrument port being substantially perpendicular to the axis, the instrument seal extending axially from the instrument port in a direction opposite to the insertion direction;

the instrument seal assembly being mounted in the seal body, and forming a gas-tight seal therewith, in a manner that restricts axial movement of the instrument seal assembly and that allows free lateral movement of the instrument seal assembly response to movement of the instrument.

#### 5,411,484 BIOMEDICAL TUBE HOLDING DEVICE

Bruce T. Shattuck, P.O. Box 63477, Pipe Creek, Tex. 78063-3477

Filed Oct. 5, 1993, Ser. No. 132,054  
Int. Cl.<sup>6</sup> A61M 25/02

U.S. Cl. 604—179 2 Claims

1. A method for stabilizing an endo-tracheal or naso-tracheal tube following tracheal intubation of a patient, which comprises steps of:

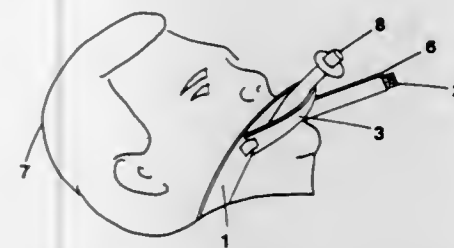
stretching a tracheal securing device across a flat surface

such as an operating table or an ICU bed such that the body of a cincture is underneath and oriented perpendicular to the patient's neck, said tracheal securing device including;

a noose for encircling the endo-tracheal or naso-tracheal tube permanently formed at one end of a length of cincture made of resilient, sterilizable material, such as Tricot, having a dense array of loops disposed about its surfaces;

means for releasably attaching the free end of said cincture to itself, such as a tab of material containing a dense array of hooks about the surfaces of the cincture for engaging said loops;

placing the noose of said tracheal securing device over the shaft of said endo-tracheal or naso-tracheal tube and slid-



ing said noose down said shaft so as to be level with an oral or nasal opening where said endo-tracheal or naso-tracheal tube is located;

pulling the free end of said tracheal securing device taut such that a portion of said noose directly engages said endo-tracheal or naso-tracheal tube, wrapping said free end tightly around the said endo-tracheal or naso-tracheal tube to apply frictional force circumferentially to the endo-tracheal or naso-tracheal tube, thus preventing tube slippage;

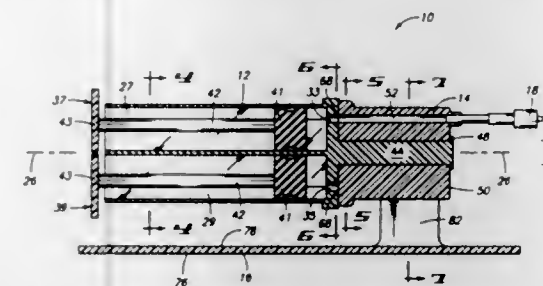
releasably attaching the free end of said cincture by maintaining the tautness of the free end and engaging a said array of hooks to the body of said cincture in an area toward an ear of said patient to apply bi-directional force restricting lateral motion of said endo-tracheal or naso-tracheal tube.

#### 5,411,485 CATHETER ACCESS SYSTEM AND METHOD

Patrick O. Tennican; L. Myles Phipps, and Russell A. Michalsen, all of Spokane, Wash., assignors to Hyprotek, Spokane, Wash.

Continuation-in-part of Ser. No. 48,906, Apr. 19, 1993, Pat. No. 5,308,322. This application Jan. 26, 1994, Ser. No. 187,632  
Int. Cl.<sup>6</sup> A61M 5/00

U.S. Cl. 604—191 46 Claims



1. A catheter access system comprising:

a syringe body having a base end, an outer end, a longitudinal axis and at least two longitudinally extending barrels, the syringe body including an independent fluid conduit associated with each of the two barrels, the two independent fluid conduits extending from their respective barrels toward the syringe body base end at spaced locations;

an independent plunger associated with each of the two barrels;

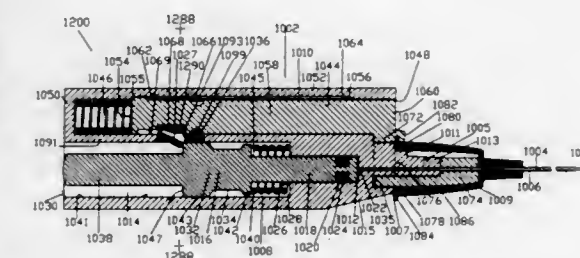
a valve body operatively connected in fluid tight communication relative to the syringe body base end, the valve body and syringe body being mounted for rotation relative to one another about the syringe body longitudinal axis, the valve body including a first fluid passageway positioned to align with either selected one of the syringe body fluid conduits when the valve body and syringe body are selectively rotated relative to one another, the valve body including a needle-less mating connector in fluid communication with the first fluid passageway for connection with a catheter access line in a patient; and

a non-invasive restriction means externally associated with the valve body to engage between the valve body and the patient for restricting longitudinal rotational movement of the valve body in space relative to the syringe body and patient when so engaged, said external restriction means enabling substantial free rotational movement of the syringe body in space relative to the valve body and the patient when so engaged, the restriction means comprising a substantially rigid sheet engaging the valve body, the longitudinal axis of the syringe body being substantially parallel with the plane of the rigid sheet.

#### 5,411,486 NEEDLE STICK PROTECTOR FOR AUTOMATIC CANNULATION DEVICES

Filberto Zadinl, 16814 Rayen St., North Hills, Calif. 91343, and Giorgio Zadinl, 2237 Hilltop La., Camarillo, Calif. 93012  
Filed Jul. 21, 1993, Ser. No. 95,653

Int. Cl.<sup>6</sup> A61M 5/00  
U.S. Cl. 604—198 11 Claims



1. A needle stick protector device for an Automatic Cannulation Device, said Automatic Cannulation Device comprising:

a) a housing,

b) a hollow needle connected to said housing,

c) a catheter slideable over said needle,

d) self-propelling means to automatically advance said catheter to an advanced position into the interior of a blood vessel in response to vanishing of a vacuum created within said housing, said vacuum being created prior to blood vessel penetration, said vanishing of the vacuum occurring upon blood vessel penetration by said needle,

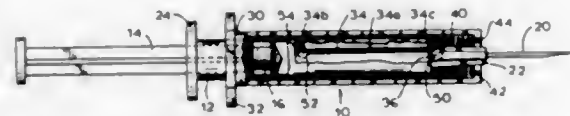
e) an interface member interposed between said self-propelling means and said catheter, said interface member having a front portion slideable over the needle engaging with said catheter to advance the catheter,

wherein:

said front portion of said interface member slideable over the needle is also adapted to enclose the tip of said needle upon full forward advancement of said interface member, said forward advancement being self-initiated in response to vanishing of said vacuum occurring upon blood vessel penetration of said needle, and wherein

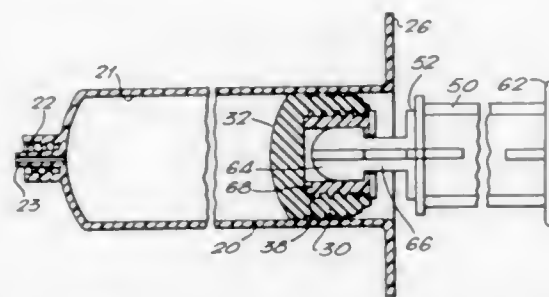
said interface member is irreversibly locked to said housing in its fully advanced position by locking means to provide a needle stick protection with said front portion of said interface member.

5,411,487  
HYPODERMIC SYRINGE WITH AUTOMATIC NEEDLE COVER  
John F. Castagna, 200 W. Sarah St., Milford, Pa. 18337  
Filed Dec. 7, 1992, Ser. No. 986,492  
Int. Cl.<sup>6</sup> A61M 5/32  
U.S. Cl. 604—198 15 Claims



1. A hypodermic syringe comprising:  
a piston barrel having proximal and distal ends, a needle mounted on said distal end, and an axially extending cavity defined by an inner surface;  
a piston plunger having proximal and distal ends, said distal end facing said needle and said proximal end being positioned externally of said piston barrel;  
a piston mounted on said distal end of said piston plunger for slidable movement in said piston barrel in mating contact with said inner surface of said piston barrel between an inserted position and a withdrawn position; and  
a cover tube having a distal end and a proximal end and an inner surface defining a cavity, said cover tube being axially movable between an extended position in which said cover tube extends over and fully covers said needle and a retracted position in which said cover tube is positioned over said piston barrel and said needle extends outwardly from said tubular cavity; and  
a locking arrangement for selectively locking said cover tube in said retracted position,  
said locking arrangement including means for automatically releasing said cover tube from said retracted position upon the application of back pressure to the cover tube, permitting said cover tube to move to said extended position when said hypodermic syringe is used to give an injection.

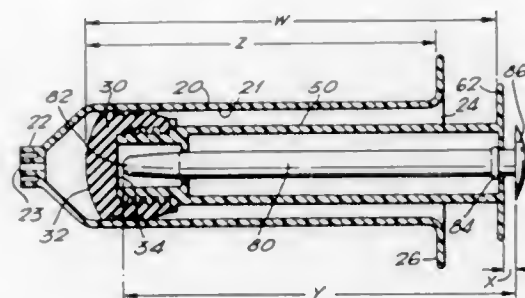
5,411,488  
PRE-FILLED SYRINGE AND PRE-FILLED CARTRIDGE HAVING AN IMPROVED PLUNGER AND PLUNGER ROD FOR REDUCING SYRINGING FORCE  
Shrikant N. Pagay, Guilderland, N.Y.; Robert J. Bachorik, II, Phoenixville, Pa., and Richard T. Liebert, Milton, N.Y., assignors to Sterling Winthrop Inc., New York, N.Y.  
Filed May 6, 1994, Ser. No. 239,092  
Int. Cl.<sup>6</sup> A61M 5/00  
U.S. Cl. 604—218 18 Claims



1. A syringe designed to be pre-filled and stored ready for injection comprising:  
(a) a barrel having an inner surface defining a cylindrical chamber for retaining an injectable fluid therein; said barrel having distal end terminating in a tapered tip to which an injection needle can be attached; and a proximal end for receiving a plunger;  
(b) a cup-shaped plunger slideably mounted in said barrel

and positioned close to the proximal end of the barrel to provide a seal with the inner surface of the barrel, said plunger comprising:  
(1) a distal convex face which is to interface with the injectable fluid contained in the barrel;  
(2) a proximal flat or concave face essentially parallel with the distal convex face;  
(3) outside wall contiguous with the distal convex face having thereon: distal ring, proximal ring and center ring extending radially outwardly and forming a slideable seal with the inner surface of the barrel;  
(4) inside wall having female threads thereon;  
(5) bottom rim which together with the inside wall defines a circular opening in the cup-shaped plunger through which a plunger rod can be inserted for engagement; and  
(c) a plunger rod having distal and proximal ends, for engaging the plunger comprising:  
(1) a plunger rod tip, located at the distal end of the plunger rod, having a semi-circular shape with convex face projecting in the direction of the plunger, the diameter of which is substantially smaller than the diameter of the plunger, and is designed to contact the proximal flat or concave inside face of the plunger at the center portion thereof;  
(2) neck portion, contiguous with the plunger rod tip, designed to receive a slideable cylinder;  
(3) slideable cylinder, positioned around the neck portion, comprising: an inside wall and an outside wall, the inside wall defines a cylinder the diameter of which is smaller than the diameter of the plunger rod tip so as to prevent the slideable cylinder slipping off of the neck portion, the outside wall having male threads for engagement of female threads of the plunger when the plunger rod is inserted into the plunger for operation of the syringe.

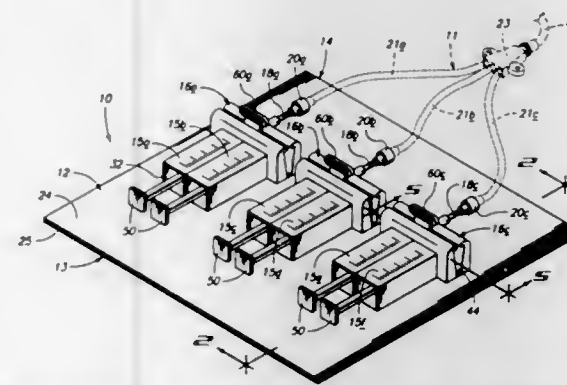
5,411,489  
PRE-FILLED SYRINGE AND PRE-FILLED CARTRIDGE HAVING ACTUATING CYLINDER/PLUNGER ROD COMBINATION FOR REDUCING SYRINGING FORCE  
Shrikant N. Pagay, Guilderland, N.Y.; Robert J. Bachorik, II, Phoenixville, Pa., and Richard T. Liebert, Milton, N.Y., assignors to Sterling Winthrop Inc., New York, N.Y.  
Filed May 6, 1994, Ser. No. 239,095  
Int. Cl.<sup>6</sup> A61M 5/00  
U.S. Cl. 604—218 16 Claims



1. A syringe designed to be pre-filled and stored ready for injection comprising:  
(a) a barrel having an inner surface defining a cylindrical chamber for retaining an injectable fluid therein; said barrel having distal end terminating in a tapered tip to which an injection needle can be attached; and a proximal end for receiving a plunger;  
(b) a cup-shaped plunger slideably mounted in said barrel and positioned close to the proximal end of the barrel to provide a seal with the inner surface of the barrel, said plunger comprising:

(1) a distal convex face which is to interface with the injectable fluid contained in the barrel;  
(2) a proximal face;  
(3) outside wall contiguous with the distal convex face having thereon: distal ring, proximal ring and center ring extending radially outwardly and forming a slideable seal with the inner surface of the barrel;  
(4) inside wall having female threads thereon; and  
(5) bottom rim which together with the inside wall defines a circular opening in the cup-shaped plunger through which a plunger actuating cylinder is inserted for engagement;  
(c) a plunger actuating cylinder having a distal end and a proximal end, for engaging the plunger comprising:  
(1) male threads at the distal end to engage female threads in the plunger; and  
(2) a handle at the proximal end; and  
(d) a plunger rod, having a distal end and a proximal end, fitted into said plunger actuating cylinder comprising:  
(1) a semi-circular shaped tip at the distal end with convex face projecting in the direction of the plunger and the diameter of which is substantially smaller than the diameter of the plunger to press against the proximal face of the plunger when pressure is being exerted on the plunger rod;  
(2) a knob at the proximal end located outside the plunger actuating cylinder and serving as first stopping means for the plunger rod to limit protrusion of the plunger rod into the proximal face of the plunger; and  
(3) a flange also at the proximal end but spaced from the knob and located within the plunger actuating cylinder and serving as second stopping means for the plunger rod to limit the movement of the plunger rod in the direction toward the proximal end of the plunger actuating cylinder;  
said first stopping means and second stopping means are designed to limit the movement of the plunger rod within the plunger actuating cylinder to a predetermined length defined by the distance between the first and second stopping means.

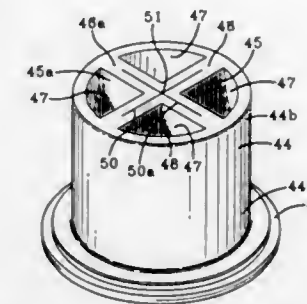
5,411,490  
INITIALIZATION AND ACCESS SYSTEM FOR MULTI-LUMEN CENTRAL VENOUS CATHETERS  
Patrick O. Tennican; L. Myles Phipps, and Russell A. Michalsen, all of Spokane, Wash., assignors to Hyprotek, Inc., Spokane, Wash.  
Continuation-in-part of Ser. No. 187,632, Jan. 26, 1994, and a continuation-in-part of Ser. No. 48,906, Apr. 19, 1993, Pat. No. 5,308,322. This application Apr. 20, 1994, Ser. No. 230,548  
Int. Cl.<sup>6</sup> A61M 5/19  
U.S. Cl. 604—236 10 Claims



10. A central venous catheter initialization and access system for initializing and accessing a central venous catheter having multiple lumens, the system comprising:

a generally planar underlying support sheet;  
a plurality of syringes mounted atop the support sheet in discrete spaced groups corresponding to individual lumens of a multi-lumen central venous catheter, each discrete syringe group comprising at least a flush syringe and an anti-coagulant syringe;  
multi-position valve assembly mounted atop the support sheet;  
the multi-position valve assembly having a plurality of individual valve inlet ports in fluid communication with the respective individual syringes;  
the multi-position valve assembly having a separate valve outlet port for each discrete syringe group;  
a plurality of mating connectors in fluid communication with the valve outlet ports for simultaneous connection of the valve outlet ports to individual lumens of a multi-lumen central venous catheter;  
the underlying support sheet extending beneath the mating connectors to provide a sterile field beneath the mating connectors;  
the valve assembly having at least one valve member which is movable to select between the flush syringes and the anti-coagulant syringes and to provide fluid communication between the selected syringes and their corresponding outlet ports for facilitating sequential injection from the flush and anti-coagulant syringes into individual lumens of a multi-lumen central venous catheter, the at least one valve member being movable to a vent position to connect a plurality of the valve inlet ports to ambient atmosphere to allow expulsion of air from a plurality of the syringes.

5,411,491  
LOW PROFILE GASTROSTOMY DEVICE WITH ONE-WAY CROSS-SLIT VALVE  
Donald J. Goldhardt, Grove City, and William H. Hirsch, Columbus, both of Ohio, assignors to Abbott Laboratories, Abbott Park, Ill.  
Filed May 28, 1993, Ser. No. 69,035  
Int. Cl.<sup>6</sup> A61M 5/00  
U.S. Cl. 604—247 16 Claims



1. A one-way cross-slit valve formed of an elastomeric material and comprising a foreshortened hollow cylindrical body having first and second ends, a body wall, and an axis and a passageway entirely through the body, the passageway being intercepted by and movement of any fluid therethrough controlled by a transversely extending continuous ridge and valley wall structure, there being two ridges extending substantially diametrically and intersecting at about the axis of the cylindrical body, the ridges constituting apices of folds in the ridge and valley wall structure, and the apices being both slit there-through the wall at the intersection to provide a cross-slit, the ridge and valley wall structure being integrally formed with and circumferentially confined by the cylindrical body wall whereby the cylindrical body wall provides hoop strength confinement for the apices, and wherein said cross-slit is essentially coplanar with said cylindrical body second end.



5,411,492

**HYPODERMIC NEEDLE PROTECTOR**

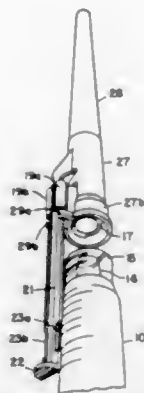
Martin Sturman, 7315 Granite Rd., Melrose Park, Pa. 19126; Maurice Kanbar, 4 E. 77th St., New York, N.Y. 10021; Robert J. Cohn, 61 Sterling Ave., Dallas, Pa. 18612, and Albert Kolvites, R.R. 3 Box 117A Yeager Rd., Mountaintop, Pa. 18707

Filed Jul. 5, 1994, Ser. No. 270,677

Int. Cl.<sup>6</sup> A61M 5/32

U.S. Cl. 604—263

9 Claims



1. A safety hypodermic needle and shielding cap assembly adapted to be coupled to a standard syringe having a fluid chamber provided at one end with a projecting nozzle surrounded by a coupling collar; said assembly comprising:

- A. a hollow hub receivable in the socket of the syringe and having a needle mounted therein provided with a tapered point extending along a longitudinal axis passing through the hub whereby the nozzle is projected into the hub and is in fluid communication with the needle;
- B. a short track mounted on one side of the hub in parallel relation to said axis;
- C. a push rod of flexible material slidable on the track and terminating at its lower end in a finger rest which when engaged by a finger of an operator advanced the rod from a retracted to an extended position;
- D. a shielding cap laterally mounted at the upper end of the rod and have a crown provided with a center bore in line with said axis, the cap when the rod is retracted being telescoped on the hub to expose the needle whereby the assembly is then in an operating mode in condition to inject a patient, the cap when the rod is extended surrounding the point of the needle whereby the assembly is then in a shielding mode to prevent accidental sticks.

5,411,493  
SPONGE BATH GARMENT AND METHOD FOR USING  
Victorio C. Rodriguez, 7791 Hoertz Rd., Parma, Ohio 44134  
Filed Sep. 27, 1993, Ser. No. 126,928  
Int. Cl.<sup>6</sup> A61M 35/00

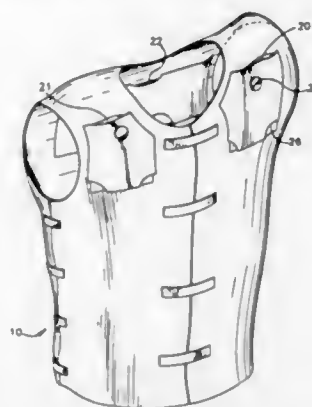
U.S. Cl. 604—290 16 Claims  
5. Apparatus for a therapeutic treatment method for use in treating a thermia condition in a human patient, which apparatus comprises:

a vest-like garment comprising an absorbent material maintained in substantial contact with the skin of the upper torso of the thermia patient when said garment is worn, said absorbent material contacting at least thirty percent of the total area of skin of said patient;

a reservoir having a lower end, said reservoir holding water at a temperature of substantially that of the normal human body, means to support said reservoir by said garment, whereby said reservoir is carried by said patient while said garment is worn, allowing mobility of said patient;

an outlet substantially at said lower end of said reservoir through which substantially all said water may leak from said reservoir and onto said absorbent material under hydrostatic pressure and the force of gravity, thereby to

maintain said absorbent material and the immediately underlying skin of said thermia patient in a wet condition and with said water at a temperature approximating that

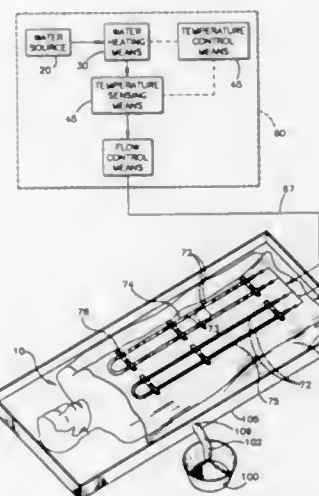


of the normal human body and to thereby effect sensible heat transfer between said water and said human patient, thereby to ameliorate said thermia condition.

5,411,494  
SPONGE BATH MACHINE AND METHOD FOR USING  
Victorio C. Rodriguez, 7791 Hoertz Rd., Parma, Ohio 44134  
Filed Sep. 27, 1993, Ser. No. 126,929  
Int. Cl.<sup>6</sup> A61M 35/00

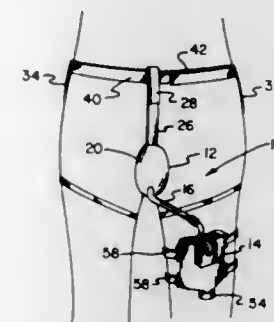
U.S. Cl. 604-290

## 19 Claims



6. Apparatus for a therapeutic treatment method for use in treating a thermia condition in a human patient, which apparatus comprises a warm water source including a water supply means, a water flow control means, a water heating means, and a thermostat controlling said water heating means, said source connected to an absorbent web for distributing to more than fifty percent of the surface of the body of said human patient a substantially continuous controlled flow of water at a controlled temperature that approximates the temperature that is considered normal in a human body, whereby said flow of water effects sensible heat transfer between said water and said human patient, thereby to ameliorate said thermia condition.

5,411,495  
SYSTEMS FOR RECEIVING AND STORING URINE  
FROM A FEMALE PATIENT  
Clara J. Willingham, 1706 W. B St., Butner, N.C. 27509  
Filed Dec. 20, 1993, Ser. No. 169,410  
Int. Cl. 6 A61F 5/44  
U.S. Cl. 604—329 2 Claims



1. A new and improved system for the receipt and storage of urine from a female patient comprising, in combination:

a pad formed of a liquid impervious material with a peripheral edge and an outwardly bowed recess interior of the periphery, the recess being positionable over the female urethra and vagina and having an adhesive around the periphery for the securement of the pad in proper position, a forward strap extending forwardly and upwardly from the upper edge of the pad with a laterally shiftable loop at the upper end thereof and a pair of rearward straps individually attached to the pad at their lower extents and extending upwardly to the lower back of the wearer, the pair of straps having upper ends, the pad having an opening at the lower end thereof;

a belt positionable around the waist of a wearer with the rearward straps individually attached at their upper end thereof to a rearward extent of the belt offset from the rear center thereof, the belt having a forward extent adapted to receive the loop at the upper end of the forward strap for lateral shifting to permit adjustment, the belt having releasable coupling means at the ends for securingment of the belt and pad in position with respect to the user;

a bag for the storage of urine received in the pad, the bag having an upper end with an upper opening and a lower end with a lower opening and a releasable cap, the bag having associated therewith a plurality of straps coupled with respect thereto for releasable securement around the front of a leg of a user; and

a tube extending from the opening at the lower end of the pad to the opening at the upper end of the bag for the passage to the bag of urine received in the pad for its storage and a one way valve in the tubing adjacent to the bag.

5,411,496  
OSTOMY POUCH CONTAINING BREAKABLE  
BUBBLES CONTAINING A DEODORIZER  
Joseph Homa, 137-01A 68th Dr., Flushing, N.Y. 11367  
Filed Mar. 1, 1994, Ser. No. 203,391  
Int. Cl.<sup>6</sup> A61F 5/44

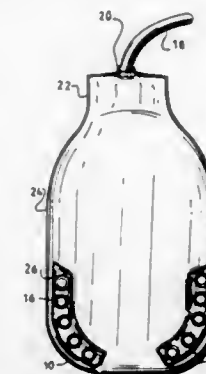
U.S. Cl. 604-333

## 6 Claims

1. An ostomy pouch for wearing by a person for the collection of bodily waste comprising:

- a) an inner and outer layer which is circumferentially sealed to prevent the leaking of bodily waste during excretion,
- b) means for attaching said pouch to a person to collect said bodily waste,
- c) breakable bubble means containing deodorant which is affixed to an inside portion of said inner and outer layer capable of releasing said deodorant to an inside portion of

said ostomy pouch to eliminate odors upon squeezing of  
said bubble means by said person, and



d) bubble retaining means for supporting, locating and restraining said bubble means within said pouch in a manner to permit said bubble means to be squeezed by said person when deodorant is to be released.

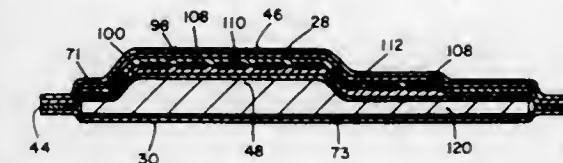
5,411,497

ABSORBENT ARTICLE WHICH INCLUDES  
SUPERABSORBENT MATERIAL LOCATED IN  
DISCRETE POCKETS HAVING AN IMPROVED  
CONTAINMENT STRUCTURE

Richard W. Tanzer, Neenah, Wis.; Frank P. Abuto, Alpharetta, Ga.; Stanley R. Kellenberger, Appleton, Wis.; Daniel R. Laux, Appleton, Wis.; Brian K. Nortman, Appleton, Wis.; William S. Pomplun, Neenah, Wis.; Carl G. Rippl; Mark L. Robinson, both of Appleton, Wis.; Lorry F. Sallee, Pine River, Wis.; Sandra M. Yarbrough, Menasha, Wis., and David L. Zenker, Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 29, 1993, Ser. No. 145,924  
Int. Cl.<sup>6</sup> A61F 13/15, 13/20  
U.S. Cl. 604—368

## 27 Claims



1. An absorbent article, comprising:

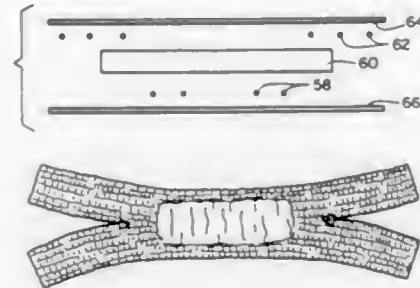
a first, liquid-permeable carrier layer and at least a second carrier layer;

water-sensitive attaching means for securing together said carrier layers at substantially attached zones thereof; said carrier layers having substantially unattached zones providing a plurality of pocket regions with said substantially attached zones located between said pocket regions; and high-absorbency material located within said pocket regions to provide an absorbent laminate;

wherein, said water-sensitive attachment means in said substantially attached zones provides a wet strength adequate to hold said carrier layers together when wet, and wherein said wet strength is less than a separating force imparted by a swelling of said high-absorbency material when said high-absorbency material is exposed to an aqueous liquid.

5,411,498

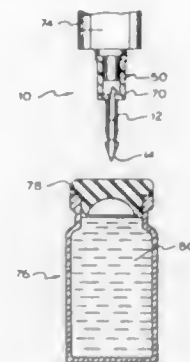
**STRETCHABLE SHAPED ABSORBENT GARMENT**  
 Anne M. Fahrenkrug, Oshkosh; Neal A. Rollins, Menasha; Marion C. Morris, Appleton; John A. Rooyakkers, Little Chute, and Cathy L. Winters, Appleton, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.  
 Continuation of Ser. No. 833,561, Feb. 5, 1992, abandoned, which is a continuation of Ser. No. 504,158, Apr. 2, 1990, abandoned. This application Jun. 29, 1994, Ser. No. 268,042  
 Int. Cl.<sup>6</sup> A61F 13/64, 13/15  
 U.S. Cl. 604—385.2 24 Claims



1. A stretchable shaped absorbent garment having a length, a width, and a thickness, said garment comprising:  
 (A) a fluid-pervious inner layer having a length and a width;  
 (B) an outer layer having a length and a width;  
 (C) an absorbent structure having a length and a width, said absorbent structure being located between said inner and outer layers; and  
 (D) a plurality of generally parallel elastomeric strands stretch bonded to said garment along substantially its entire length, said elastomeric strands being located between said inner and outer layers, with at least one of said elastomeric strands being positioned between said inner layer and said absorbent structure and at least one of said elastomeric strands being positioned between said absorbent structure and said outer layer; such that, when in a relaxed state, said elastomeric strands reduce the length of said inner layer, outer layer, and absorbent structure across the width of the garment.

5,411,499

**NEEDLELESS VIAL ACCESS DEVICE**  
 Thomas E. Dudar, Palatine; Peter L. Graham, Gurnee, and Steven C. Jepson, Palatine, all of Ill., assignors to Baxter International Inc., Deerfield, Ill.  
 Continuation-in-part of Ser. No. 147,414, Jan. 25, 1988, abandoned. This application Jul. 30, 1991, Ser. No. 737,735  
 Int. Cl.<sup>6</sup> A61M 37/00  
 U.S. Cl. 604—411 37 Claims

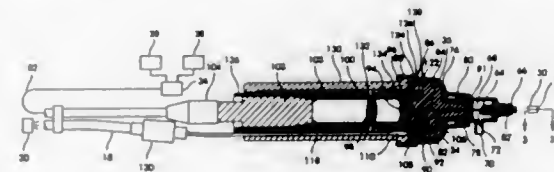


1. A cannula assembly adapted to pierce a solid closure or stopper comprising:  
 a blunt cannula having

a proximal end with an interior region and terminating with a luer flange for connection to an engaging structure, a generally cylindrical mid-region extending from the proximal end, an end region extending from the mid-region terminating in a blunt distal end and having a tapered outer surface, an internal flow channel extending through the end region and mid-region to communicate with the interior region of the proximal end region, an aperture at the outermost end of the cannula and in fluid communication with the internal flow channel, a piercing member in communication with the flow channel and, means for providing an interference fit between the piercing member and the cannula.

5,411,500

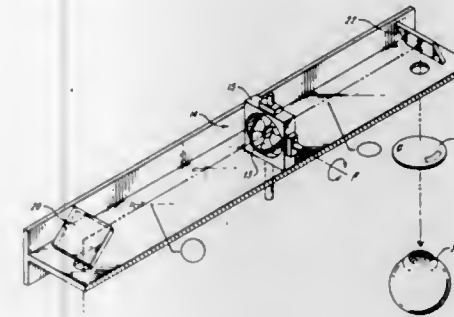
**PORTABLE ARTHROSCOPE WITH DISPOSABLE PROBE**  
 Michael Lafferty, Leucadia; Daniel Kline, Carlsbad, and Charles S. Slemon, Encinitas, all of Calif., assignors to Sofamor Danek Properties, Inc., Memphis, Tenn.  
 Continuation of Ser. No. 651,746, Feb. 4, 1991, abandoned. This application Sep. 23, 1992, Ser. No. 949,763  
 Int. Cl.<sup>6</sup> A61B 17/36  
 U.S. Cl. 606—2 13 Claims



1. A hand-held diagnostic arthroscope with disposable probe for examining an internal structure of a body, which comprises:  
 a hollow housing;  
 an image guide having a distal end and a proximal end;  
 a lens attached to said distal end of said image guide for gathering light from the internal structure of the body;  
 an optical illumination fiber joined with said image guide to establish a disposable probe having a distal end and a proximal end, said proximal end of said probe being detachably connected to said housing;  
 a rigid tubular needle surrounding and supporting said image guide and said illumination fiber;  
 a light source in light communication with said optical illumination fiber for illuminating said internal structure of said body;  
 a camera head positioned in said housing in light communication with said proximal end of said image guide for generating a visual display signal representative of said illuminated structure of said body;  
 a light focussing means positioned in said housing and a disposable cap detachably attached to said distal end of said housing for supporting said disposable probe and removably connecting said disposable probe to said housing, said image guide extending through said cap and juxtaposed with said focussing means when said cap is attached to said distal end of said housing;  
 a rigid tubular cannula having a lumen, said needle being positioned in said lumen coaxially with said cannula to establish an annular fluid passageway between said needle and said cannula; and  
 alignment means for aligning said image guide with said focussing means and for aligning said optical illumination fiber in light communication with said light source when said disposable cap is attached to said housing.

5,411,501

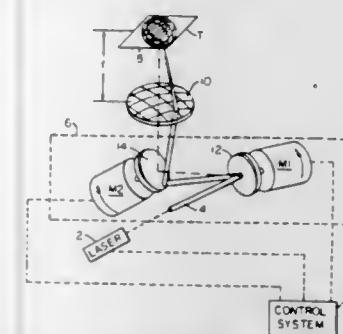
**LASER REPROFILING SYSTEM FOR CORRECTION OF ASTIGMATISMS**  
 Peter J. Klopotek, Framingham, Mass., assignor to Summit Technology, Inc., Waltham, Mass.  
 Filed Jun. 4, 1993, Ser. No. 72,516  
 Int. Cl.<sup>6</sup> A61N 5/06  
 U.S. Cl. 606—4 56 Claims



21. A laser system for astigmatically reprofiling a surface, said laser system comprising:  
 laser means for generating pulses of laser light along a beam path at an energy level such that the pulses can be absorbed at a surface to induce photoablation and such that the laser light forms an exposure area on the surface;  
 light restricting means disposed within the beam path for selectively transmitting the laser light and for varying the exposure area on the surface over time; and  
 orientation means for orienting the light restricting means at a non-perpendicular angle relative to the beam path to create an elliptical output beam and define an asymmetric ablation profile.

5,411,502

**SYSTEM FOR CAUSING ABLATION OF IRRADIATED MATERIAL OF LIVING TISSUE WHILE NOT CAUSING DAMAGE BELOW A PREDETERMINED DEPTH**  
 Eliezer Zair, Bnei-Brak, Israel, assignor to Laser Industries, Ltd., Israel  
 Continuation of Ser. No. 3,278, Jan. 12, 1993, abandoned. This application Dec. 30, 1993, Ser. No. 175,980  
 Claims priority, application Israel, Jan. 15, 1992, 10664  
 Int. Cl.<sup>6</sup> A61B 17/36  
 U.S. Cl. 606—10 7 Claims

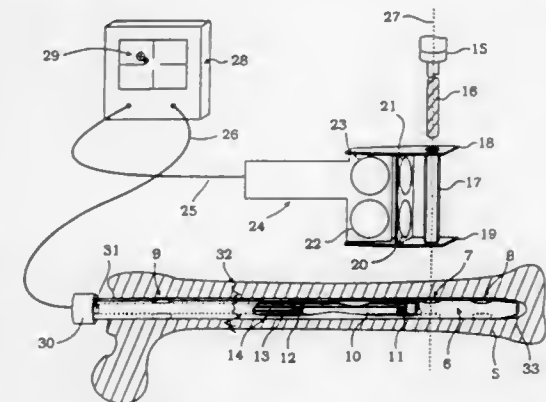


1. A system for causing ablation of an irradiated material of living tissue while not causing necrosis below a predetermined depth, said irradiated material consisting of a plurality of elements; said system including:  
 means for generating a beam of laser radiation to be uniformly absorbed by said irradiated material;  
 a scanner means for moving said beam of laser radiation in a predetermined pattern on said irradiated material so that

said elements of said irradiated material are sequentially and continuously irradiated; and  
 means for controlling the scanner means to move said beam of laser radiation in said predetermined pattern so that ablation of said irradiated material of living tissue is caused uniformly but only to a predetermined depth.

5,411,503

**INSTRUMENTATION FOR DISTAL TARGETING OF LOCKING SCREWS IN INTRAMEDULLARY NAILS**  
 Steven B. Hollstien, 3657 Thundercloud Coop, Tucson, Ariz. 85741; David S. Hollstien, 5775 Webster Rd., Paso Robles, Calif. 93446; Bradley A. Hollstien, 5775 Webster Rd., Paso Robles, Calif. 93446, and Roy B. Hollstien, 5775 Webster Rd., Paso Robles, Calif. 93446  
 Filed Jun. 18, 1993, Ser. No. 80,345  
 Int. Cl.<sup>6</sup> A61B 17/00; A61F 5/00, 2/32  
 U.S. Cl. 606—86 13 Claims



1. A device for locating a distal transverse hole disposed at known axial and radial positions in a hollow interlocking nail inserted into the medullary canal of a fractured bone and for drilling therethrough coaxially with the distal transverse hole, comprising:  
 a probe adapted to be inserted into the interlocking nail;  
 a proximal electromagnetic drive means disposed at a predetermined fixed location within said probe and capable of producing a proximal magnetic flux having a proximal magnetic axis;  
 a distal electromagnetic drive means disposed at a predetermined fixed location within said probe and capable of producing a distal magnetic flux having a distal magnetic axis, said proximal and distal electromagnetic drive means being alternately operative;  
 axial positioning means for securely placing and retaining said distal magnetic axis at a predetermined axial distance from the distal transverse hole in the interlocking nail;  
 radial positioning means for securely placing and retaining said proximal magnetic axis at a predetermined angular relationship with said distal transverse hole;  
 first electromagnetic sensor means for sensing the distal magnetic flux produced by said distal electromagnetic drive means and for emitting a first output signal corresponding thereto, such that the first output signal is zero when said first electromagnetic sensor means is in first predetermined alignment with said distal magnetic axis;  
 second electromagnetic sensor means for sensing the proximal magnetic flux produced by said proximal electromagnetic drive means and for emitting a second output signal corresponding thereto, such that the second output signal is zero when said second electromagnetic sensor means is in second predetermined alignment with said proximal magnetic axis;  
 display means connected to said first and second electromagnetic sensor means for converting said first and second outputs into visual signals enabling a user to change the



position of said first and second electromagnetic sensor means so as to cause said first and second outputs to be zero; and

drilling means for drilling a hole through said fractured bone coaxially with said distal transverse hole; said drilling means having a main axis disposed in parallel to said first predetermined alignment at an axial distance from said first electromagnetic sensor means equal to said predetermined axial distance, and said main axis also being disposed in parallel to said second predetermined alignment at an angle with said second electromagnetic sensor means equal to said predetermined angular relationship with said distal transverse hole;

whereby said probe may be inserted into the interlocking nail and securely retained with said distal magnetic axis at said predetermined axial distance from, and with said proximal magnetic axis at said predetermined angular relationship with, the distal transverse hole; said first and second electromagnetic sensor means may be aligned with said distal and proximal magnetic axes, respectively, by moving said electromagnetic sensor means until said first and second outputs are zero; and said drilling means may then be used for drilling said fractured bone coaxially with said distal transverse hole.

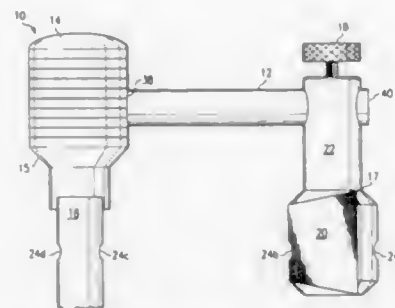
5,411,504

**DRILL JIG FOR ANIMAL PROSTHESIS INSERTION**  
John W. Villas, 2007 Vlnewood Dr., Bryan, Tex. 77802

Filed Aug. 2, 1993, Ser. No. 101,445  
Int. Cl.<sup>6</sup> A61F 5/00, 2/32

U.S. Cl. 606—87

14 Claims



1. A jig for inserting an implant into an animal, the jig comprising:

- a first member comprising a first housing and a first leg having a first end and a second end, the second end extending vertically downward from the housing, the first leg having a plurality of openings extending therethrough along an axis perpendicular to the first leg and adapted to receive a prosthesis having openings formed therethrough such that one of the openings in the prosthesis is aligned with one of the opening in the first leg;
- an elongated shank having first and second ends, the first end attached to the first housing; and
- a second member comprising a second housing and a second leg having a first end and a second end, the second leg attached to the second end of the shank, the second end of the second leg extending vertically upward from the second housing and the housing having a plurality of openings extending therethrough in a direction perpendicular to the second leg and along the same axis as the openings in the first leg.

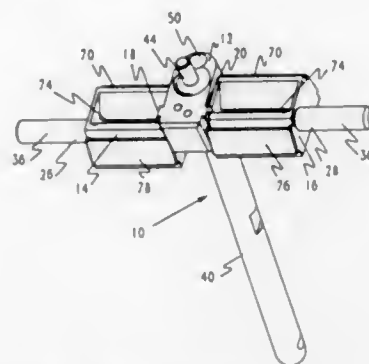
**5,411,505**  
**SAGITTAL SAW JIG FOR FEMORAL KNEE REVISION PROSTHESIS**

Charles W. Mumme, Austin, Tex., assignor to Intermedics Orthopedics, Inc., Austin, Tex.

Filed Jun. 2, 1994, Ser. No. 253,102  
Int. Cl.<sup>6</sup> A61B 17/15

U.S. Cl. 606—88

16 Claims



1. A surgical jig for guiding a sagittal saw in connection with surgical preparation of a distal femur for receiving a femoral component of a knee prosthesis, said surgical jig comprising a central body adapted to generally fit in an intercondyle area of a distal end of a patient's femur, said central body having a proximal and a distal end, means, connected to said central body, for aligning said central body with the femur, at least one condyle saw guide, slidably attached to said central body, and means for guiding said condyle saw guide on a path with respect to said central body which is displaced anteriorly from said proximal end to said distal end of said central body.

5,411,506

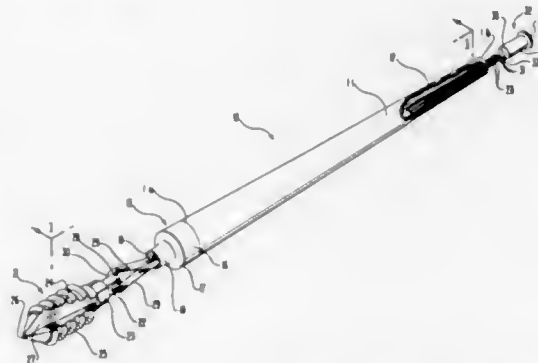
**ANCHOR DRIVER**

E. Marlowe Goble; Alan Chervitz; David P. Luman, and Kenneth L. Jensen, all of Logan, Utah, assignors to Mitek Surgical Products, Inc., Westwood, Mass.

Filed Apr. 11, 1994, Ser. No. 225,768  
Int. Cl.<sup>6</sup> A61B 17/56

U.S. Cl. 606—104

6 Claims



1. An anchor driver comprising, a driver body that is a straight section of a rigid material with a center opening therethrough; an anchor mount for seating in a distal end, as a forward extension of, said driver body, which said anchor mount is open longitudinally and includes a distal end arranged to couple to a mounting end of a ligament anchor means arranged for mounting in a hole formed in a bone, which said ligament anchor means mounting end includes a means for securing a suture thereto as, at least, a single suture strand that

is for fitting through said anchor mount and driver body open proximal end for folding back upon itself and fitting back through said driver body proximal end; and means for maintaining said suture in a straight attitude to its bend and back upon itself within said driver body that includes a cap means for closing over the driver body open proximal end that includes opposing jaw means for receiving and releasably gripping said suture strand bend therebetween; and means for biasing said Saw means to a closed attitude.

5,411,507

**INSTRUMENT FOR IMPLANTING AND EXTRACTING STENTS**

Helmut Hecke, Knittlingen, Germany, assignor to Richard Wolf GmbH, Knittlingen, Germany

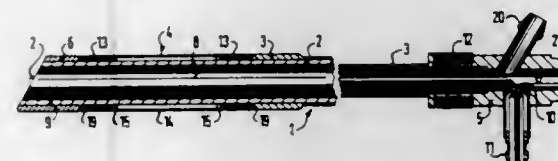
Filed Jan. 5, 1994, Ser. No. 177,882

Claims priority, application Germany, Jan. 8, 1993, 43 00 285.4

Int. Cl.<sup>6</sup> A61B 19/00

U.S. Cl. 606—108

11 Claims



1. An instrument (1) for implanting and extraction of stents for the re-channelization of hollow organs, comprising an inner first tube (2) and an outer second tube (3) which slidably houses and is axially displaceable relative to the first tube, said first and second tubes having a common longitudinal axis and respective proximal and distal ends, spreading elements (14) that can be directed radially outwardly and flexibly from said longitudinal axis for the purpose of holding a stent, whereby the spreading elements (14) can be brought into a position against an inner surface of a stent by means of axial movement of one of said tubes, the spreading elements (14) having proximal and distal ends each attached to a ring (13) and being secured with regard to their radial spacing from the longitudinal axis, each of said rings (13) slidably engaging said first tube (2), whereby through displacement of one of said tubes, which acts upon one of the rings (13), the distance between the rings (13) is varied and the spreading elements (14) are thereby deformed, thus creating in said spreading elements radially outwardly expanding bows which exert force against the inner surface of a stent, wherein the rings (13) are carried on the inner tube (2) in such a way that they can be turned freely on the inner tube, and an outer diameter of the rings corresponds to an outer diameter of the outer tube (3), and further comprising washers (19) made of low-friction material, which are placed between the respective rings (13) and a proximal end face of a distal enlargement on the inner tube (6) and the distal end of the outer tube.

5,411,508

**GASTROINTESTINAL APPROXIMATING AND TISSUE ATTACHING DEVICE**

Marc Bessler, Teaneck, N.J., and Michael R. Treat, New York, N.Y., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation-in-part of Ser. No. 783,909, Oct. 29, 1991, Pat. No. 5,197,649. This application Mar. 30, 1993, Ser. No. 39,913

Int. Cl.<sup>6</sup> A61B 17/04

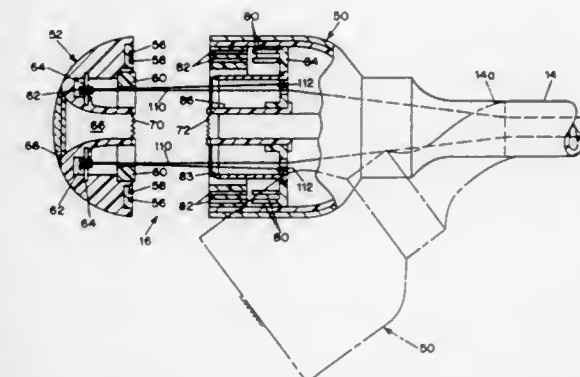
U.S. Cl. 606—153

38 Claims

1. An endoscopic surgical anastomotic device, comprising, (a) anastomotic approximating assembly for approximating two ends of anastomotic tissue, which includes: (i) a first member which defines a tissue engaging surface; and (ii) a second member defining a tissue contacting surface

which is adapted to align with said tissue engaging surface;

- (b) moving means operatively connected with said anastomotic approximating assembly for moving said first member and said second member relative to one another between a first, spaced position in which said tissue engaging surface is spaced from said tissue contacting surface for receiving tissue therebetween, and a second approximated position in which said tissue engaging surface and said tissue contacting surface are in close cooperative alignment;
- (c) imaging means operatively connected with one of said first member and said second member for obtaining an image of an interior body region;



- (d) an elongated member having a proximal and distal end, said anastomotic approximating assembly being positioned at and cooperating with said distal end of said elongated member; and
- (e) a handpiece positioned at and cooperating with said proximal end of said elongated member, said handpiece including first control means operatively connected through said elongated member with said moving means for causing said first member and said second member to move between said first and second positions; and viewing means operatively connected through said elongated member with said imaging means for viewing said interior body region image.

5,411,509

**EMBOLECTOMY CATHETER**

Said Hilal, Laguna Niguel, Calif., assignor to Applied Medical Resources Corporation, Laguna Hills, Calif.

Division of Ser. No. 574,648, Aug. 29, 1990, Pat. No. 5,192,290.

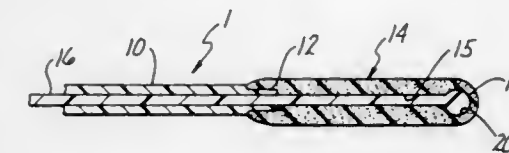
This application Sep. 30, 1992, Ser. No. 954,302

The portion of the term of this patent subsequent to Mar. 9, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> A61B 10/00

U.S. Cl. 606—159

19 Claims



6. A clot removal system for removing plaque thrombi, emboli, and other clots from a blood vessel, comprising: a catheter having an elongate configuration and extending between a proximal end and an opposing distal end, the catheter being configured for insertion into the vessel with the distal end extending beyond the clot; a tube forming a wall of the catheter and defining a lumen of the catheter; a compression member disposed coaxially of the tube;

an elastomeric, non-woven foam tip disposed at the distal end of the catheter and being fabricated to minimize abrasive shear forces against the inner lining of said vessel, said tip being fixed to one of the tube and the compression member;

means for moving one of the tube and the compression member relative to the other of the tube and the compression member to expand the foam tip outwardly against the vessel; whereby

the catheter can be removed from the vessel with the tip in the expanded state to withdraw the clot from the vessel.

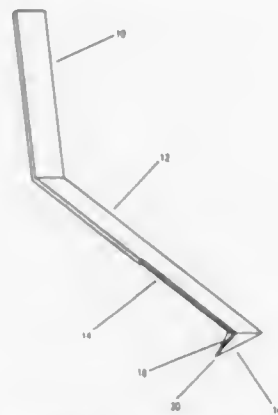
5,411,510

## SURGICAL BLADE AND METHOD FOR OCULAR SURGERY

Richard J. Fugo, 1507 Plymouth Blvd., Norristown, Pa. 19401  
Filed Jul. 6, 1993, Ser. No. 85,820  
Int. Cl.<sup>6</sup> A61B 17/32

U.S. Cl. 606—166

6 Claims



1. A method of creating self-sealing surgical incisions in the eye comprising:

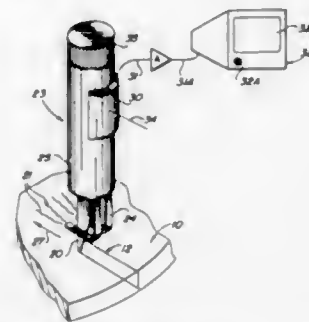
- providing a surgical blade of the type which comprises a shaft having a proximal end and a distal end, a horizontal stabilizing platform having a proximal end and a distal end, said proximal end of said horizontal stabilizing platform extending from said distal end of said shaft, and an angled active tip having a predetermined length extending downward from said distal end of said horizontal stabilizing platform at a predetermined angle with respect to said distal end of said horizontal stabilizing platform;
- effecting a vertical incision of a known depth in the sclera of the eye having a proximal end and a distal end by penetrating said sclera with said active tip of said surgical blade to a depth equal to said predetermined length of said active tip;
- effecting a horizontal scleral tunnel incision of a known depth by extending an incision from said distal end of the vertical scleral incision through to the clear cornea of the eye in a plane perpendicular to said vertical scleral incision;
- inserting said surgical blade through the scleral end of said horizontal scleral tunnel incision and into the clear corneal end of said horizontal scleral tunnel incision and, by manipulating a handle connected to said surgical blade, effecting a corneal incision which extends downward from said clear corneal end of said horizontal scleral tunnel incision at a known angle with respect to said clear corneal end of said horizontal scleral tunnel incision; said known angle being defined by said predetermined angle of said active tip of said surgical blade; said corneal incision penetrating through said clear cornea of the eye and into the anterior chamber of the eye; and
- withdrawing said surgical blade from said eye.

5,411,511  
METHOD AND DEVICE FOR DETERMINING  
PLACEMENT OF KERATOTOMY INCISIONS

Gary W. Hall, 2501 N. 32nd St., Phoenix, Ariz. 85008  
Filed Nov. 12, 1993, Ser. No. 151,273  
Int. Cl.<sup>6</sup> A61B 17/32

U.S. Cl. 606—166

13 Claims



1. A method of making an incision in a cornea, comprising the steps of:

- manipulating an RK knife so that a blade thereof extends a particular depth into the cornea at a particular point on the cornea;
- applying sufficient force to the RK knife to advance the blade in a particular direction; and
- halting movement of the blade in the particular direction when resistance of the cornea against a leading edge of the blade exceeds a particular level.

5,411,512

## GUARDED SURGICAL SCALPEL

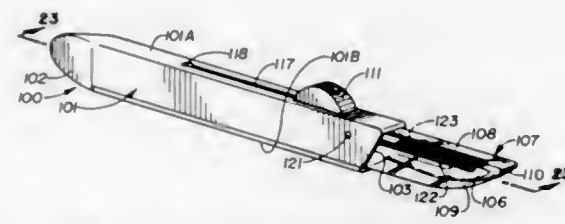
Michael R. Abidin, and Steven P. Lehmbeck, both of Baltimore, Md., assignors to Leonard Bloom, Towson, Md., a part interest

Continuation-in-part of Ser. No. 40,165, Mar. 30, 1993, Pat. No. 5,275,606, which is a continuation-in-part of Ser. No. 825,556, Jan. 24, 1992, Pat. No. 5,250,063. This application Nov. 12, 1993, Ser. No. 150,843

Int. Cl.<sup>6</sup> A61B 17/32

U.S. Cl. 606—167

10 Claims



1. A guarded scalpel, comprising a handle, a blade on the handle, a guard telescopically mounted within the handle for sliding movement therein, stop means between the guard and the handle and limiting the sliding movement of the guard within the handle, the stop means providing a bearing guide for the guard and including a pin carried transversely of the handle and received in a closed longitudinal slot formed in a side wall of the guard, the guard having a first advanced position in which the blade is substantially covered, and the guard further having a second retracted position in which the blade is exposed, and two-position resiliently-biased detent means between the guard and the handle for defining the respective first and second positions of the guard on the handle, the detent means being independent of the stop means and the detent means including a detent button extending upwardly above the handle.

5,411,513

## TRANSMISSION MECHANISM FOR A SURGICAL CUTTING INSTRUMENT

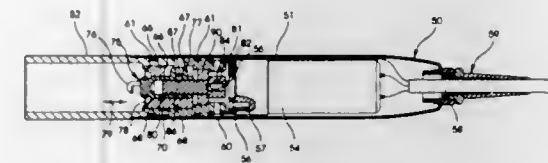
Dan D. Ireland, Martinsville, and Michael E. Miller, Indianapolis, both of Ind., assignors to Danek Medical, Inc., Memphis, Tenn.

Filed Feb. 24, 1994, Ser. No. 201,277

Int. Cl.<sup>6</sup> A61B 17/32

U.S. Cl. 606—171

9 Claims



1. A tissue cutting apparatus, comprising:

a motor driving a rotating output shaft;  
an outer housing configured for insertion into a body site;  
a cutting blade for cutting body tissue at the body site, the cutting blade configured for reciprocating movement within said outer housing;

transmission means disposed between said motor and said cutting blade for converting rotary motion from said output shaft to reciprocating linear motion of said cutting blade, said transmission means including:

- a first cam element connected to one of said output shaft and said cutting blade, said first cam element having a cylindrical surface with a channel defined continuously around the circumference thereof;
- a second cam element connected to the other of said output shaft and said cutting blade; and
- a cam follower element disposed between said first cam element and said second cam element with a portion of said cam follower element slidably disposed within said channel,

whereby said cam follower element traverses along said channel continuously about said cylindrical surface as one or the other of said first cam element of said second cam element rotates with said output shaft.

5,411,514

## BENDABLE VARIABLE ANGLE ROTATING SHAVER

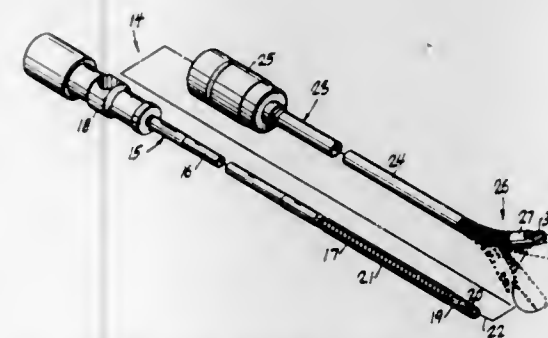
Joseph Fucci, Port Richey; Fred B. Dinger, III, Belleair; A. Frank Trott, Largo; Kenneth M. Adams, Pinellas Park, and William F. Mazurek, Palm Harbor, all of Fla., assignors to Linvatec Corporation, Largo, Fla.

Continuation of Ser. No. 26,613, Mar. 5, 1993, abandoned, which is a continuation-in-part of Ser. No. 954,099, Sep. 30, 1992, abandoned. This application Jun. 24, 1994, Ser. No. 265,558

Int. Cl.<sup>6</sup> A61B 17/32

U.S. Cl. 606—180

12 Claims



1. A surgical cutting instrument comprising:

a longitudinally extending, rotatable inner shaft having a

proximal end and a distal end, said inner shaft provided with a cutting means adjacent said distal end;

a means for rotating said inner shaft, said rotating means connected to said proximal end of said inner shaft;  
an outer tube having an inside diameter substantially equal to the outer diameter of said inner shaft, said outer tube having a proximal end and a distal end, said distal end provided with a window opening facing in a predetermined direction and adapted to enable said cutting means to cut tissue;

bend-enabling means on said outer tube for enabling a user, after manufacture of said outer tube, to bend said outer tube a predetermined amount;

means on said inner shaft for enabling said inner shaft to rotate within said outer tube after said outer tube is bent, said means for enabling said inner shaft to rotate being juxtaposed adjacent said bend-enabling means when said cutting means is in operative relationship with said window opening.

5,411,515

## OBTURATOR WITH ROTATING, SELF-LOCKING AND RESETTABLE SAFETY SHIELD

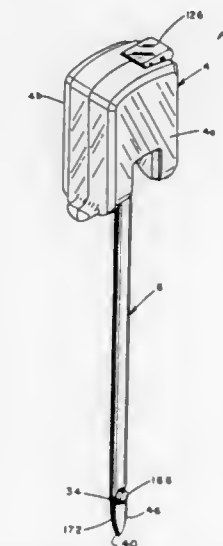
Terry M. Haber, Lake Forest; William H. Smedley, Lake Elsinore, and Clark B. Foster, Laguna Niguel, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.

Filed Jul. 29, 1993, Ser. No. 99,858

Int. Cl.<sup>6</sup> A61B 17/32

U.S. Cl. 606—184

18 Claims



1. An obturator, usable as part of a trocar to provide an opening through a tissue layer, comprising:

- an elongate obturator body having proximal and distal ends;
- a cutting element at the distal end;
- a safety shield pivotally mounted to the distal end and adjacent the cutting element, the safety shield being pivotal between a cutting position, with the cutting element exposed to the tissue layer, and a safe position, with the safety shield shielding the cutting element;
- means, carried by the body, for rotating the safety shield from the cutting position to the safe position upon passage of the cutting element at least substantially through the tissue layer;
- means, carried by the body, for locking the safety shield in the safe position; and
- means, carried by the body, for unlocking the locking means and returning the safety shield from the safe position to the cutting position.



5,411,516

## EAR PIERCING DEVICE AND METHOD

Stephen P. Thomas, 17615 100th Ave., SW., P.O. Box 1726, Vashon, Wash. 98070

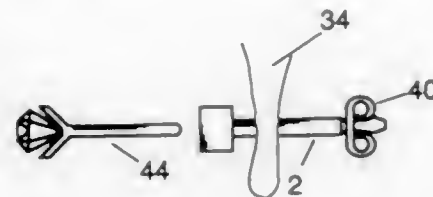
Filed May 26, 1992, Ser. No. 888,010

The portion of the term of this patent subsequent to Sep. 2, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> A61B 17/34

U.S. Cl. 606—188

8 Claims



1. A method for piercing a body part of a person, comprising:

- a first step of inserting a solid post having a piercing point through a hollow post to form a piercing post;
  - a second step of loading said piercing post within a plunger of a piercing gun;
  - a third step of positioning said piercing gun around the body part, said piercing point of said piercing post positioned adjacent a predetermined point upon the body part;
  - a fourth step of shooting said piercing post through the body part at the predetermined point;
  - a fifth step of removing said gun from said piercing post;
  - a sixth step of removing said solid post from said hollow post;
- wherein, said hollow post remains within the body part during the entire healing process and allows conventional earring posts to be interchangeably inserted into and withdrawn from said hollow post during the healing process.

5,411,517

## CANNULA FOR USE DURING ARTHROSCOPIC PROCEDURES

Mireille Guignard, "Le Vezely" Sergy Gare, F-01630 Saint-Genis/Poilly, France

PCT No. PCT/EP93/00792, § 371 Date Dec. 1, 1993, § 102(e) Date Dec. 1, 1993, PCT Pub. No. WO93/19790, PCT Pub. Date Oct. 14, 1993

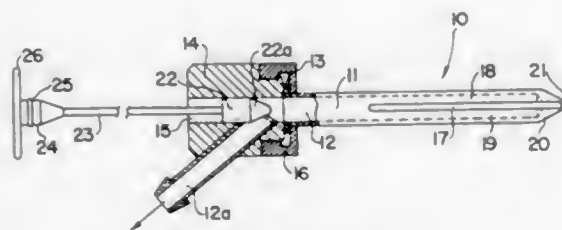
PCT Filed Mar. 31, 1993, Ser. No. 157,021

Claims priority, application France, Apr. 2, 1992, 92 04149

Int. Cl.<sup>6</sup> A61M 29/00

U.S. Cl. 606—198

6 Claims



1. A cannula for evacuating a rinsing liquid during an arthroscopic operation or examination comprising:

- a tubular element that at least in part forms an evacuation conduit for said rinsing liquid; at least two lateral elongated slots made on either side of the evacuation conduit formed by said tubular element, beginning at one free end of the tubular element and extending over a portion of its length, forming two small tongues solid with the tubular element;
- a passage for connecting said conduit to the outside;
- spacer means, extendable into said passage for exerting

forces upon said small tongues that tend to space the tongues apart on either side of said slots; means for controlling said spacer means so that said spacer means can be maneuvered from outside said conduit and slidably moved through said passage; and sealing means cooperating with said passage for sealing said passage when said spacer means is in a position spacing the tongues apart, wherein the cross-section of said conduit is reduced in the vicinity of free ends of said tongues, said spacer means comprises a piston slidably fitted into said conduit and said control means comprises a rod solid with a rear end of said piston and so providing a larger section of said conduit and a step between the piston and the rod so that said rod is able to slide the piston (1) in a forward direction into the reduced cross-section of said conduit, spacing the tongues apart and (2) in a rearward direction to clear said conduit of any obstruction.

5,411,518

## MEDICAL TOURNIQUET APPARATUS

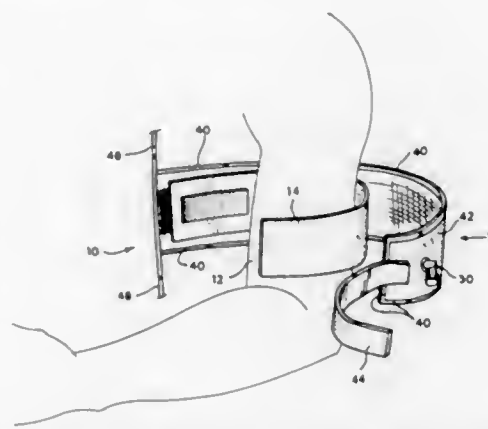
Gary W. Goldstein, Everett, and Jeffrey B. Tedeschi, Kirkland, all of Wash., assignors to Design +3, Incorporated, Everett, Wash.

Filed May 24, 1994, Ser. No. 248,186

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—202

18 Claims



1. An apparatus for restricting the flow of blood through a body member, said apparatus comprising a tourniquet for circumferentially encircling the body member, said tourniquet comprising:

- a first plenum wall having a first interior face;
- a second plenum wall having a second interior face;
- means for attaching said first plenum wall to said second plenum wall, thereby forming at least one enclosed plenum bordered by said first interior face and said second interior face;
- means for permitting the passage of fluid into and out from said at least one enclosed plenum;
- at least one stiffener positioned within said at least one enclosed plenum, wherein each of said at least one enclosed plenum includes therein only one of said at least one stiffener;
- a pad positionable between said tourniquet and said body member, said pad comprising a pad face and a pad end, said pad being fabricated from a substantially absorbent, wrinkle resistant material;
- means for removably attaching said pad end to said pad face, thereby allowing said pad to be independently and circumferentially secured upon said body member; and
- means for securing said tourniquet around said body part.

5,411,519

## SURGICAL APPARATUS HAVING HINGED JAW STRUCTURE

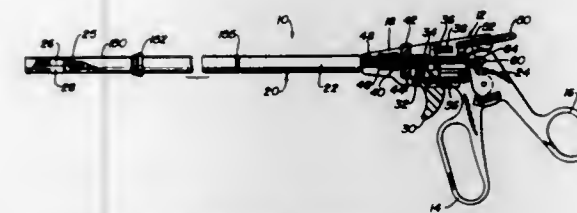
H. Jonathan Tovey, Milford, and Paul A. Scirica, East Hampton, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Sep. 23, 1992, Ser. No. 949,576

Int. Cl.<sup>6</sup> A61B 17/28

U.S. Cl. 606—207

36 Claims



1. A surgical apparatus comprising:

- a) a handle portion;
- b) an endoscopic portion extending from said handle portion; and
- c) a tool assembly operatively associated with a distal end of said endoscopic portion and including a pair of opposed cooperating jaw members, each of said jaw members having first and second relatively articulatable sections movable between a first position and a second position wherein said first and second sections together define a contact plane, said first section of each jaw member defining a proximal section having a fixed orientation with respect to said second section, and each of said jaw members including means for biasing said second section thereof into said second position.

5,411,520

## HEMOSTATIC VESSEL PUNCTURE CLOSURE SYSTEM UTILIZING A PLUG LOCATED WITHIN THE PUNCTURE TRACT SPACED FROM THE VESSEL, AND METHOD OF USE

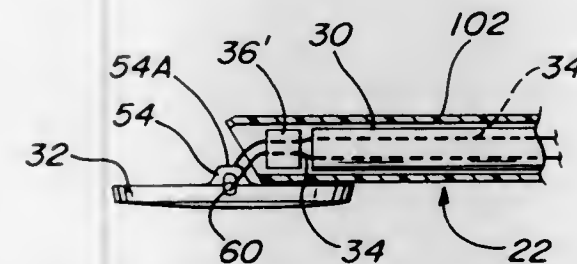
John Nash, Downingtown, and Douglas Evans, Devon, both of Pa., assignors to Kensey Nash Corporation, Exton, Pa.

Continuation-in-part of Ser. No. 846,322, Mar. 15, 1992, Pat. No. 5,282,827, which is a continuation-in-part of Ser. No. 789,704, Nov. 8, 1991, Pat. No. 5,222,974. This application Feb. 3, 1993, Ser. No. 12,816

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—213

60 Claims



16. A system comprising an instrument and a closure for use therewith for sealing a percutaneous puncture in the wall of a blood vessel, the blood vessel having a longitudinal axis, the puncture comprising a tract contiguous with the opening and extending at an angle to the longitudinal axis of the vessel through tissue overlying the vessel, said closure means comprising anchoring means, sealing means, spacer means, and filament means, said anchoring means comprising an elongated, substantially stiff, member orientable with respect to said sealing means, said sealing means being expandable, said filament means being coupled to said anchoring means, said

spacer means, and said sealing means, said instrument being insertable into the puncture tract and through the opening in the wall of the vessel for expelling said anchoring member therefrom, said anchoring member being arranged to be brought by said instrument into engagement with the interior tissue of the vessel contiguous with the opening on the inside of the vessel wall and generally parallel to the longitudinal axis of the vessel, said sealing means being arranged to be located within the tract remote from and outside the vessel wall, whereupon said sealing means is expanded to seal the tract from the passage of fluid therethrough, said spacer means being located within the tract interposed between said sealing means and said anchoring member to prevent said sealing means from gaining ingress into the vessel via the opening, said spacer means being spaced from the vessel but engaging said anchoring member through the opening in the vessel wall.

5,411,521

## MEDICAL SUTURING DEVICE, A SINGLE-STRIKE DIE MECHANISM, AND A METHOD OF USING SAID DIE MECHANISM FOR FORMING THE MEDICAL SUTURING DEVICE

Charles L. Putnam, West Redding; Mark L. Stein, Bethel, both of Conn., and Patrick R. Holmes, Southampton, England, assignors to American Cyanamid Company, Wayne, N.J.

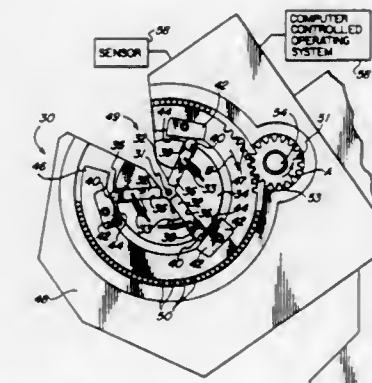
Division of Ser. No. 846,456, Mar. 4, 1992, Pat. No. 5,230,352.

This application May 4, 1993, Ser. No. 58,068

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—225

29 Claims



1. A single-strike die mechanism for securing a surgical suture in a hollow barrel end of a surgical needle, said mechanism comprising:

- a cam drive ring having a radial opening therein;
- cam drive ring mounting means for mounting said cam drive ring for rotation about a central axis;
- drive means for rotating said cam drive ring;
- a plurality of crimping dies;
- a die guide for mounting said plurality of crimping dies for linear movement in a radial direction with respect to the central axis, said plurality of crimping dies being mounted symmetrically in said die guide;
- means linking said cam drive ring and each of said plurality of crimping dies, wherein said cam drive ring need be rotated in only one direction by said drive means to actuate said linking means to drive said crimping dies in the radial direction; and
- control means for controlling rotation of said cam drive ring by said drive means in dependence on the force applied radially at the hollow barrel end of a surgical needle by said crimping dies.

5,411,522

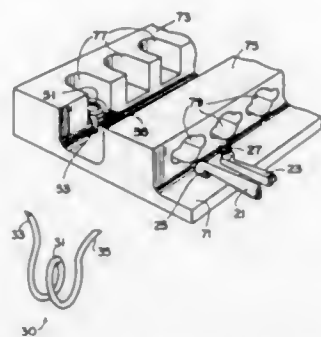
**UNITARY ANCHOR FOR SOFT TISSUE FIXATION**  
Arthur F. Trott, Largo, Fla., assignor to Linvatec Corporation,  
Largo, Fla.

Filed Aug. 25, 1993, Ser. No. 111,319

Int. Cl.<sup>6</sup> A61B 17/04

U.S. Cl. 606—232

17 Claims



1. An anchor for attaching suture in a bone tunnel having a predetermined longitudinal depth and a predetermined diameter, said anchor comprising:

- a continuous wire-like member bent to form a generally helical segment of at least one complete suture-retaining loop and first and second diverging coplanar legs extending from said helical segment, said helical segment having a diameter smaller than said predetermined diameter, said first and second legs having pointed ends normally spaced by a distance greater than the predetermined diameter of said bone tunnel, said legs being resiliently compressible toward one another sufficiently to permit selective reduction of the transverse spacing between said pointed ends to at most equal said predetermined diameter, said anchor being adapted for insertion distally into said bone tunnel with said helical segment preceding said legs and said legs compressed, and wherein the overall length of said anchor from the distal end of said helical segment to said pointed ends is less than said predetermined longitudinal depth of said bone tunnel;

wherein said helical segment comprises at least one and one-half loops, and wherein said legs adjacent their points of departure from the helical segment are bent into a common plane and define a location of closest transverse spacing between the legs, said location defining the onset of divergence between said legs in a direction proximally of the anchor; and  
wherein said location of closest transverse spacing defines an engagement neck adjacent said helical segment.

5,411,523

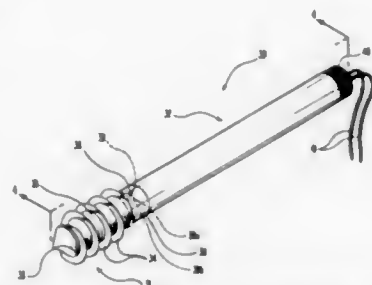
**SUTURE ANCHOR AND DRIVER COMBINATION**  
E. Marlowe Goble, Logan, Utah, assignor to Mitek Surgical Products, Inc., Westwood, Mass.

Filed Apr. 11, 1994, Ser. No. 225,791

Int. Cl.<sup>6</sup> A61B 17/04

U.S. Cl. 606—232

8 Claims



1. A suture anchor and driver combination comprising, a

driver that includes a suture anchor coupling means on a forward end thereof and is open longitudinally therethrough; a suture anchor having a driver coupling means with a means for mounting said suture anchor in a hole that has been formed into a bone cortex, and said suture anchor includes means for mounting a suture to extend from a rear end thereof; and a frangible means for joining said driver and said suture anchor at their respective coupling means that can be broken by application of a force to said driver.

5,411,524

**METHOD AND APPARATUS FOR SYNCHRONIZATION OF ATRIAL DEFIBRILLATION PULSES**

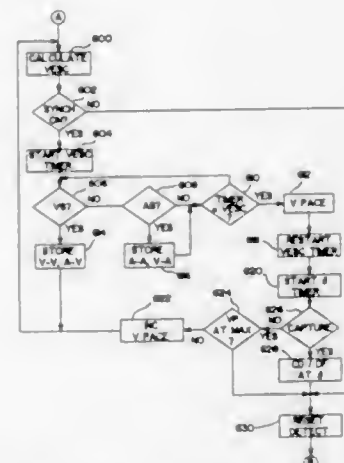
Mehra Rahul, Stillwater, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Nov. 2, 1993, Ser. No. 148,077

Int. Cl.<sup>6</sup> A61N 1/39

U.S. Cl. 607—4

12 Claims



- 2. An atrial cardioverter or defibrillator, comprising: means for detecting a tachyarrhythmia in a patient's atrium; means for delivering a cardioversion or defibrillation pulse to said patient's atrium; and synchronization means for triggering delivery of said cardioversion or defibrillation pulse, said synchronization means comprising: means for sensing depolarizations of said patient's ventricle; means for measuring intervals between sensed ventricular depolarizations to determine an interval indicative of intrinsic heart rate; means for defining a single escape interval less than said interval indicative of intrinsic heart rate, initiated on a said sensed ventricular depolarization; and means for triggering delivery of said cardioversion or defibrillation pulse in response to expiration of said single escape interval, in the absence of sensed ventricular depolarizations during said single escape interval.

5,411,525

**DUAL CAPACITOR BIPHASIC DEFIBRILLATOR WAVEFORM GENERATOR EMPLOYING SELECTIVE CONNECTION OF CAPACITORS FOR EACH PHASE**

David K. Swanson, Roseville, Minn.; Raymond E. Ideker, and Greg Walcott, both of Durham, N.C., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn. and Duke University, Durham, N.C.

Filed Jan. 30, 1992, Ser. No. 828,136

Int. Cl.<sup>6</sup> A61N 1/39

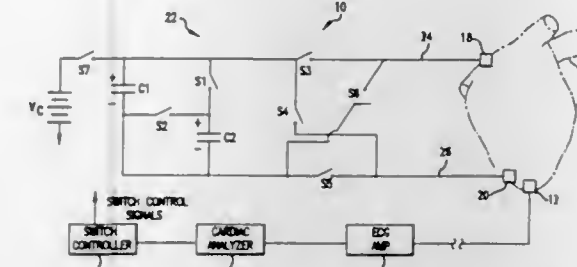
U.S. Cl. 607—5

5 Claims

- 1. A pulse generator for generating a defibrillation waveform in a defibrillator for discharge between at least two elec-

trodes implanted on or about the heart, said pulse generator comprising:

- a first capacitor;
- a second capacitor;
- first switch means for connecting the first capacitor and second capacitor in series or in parallel;
- lead lines for connecting the first and second capacitors to said at least two electrodes;
- means for charging said first and second capacitors;



second switch means for connecting said first and second capacitors to said lead lines; and  
switch control means for controlling said first and second switch means to connect said first and second capacitors in parallel for discharge via said at least two electrodes for a first phase of a biphasic waveform, and to connect said first and second capacitors in series for a second phase of said biphasic waveform.

5,411,526

**IMPROVED IMPLANTABLE DEFIBRILLATOR SYSTEM FOR PRODUCING TRUE-VOLTAGE-PULSE WAVEFORMS**

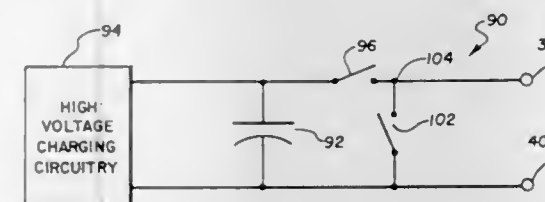
Mark W. Kroll, Minnetonka; Charles G. Supino, Arden Hills; Theodore P. Adams, Edina, and Dennis A. Brumwell, Bloomington, all of Minn., assignors to Angeion Corporation, Plymouth, Minn.

Filed Mar. 24, 1992, Ser. No. 856,733

Int. Cl.<sup>6</sup> A61N 1/00

U.S. Cl. 607—5

5 Claims



- 4. In an implantable defibrillation system for producing a truncated capacitive-discharge countershock, the implantable defibrillator system being a self-contained human implantable device that includes a pulse-generating capacitor means for storing an electrical charge, means for internally charging the pulse-generating capacitor means, and means for selectively discharging the electrical charge in the pulse-generating capacitor means for a specified pulse duration as a countershock to be delivered through electrodes adapted for implantation in a human patient in response to a means for sensing of a myocardial arrhythmia in the human patient, the improvement comprising:

- a shunt switch;
- the electrodes having a first terminal in common with a first terminal of each of the pulse-generating capacitor means and said shunt switch;
- the means for selectively discharging the electrical charge including a series switch connected between a second terminal of the pulse-generating capacitor means and a second terminal of the shunt switch; and
- the second terminal of the shunt switch connected to a node

lying between the series switch and a second terminal of the electrodes, the node being a conductor circuit extending from the series switch to the second terminal of the electrodes,

such that the means for selectively discharging the electrical charge selectively closes the shunt switch at the specified pulse duration to actively truncate the countershock.

5,411,527

**DIFIBRILLATION ELECTRODES AND IMPLANTATION**

Eckhard Alt, Ottobrunn, Germany, assignor to Intermedics, Inc., Angleton, Tex.

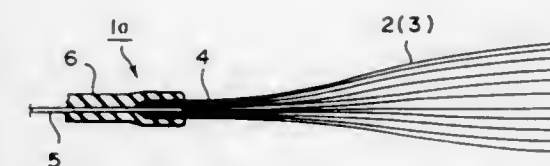
Continuation-in-part of Ser. No. 517,186, May 1, 1990, Pat. No. 5,143,089. This application Aug. 31, 1992, Ser. No. 937,173

The portion of the term of this patent subsequent to Sep. 1, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> A61N 1/05

U.S. Cl. 607—5

31 Claims



1. A method for surgical implantation of an electrode in a patient for use in defibrillating the patient's heart, which comprises:

selecting an electrical lead having at its distal end a defibrillation electrode composed of a multiplicity of fine, elongate, juxtaposed, individual, flexible conductive fibers each having an uncoated, relatively smooth surface layer of carbon derivative of substantially uniform thickness along substantially an entire length of each of said fibers to provide an overall electrode effective electrical surface area which is a cumulative effect of each surface area of the individual fibers and considerably greater than the geometric surface area of the electrode, for implantation in the patient's body;

puncturing a preselected site in the chest/abdominal wall of the patient for insertion of the flexible fiber electrode and lead therein; and

inserting the flexible fiber electrode and lead through the puncture site, and maneuvering the inserted fiber electrode into position within the patient's body to encompass a portion of the ventricular mass of the heart for electrical stimulation of the ventricles when the electrode is energized, while viewing the maneuvering externally on a visual internal body scanner.

5,411,528

**ELECTRICALLY PROGRAMMABLE POLARITY CONNECTOR FOR AN IMPLANTABLE BODY TISSUE STIMULATOR**

Leslie S. Miller, Saugus, and John R. Helland, Santa Clarita, both of Calif., assignors to Pacesetter, Inc., Sylmar, Calif.

Filed Nov. 19, 1992, Ser. No. 979,083

Int. Cl.<sup>6</sup> A61N 1/08

U.S. Cl. 607—5

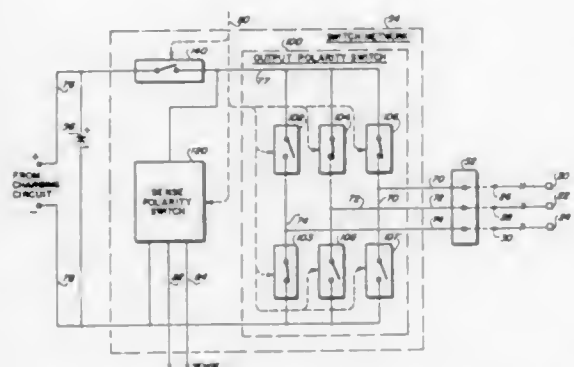
22 Claims

- 1. An implantable cardioverter defibrillator (ICD) comprising:

- at least three output terminals which are adapted to allow a multiplicity of defibrillation lead electrical connectors to be detachably electrically connected thereto;
- a positive output bus;
- a negative output bus;
- a switch network connected to said at least three output terminals, said positive output bus, and said negative output bus, for selectively connecting each of said at least



three output terminals to a selected one of said positive output bus and said negative output bus;  
an output circuit, connected to said positive output bus and said negative output bus, for developing and storing an electrical charge and providing such stored charge to said positive and negative output buses;  
sensing means for sensing cardiac activity;  
control means coupled to said switch network for controlling which of said at least three output terminals are connected to which of said positive and negative output



buses, said control means also operatively controlling said output circuit and said sensing means to determine when a shocking pulse is needed and for controlling the output circuit and switch network so as to initiate discharge of a shocking pulse through said switch network to said at least three output terminals when a shocking pulse is needed; and

telemetry means for noninvasively programming said control means to select which of said at least three output terminals will be connected by said switch network to which of said positive and negative output buses.

5,411,529

# WAVEFORM DISCRIMINATOR FOR CARDIAC STIMULATION DEVICES

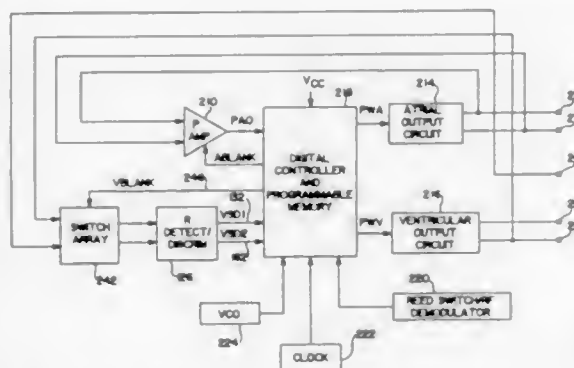
Terrence R. Hudrlik, Fridley, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 626,061, Dec. 12, 1990, Pat. No. 5,265,603, which is a continuation-in-part of Ser. No. 566,636, Aug. 10, 1990, abandoned. This application Sep. 13, 1993, Ser. No. 120,613

Int. Cl.<sup>6</sup> A61N 1/362

U.S. Cl. 607-6

23 Claims



1. A cardiac pacemaker, comprising:  
pulse generator means for generating pacing pulses at predetermined intervals;  
means for sensing the occurrence of depolarizations of a heart chamber;

means for producing signals indicative of power levels of sensed depolarizations of said heart chamber; and  
control means responsive to said signals for altering an operative parameter of said pulse generating means as a function of the power levels of said depolarizations.

5,411,530

# SENSING ALGORITHM FOR ANTI-TACHYCARDIA DEVICES USING DUAL CHAMBER SENSING

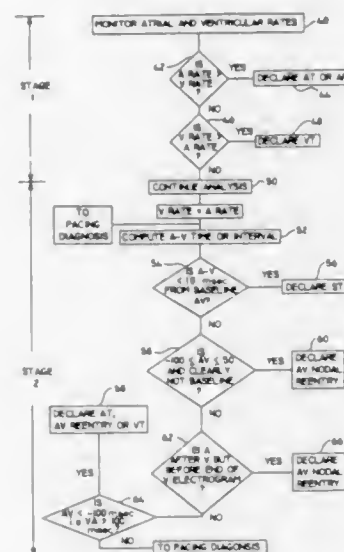
Masood Akhtar, 1765 Brojan Dr., Elm Grove, Wis. 53122

Filed Nov. 13, 1992, Ser. No. 976,015

Int. Cl.<sup>6</sup> A61N 1/362

U.S. Cl. 607-14

17 Claims



1. A method for sensing cardiac activity and classifying a condition of a heart comprising the steps of:  
of first stage of sensing atrial and ventricular depolarization rates of the heart;  
comparing the atrial depolarization rate with the ventricular depolarization rate;  
a second stage implemented if the atrial depolarization rate equals the ventricular depolarization rate, said second stage including the steps of:  
computing an A-V time interval;  
comparing the A-V time interval with a baseline value;  
declaring the heart condition based on the difference between the A-V time interval and the baseline value; and  
a third stage implemented if no declaration is made in said second stage, said third stage including the steps of:  
pacing the heart at a predetermined rate for a predetermined period of time;  
monitoring a response to said step of pacing during and after said predetermined period of time; and  
declaring a specific arrhythmia based on the response of the heart during said step of pacing and after said predetermined period of time.

5,411,531

# METHOD AND APPARATUS FOR CONTROL OF A-V INTERVAL

Michael R. S. Hill, Brooklyn Park, and Rahul Mehra, Stillwater, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Sep. 23, 1993, Ser. No. 125,579

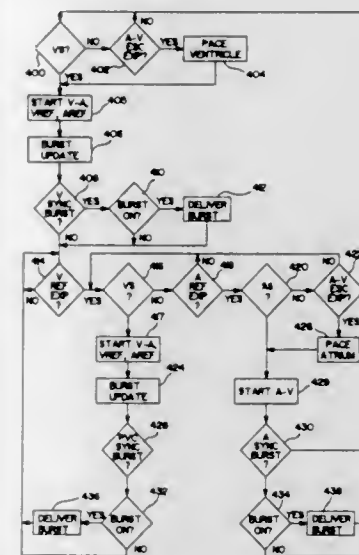
Int. Cl.<sup>6</sup> A61N 1/368

U.S. Cl. 607-14

15 Claims

2. An electrical medical stimulator, comprising:  
electrode means for delivery of electrical stimulation to the fat pad associated with the AV node of a human heart;

means for sensing atrial and ventricular depolarizations of said human heart;  
pulse generator means for generating stimulus pulses and for providing said stimulus pulses to said first electrode means;  
means for sensing the durations of the A-V conduction intervals of said human heart



means for defining a desired A-V conduction interval range; and  
control means responsive to said A-V interval sensing means for controlling operation of said pulse generator means to vary the durations of said A-V conduction intervals to fall within said desired interval range.

5,411,532

# CARDIAC PACEMAKER HAVING INTEGRATED PACING LEAD AND OXYGEN SENSOR

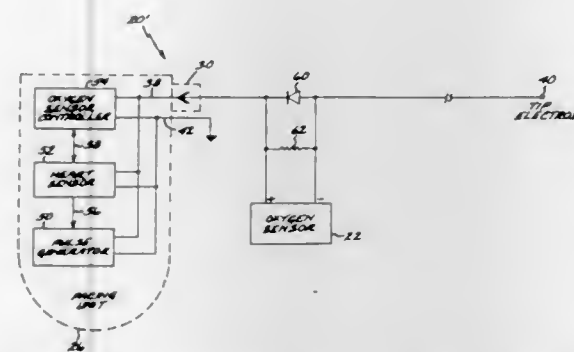
Said Mortazavi, Granada Hills, Calif., assignor to Pacesetter, Inc., Sylmar, Calif.

Filed Jun. 4, 1993, Ser. No. 73,225

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 607-22

23 Claims



1. An implantable cardiac pacemaker system including a pulse generator for generating pacing pulses, the system further including:  
at least one electrical conductor having a proximal end for electrically interfacing with the pulse generator and a distal end for electrical contact with selected heart muscle,  
said pulse generator further selectively coupling pacing pulses along the at least one conductor to electrically stimulate the patient's heart muscle;

an oxygen sensor circuit connected in series circuit arrangement with the at least one conductor;  
means for generating oxygen sensing pulses; and  
an oxygen sensor circuit controller for intermittently coupling oxygen sensing pulses to the oxygen sensor circuit along the at least one conductor for measuring the oxygen content of the patient's blood.

5,411,533

# METHOD AND DEVICE FOR CHECKING STIMULATION POWER IN A PACEMAKER

Anne Dubreuil, Boulange; Remi Nitzsche, Beynes, and Georges Wanderstok, Clamart, all of France, assignors to ELA Medical S.A., Montrouge, France

PCT No. PCT/FR92/00779, § 371 Date Jun. 17, 1993, § 102(e) Date Jun. 17, 1993, PCT Pub. No. WO93/02741, PCT Pub. Date Feb. 18, 1993

PCT Filed Aug. 7, 1992, Ser. No. 39,082

Claims priority, application France, Aug. 9, 1991, 91 10169

Int. Cl.<sup>6</sup> A61N 1/36

U.S. Cl. 607-28

50 Claims



1. A method of regulating pacing energy of a stimulus pulse having an amplitude and width delivered by a cardiac pacemaker comprising:

- sensing an endocardial response to stimulus pulse delivered by the pacemaker;
- defining a capture parameter which varies as a function of the pacing energy;
- providing a calibration phase for determining representative characteristics of the capture parameter as a function of the sensed endocardial response to at least one series of stimulus pulses;
- selecting a reference value for determining whether a stimulus pulse is efficient in response to the determined representative characteristics of the capture parameter;
- providing a threshold search phase for determining a capture threshold value based on the selected reference value; and
- controlling the pacing energy of the delivered pulses based on the determined capture threshold value.

5,411,534

## ELECTRICAL SAFETY SYSTEM FOR ELECTRICAL DEVICE

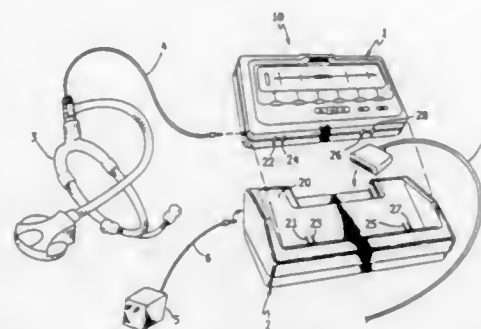
Alan P. Dieken, Oakdale; David J. Flischer, Arden Hills; Jonathan C. Platt, Bloomington, and William L. Sondermann, Circle Pines, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 8,724, Jan. 22, 1993, abandoned. This application Jul. 13, 1994, Ser. No. 274,353

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 607—31

17 Claims



1. An apparatus for electrical isolation from a power source of exposed electrical contacts on multiple modules of an electrical device, wherein the isolation continues until proper alignment of the multiple modules, wherein the device comprises two modules capable of mechanical alignment and electrical connection, and wherein at least one module is portable, the apparatus comprising:  
unenergized, exposed electrical contacts on the first module, at least one concealed actuating component within the first module, at least one concealed sensor component within the second module, unenergized, exposed electrical contacts on the second module, and  
at least one electrical switching device in electrical communication with a corresponding concealed sensor component and with the power source, wherein each switching device is normally open but when closed is in electrical communication with corresponding exposed electrical contacts on the second module and in energized electrical communication with electrical circuitry connected to the power source, wherein alignment of a concealed actuating component and a corresponding concealed sensor component causes a corresponding switching device to close and to provide energized electrical communication with electrical circuitry to the exposed electrical contacts on the second module, and wherein mechanical alignment of the first module and the second module causes energized electrical connection of exposed electrical contacts on the second module with corresponding exposed electrical contacts on the first module.

5,411,535

## CARDIAC PACEMAKER USING WIRELESS TRANSMISSION

Tadashi Fujii, Fujinomiya, and Shinji Ishida, Nakai, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1993, Ser. No. 25,132

Claims priority, application Japan, Mar. 3, 1992, 4-044992

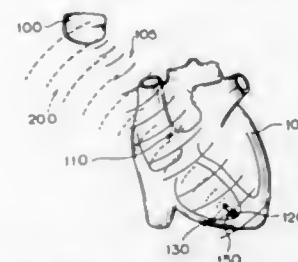
Int. Cl.<sup>6</sup> A61N 1/365

U.S. Cl. 607—32

6 Claims

1. A cardiac pacemaker comprising:  
a cardiac pacemaker main body including, at least two detecting means for detecting cardio-information, control means for outputting at least one controlled pulse on the

basis of the cardio-information, and transmission means for modulating and transmitting the at least one pulse; and



a pace electrode unit including receiving means for receiving and demodulating the transmitted pulse, and stimulating electrode means which is activated by an output pulse from said receiving means.

5,411,536

## METHOD AND APPARATUS FOR COMMUNICATING DATA BETWEEN MEDICAL DEVICES TO IMPROVE DETECTABILITY OF ERRORS

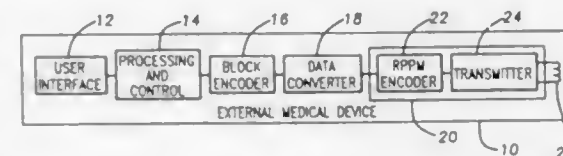
Randolph K. Armstrong, Missouri City, Tex., assignor to Intermedics, Inc., Angleton, Tex.

Filed Jun. 3, 1993, Ser. No. 71,519

Int. Cl.<sup>6</sup> A61N 1/372

U.S. Cl. 607—32

34 Claims



1. A method of processing data to be communicated between an implantable medical device and an external medical device to improve detectability of communication errors, comprising the steps of:

- in at least one of said implantable and external medical devices:  
a) generating a first block of data including a message data portion and a redundant data portion, said message data portion including a plurality of message data values and said redundant data portion including at least one redundant data value having a predefined redundant relationship to at least one of said plurality of message data values;
- b) altering said first block of data by converting alternating data values of at least one of said data portions of said first block of data to respective complement data values; and
- c) generating a signal including a sequence of relative pulse position modulated pulses, wherein each pulse is positioned at a time interval relative to an immediately preceding pulse that is representative of a corresponding one of the data values of said altered block of data.

5,411,537

## RECHARGEABLE BIOMEDICAL BATTERY POWERED DEVICES WITH RECHARGING AND CONTROL SYSTEM THEREFOR

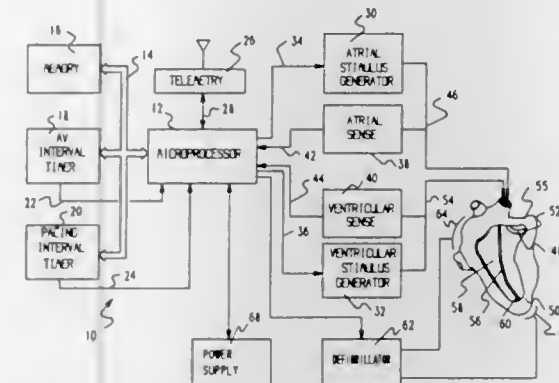
Mohammed Z. Munshi, Missouri City, and Ashok P. Nedun-gadi, Lake Jackson, both of Tex., assignors to Intermedics, Inc., Angleton, Tex.

Filed Oct. 29, 1993, Ser. No. 145,945

Int. Cl.<sup>6</sup> A61N 1/00

U.S. Cl. 607—33

49 Claims



1. An implantable medical device comprising means for delivering a therapy to the body of a patient, means in electrical communication with said therapy delivering means for controlling said therapy delivering means, and an electrical power supply having a rechargeable battery in electrical communication with said therapy delivering means and said controlling means, said battery having an open circuit voltage which is a substantially linear function of a charge on said battery, means for receiving a charge for said battery from a power source external to the body of a patient, said charge receiving means being connected to said battery, means in electrical communication with said battery for detecting a battery voltage of said battery, and means in electrical communication with said detecting means and said charge receiving means for terminating charging whenever said voltage exceeds a predetermined level.

5,411,538

## IMPLANTABLE MEDICAL DEVICE WITH DETACHABLE BATTERY OR ELECTRONIC CIRCUIT

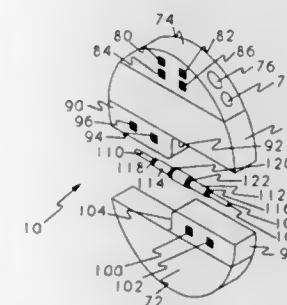
Jack H. Lin, Lake Jackson, Tex., assignor to Intermedics, Inc., Angleton, Tex.

Filed Nov. 1, 1993, Ser. No. 146,904

Int. Cl.<sup>6</sup> A61N 1/375

U.S. Cl. 607—33

12 Claims



1. An implantable medical device comprising electronic circuit means;

first container means enclosing said electronic circuit means battery means;  
second container means enclosing said battery means; and means for detachably coupling said electronic circuit means and said battery means, said coupling means comprising a pin having  
a first end with a first anode and a first cathode and ring means between said first anode and said first cathode for inhibiting passage of body fluids, and  
a second end with a second anode and a second cathode, spaced apart from said first anode and said first cathode, and ring means between said second anode and said second cathode for inhibiting passage of body fluids,  
a first receptacle for receiving first end of said pin, and a second receptacle for receiving said second end of said pin.

5,411,539

## ACTIVE CAN EMULATOR AND METHOD OF USE

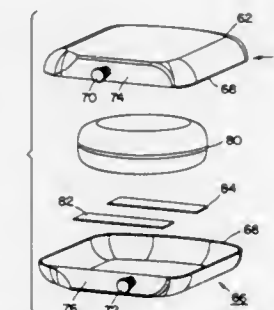
Hans J. Neisz, Coon Rapids, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Aug. 31, 1993, Ser. No. 114,719

Int. Cl.<sup>6</sup> A61N 1/375

U.S. Cl. 607—36

13 Claims



1. A pulse generator emulator operable as a subcutaneous electrode for use with at least one remote electrode in testing the efficacy of electrical stimulation of a body organ with an implantable pulse generator, comprising:  
an emulator housing, configured to emulate the characteristics of a hermetically sealed housing of an implantable pulse generator of the type having a connector block attached thereto, said emulator housing having an electrode on a surface thereof and first connector means attached to the emulator housing for making electrical connection to the electrode; and  
an elongated lead including a conductor extending from a proximal end to a distal end thereof, a second connector means for coupling to a defibrillator, located at the proximal end and coupled to said conductor, a header permanently mounted to the distal end of the lead configured to emulate the connector block of the implantable pulse generator and third connector means mounted to said header and coupled to said conductor, for removably connecting with said first connector means.

5,411,540

## METHOD AND APPARATUS FOR PREFERENTIAL NEURON STIMULATION

David J. Edell, Lexington; John L. Wyatt, Jr., Sudbury, and Joseph Rizzo, III, Boston, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 3, 1993, Ser. No. 72,320

Int. Cl.<sup>6</sup> A61N 1/00

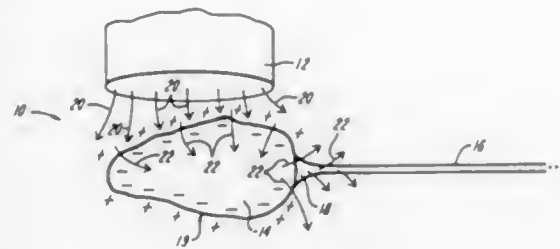
U.S. Cl. 607—53

23 Claims

1. A method for preferentially stimulating neural somas with respect to neural axons located near the somas but not integral with the neural somas, in a region of neural tissue comprising:



positioning a stimulating electrode in the vicinity of the region of neural tissue and, applying a positive electrical pulse to the region of neural tissue including one or more neural somas to be stimulated and neural axons to lower a stimulation thresh-



olds of the neural somas with respect to thresholds of the non-integral neural axons, whereby the neural somas of the neural tissue are preferentially stimulated by the positive electrical pulse over the neural axons not integral with the neural somas to be stimulated.

5,411,541

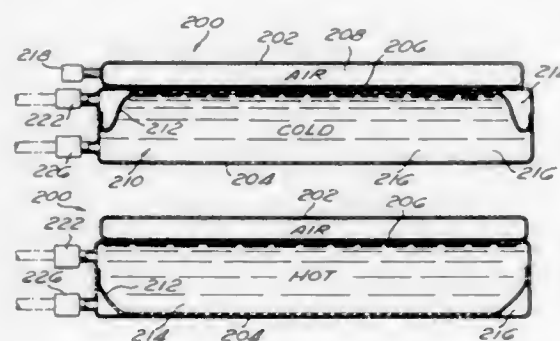
## PORTABLE FLUID THERAPY DEVICE

Anthony H. G. Bell, Laguna Niguel, and Carl E. Prindle, South Laguna Beach, both of Calif., assignors to Oansh Designs Ltd., Zurich, Switzerland

Filed Aug. 5, 1993, Ser. No. 103,293  
Int. Cl.<sup>6</sup> A61F 7/00

U.S. Cl. 607-104

10 Claims



1. A therapy device comprising of a flexible bladder member with a portable fluid therapy device, said flexible bladder for use in combination:

defining independently inflatable inner and outer chambers,

with said inner chamber defining independently inflatable hot and cold water receiving regions any and, said bladder member comprising:

- an outer wall;
  - an inner wall;
  - an intermediate wall positioned between said inner and outer walls; and
  - a flexible baffle positioned between said intermediate and inner walls;
- said outer chamber being defined between said outer and intermediate walls, said hot water region being defined between said baffle and said intermediate wall, and said cold water region being defined between said baffle and said inner wall;
- a first inlet valve port fluidly coupled to the hot water region of said inner chamber;
  - a first outlet valve port fluidly coupled to the hot water region of said inner chamber;
  - a second inlet valve port fluidly coupled to the cold water region of said inner chamber;
  - a second outlet valve port fluidly coupled to the cold water region of said inner chamber; and
  - an inlet/outlet valve port fluidly coupled to said outer chamber.

5,411,542

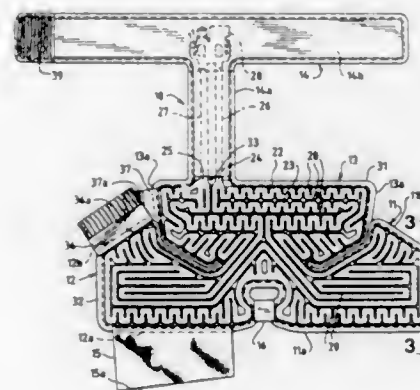
## POST-OPERATIVE THERMAL BLANKET FOR ANKLE AND FOOT

Marvin E. Jensen, Mundelein, assignor to Hollister Incorporated, Libertyville, Ill.

Filed Oct. 20, 1993, Ser. No. 139,287  
Int. Cl.<sup>6</sup> A61F 7/00

U.S. Cl. 607-104

13 Claims



1. A thermal blanket for post-operative treatment of a foot and ankle, said blanket having inner and outer panels of easily-foldable material and having an outline defining two foot sections and an ankle section integral therewith; said outer panel having substantially its entire outer surface formed of soft loop pile fabric and said inner panel being composed of double layers of thermoplastic sheet material heat-sealed together to define at least one serpentine fluid-flow passage extending along a zigzag pathway from a fluid inlet opening to an adjacent fluid outlet opening; said foot sections having

mutually-spaced apart bottom edges joined by a flexible elastically stretchable web positioned to underlie a patient's foot when said blanket is worn; said foot sections having upper edges adapted to extend along a patient's instep, and said ankle section having a pair of front edges adapted to extend along a front of a patient's ankle, when said blanket is worn; first attachment means for adjustably and releasably connecting together said upper edges of said foot sections; and second attachment means for adjustably and releasably connecting together said front edges of said ankle section.

5,411,543

Patent Not Issued For This Number

5,411,544

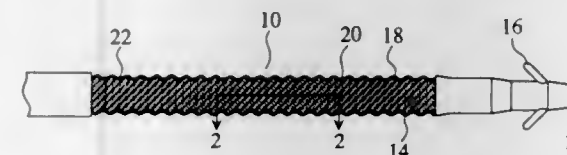
## DEFIBRILLATION LEAD WITH IMPROVED MECHANICAL AND ELECTRICAL CHARACTERISTICS

Craig E. Mar; M. Elizabeth Bush, both of Fremont, and Benjamin D. Pless, Menlo Park, all of Calif., assignors to Ventritex, Inc., Sunnyvale, Calif.

Filed Nov. 2, 1993, Ser. No. 145,839  
Int. Cl.<sup>6</sup> A61N 1/05

U.S. Cl. 607-122

2 Claims



1. A defibrillation lead comprising:
  - a flexible polymeric catheter having an outer roughened surface;
  - a partially exposed metal coil embedded in a portion of said flexible polymeric catheter;
  - a first layer of electrically conductive material deposited by a surface deposition technique on said exposed portion of said metal coil and to the portion of said catheter containing said partially embedded metal coil wherein an electrical connection of said metal coil and said first layer of electrically conductive material is formed; and
  - terminal means for connection to a defibrillator, electrically joined to said first layer of electrically conductive material and to said partially embedded metal coil.

5,411,545

## MEDICAL ELECTRICAL LEAD

Mark D. Breyer, Plymouth; Naim S. Istephanous, Roseville; Robert E. Kraska, Minneapolis; Joseph F. Lessar, Coon Rapids, and Jennifer P. Miller, Elk River, all of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

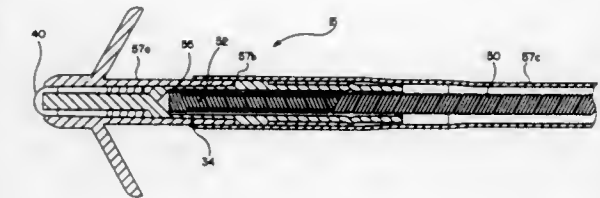
Filed Mar. 14, 1994, Ser. No. 212,476  
Int. Cl.<sup>6</sup> A61N 1/05

U.S. Cl. 607-122

6 Claims

1. A medical electrical lead comprising:
  - (a) an electrode at a distal end thereof;

(b) a connector at a proximal end thereof; and



(c) an elongated electrical conductor extending between the electrode and the connector, the conductor in electrical contact with the electrode at a distal end and in electrical contact with the connector at a proximal end, the conductor comprised of a wire wound in a coil configuration, the wire comprised of a duplex stainless steel having a composition of at least 22% chromium, at least 3% molybdenum and at least 5% nickel.

5,411,546

## DEFIBRILLATION ELECTRODE

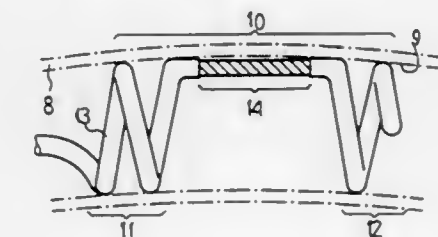
Staffan Bowald, Almunge, and Jakob Hirschberg, Taebu, both of Sweden, assignors to Siemens Elema AB, Solna, Sweden

Filed Dec. 6, 1993, Ser. No. 161,412

Claims priority, application Sweden, Dec. 11, 1992, 9203733-2  
Int. Cl.<sup>6</sup> A61N 1/05

U.S. Cl. 607-126

19 Claims



1. A defibrillation electrode for intravascular siting in a patient comprising:

- a flexible electrode cable containing at least one elongate, electrically insulated conductor having an electrode head formed by a helically wound continuation of said elongate conductor and insulating an uninsulated conductor portion, said electrode head having at least one defibrillation surface for delivering defibrillation pulses to the heart; and
- said electrode head being radially expandable from a non-expanded state to an expanded state, and defining in the expanded state the contours of a hollow body formed by electrically insulated windings of said helically wound continuation with said uninsulated conductor portion extending straight between said windings.

5,411,547

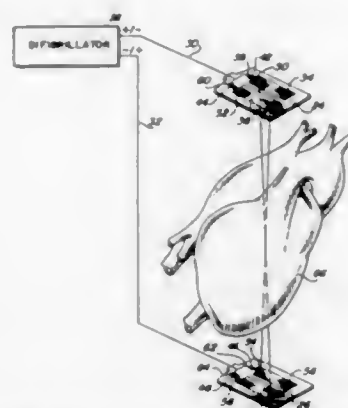
**IMPLANTABLE CARDIOVERSION-DEFIBRILLATION PATCH ELECTRODES HAVING MEANS FOR PASSIVE MULTIPLEXING OF DISCHARGE PULSES**

James D. Causey, III, Simi Valley, Calif., assignor to Pacesetter, Inc., Sylmar, Calif.

Filed Aug. 9, 1993, Ser. No. 104,295

Int. Cl.<sup>6</sup> A61N 1/39, 1/05

U.S. Cl. 607—129



5. A shocking electrode for providing bidirectional current flow comprising:

a patch having first and second mesh electrodes thereon; and diode multiplexing means electrically coupled to the first and second mesh electrodes for steering current flow in a first direction through the first mesh electrode and for steering the current flow in a direction opposite to the first direction through the second mesh electrode.

5,411,548

**METHOD OF VARYING APPROPRIATE MUSCLE STRENGTH OF A PERSON TO ALLEVIATE URINARY OR FECAL URGENCY OR INCONTINENCE OR VAGINAL OR BLADDER SPASMS**

Brent Carman, R.R. #1, Millarville, Alberta, Canada

Continuation-in-part of Ser. No. 3,052, Jan. 11, 1993, Pat. No. 5,291,902. This application Dec. 23, 1993, Ser. No. 172,301

The portion of the term of this patent subsequent to Mar. 8, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61N 1/00

U.S. Cl. 607—138

15 Claims

1. A method of varying the appropriate muscle strength of a person to at least alleviate urinary or fecal urgency or incontinence, or vaginal or bladder spasms comprising:

placing a surface electrode of electromyographic measuring apparatus at an appropriate position on the person and/or inserting a probe electrode of electromyographic measuring apparatus and/or pressure transducer probe of pressure measuring apparatus into the vaginal or anal passage of a person,

measuring with said electromyographic or pressure measuring apparatus the appropriate muscle strength of the person while the person is at rest and not consciously tensing the appropriate muscles in a urine or feces stopping manner to obtain a first EMG or pressure signal, while the person is tensing the appropriate muscles in a urine or feces stopping manner for a short period of time to obtain a second EMG or pressure signal, and while the person is tensing the appropriate muscles in a urine or feces stopping manner for a longer period of time to obtain a third EMG or pressure signal, and

adjusting the threshold value of a portable electromyographic or pressure measuring unit to enable the person to repeat said measurements at different times to attempt to obtain better EMG or pressure signals in an urge, incontinence or spasm reducing sense, said portable unit giving

an audible and/or visual and/or tactile indication when an EMG or pressure signal representing an improvement relative to said threshold value is achieved.

5,411,549

**SELECTIVELY EXPANDABLE, RETRACTABLE AND REMOVABLE STENT**

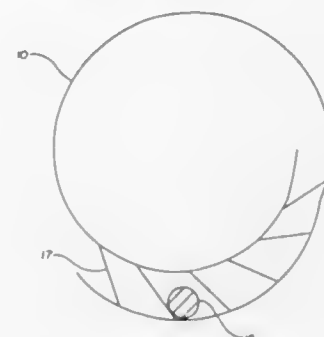
Jeffrey J. Peters, Golden Valley, Minn., assignor to Scimed Life Systems, Inc., Maple Grove, Minn.

Filed Jul. 13, 1993, Ser. No. 91,162

Int. Cl.<sup>6</sup> A61F 2/06

U.S. Cl. 623—1

18 Claims



1. Stent apparatus comprising:

a. a resilient member disposed in a generally tubular, coiled manner about a transverse axis, having a minimum diameter when in a relaxed coiled position and being selectively expandable to one or more increasingly greater diameters; b. said member having a first side and a second side; and, c. movable latch device on said first side that is movable relative to the resilient member and a detent device on said second side, such that expansion of said resilient member from said relaxed coiled position causes said detent device and said movable latch device to make contact to hold said member in an expanded position, and movement of said latch device causes release of the detent device.

5,411,550

**IMPLANTABLE PROSTHETIC DEVICE FOR THE DELIVERY OF A BIOACTIVE MATERIAL**

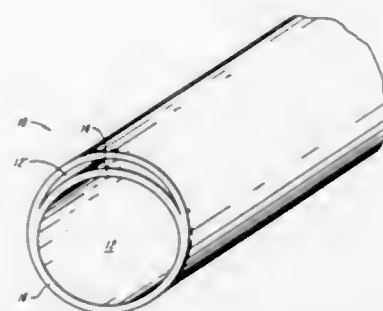
Steve A. Herweck, Nashua; Theodore Karwoski, Hollis, and Paul Martakos, Pelham, all of N.H., assignors to Atrium Medical Corporation, Hudson, N.H.

Continuation of Ser. No. 760,753, Sep. 16, 1991, abandoned. This application Aug. 19, 1993, Ser. No. 109,103

Int. Cl.<sup>6</sup> A61F 2/06, 2/04

U.S. Cl. 623—1

20 Claims



1. An implantable prosthetic device for sustained release of a bioactive material into a fluid flow pathway of a patient comprising a single tubular body extruded as a continuous wall, said wall having at least two interior lumina formed therein, said body being adapted for attachment to said fluid flow pathway, and said continuous wall defining

- (a) a primary lumen for accommodating fluid flow of said pathway
- (b) at least one secondary lumen being a space having an internal cross-dimension of at least 0.1 mm and located in said wall for receiving a quantity of bioactive material and extending adjacent said primary lumen, at least a portion of each said secondary lumen being separated from said primary lumen by a semipermeable membrane permitting controlled and sustained release of the bioactive material disposed in said lumen so as to allow the bioactive material to permeate from said secondary lumen through said membrane portion and into said primary lumen directly into the fluid flow pathway.

5,411,552

**VALVE PROTHESIS FOR IMPLANTATION IN THE BODY AND A CATHETER FOR IMPLANTING SUCH VALVE PROTHESIS**

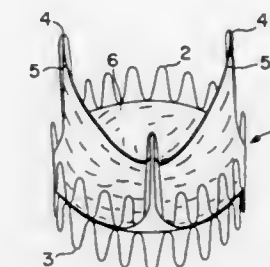
Henning R. Andersen, Dalvangen 37A, DK-8270 Højbjerg; John M. Hasenkam, Aprilvej 8, DK-8210 Aarhus V, and Lars L. Knudsen, Rudolf Walffsgade 6, DK-8000 Aarhus C, all of Denmark

Continuation of Ser. No. 961,891, Jan. 11, 1993, abandoned. This application Jun. 14, 1994, Ser. No. 261,235

Claims priority, application Denmark, May 18, 1990, 1246/90 Int. Cl.<sup>6</sup> A61F 2/24

U.S. Cl. 623—2

8 Claims



1. A valve prosthesis for implantation in a body channel, the valve prosthesis comprising a collapsible elastical valve which is mounted on an elastical stent, the elastical valve having a plurality of commissural points, wherein the stent comprises:

cylindrical support means which is radially collapsible for introduction within the body channel and which has a plurality of circumferentially-expandable sections such that the cylindrical support means is radially expandable for being secured within the body channel; and

a plurality of commissural supports projecting from one side of the cylindrical support means in a direction generally parallel to the longitudinal axis thereof for supporting the commissural points of the collapsible valve, at least one circumferentially-expandable section of the cylindrical support means lying between each of the commissural supports, such that the collapsible valve may be collapsed and expanded together with the cylindrical support means for implantation in the body channel by means of a technique of catheterization.

5,411,551

**STENT ASSEMBLY WITH SENSOR**

Thomas R. Winston, Leadwood, and John M. Neet, Shawnee, both of Kans., assignors to Ultrasonic Sensing and Monitoring Systems, Inc., Kansas City, Mo.

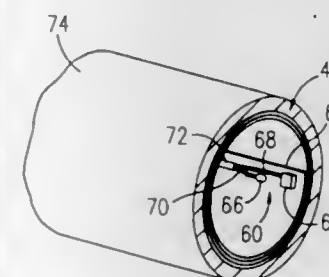
Continuation-in-part of Ser. No. 925,959, Aug. 5, 1992, Pat. No. 5,306,294. This application Sep. 28, 1993, Ser. No. 127,806

The portion of the term of this patent subsequent to Apr. 26, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61F 2/06

U.S. Cl. 623—1

8 Claims



1. A stent and sensing device for placement in a body passage, comprising:

a tubular stent member presenting an inner surface and an outer surface adapted to contact the walls of a body passage, said stent having a relatively contracted condition permitting placement of the stent member within said passage, and an expanded condition whereby said stent is adapted to contact said body passage walls,

said stent member being a flexible sheet wound into a multiple layer roll having said contracted and expanded conditions, said sheet having a spring force so that said sheet is urged toward the expanded condition thereof, said roll in the expanded condition thereof having at least two layers which overlap and bear against one another over a substantial portion of a circumference of the inner layer, said expanded roll adapted for securely contacting said body passage walls by virtue of said radial expansion tendency; and

a sensing device secured to the inner surface of said tubular stent member and oriented for monitoring of a desired condition within the body.

5,411,553

**CROSS-LINKED SILICONE POLYMERS, FAST CURING SILICONE PRECURSOR COMPOSITIONS, AND INJECTABLE INTRAOCULAR LENSES**

John D. Gerace, Laguna Niguel, and F. Richard Christ, Laguna Beach, both of Calif., assignors to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 885,136, May 18, 1992, Pat. No. 5,278,258.

This application Sep. 3, 1993, Ser. No. 116,418

Int. Cl.<sup>6</sup> A61F 2/16

U.S. Cl. 623—6

13 Claims

1. An intraocular lens comprising an optic including an optically clear, cross-linked polymer derived from the polymerization of a mixture comprising

(A) a vinyl-containing polyorganosiloxane component, (B) an organosilicon component including silicon-bonded hydride groups which react with vinyl groups included in (A) during said polymerization and (C) an effective amount of a platinum group metal-containing catalyst component, provided that the mole ratio of vinyl groups to silicon-bonded hydride groups in the mixture is greater than about 4 and is such that said polymer has a reduced discoloration susceptibility relative to a substantially identical polymer having a mole ratio of vinyl groups to silicon-bonded hydride groups in the mixture equal to 1.2.



5,411,554

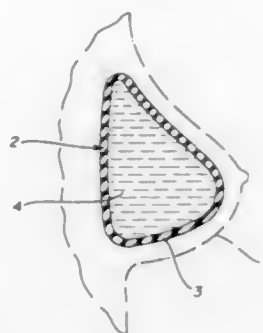
## LIQUID POLYMER FILLED ENVELOPES FOR USE AS SURGICAL IMPLANTS

Angelo G. Scopellanos; Rao S. Bezawada, both of Whitehouse Station; Stephen C. Arnold, Franklin, all of N.J., and Richard D. Gooding, Easton, Pa., assignors to Ethicon, Inc., Somerville, N.J.

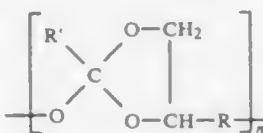
Filed Jul. 20, 1993, Ser. No. 95,129  
Int. Cl.<sup>6</sup> A61F 2/12

U.S. Cl. 623—8

9 Claims

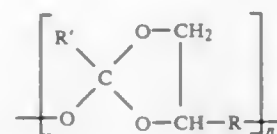


1. A surgical implant comprising a water impermeable envelope filled with one or more liquid bioabsorbable polymers selected from the group consisting of lactone copolymers and poly(orthoesters) wherein the lactone copolymers are composed of at least two monomers selected from the group consisting of glycolide, L-lactide, D,L-lactide, 1,4-dioxanone, ε-caprolactone, 1,5-dioxepan-2-one and trimethylene and the poly(orthoesters) are of the formula:



wherein R is a linear or branched alkylene group containing 3 to 10 carbon atoms and R' is a linear or branched alkyl group containing 1 to 10 carbon atoms and n is selected to provide liquid poly(orthoesters) at body temperature.

2. A process for using a surgical implant comprising implanting in a human a sealed envelope filled with a liquid bioabsorbable polymer selected from the group consisting of lactone copolymers and poly(orthoesters), wherein the lactone copolymers are composed of at least two monomers selected from the group consisting of glycolide, L-lactide, D,L-lactide, 1,4-dioxanone, ε-caprolactone, 1,5-dioxepan-2-one and trimethylene carbonate and the poly(orthoesters) are of the formula:



wherein R is a linear or branched alkylene group containing 3 to 10 carbon atoms and R' is a linear or branched alkyl group containing 1 to 10 carbon atoms and n is selected to provide liquid poly(orthoesters) at body temperature.

5,411,555

## KNEE JOINT PROSTHESIS KIT

Elmar Nieder, York, Germany, assignor to GMT Gesellschaft Fur Medizinische Technik GmbH, Hamburg, Germany

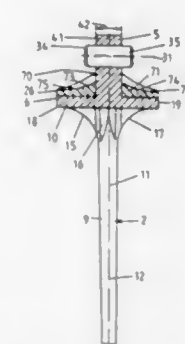
Filed Jun. 11, 1992, Ser. No. 897,468

Claims priority, application Germany, Jun. 11, 1991, 41 19 226

Int. Cl.<sup>6</sup> A61F 2/38

U.S. Cl. 623—20

59 Claims



1. A knee joint prosthesis kit comprising first and second tibial components each including an elongated shank configured to be implanted in a tibia; a femoral component having a shank implantable in a femur; and means for joining said femoral component to a selected one of said tibial components including means for movably connecting said first tibial component with said femoral component so that the first tibial component is pivotable relative to the femoral component only about a first axis, and means for movably securing said second tibial component to said femoral component so that the second tibial component is pivotable relative to said femoral component about said first axis as well as about a second axis which is at least substantially normal to said first axis, said first axis being nearer to a dorsal end than to a patellar end of said connecting means.

## CHEMICAL

5,411,556

## DYEING LEATHER WITH A RED AZO DYE

Johannes P. Dix, Weisenheim; Gunther Lamm, Hassloch; Helmut Reichelt, Neustadt, and Georg Zeidler, Dannstadt-Schauernheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 14, 1993, Ser. No. 136,032

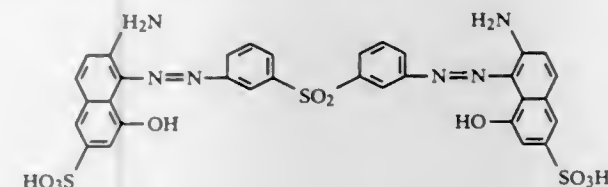
Claims priority, application Germany, Nov. 19, 1992, 42 38 903.8

Int. Cl.<sup>6</sup> D06P 3/32

U.S. Cl. 8—437

1 Claim

1. A process for dyeing leather, which comprises treating the leather with the dye of the formula



5,411,557

## TEXTILE PRINTING PROCESS

Yukio Terada, Amagasaki, Japan, assignor to King Printing Co., Ltd., Osaka, Japan

Continuation of Ser. No. 31,021, Mar. 11, 1993, abandoned, which is a continuation of Ser. No. 899,150, Jun. 17, 1992, abandoned, which is a continuation of Ser. No. 662,509, Feb. 28, 1991, abandoned, which is a continuation of Ser. No. 420,747, Oct. 13, 1989, abandoned, which is a continuation of Ser. No. 245,954, Sep. 15, 1988, abandoned, which is a continuation of Ser. No. 927,976, Nov. 7, 1986, abandoned. This application Nov. 3, 1993, Ser. No. 145,313

Claims priority, application Japan, Nov. 21, 1985, 60-262257; Nov. 21, 1985, 60-262258; Dec. 24, 1985, 60-291533; Aug. 13, 1986, 61-190331

Int. Cl.<sup>6</sup> D06P 5/08

U.S. Cl. 8—444

5 Claims

1. A printing process which comprises printing by a lithographic or relief printing process onto the surface of a fabric made from natural or nylon fibers with a printing ink comprising a) a water-soluble dye reactive with the fabric which is to be printed and which is rendered insoluble by reaction with a metal salt, an amine or an amide, and b) at least one of an oil varnish, a glycol varnish and an amine varnish, said glycol varnish or amine varnish containing at least one of a basic compound, a hydrotropic agent, a neutral sodium salt, a surfactant, water and an alcohol, steaming the fabric, soaping the steamed fabric and rinsing the soaped fabric.

5,411,558

## HEAVY OIL EMULSION FUEL AND PROCESS FOR PRODUCTION THEREOF

Takao Taniguchi; Masanori Iizuka; Kazuo Isobe; Sayuri Tamaki, all of Wakayama; Shinichi Satake, and Tadakazu Yamashita, both of Kanagawa, all of Japan, assignors to Kao Corporation and Nippon Oil Company, Limited, both of Tokyo, Japan

Filed Aug. 26, 1993, Ser. No. 112,146

Claims priority, application Japan, Sep. 8, 1992, 4-239372; Sep. 24, 1992, 4-254798

Int. Cl.<sup>6</sup> C10L 1/32

U.S. Cl. 44—301

36 Claims

1. An oil-in-water heavy oil emulsion fuel comprising (a) a heavy oil, (b) a surfactant and (c) water, wherein oil particles having a diameter of 100 μm or less account for 80% by weight or more of all the oil particles and the oil particles have a particle size distribution such that the distribution constant, n, determined from two relational expressions obtained by substituting a particle diameter (μm) corresponding to a cumulative oversize weight of 10% and a particle diameter (μm) corre-

sponding to a cumulative oversize weight of 90% in a Rosin-Rammler distribution function expressed by the equation (1) is in the range of from 0.5 to 1.6:

$$R(D) = 100 \exp\{-(D/D_c)^n\} \quad (1)$$

wherein R represents a cumulative oversize weight in %, D represents a particle diameter, n represents a constant (a distribution constant) and D<sub>c</sub> represents a constant (a particle size characteristic constant).

5,411,559

## SUCCINIMIDES

Dennis J. Malfer, Crestwood, Mo., assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 480,905, Feb. 16, 1990, Pat. No. 5,312,555.

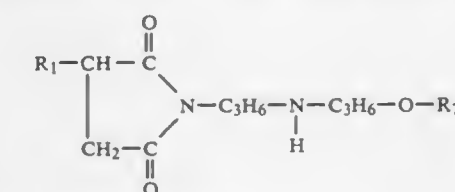
This application May 3, 1991, Ser. No. 697,931

Int. Cl.<sup>6</sup> C10L 1/22

U.S. Cl. 44—347

3 Claims

1. A liquid gasoline fuel for internal combustion engines, said fuel containing a minor effective amount of a product formed by reacting at least one acyclic hydrocarbyl substituted succinic acylating agent with at least one N-(alkoxyalkyl)alkanediamine wherein the product is composed predominantly of succinimide represented by the following formula:



wherein R<sub>1</sub> is an alkyl or alkenyl group bifurcated on its beta carbon atom into two branches, one of which contains at least 4 carbon atoms and the other of which contains at least 6 carbon atoms, said group containing an average of in the range of 12 to 50 carbon atoms and R<sub>7</sub> is an alkyl group containing up to about 50 carbon atoms.

5,411,560

## METHOD OF PRODUCING BINDERLESS PELLETS FROM LOW RANK COAL

David E. Mainwaring, and David W. Guy, both of Hawthorn, Australia, assignors to Swinburne Limited, Australia

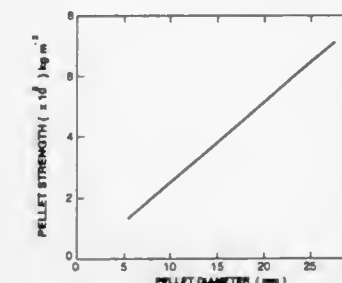
Filed Nov. 4, 1993, Ser. No. 145,623

Claims priority, application Australia, Nov. 5, 1992, PL5701

Int. Cl.<sup>6</sup> C10L 5/00

U.S. Cl. 44—592

6 Claims



1. A method of forming binderless pellets from a low rank coal comprising the steps of:

- providing a feedstock consisting of a low rank coal having a surface carbon to oxygen ratio of less than 10;
- feeding said low rank coal to a rotary pelletizing station;
- maintaining the moisture level in said coal so that the voids within the coal are filled; and
- rotating the coal in the pelletizing station for a time

sufficient to comminute the coal and form pellets in a growth phase without the addition of binders.

5,411,561

## METHOD FOR PRODUCING RAISINS

Bruce G. Conley, Reedley, Calif., assignor to Sun-Maid Growers of California, Kingsburg, Calif.

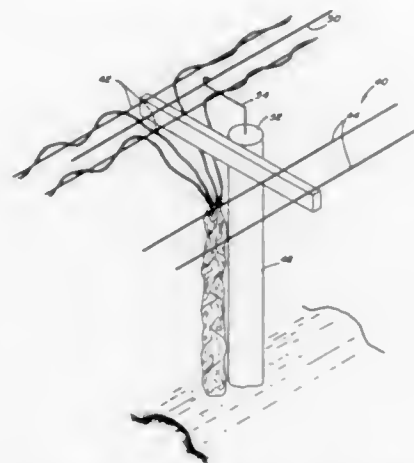
Continuation of Ser. No. 814,140, Dec. 30, 1991, abandoned.

This application Jun. 30, 1993, Ser. No. 85,668

Int. Cl.<sup>6</sup> A01B 79/00; A01C 1/00; A01G 17/06, 17/14

U.S. Cl. 47—58

10 Claims



1. A method for producing raisins comprising the following steps:

selecting a grape variety from a group consisting of Thompson seedless types, said grape variety ripening at substantially the same time as Thompson seedless;  
selecting a vineyard site having the following climatological characteristics:

a growing and drying season of at least 210 days long, 4000 to 5100 degree days during the growing and drying season and at least 180 sunny days during the growing and drying season;

growing the selected grape variety in rows of grape vines at the vineyard site, the rows of grapes extending in a generally east-west direction, the growing step including the steps of:

a) creating divided canopies along rows of the grapevines with fruiting canes primarily on the south side of each said row and replacement canes separated from the fruiting canes using a catching trellis system;

b) determining when the grapes have reached a desired degree of maturity; and

c) cutting at least a portion of the fruiting canes between the crowns of the grapevines and the first bunch of grapes on each of the cut fruiting canes after the grapes have reached said desired level of maturity;

permitting the grapes on the cut fruiting canes to dry on the cut fruiting canes due to the heat of the sun only to create natural raisins; and

harvesting the natural raisins.

5,411,562

## TOPIARY WATERING SYSTEM

Daniel Saparzadeh, 1213 Milford, Houston, Tex. 77006

Filed Jul. 27, 1993, Ser. No. 97,980

Int. Cl.<sup>6</sup> A01G 25/00

U.S. Cl. 47—58

18 Claims

1. A method of regulating fluid flow to maintain a desired moisture content to a topiary, comprising:

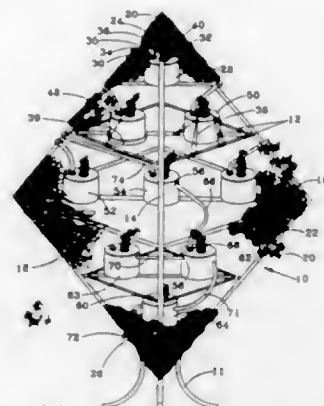
forming an openwork support frame of rod-like members enclosing an open central volume;

positioning a plurality of fluid containers at different vertical

levels in said open central volume each supported by said support frame such that each fluid container is disposed in a different region of said support frame;

filling said support frame with a topiary filler material outward of each of the fluid containers, such that exposed exterior surfaces of the filler material define exterior surfaces of the topiary and the filler material encloses each of said fluid containers;

filling each of said plurality of fluid containers within said topiary with fluid;



positioning a wick in engagement with the fluid within each of the respective containers at one end and inside the topiary of its other end for conveying fluid from each of said plurality of fluid containers to said filler material within respective ones of said different regions of said topiary; and

growing vegetation over the exterior surface of the topiary, whereby the roots of said vegetation extend inwardly from said exterior surface into said filler material to contact said water conveyed from said plurality of fluid containers.

5,411,563

## STRENGTHENING OF MULTILAYER CERAMIC/GLASS ARTICLES

Tsung-Shou Yeh; Jane-Chyi Lin, both of Hsinchu, and Shiang-Po Hwang, Tainan, all of Taiwan, Prov. of China, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China

Filed Jun. 25, 1993, Ser. No. 82,670

Int. Cl.<sup>6</sup> C03B 19/06

U.S. Cl. 65—17.3

12 Claims

1. A method for strengthening ceramic/glass substrates comprising the steps of:

(1) preparing at least first and second slurries, said first and second slurries comprising, respectively, first and second ceramic/glass powder mixtures, wherein said first and second ceramic/glass mixtures comprising about 20–100 wt % glass material and about 0–80 wt % ceramic material and said first ceramic/glass powder mixture would exhibit a greater thermal expansion coefficient after sintering than said second ceramic/glass powder mixture said first and second slurries further comprising other additives such as solvent, binder, dispersion agent, plasticizer;

(2) preparing at least first and second precursory substrates from corresponding said first and second slurries from step (1);

(3) preparing a laminated precursory substrate under a laminating condition by stacking and applying heat and pressure thereon, a plurality of said at least first and second precursory substrates from step (2) in such a manner that at least one of said first precursory substrate is sandwiched between at least two of said second precursory substrates; and

(4) sintering said laminated precursory substrate under a sintering condition by placing the same in a furnace and applying heat thereto.

5,411,564

## PNEUMATIC PLUNGER MECHANISM FOR A GLASSWARE FORMING MACHINE

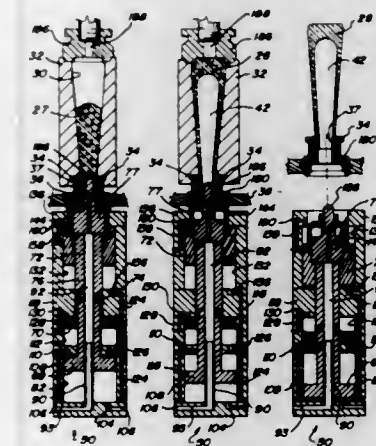
James A. Bolin, Tulsa, Okla., assignor to I.M.T.E.C. Enterprises, Inc., Tulsa, Okla.

Filed Dec. 30, 1992, Ser. No. 998,473

Int. Cl.<sup>6</sup> C03B 11/10

U.S. Cl. 65—68

72 Claims



1. A pneumatically operated plunger mechanism for use in an IS of a glassware forming machine to form a gob of fluid glass into a parison, comprising:

a housing having at least two cylinders, each cylinder containing a piston therein to allow movement of the piston along a length of the cylinder;

a plunger piston positioned in a first one of the cylinders to move in the first cylinder in a plunger stroke;

a plunger connected to the plunger piston to move between a retracted position relative to the housing to and a fully extended position upon movement of the plunger piston in the first cylinder;

a thimble piston positioned in a second one of the cylinders to move in the second cylinder in a thimble stroke;

a thimble connected to the thimble piston to move between a retracted position relative to the housing and a fully extended position upon movement of the thimble piston in the second cylinder;

air passageways in the housing to communicate pressurized air to the cylinders to move each piston in its cylinder along the stroke of each piston; and

the thimble, the thimble piston, the plunger and the plunger piston interoperatively connected with one another to move the plunger from its retracted position to an intermediate extended position upon movement of the thimble from its retracted position to its fully extended position upon application of pressurized air to the second cylinder and without application of pressurized air to the first cylinder, to move the plunger to its fully extended position upon the application of pressurized air to the first cylinder, and to move the plunger and the thimble to their retracted positions upon application of pressurized air to the first cylinder.

5,411,565

## FABRICATING STRIP WAVEGUIDES BY CONSOLIDATING A RARE-EARTH-DOPED LAYER WITH A LASER

Livio Cognolato, Baldissero Torinese, and Angelantonio Gnazzo, Alessandria, both of Italy, assignors to SIP - Societa Italiana per L-Esercizio Delle Telecomunicazioni P.A., Turin and Sirti S.p.A., Milan, both of Italy

Division of Ser. No. 958,687, Oct. 9, 1992, Pat. No. 5,279,634.

This application Aug. 6, 1993, Ser. No. 103,750

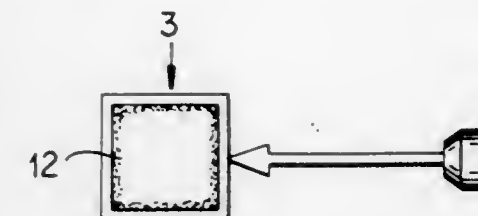
Claims priority, application Italy, Oct. 15, 1991, TO91A0775

The portion of the term of this patent subsequent to Jan. 18, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C03C 17/02

U.S. Cl. 65—386

4 Claims



1. A method of fabricating an active strip monomode waveguide of a desired geometrical shape, comprising the steps of:

(a) depositing upon a substrate for an active strip monomode waveguide, a soot layer of substantially the same composition as that of said substrate;

(b) impregnating said layer with a solution of at least one rare-earth dopant precursor;

(c) drying said layer and transforming said precursor into a rare-earth dopant distributed in said layer;

(d) directing a beam of radiation to which said substrate is transparent and which is of a wavelength in an absorption band of said rare-earth dopant, against said layer thereby heating and fusing said layer to form the active strip monomode waveguide therefrom; and

(e) during step (d) sweeping said beam against said layer with a trajectory corresponding to said desired geometrical shape.

5,411,566

## OPTICAL FIBER SPATIAL MODE CONVERTER USING PERIODIC CORE DEFORMATION

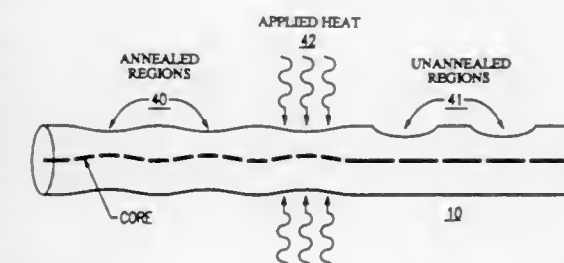
Craig D. Poole, Ocean, and Herman M. Presby, Highland Park, both of N.J., assignors to AT&T Corp., Murray Hill, N.J.

Filed Jun. 8, 1994, Ser. No. 255,685

Int. Cl.<sup>6</sup> C03B 23/20

U.S. Cl. 65—402

8 Claims



5. A product made in accordance with the method of claim 1.





CuCN precipitate formed and combining the CuCN precipitate with the untreated portion of the pregnant leach solution or by contacting the pregnant leach solution with unleached coarse or finely ground ore containing copper; and

(d) removing and recovering copper from the solution resulting from step (c).

5,411,576

# **OILY MIST RESISTANT ELECTRET FILTER MEDIA AND METHOD FOR FILTERING**

Marvin E. Jones, Grant Township, Washington County, and Alan D. Rousseau, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 38,145, Mar. 26, 1993, abandoned. This application Jul. 13, 1994, Ser. No. 275,073

Int. Cl.<sup>6</sup> B03C 3/60

U.S. Cl. 95—57

20 Claims

1. An oily mist resistant electret filter media comprising melt blown polypropylene electret microfibers and a melt processable fluorochemical additive compound having a melting point of at least about 25° C. and a molecular weight of about 500 to 2500 present in an amount of about 0.2 to 10 weight percent to achieve sustained electret filtration enhancement.

11. A method for filtering particulate material from air containing oily aerosol particles comprising passing said air through electret filter media comprising polypropylene melt blown microfibers and a melt processable fluorochemical additive, said additive having a melting point of at least 25° C. and a molecular weight of about 500 to 2500 present in an amount of about 0.2 to 10 weight percent to achieve sustained electret filtration enhancement.

5,411,577

# **METHOD FOR SEPARATING GASES USING A PARTICULATE COMPOSITE MATERIAL WITH CARBON MATRIX**

Serge Moreau, Velizy Villacoublay; Bernard Sardan, Le Chesnay, and Pierre Ehrburger, Didenheim, all of France, assignors to l'Air Liquide, Societe Anonyme Pour l'Etude et l'Exploitation des Procédés Georges Claude, Paris, France

Division of Ser. No. 725,469, Jul. 3, 1991, Pat. No. 5,294,585. This application Dec. 22, 1993, Ser. No. 171,423

Claims priority, application France, Jul. 17, 1990, 90 09090

Int. Cl.<sup>6</sup> B01D 53/047

U.S. Cl. 95—96

9 Claims

1. A method of separating gases, comprising flowing gases to be separated past or through a particulate composite material with a carbon matrix and selectively adsorbing a portion of said gases to be separated into said material to separate the selectively adsorbed portion of gases from the gases to be separated wherein said material includes an essentially carbon microporous phase having a microporous volume between 0.1 and 1 cm<sup>3</sup>/g, associated with an amorphous mineral dispersed phase essentially containing a mineral oxide selected from the group consisting of silicon, aluminum, titanium and magnesium oxides, said mineral dispersed phase being disposed on the carbon phase to a thickness of less than 10 nm.

5,411,578

# **VACUUM SWING ADSORPTION PROCESS WITH MIXED REPRESSURIZATION AND PROVIDE PRODUCT DEPRESSURIZATION**

Charles F. Watson, Orefield; Roger D. Whitley, Allentown; Rakesh Agrawal, Emmaus, and Ravi Kumar, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 10, 1994, Ser. No. 241,260

Int. Cl.<sup>6</sup> B01D 53/47

U.S. Cl. 95—101

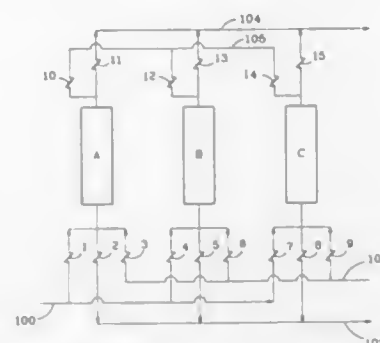
12 Claims

1. A process for selectively separating a more strongly adsorbable component from a less strongly adsorbable compo-

nent of a feed gas mixture in a plurality of adsorption beds containing an adsorbent selective for said more strongly adsorbable component, comprising the steps of:

(a) introducing said feed gas mixture at elevated pressure containing said more strongly adsorbable component and said less strongly adsorbable component into an inlet of a first adsorption bed containing said adsorbent selective for said more strongly adsorbable component and adsorbing said more strongly adsorbable component on said adsorbent while said less strongly adsorbable component passes through said first bed unadsorbed as a product and as a source of product repressurization gas for a bed of said plurality of adsorption beds undergoing product repressurization of step (f) and continuing until the adsorption front of said more strongly adsorbable component approaches an outlet of said first bed and terminating the introduction of said feed gas mixture;

(b) following the termination of the introduction of said feed gas mixture into said first bed, cocurrently depressurizing said first bed to a lower pressure to remove a cocurrent depressurization gas from said first bed and recovering the cocurrent depressurization gas as product;



(c) then further cocurrently depressurizing said first bed to a second lower pressure to remove a cocurrent depressurization gas and passing this cocurrent depressurization gas to the outlet of a bed of the plurality of adsorption beds undergoing purge of step (e);

(d) countercurrently evacuating said first bed under vacuum conditions to remove said more strongly adsorbable component;

(e) countercurrently purging said first bed with said cocurrent depressurization gas from a bed of the plurality of adsorption beds undergoing step (c) to remove additional more strongly adsorbable component from said first bed;

(f) partially repressurizing said first bed with said less strongly adsorbable component gas from a bed of the plurality of adsorption beds undergoing the adsorption of step (a);

(g) further repressurizing said first bed with elevated pressure feed gas mixture; and

(h) performing steps (a) through (g) in each of the plurality of adsorption beds in a phased sequence.

5,411,579

# **AUTO FILTER CURB**

Russell R. Benton, and Elbert L. McGarr, Jr., both of P.O. Box 757, East Tallassee, Ala. 36023

Filed Jul. 28, 1993, Ser. No. 98,096

Int. Cl.<sup>6</sup> B01D 46/18

U.S. Cl. 95—277

2 Claims

1. A method of supporting an airconditioning unit on a rooftop and automatically cleaning the conditioned air that circulates through said unit, comprising the steps of

a. positioning a selected rectangular shaped rigid partition on its edge with its length positioned horizontally and its width extending up in a vertical position,

b. positioning at least three other selectively shaped rigid

partitions on edge with each having its length selectively positioned horizontally and with each having its width extending up in a vertical position and with each having its ends selectively connected in series with each adjoining selected partition, thus forming a quadrilaterally shaped apparatus,

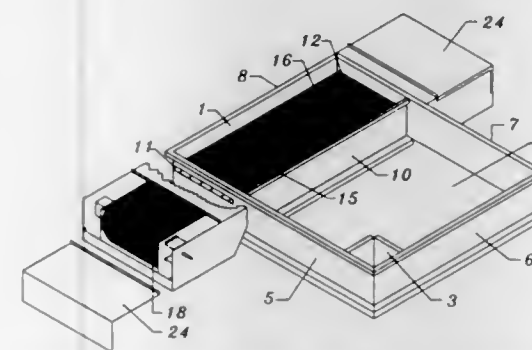
c. installing at least one selected rigid partition on its edge and selectively located within said quadrilaterally shaped apparatus, having its length selectively positioned horizontally and its width extending up vertically and having its ends connected at selected locations to the inside walls of said apparatus, thus dividing the apparatus into at least two separate compartments,

d. constructing a selectively sized service compartment, for electrical wiring and service connections, by installing at least one selected rigid partition on edge in a vertical position and connecting its ends at selected locations to the inside walls of a selected compartment of said apparatus,

e. installing at least two selectively sized, rectangular, parallel slots, at selected locations, through opposite outer walls of a selected compartment of said apparatus,

f. installing a selected, rigid grating, of selected mesh and size, to extend from the base of one slot, over the area of said compartment, to the base of the other slot on the opposite outer wall and having means for support,

g. installing a second selected rigid grating, of selected mesh and size, parallel to and over the area of the first grating, and having means for support that allows selected air space to exist between the two parallel gratings,



h. installing on the outer wall of said compartment, parallel and adjacent to a selected slot, a dispenser type spool, having means for support and rotating means that contain tension springs, for proper rotation, and containing a selected supply of rolled air filter material,

i. installing parallel and between said dispenser spool and its adjacent slot, a selected idle roller, having means for support and rotation means, for guiding purposes,

j. installing on the opposite outer wall of said compartment, parallel and adjacent to the opposite slot, a receiving type spool, having means for support and rotating means that contain tension springs, for proper rotation, and power source means with automatic control for receiving filter material, when activated,

k. installing parallel and between said receiving spool and its adjacent slot, a selected feed roller, having means for support and rotating means, for guiding purposes,

l. installing over the idle and feed rollers, through the slots and between the two gratings, in proper series, a portion of the filter material from the dispenser spool, and having means of attaching said filter material to the receiving spool,

m. installing means for covering the dispenser spool area and means for covering the receiving spool area, for protection,

n. having means for installing the apparatus on a selected rooftop and supporting a rooftop airconditioning unit,

thus automatically cleaning the conditioned air that circulates through said unit, consequently an Auto Filter Curb.

5,411,580

# **OXYGEN-SEPARATING POROUS MEMBRANES**

Eishun Tsuchida; Hiroyuki Nishide, both of Tokyo; Hiroyoshi Kawakami, Hachioji, and Yukiko Sasame, Kodaira, all of Japan, assignors to Praxair Technology, Inc., Danbury, Conn.

Filed Jul. 31, 1991, Ser. No. 740,902

Int. Cl.<sup>6</sup> B01D 53/22, 71/00

U.S. Cl. 96—5

4 Claims

1. An oxygen-separating porous membrane characterized by a complex comprising (a) a transition metal (II) ion, (b) a porphyrin ligand consisting of meso-tetrakis (α,α,α,α-o-pivalamidophenyl)porphyrinato, and (c) an aromatic amine, said complex retained in the pores of a porous substrate, the mean pore diameter of said porous membrane being in the range of 3.5 to 100 Å.

5,411,581

# **GAS SEPARATION APPARATUS**

Graham B. Robinson, Godalming, England, assignor to The BOC Group plc, Windlesham, United Kingdom

Filed Jan. 11, 1994, Ser. No. 179,863

Claims priority, application United Kingdom, Jan. 14, 1993, 9300631

Int. Cl.<sup>6</sup> B01D 53/22, 53/04

U.S. Cl. 96—8

3 Claims



1. A gas separation apparatus comprising: a membrane gas separation unit containing one or more semi-permeable gas separation membranes; said membrane gas separation unit of tubular configuration and having an inlet end for receiving the feed gas; a compressor for feeding a feed gas under pressure to said membrane gas separation unit; and an end cap packed with a regenerative desiccant interposed between said compressor and membrane gas separation unit for preventing any free water in the feed gas from contacting the membranes.

5,411,582

# **PROCESS FOR THE ELECTROPHORETIC DEPOSITION OF METAL POWDER FOR THE RECOATING OF A PART BY DIFFUSION BRAZING, AND ELECTROPHORESIS BATH FOR USE THEREIN**

Marie-Joséphine A. Bodine, Châtelleraut, France, assignor to Societe Sochata, Velizy Villacoublay, France

Division of Ser. No. 957,166, Oct. 7, 1992, Pat. No. 5,336,382. This application Apr. 4, 1994, Ser. No. 222,713

Claims priority, application France, Oct. 9, 1991, 91 12409

Int. Cl.<sup>6</sup> C25D 13/00

U.S. Cl. 106—1.05

1 Claim

1. A bath for electrophoretically depositing metal powder upon a superalloy part to obtain a deposit suitable for producing a coating of the superalloy part by a diffusion brazing heat treatment, comprising demineralized water, from 7.5 to 17.5 grams per liter of agar-agar in solution in said water, and from 1.75 to 2.25 kg per liter of metal powder dispersed in said



solution, wherein said metal powder is a diffusion brazing heat treatment mixture of two metals.

5,411,583

**HF-RESISTANT CERAMICS AND USE THEREOF**  
Stephen J. Bennisson, Princeton, N.J., and Kurt R. Mikeska, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 15, 1993, Ser. No. 152,810

Int. Cl.<sup>6</sup> C04B 35/10

U.S. Cl. 106—14.05 13 Claims

1. A process wherein HF and a solid HF contact surface are employed comprising:

(1) employing a solid HF contact surface consisting essentially of a sintered, single phase, polycrystalline, solid-solution alumina and magnesia ceramic wherein magnesia is present in an effective amount, at least about 10  $\mu$ moles  $Mg^{+2}$  per mole  $Al^{+3}$  and no higher than the solubility limit of magnesia in alumina at the sintering temperature for said ceramic, to provide resistance to corrosion of said HF contact surface from HF; and

(2) contacting the HF contact surface of (1) with HF.

5,411,584

**DENTAL CEMENT**

Ademola O. Akinmade, Miltcham, and Julian H. Braybrook, Ewell, both of England, assignors to British Technology Group Limited, London, England

PCT No. PCT/GB93/00272,  $\S$  371 Date Jul. 1, 1994,  $\S$  102(e) Date Jul. 1, 1994, PCT Pub. No. WO93/16675, PCT Pub. Date Sep. 2, 1993

PCT Filed Feb. 10, 1993, Ser. No. 256,265

Claims priority, application United Kingdom, Feb. 19, 1992, 9203510

Int. Cl.<sup>6</sup> C09K 3/00

U.S. Cl. 106—35 22 Claims

1. A cement composition, comprising an intimately blended mixture of a water-containing liquid, at least 30% by weight of the composition being a cation-catalysed cross-linkable polymeric acid containing on average one phosphonic acid group per one to three backbone carbon atoms, and a metal oxide or cation-leachable surgically acceptable aluminosilicate glass powder in the proportions (1 minus x)g said polymeric acid: 1 to 5 g glass or metal oxide: x g liquid, where x is from 0.3 to 0.7, wherein said polymeric acid has been pre-reacted in aqueous solution at elevated temperature with a fluoride, phosphate and mixtures thereof.

5,411,585

**PRODUCTION OF STABLE HYDROLYZABLE ORGANOSILANE SOLUTIONS**

Richard W. Avery, Frederick H. Martin, Sean G. Dwyer, all of Racine County, Wis., and Colin W. Brown, Middlesex County, England, assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation of Ser. No. 98,331, Jul. 30, 1993, abandoned, which is a continuation-in-part of Ser. No. 657,017, Feb. 15, 1991, abandoned. This application Jun. 30, 1994, Ser. No. 269,949

Int. Cl.<sup>6</sup> C08K 5/54

U.S. Cl. 106—287.1 52 Claims

1. A method of improving the storage stability and broadening the pH stability of an aqueous solution containing from about 0.001% to 5% by weight of a water soluble organosilane of the formula



provided that the organosilane forms a clear solution in water at 25° C. at the intended level of use, which method comprises including within the solution

a. from about 0.05% to 10% by weight of the total aqueous solution of a water soluble organic quaternary ammonium compound which is free of silicon atoms and contains at

least one nitrogen-bonded hydrocarbon group of at least 8 carbons and

b. from about 0.5% to 30% by weight of the total aqueous solution of at least one surfactant selected from the group consisting of nonionic, amphoteric, sarcosine anionic, and cationic surfactants other than the compounds of (a); wherein the amounts of (a) and (b) present are effective to improve the storage stability of and to broaden the pH stability of the resulting solution and each

A is —OH or a hydrolyzable group,

B is an alkyl group of from 1 to 4 carbon atoms,

x has a value of 0, 1 or 2, and

D is a hydrocarbon group of from 1 to 4 carbon atoms, phenyl, or a nonionic or cationic, substituted-hydrocarbon group containing at least one oxygen or nitrogen group or salts of such substituted-hydrocarbon groups.

5,411,586

**LUSTER PIGMENTS CONTAINING BISMUTH VANADATE**

Raimund Schmid, Neustadt; Norbert Mronja, Dossenheim; Harald Ochmann, Dannstadt-Schauernheim, and Christoph Schwidetzky, Hassloch, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Jun. 27, 1994, Ser. No. 266,481

Claims priority, application Germany, Jul. 2, 1993, 43 22 020.7

Int. Cl.<sup>6</sup> C04B 14/00

U.S. Cl. 106—415 9 Claims

1. Luster pigments comprising coated platelet-shaped substrates wherein the coating comprises a layer comprising bismuth vanadate.

5,411,587

**PAPER COATING KAOLIN PIGMENTS THEIR PREPARATION AND USE**

Mitchell J. Willis, Macon, Ga.; Patrick D. Canavan, Brooklyn, N.Y.; Fred M. Allen, Windsor, and Jordan K. Lampert, Metuchen, both of N.J., assignors to Engelhard Corporation, Iselin, N.J.

Continuation-in-part of Ser. No. 791,821, Nov. 13, 1991, Pat. No. 5,169,443. This application Apr. 12, 1994, Ser. No. 211,674

Int. Cl.<sup>6</sup> C09C 1/28, 3/06

U.S. Cl. 106—486 4 Claims

1. A method of making a hydrous kaolin pigment which comprises

(A) providing degritter —325 mesh kaolin crude having the following characteristics:

(1) Particle Size (e.s.d. as determined by Sedigraph)

(a) less than 2 microns: 40–65%  
less than 0.2 microns:  $\leq 12\%$

$$\text{ratio } \frac{\% \text{ less than 2 microns}}{\% \text{ less than 0.5 microns}} : > 2.1 \quad (b)$$

(2) Surface Area: 12.0 m<sup>2</sup>/gm or less (BET method using N<sub>2</sub> as adsorbate)

(3) Structural Order

(a) Hinckley Index:  $> 0.90$

(b) C-axis crystal coherence - Full-Width-Half-Maximum measure of (001) peaks - FWHM (001)  $\leq 0.26$

(4) Cation Exchange Capacity - measured by Na<sup>+</sup> adsorption at pH 4.0 on non-dispersed minus 325 mesh crude:  $\leq 0.05$  microequivalents/m<sup>2</sup>; and

(B) subjecting the crude to delamination and terminating delamination when a predominant proportion of the original booklet particles have been parted along basal (001) cleavages into discrete platelets but before significant attrition of platelets occurs.

5,411,588

**DEVICE FOR PROCESSING DISC-SHAPED REGISTRATION CARRIERS**

Petrus J. F. Diepens, Hg Son; Joost Van Erp, CG Eindhoven, and Michael A. T. Hompus, MD Eindhoven, all of Netherlands, assignors to OD & ME B.V., Eindhoven, Netherlands

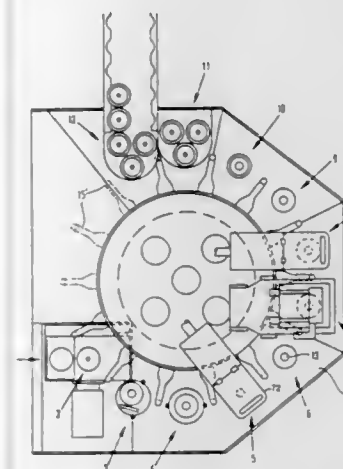
Filed Jun. 16, 1993, Ser. No. 77,524

Claims priority, application Netherlands, Jun. 16, 1992, 9201065

Int. Cl.<sup>6</sup> B05C 11/00

U.S. Cl. 118—666

25 Claims



3. A device comprising with a number of processing stations, which are arranged along a curved path, spaced apart by at least substantially equal angular distances, with a transport means which is pivotable about a vertical axis of rotation, said transport means being fitted with gripping means for taking hold of and moving products to be processed between the various processing stations, and with driving means for said pivotable transport means, by which said transport means is pivotable in a first direction, so as to be able to move said gripping means to a position above a product located in a processing station, upon which the transport means is pivotable in opposite direction, so as to be able to transfer the product from one processing station to a following processing station, whereby said processing stations are fitted with supporting means for supporting disc-shaped registration carriers, and at least some of said stations are fitted with exchangeable processing units, said transport means comprising an annular means, which is pivotable about said axis of rotation, to which said gripping means are connected and which is capable of reciprocating pivotal movement by means of a driving mechanism, said annular means being rotatably supported by a second co-axial annular means, which is rotatable with respect to a third co-axial annular means, and whereby one of said second or said third annular means is provided with a wave-shaped guide path, which mates with a follow-on means connected to the other of said third or said second annular means, said third annular means being capable of reciprocating movement by means of a driving mechanism.

5,411,589

**COATING APPARATUS WITH COATING DIE**

Makoto Yoshida; Kazuyuki Shimizu; Eiichi Morita; Masato Fujimori, and Hiromi Tanaka, all of Hino, Japan, assignors to Konica Corporation, Japan

Filed Dec. 15, 1992, Ser. No. 990,731

Claims priority, application Japan, Dec. 17, 1991, 3-333437

Int. Cl.<sup>6</sup> B05C 1/08, 3/18

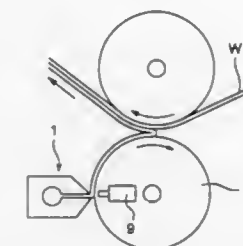
U.S. Cl. 118—688

6 Claims

1. An apparatus for coating a web comprising a backup roller supporting said web and adapted for backup rotation about a backup rotation axis, said web having a web width, and moving in an advancing direction with said backup rotation, a

coating roller adapted for coating rotation about a coating rotation axis, said coating axis being substantially parallel to said backup axis and adjacent said web, whereby coating material is transferred from said coating roller to said web, said apparatus further comprising a coating die having a dispensing slit with its longitudinal dimension substantially parallel to said coating axis, perpendicular to said advancing direction, and adjacent said coating roller, said die being movable toward and away from a peripheral surface of said coating roller to form an adjustable gap therebetween,

said coating die comprising a lip surface, said lip surface facing said peripheral surface of said coating roller



thereby forming said adjustable gap, at least one extended portion of said die extending beyond said coating roller in said longitudinal direction, said extended portion constituting a reference surface which is fixed with respect to said lip surface, whereby location of said lip surface can be determined by location of said extended portion; a distance locator at a fixed position on a side of said coating roller adapted to measure a distance from said fixed position to said reference surface; and a control for adjusting said gap by moving said coating die toward or away from said coating roller based on said distance from said coating die to said coating roller.

5,411,590

**GAS INJECTORS FOR REACTION CHAMBERS IN CVD SYSTEMS**

Mark R. Hawkins, Mesa, and McDonald Robinson, Paradise Valley, both of Ariz., assignors to Advanced Semiconductor Materials America, Inc., Phoenix, Ariz.

Continuation of Ser. No. 66,019, Jun. 24, 1987, Pat. No.

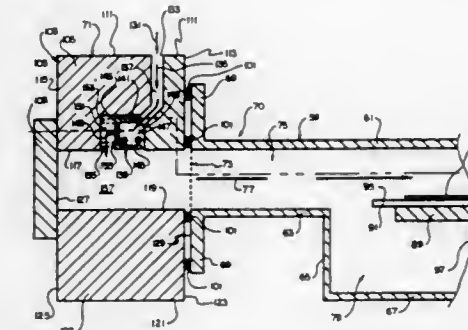
5,221,556. This application Dec. 16, 1991, Ser. No. 782,060

The portion of the term of this patent subsequent to Jun. 22, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C23C 16/00

U.S. Cl. 118—715

14 Claims



1. In a CVD system having a reaction chamber defining a longitudinal axis and a lateral axis perpendicular to said longitudinal axis together defining a plane for processing one circular substrate at a time, the substrate being centrally positioned along said lateral axis within said chamber and in said plane, an improved gas injector for injecting at least a reactant gas into the reaction chamber, said injector being positioned at one

longitudinal end of said reaction chamber and adjacent a gas input to said chamber, said improved gas injector comprising:

- a source of reactant gas;
- an injector body including an elongated substantially hollow gas distribution manifold chamber, a gas inlet and a gas input passage in fluid communication with said gas inlet and with a central region of said gas distribution manifold chamber;
- a conduit for supplying reactant gas from said source into said gas inlet of said injector body at a flow rate so that gas flows through said input passage and is distributed from the central region
- in opposed lateral directions within said gas distribution manifold chamber and throughout the length of said injector body;
- a manifold member defining one outer boundary of said gas distribution manifold chamber, said manifold member being a generally rectangular, substantially planar member and including selectively dimensioned outlets for producing a non-uniform gas velocity profile of the gas passing therethrough, said outlets including a plurality of groups of apertures, each of said groups of apertures having different and distinct diameters for producing the non-uniform gas velocity profile of the gas passing through said apertures so that the gas flow has a greater velocity through a central region of the manifold member than in laterally outward regions; and
- a cavity for diverting the gas flow at 90° and into the gas input of the reaction chamber as an injected gas flow along the longitudinal axis having the non-uniform gas velocity profile along the lateral axis of the reaction chamber.

5,411,591

# APPARATUS FOR THE SIMULTANEOUS MICROWAVE DEPOSITION OF THIN FILMS IN MULTIPLE DISCRETE ZONES

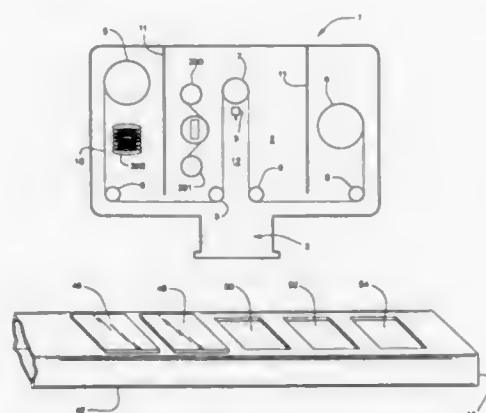
Masatsugu Izu, Bloomfield Hills; Buddie R. Dotter, II, Utica; Stanford R. Ovshinsky, Bloomfield Hills, all of Mich., and Wataru Hasegawa, Higashi-Osaka, Japan, assignors to Energy Conversion Devices, Inc., Troy, Mich.

Division of Ser. No. 240,202, May 9, 1994, which is a continuation of Ser. No. 976,149, Nov. 13, 1992, abandoned. This application Jul. 22, 1994, Ser. No. 278,734

Int. Cl. C23C 16/50

U.S. Cl. 118—718

37 Claims



1. Apparatus for the plasma enhanced chemical vapor deposition of thin film material onto an elongated web of substrate material, said apparatus including in combination:

- an evacuable deposition chamber;
- means for evacuating said deposition chamber to sub-atmospheric pressure;
- an elongated web of substrate material disposed in said deposition chamber so that the deposition surface thereof

substantially encloses a first interior volume of said chamber, said first volume defining a first plasma region;

linear applicator means for introducing a precursor mixture of deposition gases into said first volume;

means for the substantially uniform introduction of microwave energy from a source into said first volume for dissociating the precursor gaseous mixture into a plasma of activated species and depositing the activated species onto said substrate web, said microwave introduction means, operatively disposed adjacent the non-deposition surface of said substrate web; and

said precursor mixture substantially confined by the disposition of the web of substrate material relative to the microwave introduction means, whereby the activated species are substantially prevented from depositing on the linear applicator.

5,411,592

# APPARATUS FOR DEPOSITION OF THIN-FILM, SOLID STATE BATTERIES

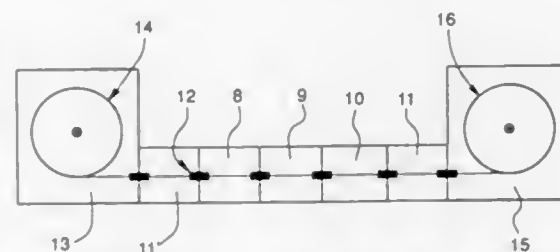
Stanford R. Ovshinsky, Bloomfield Hills; Herbert Ovshinsky, Oak Park, and Rosa Young, Troy, all of Mich., assignors to Ovonic Battery Company, Inc., Troy, Mich.

Filed Jun. 6, 1994, Ser. No. 254,392

Int. Cl. C23C 16/00; H01M 4/00, 6/00

U.S. Cl. 118—718

15 Claims



1. A multi-chambered deposition apparatus for depositing solid-state, thin-film battery materials onto substrate material, said apparatus including:

- at least three distinct evacuable deposition chambers, said deposition chambers physically interconnected in series;
- the first of said deposition chambers adapted to deposit battery electrode material having a first polarity onto the substrate;
- the second of said deposition chambers adapted to deposit solid-state electrolyte material onto the battery electrode material deposited in the first chamber;
- the third of said deposition chambers adapted to deposit battery electrode material of the opposite polarity from that deposited in the first chamber; and
- at least two gas gates, each gas gate interconnecting two of said deposition chambers such that the substrate material is allowed to proceed from one deposition chamber to the next, while maintaining gaseous segregation between the chambers.

13. A deposition apparatus as in claim 1, wherein said deposition chambers are adapted to deposit materials by at least one method selected from the group consisting of evaporation, chemical vapor deposition, physical vapor deposition, microwave plasma enhanced chemical vapor deposition, sputtering, laser ablation, spray coating, or plasma spraying.

5,411,593

# APPARATUS FOR SERVICING VACUUM CHAMBER USING NON-REACTIVE GAS FILLED MAINTENANCE ENCLOSURE

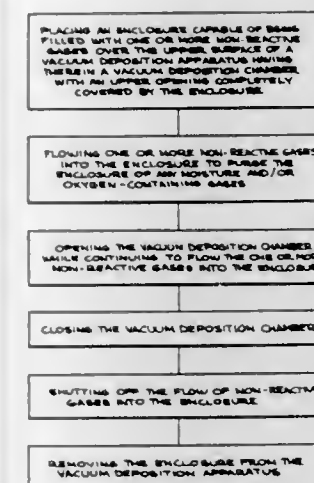
David K. Carlson, Santa Clara, and Norma B. Riley, Pleasanton, both of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Division of Ser. No. 989,248, Dec. 11, 1992. This application Dec. 14, 1993, Ser. No. 167,675

Int. Cl. C23C 16/00

U.S. Cl. 118—719

15 Claims



1. Apparatus for providing access to the interior of a vacuum deposition chamber in a vacuum deposition apparatus for servicing through an opening normally covered by a cover on said chamber without exposing residues within said chamber to moisture and/or oxygen-containing gases which comprises:

- a) a removable enclosure capable of being temporarily placed over the upper surface of said vacuum deposition apparatus containing said vacuum deposition chamber to permit servicing of the interior of said vacuum deposition chamber, said enclosure having a bottom opening large enough to completely cover said cover on said chamber, said enclosure being capable of being filled with one or more non-reactive gases flowed into said enclosure to purge moisture and/or oxygen-containing gases from said enclosure; and
- b) means for flowing said one or more non-reactive gases into said enclosure;

to thereby prevent moisture and/or oxygen-containing gases from entering said enclosure, whereby such undesirable gases will be excluded from contact with residues within said vacuum deposition chamber when said cover is removed to access said chamber for servicing through said opening in said chamber while said enclosure covers said opening to said chamber.

8. Apparatus for providing access to the interior of a vacuum chamber in a vacuum apparatus through a cover on an upper surface of said vacuum apparatus without exposing said residues within said chamber to moisture and/or oxygen-containing gases which comprises:

- a) an enclosure having a closed top, a plurality of sidewalls, and a bottom opening large enough to completely cover said cover on said chamber, and which is capable of being filled with one or more non-reactive gases; and
- b) means for flowing one or more non-reactive gases into said enclosure to purge moisture and/or oxygen-containing gases from said enclosure while removing said cover through one or more openings in one or more of said sidewalls of said enclosure for servicing the interior of said vacuum chamber;

whereby said flow of non-reactive gas into said enclosure will inhibit ingress of moisture and/or oxygen-containing gases, as

well as particulate impurities, into said interior of said vacuum chamber when said cover is removed.

5,411,594

# BEI HYDROLYSIS PROCESS SYSTEM AN IMPROVED PROCESS FOR THE CONTINUOUS HYDROLYSIS SACCHARIFICATION OF LIGNO-CELLULOSICS IN A TWO-STAGE PLUG-FLOW-REACTOR SYSTEM

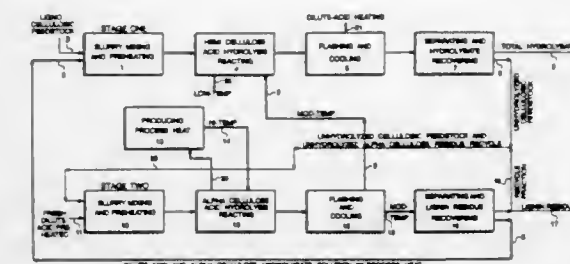
Donald L. Brelsford, 8655 Bridger Canyon Rd., Bozeman, Mont. 59715

Filed Jul. 8, 1991, Ser. No. 736,949

Int. Cl. B01J 3/00; C13K 1/02

U.S. Cl. 127—37

10 Claims



1. A two-stage dilute-acid hydrolysis process for the continuous saccharification of ligno-cellulosic biomass feedstock to produce hydrolysate sugars, comprising the following steps:

- (a) substantially continuously admixing, in a first-stage, a lignocellulosic biomass feedstock and a dilute mineral acid to form an aqueous preheated feedstock slurry, of about 10 to 20 wt % solids, whereas said dilute mineral acid is in a hot pressurized aqueous solution, supplied by reverse interstage transfer from a second stage, said dilute mineral acid consisting of an alpha cellulose hydrolysate and dilute mineral acid in aqueous solution;
- (b) introducing said preheated feedstock slurry into one end of a first tubular reactor and constricting the other end of said reactor so as to develop a back pressure therein;
- (c) receiving indirectly into said aqueous feedstock slurry sufficient process heat supplied by reverse inter-stage transfer of said second-stage flash-steam to heat and maintain said slurry at a pressure ranging from about 45 to 200 psia and at a temperature ranging from about 135° to 195° C. saturated steam equivalent;
- (d) passing said heated feedstock slurry of step (c) into and through a reaction zone in said first tubular reactor, the length of said reaction zone and the flow rate of said heated slurry introduction being so selected as to afford an average reaction zone detention time of about 1.0 to 20 minutes;
- (e) producing hemicellulose hydrolysate sugars in said reacting slurry;
- (f) substantially continuously discharging and flashing said reacting slurry, thereby cooling by reducing the pressure and temperature of said reacting slurry, and also substantially continuously generating a first stage flashed steam supply;
- (g) thereafter separating said flashed slurry into: 1.) a combined hydrolysate solution, and 2.) an unhydrolyzed hemicellulose hydrolysis residue;
- (h) recovering said combined hydrolysate solution, which includes therein said hemicellulose hydrolysate sugars, said alpha cellulose hydrolyzate sugars, and said dilute-acid, thereby producing a single-solution final product of said saccharification.
- (i) admixing, within said second stage, a blend of said unhydrolyzed hemicellulose hydrolysis residue, and of a recycled up-to 50 wt % fraction of an unhydrolyzed alpha cellulose hydrolysis residue, with a fresh preheated dilute mineral acid solution, to form a partially heated aqueous alpha cellulose hydrolysis slurry, of about 10 to 20 wt %



- solids, whereas said dilute acid is continually preheated by a first stage flash steam supply;
- (j) introducing said aqueous preheated slurry into one end of a second tubular reactor and constricting the other end of said reactor so as to develop a back pressure therein;
- (k) receiving indirectly into said aqueous alpha cellulose hydrolysis slurry, sufficient process heat, by way of a high temperature fresh process heat supply, to heat and maintain said aqueous slurry at a pressure ranging from about 100 to 200 psia and to a temperature ranging from about 165° to 260° C. saturated steam equivalent;
- (l) passing said heated slurry into and through a reaction zone in said tubular reactor, the length of said reaction zone and the flow-rate of said heated slurry introduction being so selected as to afford an average reaction zone detention time of about 0.5 to 20 minutes;
- (m) producing alpha cellulose hydrolysate sugars in said heated slurry in the presence of said dilute acid;
- (n) there after continuously discharging and flashing said reacting slurry, thereby cooling and reducing its pressure and temperature and generating a second stage flashed steam supply.
- (o) separating said flashed slurry into: 1.) a hot reduced pressure alpha cellulose hydrolysate and dilute acid solution, and 2.) an unhydrolyzed alpha cellulose and lignin residue solids;
- (p) recovering said hydrolysate and dilute acid solution, whereupon continuously transferring said solution to said first stage for admixing to slurry;
- (q) recovering said unhydrolyzed alpha cellulose and lignin residue, whereupon continuously fractionating said residue, thereby an up to 50 wt % fraction is recycled within second stage and blended with said unhydrolyzed hemi-cellulose hydrolysis residue from said first stage, thereafter admixing said blend to said second stage slurry, whereby said remaining fraction is a unhydrolyzed alpha cellulose lignin residue and is the final solid product of said saccharification.

5,411,595

## POST-ETCH, PRINTED CIRCUIT BOARD CLEANING PROCESS

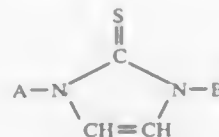
George S. Bokisa, Sr., North Olmsted; Gary W. Loar, Parma, both of Ohio, and Americus C. Vitale, West Chester, Pa., assignors to McGean-Robco, Inc., Cleveland, Ohio  
Filed Jul. 13, 1993, Ser. No. 90,892  
Int. Cl.<sup>6</sup> B08B 3/08

U.S. Cl. 134—2

14 Claims

1. A process for removing contaminants from plated surfaces of an etched printed circuit comprising removing said contaminants by treating the plated surfaces with a cleaning solution consisting essentially of removing said contaminants by aqueous solution of

- (i) an imidazole-2-thione compound of the formula:



wherein A and B are the same or different —R—Y groups, wherein R is a linear, branched or cyclic alkenyl group containing 1 to 12 carbon atoms and Y is a hydrogen, halogen, cyano, vinyl, phenyl or ether moiety; and

- (ii) an acid.

5,411,596  
OIL BASED COMPOSITION CLEAN UP METHOD AND COMPOSITION FOR USE THEREIN

Thomas J. Pennaz, Brooklyn Park, Minn., assignor to Deluxe Corporation, Shoreview, Minn.

Filed Apr. 1, 1993, Ser. No. 41,830

Int. Cl.<sup>6</sup> B08B 3/08; C09D 9/00

U.S. Cl. 134—26

21 Claims

1. A process for removing a water insoluble ink composition from printing equipment using an aqueous solution comprising the steps of:

- applying a clean up composition to said ink composition, said clean up composition comprising a water reducible resin which is substantially water insoluble at an acidic pH and water washable at an alkaline pH and being applied in an amount sufficient to form a mixture which is water washable at an alkaline pH; and  
washing said mixture from said printing equipment using an aqueous wash solution having a wash pH of at least 8.5.

5,411,597

## RAPID OPHTHALMIC DISINFECTION METHOD AND SOLUTION USING SALT AND GLYCOL AND/OR LOWER ALKANOL

Fu-Pao Tsao, Lawrenceville; Susan A. Littlefield, Norcross, and John H. Stone, Conyers, all of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 928,524, Aug. 11, 1992, abandoned, which is a continuation of Ser. No. 776,711, Oct. 15, 1991, abandoned, which is a continuation of Ser. No. 456,059, Dec. 21, 1989, abandoned, which is a continuation of Ser. No. 304,746, Jan. 31, 1989, abandoned. This application Sep. 3, 1993, Ser. No. 116,820

The portion of the term of this patent subsequent to Mar. 29, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61L 2/18; C11D 3/40, 3/48, 17/08

U.S. Cl. 134—26

3 Claims

1. A method of cleaning and disinfecting a contact lens comprising the steps of:

- (a) contacting said lens with the cleaning and disinfecting composition comprising:  
(1) 5 to 20 weight percent sodium chloride,  
(2) x to 50 weight percent of an alkylene glycol having between 3 and 8 carbon atoms,  
(3) y to 30 weight percent of a lower alkanol having 2 to 6 carbon atoms, wherein x and y are defined by the equation  $x/10 + y/2 \geq 1.0$ , and  
(4) an ophthalmologically acceptable solvent, wherein said composition has a pH of 5 to 7;  
(b) mechanically abrading the surface of said lens with said cleaning and disinfecting composition for a period of about 5 to 30 seconds; and  
(c) rinsing said lens with an ophthalmologically-acceptable solution, thereby removing substantially all of said disinfecting and cleaning composition.

5,411,598

## RAPID METHOD FOR CLEANING/DISINFECTING OPHTHALMIC DEVICES USING NOVEL GLYCOL/LOWER ALKANOL SOLUTION

Fu-Pao Tsao, Lawrenceville; Susan A. Littlefield, Norcross, and John H. Stone, Conyers, all of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 971,699, Nov. 4, 1992, Pat. No. 5,298,182, which is a continuation-in-part of Ser. No. 825,757, Jan. 23, 1992, abandoned, which is a continuation of Ser. No. 456,058, Dec. 21, 1989, abandoned, which is a

continuation-in-part of Ser. No. 304,672, Jan. 31, 1989, abandoned. This application Feb. 18, 1994, Ser. No. 198,930  
Int. Cl.<sup>6</sup> A61L 2/18; C11D 3/44, 3/48; G02C 13/00

U.S. Cl. 134—26

6 Claims

1. A method of cleaning and disinfecting a contact lens comprising the steps of:

- (a) contacting said lens with an aqueous liquid cleaning and disinfecting composition comprising:  
(1) 10 to 50 weight percent of an alkylene glycol having between 3 and 8 carbon atoms,  
(2) 2 to 30 weight percent of a lower alkanol, and  
(3) 0.5 to 25 weight percent of a surfactant which is compatible with said ophthalmic device;  
(b) mechanically rubbing the surface of said lens with said cleaning and disinfecting composition for a predetermined period of time; and  
(c) rinsing said lens with an ophthalmologically-acceptable solution, thereby removing substantially all of said disinfecting and cleaning composition.

5,411,599

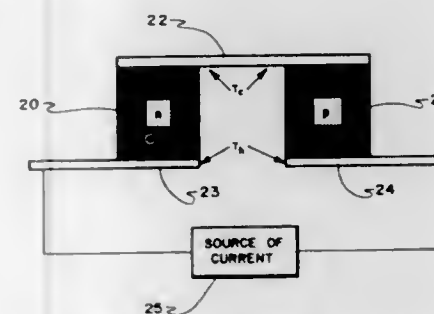
## THERMOELECTRIC DEVICE UTILIZING NANOPOROUS MATERIAL

Stuart B. Horn, Fairfax, and Elizabeth H. Nelson, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Division of Ser. No. 122,981, Sep. 20, 1993. This application Apr. 12, 1994, Ser. No. 227,741

Int. Cl.<sup>6</sup> H01L 35/00, 35/02, 35/04

U.S. Cl. 136—203

2 Claims



1. In a thermoelectric device, a semiconductor utilized as the n- and p- legs of a peltier couple, comprising:  
a nanoporous structure whereby lattice thermal conductivity is greatly reduced, due to enhanced phonon scattering on the order of 10 W/cm<sup>2</sup>·K.

5,411,600

## ULTRATHIN FILM THERMOCOUPLES AND METHOD OF MANUFACTURE

Donald S. Rimai, Webster; Raymond E. Anne, Caledonia, and Raymond C. Bowen, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 892,853, Jun. 3, 1992, abandoned. This application Dec. 17, 1993, Ser. No. 169,686  
Int. Cl.<sup>6</sup> H01L 35/28

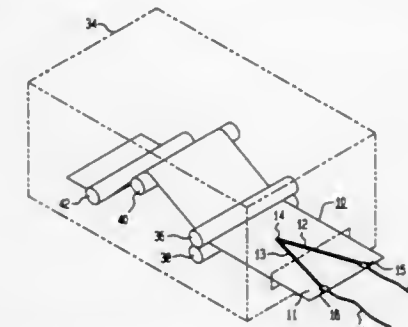
U.S. Cl. 136—225

1 Claim

1. An ultrathin film thermocouple device for measuring temperatures of a sheet of copy paper as same passes through

and contacts various surfaces of a copier, the ultrathin film thermocouple device comprising:

- a sheet of copy paper;  
a first thermocouple metal having a thickness in the range of 10 and 100 nm and being in contact with the sheet of copy paper;  
a second thermocouple metal having a thickness in the range 10 and 100 nm, overlapping a portion of the first thermocouple metal so as to form a thermocouple junction, and being in contact with the sheet of copy paper; and



the ultrathin film thermocouple device comprising the sheet of copy paper and the first and second thermocouple metals being sufficiently thin and flexible such that it can be bent to a radius of approximately 1 millimeter such that it can pass through and bend to conform to various surfaces of the copier so as to facilitate measurement of temperatures of the sheet of copy paper as same comes in close proximity or contact with preselected surfaces of the copier as the ultrathin film thermocouple device passes through the copier.

5,411,601

## SUBSTRATE FOR SOLAR CELL AND SOLAR CELL EMPLOYING THE SUBSTRATE

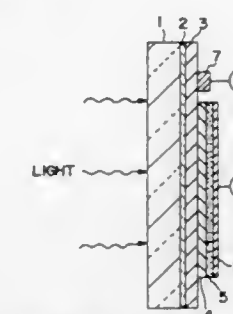
Hiroshi Higuchi, Neyagawa; Takashi Arita, Hirakata; Sotoyuki Kitamura, Katano, and Mikio Murozono, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 2, 1993, Ser. No. 146,306

Claims priority, application Japan, Nov. 27, 1992, 4-318239  
Int. Cl.<sup>6</sup> H01L 31/072, 31/18

U.S. Cl. 136—256

14 Claims



1. A solar cell comprising:  
a glass plate having at least one side;  
an insulator layer formed on said one side of said glass plate, said insulator layer comprising titanium oxide; and  
a compound semiconductor formed in contact with said insulator layer.

5,411,602

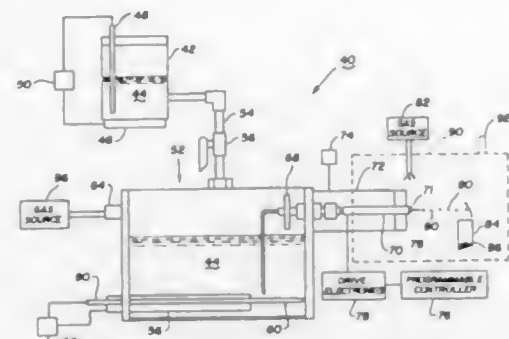
## SOLDER COMPOSITIONS AND METHODS OF MAKING SAME

Donald J. Hayes, Plano, Tex., assignor to MicroFab Technologies, Inc., Plano, Tex.

Filed Feb. 17, 1994, Ser. No. 197,750  
Int. Cl.<sup>6</sup> B23K 35/34

U.S. Cl. 148—23

43 Claims



1. A method of making solder paste comprising the steps of:
  - (a) ejecting a stream of liquid solder from an ejection device toward a receptacle;
  - (b) separating said stream of liquid solder into a plurality of substantially spherically-shaped liquid balls of a first predetermined uniform diameter;
  - (c) providing an atmosphere of inert gas between said ejection device and said receptacle;
  - (d) solidifying said liquid balls to form solid balls in said atmosphere of inert gas;
  - (e) catching said solid balls in said receptacle; and
  - (f) mixing the spherically-shaped solid balls with a fluid carrier to form a paste.

5,411,603

## METHOD OF PROTECTING MAGNETIC POWDERS AND DENSIFIED PERMANENT MAGNETS OF THE FE ND B TYPE FROM OXIDATION AND ATMOSPHERIC CORROSION

Fernand Vial, Meylan, France, and Masato Sagawa, Kyoto, Japan, assignors to Ugimac SA, St. Pierre d'Allevard, France  
Filed Dec. 7, 1993, Ser. No. 162,292Claims priority, application France, Jan. 22, 1993, 93 00840  
Int. Cl.<sup>6</sup> H01F 41/02

U.S. Cl. 148—101

6 Claims

1. A method of protecting magnetic powder and densified permanent magnets produced therefrom from oxidation and atmospheric corrosion, said powder containing at least one rare earth element, at least one transition metal element and boron, comprising introducing fluorine into the powder utilizing a gaseous mixture of fluorine and nitrogen during fine grinding of the powder, the gaseous mixture containing from 1 to 100 ppm by volume of fluorine, to obtain the protected powder.

5,411,604

## METHOD OF PRODUCING LOW IRON LOSS, LOW-NOISE GRAIN-ORIENTED SILICON STEEL SHEET, AND LOW-NOISE STACKED TRANSFORMER

Yukio Inokuti; Kazuhiro Suzuki, both of Chiba, and Eiichi Hina, Okayama, all of Japan, assignors to Kawasaki Steel Corporation, Japan

Filed Jan. 26, 1993, Ser. No. 8,531

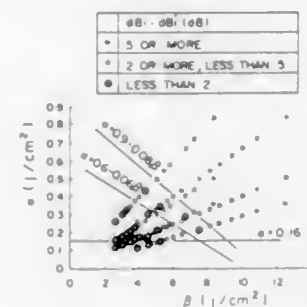
Claims priority, application Japan, May 29, 1992, 4-139047  
Int. Cl.<sup>6</sup> H01F 30/06

U.S. Cl. 148—112

8 Claims

1. A method of producing a grain oriented silicon steel sheet having reduced iron loss and which, when used as a material in

a stacked transformer, makes it possible to obtain a noise difference (dBi—dB'i) less than 5 dB, said method comprising: preparing a finish-annealed grain oriented silicon steel sheet; irradiating the surface of said grain oriented silicon steel sheet with an electron beam directed along scan paths which cross the rolling direction of said steel sheet, said irradiation being applied to said sheet at a scanning speed v(cm/s) and a spacing L(cm) in the rolling direction, with an electron beam having a beam diameter d(cm) generated by a current I<sub>b</sub> (mA) and an acceleration voltage V<sub>k</sub> (kV); wherein said beam is applied with a surface energy density α





of not more than 3% of "Mo+W/2", another group of at least one element of V and Nb in total amount of not more than 3% of "V+Nb/2" and still another group of at least one element selected from not more than 12% Co, not more than 5% Ni and not more than 5% Cu, and balance of Fe and unavoidable impurities, wherein: the section steel wire has been subjected to a quenching heat-treatment followed by a tempering heat-treatment so as to have a Vickers hardness of HV 300 to HV 450, the section steel wire has a substantially H- or X shaped cross-section, having a web portion and flange portions, which is provided by working a blank steel wire having a rectangular or square cross-section by forming longitudinal recesses on two opposite sides of the rectangular blank steel wire respectively, and a thickness ratio of the thickness of the web portion bridging the flange portions to the total thickness (T) of the flange portions is not greater than 0.3.

5,411,610

# HIGH-STRENGTH STAINLESS STEEL FOIL FOR CORRUGATING AND PROCESS FOR PRODUCING THE SAME

Jun Araki; Jun Nakatuka; Wataru Murata; Hidehiko Sumitomo, all of Hikari; Masayuki Kasuya, Tokai; Hitoshi Ota, Tokai; Yulchi Kato, Tokai; Masuhiro Fukaya, Sagami-hara; Keiichi Ohmura, Sagami-hara; Mikio Yamanaka, Sagami-hara, and Fumio Fudanoki, Hikari, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

PCT No. PCT/JP92/01513, § 371 Date Aug. 19, 1993, § 102(e) Date Aug. 19, 1993, PCT Pub. No. WO93/13235, PCT Pub. Date Jul. 8, 1993

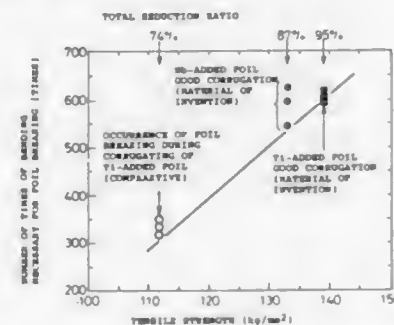
PCT Filed Nov. 19, 1992, Ser. No. 129,131

Claims priority, application Japan, Dec. 20, 1991, 3-338439

Int. Cl.<sup>6</sup> C21D 8/00; C22C 38/06

U.S. Cl. 148—542

14 Claims



1. A high-strength ferritic stainless steel foil for corrugation, comprising an alloy composed mainly of 10 to 40% by weight of Cr, 1 to 10% by weight of Al, and a balance of iron, and having a strength of 120 to 200 kgf/mm<sup>2</sup> in terms of 0.2% yield point.

5,411,611

# CONSUMABLE ELECTRODE METHOD FOR FORMING MICRO-ALLOYED PRODUCTS

Prabhat Kumar; Louis Huber, both of Allentown; Robert Engleman, Oley, and Charles Heatley, Zionsville, all of Pa., assignors to Cabot Corporation, Boston, Mass.

Filed Aug. 5, 1993, Ser. No. 102,358

Int. Cl.<sup>6</sup> C21D 1/00

U.S. Cl. 148—557

17 Claims

1. A method for forming a wrought metal product from a consumable electrode comprising: forming an electrode body from a starting metal, applying at least a first alloy layer of uniform thickness to said body, positioning said body in the proximity of a crucible, said crucible having a grounding source, inducing an arc discharge between said body and said

ground source of sufficient temperature to induce melting of said starting metal and alloy layer and forming a molten pool in said crucible,



simultaneously mixing said molten pool while continuously melting said body, solidifying said molten pool into an ingot, and forming a wrought product from said ingot.

5,411,612

# METHOD OF SCALELESS INDUCTION HEATING

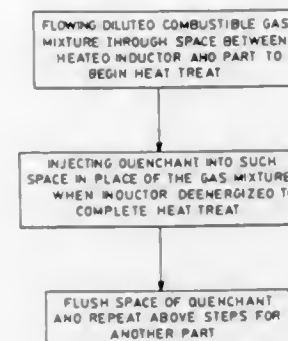
Mark G. Shapona, Canton, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1993, Ser. No. 172,780

Int. Cl.<sup>6</sup> C21D 1/42, 9/32

U.S. Cl. 148—567

6 Claims



1. A method of carrying out scaleless inductive heating of ferrous parts by use of an inductor having internal passages therethrough, comprising:

- while gradually flowing a gaseous reactant along a flow path through said inductor passages into a spacing between said inductor and a part surface to be heat treated, inductively heating such surface to a temperature for carrying out a heat treating cycle, said reactant being capable of reacting with any available oxygen in said space before such oxygen can react with part surface; and
- concurrently stopping said flow and injecting a fluid quenchant along the same flow path through said spacing to rapidly lower the temperature of said part surface to complete the heat treating cycle.

5,411,613

# METHOD OF MAKING HEAT TREATED STAINLESS STEEL NEEDLES

Said Rizk, Monroe; William O. Powers, North Haven, and W. Scott Samsel, Bristol, all of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Oct. 5, 1993, Ser. No. 132,008

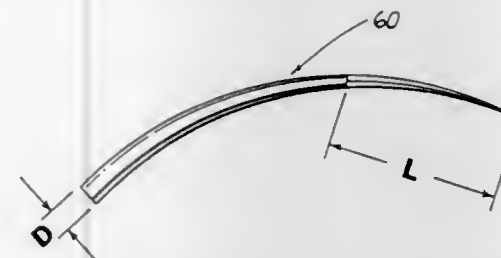
Int. Cl.<sup>6</sup> C21D 6/02, 9/26

U.S. Cl. 148—606

20 Claims

1. A process for using martensitic precipitation hardening stainless steel to make surgical needles comprising the steps of: forming needle blanks consisting essentially of martensitic stainless steel into surgical needles by at least one step selected from the group consisting of sharpening a first

end to be pointed, tapering, bending, and drilling a hole into a second end of said needle blank; heating said surgical needles under vacuum at a temperature in the range from about 350° C. to about 550° C. for a time in the range from about 15 minutes to about 20 hours;



cooling said heated surgical needles in the absence of oxygen from said heating temperature to a temperature in the range from about 150° C. to about ambient temperature, whereby said heating step hardens the surgical needle subsequent to said forming step.

5,411,614

# METHOD OF MAKING TI-AL-V-MO ALLOYS

Atsushi Ogawa; Kuninori Minakawa, and Kazuhide Takahashi, all of Kawasaki, Japan, assignors to NKK Corporation, Tokyo, Japan

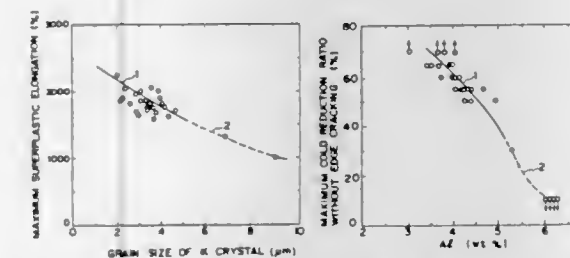
Division of Ser. No. 170,672, Dec. 20, 1993, Pat. No. 5,362,441, which is a continuation of Ser. No. 95,724, Jul. 21, 1993, abandoned, which is a division of Ser. No. 880,743, May 8, 1992, Pat. No. 5,256,369, which is a continuation of Ser. No. 719,663, Jun. 24, 1991, Pat. No. 5,124,121, which is a continuation of Ser. No. 547,924, Jul. 3, 1990, abandoned. This application Aug. 18, 1994, Ser. No. 292,617

Claims priority, application Japan, Jul. 10, 1989, 1-177759; Feb. 26, 1990, 2-044993

Int. Cl.<sup>6</sup> C22C 14/00

U.S. Cl. 148—670

54 Claims



1. A method of making a titanium base alloy comprising the steps of:

heating a titanium base alloy to a temperature ranging from β-transus minus 250° C. to β-transus; the titanium base alloy consisting essentially of about 3.42 to 5 wt. % Al, 2.1 to 3.7 wt. % V, 0.85 to 2.37 wt. % Mo, at least 0.01 wt. % O, at least one element selected from the group consisting of Fe, Co, and Cr, and the balance being titanium, and satisfying the following equations:

$$0.85 \text{ wt. \%} \leq X \text{ wt. \%} \leq 3.15 \text{ wt. \%},$$

$$7 \text{ wt. \%} \leq Y \text{ wt. \%} \leq 13 \text{ wt. \%},$$

$$X \text{ wt. \%} = \text{Fe wt. \%} + \text{Co wt. \%} + 0.9 \text{ Cr wt. \%}$$

$$Y \text{ wt. \%} = 2 \times \text{Fe wt. \%} + 2 \times \text{Co wt. \%} + 1.8 \times \text{Cr wt. \%} + 1.5 \times \text{V wt. \%} + \text{Mo wt. \%}, \text{ and}$$

hot working the heated alloy with a reduction ratio of at least 50%.

# 5,411,615 ALUMINIZED EUTECTIC BONDED INSENSITIVE HIGH EXPLOSIVE

Theodore S. Sumrail; William H. Graham, both of Huntsville, Ala.; Carl M. Rector, Elora, Tenn., and Joey M. Reed, Huntsville, Ala., assignors to Thiokol Corporation, Ogden, Utah

Filed Oct. 4, 1993, Ser. No. 131,139

Int. Cl.<sup>6</sup> C06B 31/32, 29/22

U.S. Cl. 149—47

20 Claims

1. An insensitive high performance explosive composition comprising:

a eutectic melt comprising dicyandiamide (DCDA), ammonium nitrate (AN), guanidine nitrate (GN), ethylene diamine dinitrate (EDDN); 1,3,5-trinitro-1,3,5-triaza-cyclohexane (RDX) having a particle size in the range from about 1 μm to about 10 μm; ammonium perchlorate (AP); and a reactive metal.

5,411,616

# METHOD FOR ULTRASONICALLY WELDING THIN-WALLED COMPONENTS

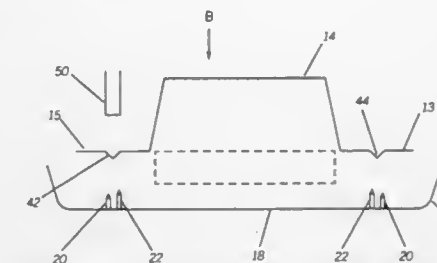
Venus D. Desai, Plantation; Michael M. Austin, Pompano Beach, and Steven Fischl, Sunrise, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 20, 1993, Ser. No. 169,028

Int. Cl.<sup>6</sup> B32B 31/16

U.S. Cl. 156—73.1

2 Claims



1. A method for ultrasonically joining at least a first and a second piece of plastic material, said method comprising the steps of:

forming a plurality of energy directors around the peripheral edge of a bonding surface of said first plastic piece, said energy directors extending from the bonding surface of said first plastic piece, and comprising at least a first and a second set of elongated, raised ridges, said ridges arranged in parallel fashion; providing a grooved flange around the peripheral edge said second piece of plastic, the groove in said flange adapted to seat between said first and second set of energy directors; bringing said first and second pieces into contact with one another so that said groove is seated in said plurality of energy directors; applying pressure to said plastic pieces to hold them in seated relationship; and applying ultrasonic welding energy to said parts so that said plurality of energy directors engage said groove.

5,411,617

# METHOD FOR USE IN FABRICATING AND/OR TESTING A THIN MIRROR

Carlo La Fiandra, New Canaan, Conn., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 26, 1993, Ser. No. 53,082

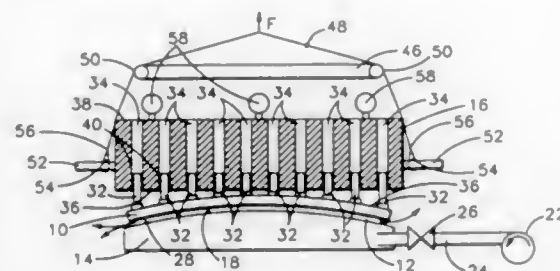
Int. Cl.<sup>6</sup> B32B 31/00

U.S. Cl. 156—154

17 Claims

1. A method for use in fabricating and/or testing a thin mirror, said thin mirror having an optical surface and a rear surface, said method comprising the steps of:

floating said thin mirror on an air bearing such that the optical surface thereof is facing said air bearing; interfacing, while said thin mirror is floating, a rigid support structure with said thin mirror;



inverting said thin mirror; and finishing said optical surface thereof while said thin mirror is supported by said rigid support structure.

5,411,618

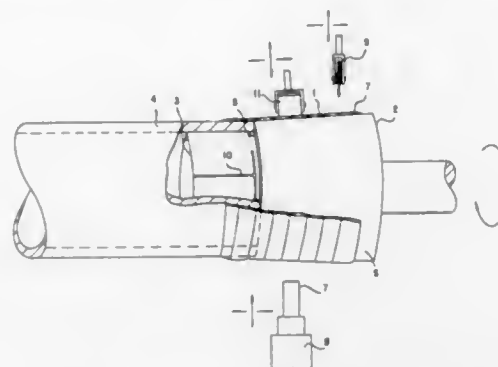
**METHOD AND APPARATUS FOR PRODUCING WAISTBAND-EQUIPPED DISPOSABLE DIAPERS**  
Frank F. Joczewicz, Jr., Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.  
Filed Nov. 24, 1993, Ser. No. 157,980  
Int. Cl.<sup>6</sup> A61F 13/15; B32B 31/10  
U.S. Cl. 156-164 21 Claims



1. In a method of diaper manufacture, the steps of advancing a series of fluff pad along a linear path in longitudinally spaced relation, said pads having upper and lower faces, a pair of longitudinally extending sides, and a pair of transversely extending ends, uniting a continuous moisture impervious web to one face of said spaced pads to provide areas of exposed moisture impervious web between said spaced fluff pads, uniting two continuous moisture pervious webs to the other face of said spaced pads in laterally spaced relation to provide a longitudinally extending central area free of the moisture pervious webs while maintaining exposed the moisture impervious web areas between successive pads in said central area, performing at least one additional processing step on the pad united with the moisture impervious web and the two moisture pervious webs while such an assembly is advanced along the linear path, and adhesively sandwiching a transversely extending waist elastic between a further continuous web of moisture pervious material extending over each said central area and each said exposed moisture impervious web areas with said waist elastic being aligned with said exposed moisture impervious web areas.

5,411,619

**METHOD FOR MANUFACTURING A JOINT PIPE**  
Kristian Sundqvist, Nykarleby, and Gunnar Blomqvist, Helsingby, both of Finland, assignors to OY KWH Pipe AB, Vasa, Finland  
PCT No. PCT/FI92/00130, § 371 Date Oct. 1, 1993, § 102(e) Date Oct. 1, 1993, PCT Pub. No. WO92/19438, PCT Pub. Date Nov. 12, 1992  
PCT Filed Apr. 29, 1992, Ser. No. 122,487  
Claims priority, application Finland, Apr. 30, 1991, 912101  
Int. Cl.<sup>6</sup> B29C 53/62, 53/82  
U.S. Cl. 156-187 8 Claims



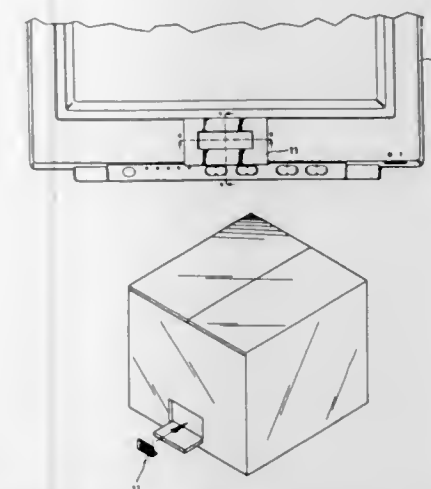
1. A method for manufacturing a joint pipe from a spirally wound thermoplastic profile (7) at an end of a thermoplastic pipe (4), comprising the steps of: providing a rotatably driven, heated mandrel (2) having a substantially cylindrical end section (3) corresponding to the inner diameter of the pipe end (4), a radial stop surface (5) corresponding to the wall thickness of the pipe end (4) and a conical section (6) wherein the radial stop surface (5) is between the outer surface of the end section (3) and the outer surface of the conical section (6), pushing the thermoplastic pipe end (4) onto the end section (3) of the mandrel (2) such that a uniform transition between the outer surface of the pipe end and the conical section is obtained, forming a joint pipe (1) on the pipe end (4) by extruding a melt profile (7) made of thermoplastic material onto the mandrel (2) beginning at that end of the mandrel (2), which is remote from the pipe end (4) and, spirally winding the melt profile (7) around the conical section (6) and around the pipe end (4) while rotating the mandrel (2) and pipe end (4) such that adjacent windings of the melt profile overlap, terminating the extruding step while continuing to rotate the mandrel (2) and the pipe end (4), spraying cooling water over the joint pipe (1), cutting a free end of the joint pipe (1) with a rotating knife (9), and removing the pipe end (4) with the joint pipe (1) from the mandrel (2).

5,411,620

**METHOD FOR ADHERING A LABEL ONTO A SURFACE OF AN OBJECT AND A FIXTURE THEREOF**  
Hung H. Hsu, Taoyuan, Taiwan, Prov. of China, assignor to Acer Peripherals, Inc., Taiwan, Taiwan, Prov. of China  
Filed Sep. 9, 1993, Ser. No. 118,708  
Int. Cl.<sup>6</sup> B32B 31/10  
U.S. Cl. 156-230 4 Claims

1. A method for adhering a label accurately onto a predefined location of a surface of an object, the surface of the object having a first positioning structure for positioning a fixture, the fixture having a hollow space for receiving the label to be adhered, the method comprising the steps of: (1) placing the label into the hollow space of the fixture which is provided with a second positioning structure;

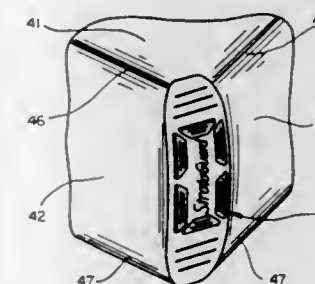
(2) placing the fixture on the surface of the object to engage the second positioning structure of the fixture with the first positioning structure;



(3) pressing the label forward to the surface of the object to adhere the label to surface of the object;  
(4) removing the fixture from the first positioning structure of the surface to detach the label from the fixture.

5,411,621

**WATERBED CORNER STRUCTURE AND METHOD**  
John B. Johanning, Beverly Hills, Calif., assignor to Strata Flotation, Inc., Beverly Hills, Calif.  
Division of Ser. No. 395,715, Aug. 18, 1989, Pat. No. 4,930,172.  
This application Jan. 25, 1990, Ser. No. 470,163  
Int. Cl.<sup>6</sup> B29C 45/00  
U.S. Cl. 156-242 1 Claim



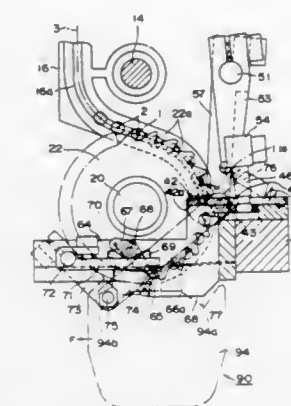
1. In a method of making a corner in a waterbed mattress having walls of film material, the steps of: forming by injection molding a cornerpiece which is substantially thicker and tougher than the film material with cleats which project from a surface of the cornerpiece and are an integral part of the cornerpiece, and sealing the cornerpiece to the film material at a corner of the mattress.

5,411,622

**METHOD AND APPARATUS FOR RETAPING ELECTRONIC PARTS**  
Takeshi Miyaoka, and Katsumi Ueno, both of Saitama, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan  
Filed Jan. 3, 1994, Ser. No. 176,466  
Claims priority, application Japan, Jan. 18, 1993, 5-023323  
Int. Cl.<sup>6</sup> B32B 31/10  
U.S. Cl. 156-265 19 Claims

12. A method for separating parts that are secured together by an elongate strip comprising: cutting said strip at locations between adjacent ones of said

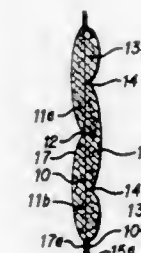
parts to provide separated parts having pieces of said strip remaining on said parts, and



engaging said pieces of said strip and forcing said pieces from said parts.

5,411,623

**METHOD OF MANUFACTURING SOUND ABATEMENT BLANKETS WITH NON-OVERLAPPING SEAMS**  
Peter J. Shutt, Bakersfield, Calif., assignor to Bravo Environmental, Inc., Bakersfield, Calif.  
Filed Jul. 28, 1993, Ser. No. 104,473  
Int. Cl.<sup>6</sup> B32B 31/00, 31/20, 7/08  
U.S. Cl. 156-290 17 Claims



1. A method of manufacturing sound abatement blankets, said sound abatement blankets having a planar inner membrane, a front cover, and a back cover, comprising the following steps: interposing said inner membrane between said front cover and said back cover; peripherally connecting said inner membrane, said front cover and said back cover at a periphery with a peripheral seam juncture; first interiorly connecting said front cover to said inner membrane to form at least one interior front seam juncture and at least two front pockets defined by the front seam juncture and the peripheral seam juncture; second interiorly connecting said back cover to said inner membrane to form at least one interior back seam juncture and at least two rear pockets defined by the front seam juncture and the peripheral seam juncture such that each said interior front seam junctures are substantially non-overlapping with each said interior back seam juncture; and substantially filling each said front pocket and each said rear pocket with insulating material.



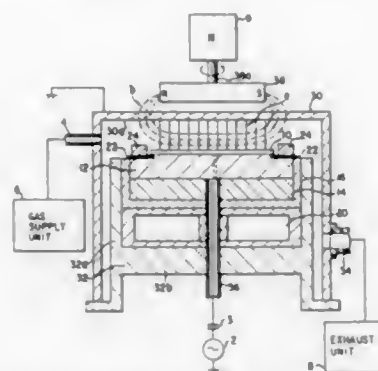
5,411,624

**MAGNETRON PLASMA PROCESSING APPARATUS**  
Yoshihisa Hirano, Kodaira; Yoshifumi Takara, Machida, and Masahiro Ogasawara, Hachioji, all of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 917,293, Jul. 23, 1992, abandoned. This application Dec. 27, 1993, Ser. No. 173,473  
Claims priority, application Japan, Jul. 23, 1991, 3-207410  
Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 156—345

17 Claims



1. A magnetron plasma processing apparatus comprising: a reaction chamber for housing an object to be processed; first and second electrodes which are provided in the reaction chamber, the first electrode for placing the object to be processed thereon and the second electrode opposing said first electrode through the object to be processed on the first electrode;

means for applying a voltage between the first and second electrodes to generate an electric field between the first and second electrodes;

a permanent magnet rotatably provided outside the reaction chamber having opposing ends of different polarities to generate a magnetic field between the first and second electrodes, a component of the magnetic field above a central portion of the object to be processed being stronger than a component of the magnetic field above a peripheral portion of the object to be processed;

means for rotating the permanent magnet;

means for supplying a reaction gas into the reaction chamber to generate a magnetron plasma by functions of the electric field and the magnetic field; and

plasma increasing means, provided to surround the peripheral portion of the object to be processed, for strengthening a component of the electric field perpendicular to the magnetic field and increasing an amount of plasma generated at the peripheral portion of the object to be processed.

5,411,625

**APPARATUS FOR BONDING A TEAR TAPE TO A WEB OF MATERIAL**

Heinz Focke, Verden; Uwe Mehner, and Frank J. Hill, both of Delmenhorst, all of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Germany

Filed May 13, 1993, Ser. No. 60,139  
Claims priority, application Germany, May 14, 1992, 42 15 690.4

Int. Cl.<sup>6</sup> B32B 31/04; G05G 15/00

U.S. Cl. 156—359

9 Claims

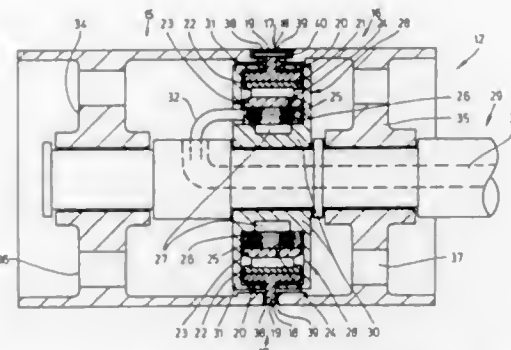
1. An apparatus for bonding a tear tape (10) to a web (11) of material, the tear tape being disposed in spaced relationship to both edges of the web (11) of material, and, wherein for transferring heat and pressure, the tear tape (10) and the web (11) of material are conveyable over a portion of a periphery of a heated sealing roller (12), said apparatus comprising:

a) means for bringing together the tear tape (10) and the web (11) of material in a region of the sealing roller (12) and

supplying them to the periphery of the sealing roller (12) as a unit,

b) wherein the sealing roller (12) includes two part rollers (15, 16), between which a heating ring (17) is disposed,

c) wherein the heating ring (17) is insulated from the part rollers (15, 16) by a gap (38, 39) extending on both sides of the heating ring (17),



d) wherein the part rollers (15, 16) and the heating ring (17) are mounted on a common, fixedly disposed axis (29),

e) wherein the heating ring has a radially outer heating face (19) which extends flush with lateral areas of the part rollers (15, 16), or slightly projects therefrom, and

f) wherein a unit of the tear tape (10) and the web of material (11) abuts the sealing rollers such that the tear tape (10) extends in a region of the heating ring (17).

5,411,626

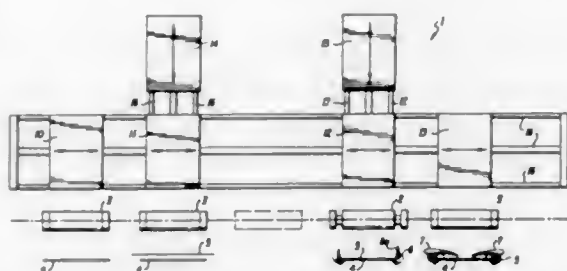
**PLANT FOR MAKING TIRE CARCASSES FOR VEHICLE WHEELS**

Renato Coretta, Gallarate, and Bruno Colombani, Milan, both of Italy, assignors to Pirelli Coordinamento Pneumatici S.p.A., Milan, Italy

Filed Feb. 11, 1993, Ser. No. 15,155  
Claims priority, application Italy, Feb. 11, 1992, M192A0269  
Int. Cl.<sup>6</sup> B29D 30/08

U.S. Cl. 156—396

7 Claims



1. An automated plant for making tire carcasses for vehicle wheels, comprising:

a plurality of assembling drums positioned for an advancing movement along an assembling path provided with a plurality of stop positions, each stop position having means for carrying out a specific operating step of a manufacturing process of said carcasses;

a plurality of primary work stations mounted on longitudinal guide means extending parallel to said assembling path, each station having means to apply, around each individual assembling drum, at said stop positions, a main tire component which is common to a plurality of carcass types included in a given production range, at least one of said primary work stations being a moveable station which is movable along said guide means away from its stop position to a second position along said assembly path;

at least one auxiliary work station having means to apply, around each individual assembling drum, one predetermined accessory tire component, intended for a specific one of said tire carcass types included in said production range,

said at least one auxiliary work station being mounted on second guide means substantially transverse to said longitudinal guide means for movement between a rest position in which it is away from the assembling path, and a work position in which it is brought onto the assembling path and disposed in an operative condition at one of said drum stop positions from which said at least one moveable primary work station has been moved parallel to said assembling path, in order to carry out the application of said accessory component.

5,411,627

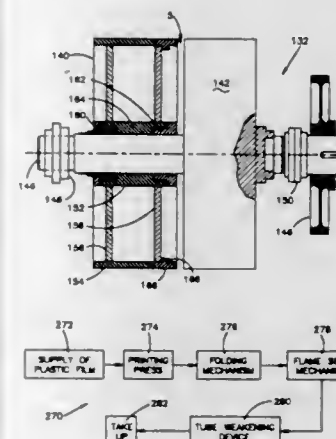
**METHOD AND APPARATUS FOR MANUFACTURE OF TUBING**

Bernard Lerner, Aurora; Dana Liebbart, Cuyahoga Falls, and John VanDomelen, Gates Mills, all of Ohio, assignors to Automated Packaging Systems, Inc., Streetsboro, Ohio

Continuation of Ser. No. 4,629, Jan. 14, 1993, abandoned, which is a continuation of Ser. No. 846,973, Mar. 6, 1992, abandoned, which is a continuation of Ser. No. 309,333, Feb. 10, 1989, abandoned. This application Apr. 14, 1994, Ser. No. 227,579  
Int. Cl.<sup>6</sup> B29C 53/36, 65/10; B31B 23/60, 27/60

U.S. Cl. 156—466

40 Claims



1. In an apparatus for converting an elongate plastic web into a tube transported along a path of travel, an improved heat seal mechanism positioned along the path comprising

a) a rotatable member positioned along the path and having a cylindrical surface for engaging portions of a web moving along the path;

b) a torch positioned near the member, the torch having a nozzle for emitting a thin, hot flame along an axis intersecting the path transversely at an acute angle with respect to an imaginary line perpendicular to the path and at a location near but spaced from the member to impinge against the member and marginal portions of a web projecting outward from the member and the engaged portions, the flame axis intersection of the projecting portions being canted toward the member; and,

c) the member when in use functioning both as a heat sink inhibiting heat softening of the engaged portions and as a shield to block flame impingement against the engaged portions.

5,411,628

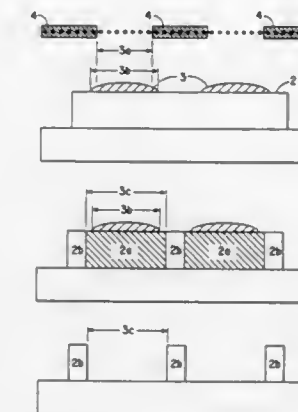
**DIFFUSION PATTERNING PROCESS AND SCREEN THEREFOR**

Carl B. Wang, Tokyo, Japan, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 21, 1993, Ser. No. 139,442  
Int. Cl.<sup>6</sup> B44C 1/22; B29C 37/00

U.S. Cl. 216—62

3 Claims



1. A non photographic method for making patterns in organic films comprising the sequential steps:

a) applying a patterned imaging layer comprising an agent which is capable of changing the solubility of a solid organic polymer in at least one unpatterned layer being in contact with said imaging layer to form a compiled body on a substrate by screen printing with a screen having a plurality of polygon shaped apertures of which each side is recessed,

b) drying the imaging layer to diffuse said solubility change agent from the imaging layer to the unpatterned layer(s), and

c) removing the patterned imaging layer and the diffusion patterned areas of the unpatterned layer(s) which are both soluble in an eluant, by washing said compiled body with the eluant.

5,411,629

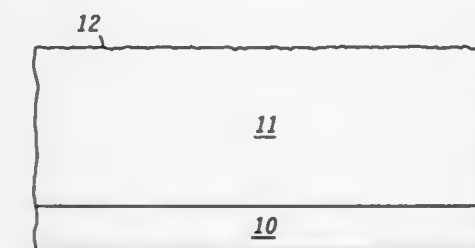
**METHOD FOR ROUGHENING SURFACE OF HALOCARBON FILM**

Timothy J. Warfield, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 3, 1992, Ser. No. 829,193  
Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 216—34

12 Claims



1. A method for roughening a surface of a halocarbon film to promote adhesion to the halocarbon film, comprising the steps of:

providing a colloidal suspension, wherein the colloidal suspension consists essentially of a mixture of an ether solvent and a plurality of metal atoms selected from Group IIA elements of a periodic table;

applying the colloidal suspension to a top surface of the halocarbon film; and  
rinsing the top surface of the halocarbon film with the ether solvent.

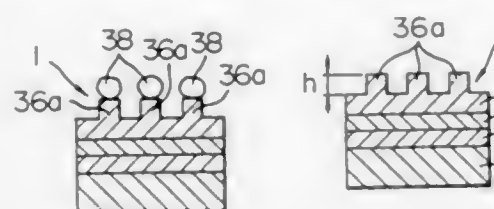
5,411,630

**MAGNETIC DISK MANUFACTURING METHOD**

Norikazu Nagase, Odawara; Yoshihiro Moriguchi, Hiratsuka; Youichi Inomata, Odawara; Hiroshi Yashiki, Odawara; Masaki Ohara, Odawara, and Yoshiki Kato, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Nov. 10, 1993, Ser. No. 149,770  
Claims priority, application Japan, Nov. 12, 1992, 4-302167  
Int. Cl.<sup>6</sup> B44C 1/22

U.S. Cl. 216—22

23 Claims



1. A magnetic disk manufacturing method including the steps of:

- preparing a magnetic disk with a protective film formed on its surface and supporting said magnetic disk in a space;
- preparing a multiplicity of fine solid particles;
- spraying said multiplicity of fine solid particles into said space;
- charging the thus sprayed fine solid particles with electricity of the same polarity so that said fine solid particles are floating in said space in a mutually separated state due to electric repellent forces acting between said fine solid particles;
- electrostatically depositing said fine solid particles charged with electricity on at least one portion of an outer surface of said protective film; and
- etching said at least one portion of the outer surface of said protective film by using said deposited fine solid particles as masks, thereby forming a multiplicity of projections on the outer surface of said protective film.

5,411,631

**DRY ETCHING METHOD**

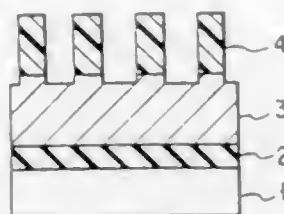
Masaru Hori, Aichi; Haruo Okano, Tokyo; Michishige Aoyama, Suzuka; Masao Ito, Kitakami; Kel Hattori, Yokohama; Fumihiko Higuchi, Yokohama, and Yoshifumi Tahara, Machida, all of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Nov. 12, 1993, Ser. No. 151,185

Claims priority, application Japan, Nov. 11, 1992, 4-301396  
Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 216—72

22 Claims



1. A dry etching method comprising the first step of forming a mask pattern on a film to be etched containing a plurality of materials having different etching rates; the second step of setting an etching gas in a plasma state and

anisotropically etching said film to be etched mainly by a chemical action of a plasma of the etching gas using said mask pattern as a mask; the third step of setting a gas having a sputter effect in a plasma state and sputter-removing a surface of said film to be etched by a plasma of the gas; and wherein the second step and the third step are repeated a plurality of number of times.

5,411,632

**METHOD FOR THE ETCHING OF A HETEROSTRUCTURE OF MATERIALS OF THE III-V GROUP**

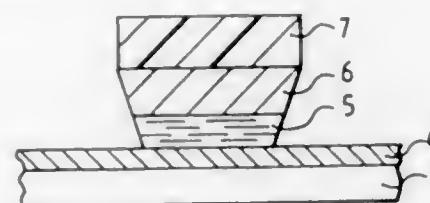
Sylvain Delage, Grieres; Hervé Blanck, Arcueil, and Simone Cassette, Limours, all of France, assignors to Thomson-CSF, Puteaux, France

Filed Nov. 5, 1993, Ser. No. 147,482

Claims priority, application France, Nov. 6, 1992, 92 13400  
Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 156—652.1

7 Claims



1. A method for the etching of a heterostructure of layers of group III-V semiconductor materials, for the making of a heterojunction transistor, said method being one wherein the heterojunction comprises at least one first layer of a compound containing arsenic (such as GaAs, AlGaAs etc.) which is etched by a first reactive ion etching, and a second layer of a compound containing phosphorus (such as InP, GaInP etc.) which is etched by an aqueous solution of hydrochloric acid (HCl);

wherein the chemical corrosion, by HCl, of the second layer is preceded by a cleansing of the surface by means of a second reactive ion etching localized on a thickness of the order of 100 angstroms, this cleansing being made necessary by the presence of interdiffusions at the interface of the first and second layers.

5,411,633

**MEDIUM CONSISTENCY PULP OZONE BLEACHING**

Joseph R. Phillips; Brian F. Greenwood; Erwin Funk, and Stephen Dunn, all of Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.

Filed Apr. 30, 1991, Ser. No. 693,287

Int. Cl.<sup>6</sup> D21C 9/153

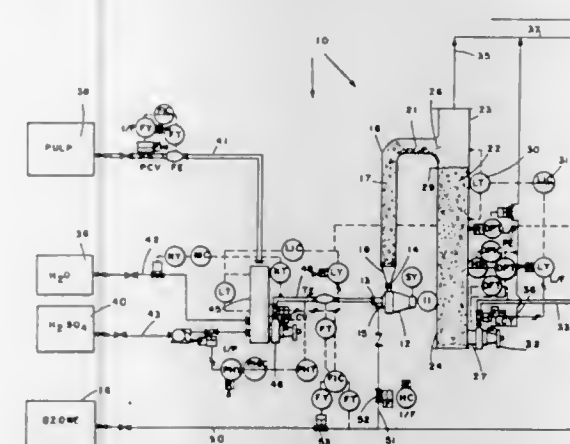
U.S. Cl. 162—52

6 Claims

1. A method of ozone bleaching paper pulp having a consistency of about 6–15% throughout treatment, using a mixer, comprising the steps of:

- (a) feeding ozone in a carrier gas, under a pressure substantially greater than 1 bar, and paper pulp having a consistency of about 6–15% to the mixer;
- (b) effecting intimate and uniform mixing of the pulp and ozone in the mixer;
- (c) passing the intimate uniform mixture of ozone and pulp in a first path from the mixer, retaining it in the first path a first time period sufficient for at least 90% of the ozone to react with the pulp to effect bleaching thereof;
- (d) moving the pulp which has reacted with ozone in a second path, markedly different than the first path, so that separation of gas in the pulp and the pulp occurs, while the gas is maintained under pressure;

- (e) removing separated gas from step (d) in a third path, while retaining it under pressure;
- (f) removing pulp with gas separated therefrom, from step (d), in a fourth path; wherein step (c) is practiced by passing the mixture in a vertically upward path, and step (d) is practiced by passing the mixture in a horizontal path, where gas and pulp separation begins; and wherein steps (e) and (f) are practiced by feeding the second,



horizontal, path into a first vertical position near the top of an upright vessel having a significantly greater cross-sectional area than the cross-sectional areas of the first and second paths; maintaining a pulp level within the upright vessel below the first vertical position, so that a gas pad is provided in the top of the upright vessel; and withdrawing gas under pressure in the third path from the top of the upright vessel, and withdrawing pulp in the fourth path from the bottom of the upright vessel.

5,411,634

**MEDIUM CONSISTENCY OZONE BLEACHING**

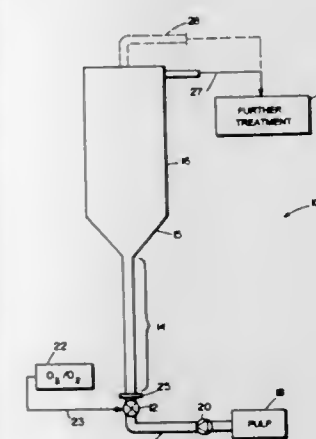
Kaj Henricson, Helsinki, Finland; Joseph Phillips, Glens Falls, N.Y.; Brian F. Greenwood, Glens Falls, N.Y.; Erwin D. Funk, Glens Falls, N.Y., and Stephen J. Dunne, Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.

Continuation-in-part of Ser. No. 693,287, Apr. 30, 1991. This application Jun. 7, 1991, Ser. No. 710,439

Int. Cl.<sup>6</sup> D21C 9/153

U.S. Cl. 162—52

16 Claims



1. A method of ozone bleaching paper pulp having a consistency of about 6–15% throughout treatment, using a mixer, comprising the steps of continuously and substantially sequentially:

- (a) feeding ozone in a carrier gas, under a pressure substan-

- tially greater than 1 bar, and paper pulp having a consistency of about 6–15%, to the mixer;
- (b) effecting uniform and intimate mixing of the pulp and ozone in the mixer;
- (c) passing the intimate mixture of ozone and pulp from the mixer in a first, substantially vertical, path at a first velocity of about 1 m/s or greater for a first time period of about 1–5 seconds, so that the gas and pulp do not separate during movement at the first velocity during the first time period, and the vast majority of the pulp brightening reaction between ozone and pulp takes place; and
- (d) reducing the velocity of the pulp and gas mixture while it continues to move in the first path for a second time period, during which time the flow path has a larger cross-sectional area, and the reaction continues to take place.

5,411,635

**OZONE/PEROXYMONOSULFATE PROCESS FOR DELIGNIFYING A LIGNOCELLULOSIC MATERIAL**

Raymond C. Francis, Dewitt; Xiao-Zhu Zhang, Syracuse, both of N.Y., and Nicholas A. Troughton, Brussels, Belgium, assignors to The Research Foundation of State University of New York, Albany, N.Y. and Solvay Interco, Brussels, Belgium

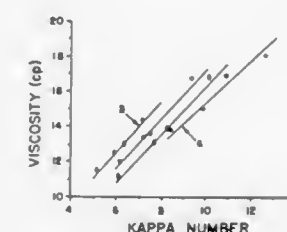
Filed Mar. 22, 1993, Ser. No. 34,092

Int. Cl.<sup>6</sup> D21C 9/153, 9/16

U.S. Cl. 162—65

15 Claims

• pH=4, 0 K/2 E  
• pH=2, 0 K/2 E  
• pH=2, 0 K/2 E  
• pH=8, 0 K/2 E



1. A process for delignifying a chemical pulp comprising reacting said pulp with a mixture of ozone and peroxymonosulfate, said mixture having a pH which is from about pH 1 to about 1 pH unit lower than the pKa of peroxymonosulfate.

5,411,636

**METHOD FOR INCREASING THE INTERNAL BULK OF WET-PRESSED TISSUE**

Michael A. Hermans, Neenah; Fung-Jou Chen, Appleton; Larry L. Spiegelberg, Appleton; Bernhardt E. Kressner, Appleton, and Janice G. Neilson, Appleton, all of Wis., assignors to Kimberly-Clark, Neenah, Wis.

Filed May 21, 1993, Ser. No. 66,188

Int. Cl.<sup>6</sup> D21H 27/02

U.S. Cl. 162—109

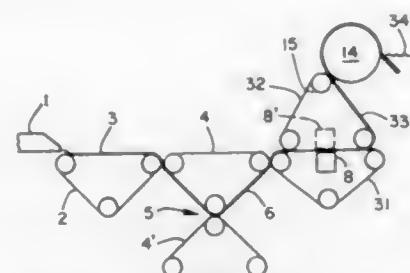
9 Claims

1. A method for making a wet-pressed tissue product comprising:

- (a) depositing an aqueous suspension of papermaking fibers onto an endless forming fabric to form a wet web;
- (b) transferring the wet web to a papermaking felt;
- (c) pressing the wet web to a consistency of about 30 percent or greater;
- (d) transferring the web to a coarse fabric;



- (e) deflecting the web to substantially conform the web to the contour of the coarse fabric;  
 (f) transferring the web to a transfer fabric;



- (g) transferring the web to the surface of a Yankee dryer and drying the web to final dryness; and  
 (h) creping the web.

5,411,637

## METHOD FOR PRODUCING HIGH PRESSURE LAMINATES

John W. Glomb, Wilton, Conn., and Yvette A. Tramont, Charleston, S.C., assignors to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 52,456, Apr. 26, 1993, abandoned, which is a continuation-in-part of Ser. No. 887,697, May 22, 1992, abandoned. This application Nov. 24, 1993, Ser. No. 157,973

Int. Cl.<sup>6</sup> D21H 19/10

U.S. Cl. 162—135

9 Claims

1. A method for the production of high pressure laminates wherein the improvement comprises resin-impregnating starch-treated saturating kraft paper, said paper being produced by forming a sheet on a Fourdrinier wire cloth from an aqueous fluid containing cellulosic pulp and other papermaking ingredients, and applying to the surface of the sheet a starch slurry, comprised of starch and water, at an application rate in the range of about 0.01 to 1.04 pounds of starch per 1,000 square feet of paper; and applying pressure to the resin-impregnated paper to form the laminates.

5,411,638

## TREATMENT BY PLASMA OF AN ARAMID MONOFILAMENT AND MONOFILAMENT THUS OBTAINED

Denis Bernard, Saint-Laure, France, and Jean-Luc Cornillon, Greer, S.C., assignors to Compagnie Generale Des Etablissements Michelin-Michelin & Cie, Clermont-Ferrand Cedex, France

PCT No. PCT/FR91/01052, § 371 Date Jun. 22, 1993, § 102(e) Date Jun. 22, 1993, PCT Pub. No. WO92/12285, PCT Pub. Date Jul. 23, 1992

PCT Filed Dec. 20, 1991, Ser. No. 78,288

Claims priority, application France, Dec. 27, 1990, 90 16597  
 Int. Cl.<sup>6</sup> H05F 3/00

U.S. Cl. 204—164

23 Claims

1. A method of treating at least one aramid fiber to promote its adhesion to rubber, characterized by the following features:  
 (a) at least one monofilament is used which satisfies the following relationships:

$$1.7 \leq Ti \leq 260;$$

$$40 \leq D \leq 480;$$

$$T \geq 170-D/3;$$

$$Mi \geq 2000;$$

wherein  $Ti$  is the linear density in tex,  $D$  is the diameter in  $\mu m$  (micrometers),  $T$  is the tenacity in cN/tex, and  $Mi$  is the initial modulus in cN/tex;

(b) this monofilament is subjected to a surface treatment by plasma so that the monofilament has a wettability by water which satisfies the relationship  $W_{SL} \geq 120$ , wherein

$W_{SL}$  is the reversible solid-liquid adhesion work expressed in  $mJ/m^2$ .

5,411,639

## PROCESS FOR ENHANCING SIZING EFFICIENCY IN FILLED PAPERS

Frederick L. Kurre, Laurel, Md., assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 15, 1993, Ser. No. 136,265

Int. Cl.<sup>6</sup> D21H 17/69

U.S. Cl. 162—175

12 Claims

1. A process of incorporating an inorganic calcium carbonate filler material into a fibrous material which comprises reacting an aqueous slurry of the filler material with between about 1.5–30.0 parts of a starch-soap complex per 100 parts filler, wherein the starch component is an oxidized starch or an unmodified starch, either before or after the introduction of the filler material into a furnish of the fibrous material to precipitate the starch-soap complex on the surfaces of the filler material.

5,411,640

## CENTRIFUGAL DISTILLATION APPARATUS

Arnold Ramsland, 121 S. Kingman Rd., South Orange, N.J. 07079

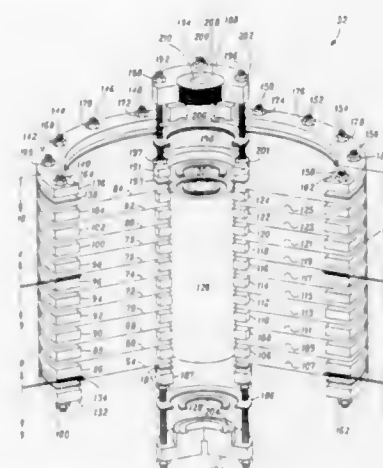
Continuation-in-part of Ser. No. 612,120, Nov. 9, 1990, abandoned. This application Nov. 1, 1991, Ser. No. 789,403

The portion of the term of this patent subsequent to Sep. 3, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> B01D 1/22

U.S. Cl. 202—174

9 Claims



1. A substantially adiabatic, centrifugal distillation apparatus comprising a rotatable inner distiller and an outer stationary collection assembly, said distiller having a plurality of distillation chambers formed by stacked disks interspersed by inner and outer spacer rings, said disks each having an upper side and a lower side, said upper side being relatively smooth and being an evaporating surface and said lower side having a large number of centrally radially oriented etched grooves and being a condensing surface, said distiller having a central feed portion which controls flow of liquid feed onto the upper side of each of said disks forming the distillation chambers and an outer distribution portion which controls flow of residue from the surface of the upper side of each disk and the flow of distillate from the lower surface of each disk into separate channels in the outer collection assembly.

5,411,641

## ELECTROCHEMICAL CONVERSION OF ANHYDROUS HYDROGEN HALIDE TO HALOGEN GAS USING A CATION-TRANSPORTING MEMBRANE

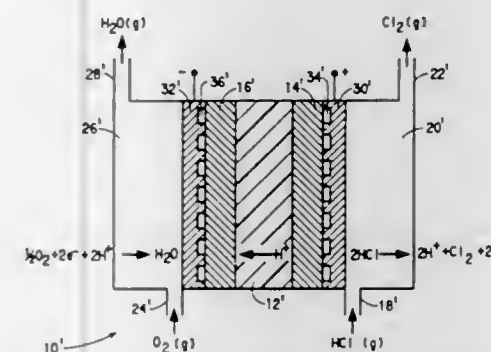
James A. Trainham, III, Newark, Del.; Clarence G. Law, Jr., West Trenton, N.J.; John S. Newman, Kensington, Calif.; Kenneth B. Keating, Wilmington, Del., and Douglas J. Eames, Berkeley, Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 22, 1993, Ser. No. 156,196

Int. Cl.<sup>6</sup> C25B 1/24, 9/00

U.S. Cl. 204—59 R

27 Claims



1. A process for the direct production of essentially dry halogen gas from essentially anhydrous hydrogen halide, wherein:

- molecules of essentially anhydrous hydrogen halide are fed to an inlet of an electrochemical cell and are transported to an anode of the cell;
- the molecules of the essentially anhydrous hydrogen halide are oxidized at the anode to produce essentially dry halogen gas and protons;
- the protons are transported through a cation-transporting membrane of the electrochemical cell; and
- the transported protons are reduced at a cathode of the electrochemical cell.

5,411,642

## CHLOR-ALKALI ELECTROLYSIS PROCESS CARRIED OUT IN CELLS PROVIDED WITH POROUS DIAPHRAGMS

Carlo M. Traini, Milan, Italy, and Antonio J. A. Maciel, ap-to.802, Meceio-Esado de Alagoas, Brazil, assignors to De Nora Permelec do Brasil S.A.; Salgema Industrias Quimicas S.A. and Antonio Jose Acioli Maciel, all of Brazil

Filed May 18, 1994, Ser. No. 246,174

Claims priority, application Brazil, May 28, 1993, 9302093

Int. Cl.<sup>6</sup> C25B 1/20, 1/26

U.S. Cl. 204—98

12 Claims

1. Improved chlor-alkali electrolysis process carried out in cells comprising at least one couple of cathodes and expandable anodes, provided with mobile surfaces, separated from each other by a porous diaphragm deposited onto said cathodes and made only of asbestos fibers, characterized in that a conditioning step of electrolysis is carried out while maintaining said anodes in the restrained position and thereafter electrolysis is carried out releasing the anodes to the expanded position.

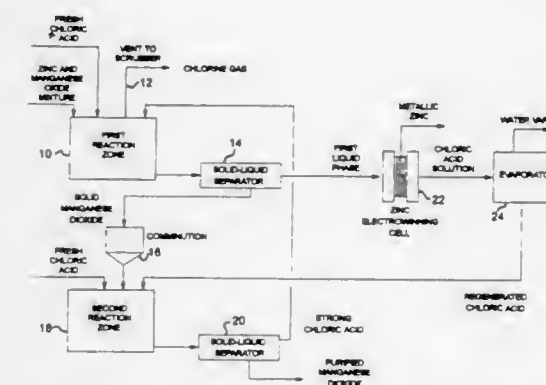
5,411,643

INTEGRATED PROCESS OF USING CHLORIC ACID TO SEPARATE ZINC OXIDE AND MANGANESE OXIDE  
 David W. Cawfield, and Leslie R. Ward, both of Cleveland, Tenn., assignors to Olin Corporation, Stamford, Conn.  
 Continuation-in-part of Ser. No. 180,838, Jan. 12, 1994, which is a continuation-in-part of Ser. No. 987,503, Dec. 7, 1992, Pat. No. 5,279,743. This application Apr. 18, 1994, Ser. No. 228,631

Int. Cl.<sup>6</sup> C25C 1/16; C01G 45/02

U.S. Cl. 204—115

13 Claims



1. A process for producing manganese dioxide and zinc metal comprising the steps of:

- reacting a mixture of zinc oxide and manganese oxide with an aqueous chloric acid solution wherein the chloric acid is in molar excess to the manganese oxide in a reaction zone to form a reaction mixture in said zone consisting essentially of chlorine gas, a solid phase containing manganese dioxide, and a liquid phase containing zinc ions, chlorate ions, chloric acid, and water; the concentration of chloric acid in said liquid phase is greater than about 1% by weight of said liquid phase upon leaving the reaction zone;
- separating said chlorine gas from said solid phase and said liquid phase;
- separating said solid phase containing manganese dioxide from said liquid phase containing zinc ions, chlorate ions, chloric acid, and water thereby forming a separated solid phase and a separated liquid phase;
- subjecting said separated liquid phase to electrolysis in an electrochemical cell, thereby producing zinc metal at the cathode and oxygen at the anode;
- removing water from said separated liquid phase to concentrate said chloric acid in said separated liquid phase thereby forming a separated and concentrated liquid phase;
- returning said separated and concentrated liquid phase back to said reaction zone; and
- recovering said zinc metal from said electrochemical cell.

5,411,644

## METHOD OF OPERATED DUAL PUMP GETTER AND OXIDANT SENSOR AND REGULATOR

Armand P. Neukermans, 3510 Arbutus Ave., Palo Alto, Calif. 94303

Filed Nov. 3, 1993, Ser. No. 147,149

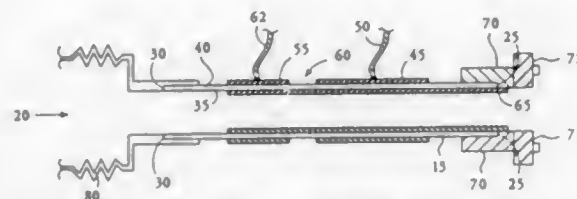
Int. Cl.<sup>6</sup> G01N 27/419

U.S. Cl. 204—130

14 Claims

1. A method of providing a known amount of oxygen atoms to a gas comprising:  
 providing an oxygen ion conductive electrolyte wall having an outer surface in contact with air and an inner surface defining a conduit,  
 flowing a gas through said conduit,  
 extracting substantially all active oxygen atoms from oxi-

dants in said gas by transporting oxygen ions through said wall and into said air near an inlet end of said conduit, and



injecting a known quantity of oxygen atoms from said air into said gas by transporting oxygen ions through said wall downstream of said extraction of substantially all oxygen atoms.

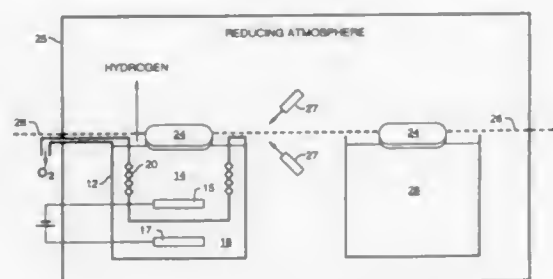
5,411,645

# HYDROGEN ASSISTED REDUCED OXIDE SOLDERING SYSTEM

D. Morgan Tench, Ventura, Calif., assignor to Rockwell International Corporation, Seal Beach, Calif.  
Continuation-in-part of Ser. No. 23,653, Feb. 26, 1993, Pat. No. 5,304,297. This application Aug. 19, 1993, Ser. No. 109,136  
Int. Cl.<sup>6</sup> C25F 7/00

U.S. Cl. 204-140

20 Claims



I. Apparatus for reduced oxide, hydrogen assisted soldering, comprising:  
an enclosed chamber;  
a reducing agent present within said chamber;  
means for treating a solderable component in said chamber with said reducing agent for reducing oxides on said solderable component; and  
electrochemical means in contact with said reducing agent for regenerating said reducing agent, said electrochemical means evolving hydrogen into said enclosed chamber for producing a reducing atmosphere within said chamber.

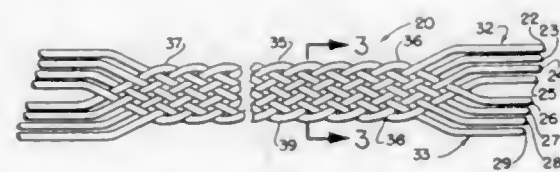
5,411,646

CATHODIC PROTECTION ANODE AND SYSTEMS  
Robert M. Gossett, Akron; Michael K. Baach, Parma, both of Ohio; Dennis F. Dong, Kingston, Canada, and Richard E. Loftfield, Jacksonville, Fla., assignors to Corpro Companies, Inc., Medina, Ohio

Filed May 3, 1993, Ser. No. 56,505  
Int. Cl.<sup>6</sup> C23F 13/00

U.S. Cl. 204-147

91 Claims



I. An anode for the cathodic protection of metal structure comprising a diagonally cross-woven braid of metal wires each having an electrocatalytic coating adapted to be spaced from

the structure to be protected whereby a current may be impressed between the anode and the structure.

5,411,647

# TECHNIQUES TO IMPROVE THE PERFORMANCE OF ELECTROCHEMICAL SENSORS

Kirk W. Johnson, and John J. Mastrototaro, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 980,465, Nov. 23, 1992, abandoned.  
This application Jan. 25, 1994, Ser. No. 187,121  
Int. Cl.<sup>6</sup> G01N 27/26

U.S. Cl. 204-153.1

31 Claims

I. A method of reducing the settling time of an electrochemical sensor having one or more electrodes, comprising:  
pretreating the electrochemical sensor after placement in a medium by applying a controlled electric current to one or more of the electrodes of the sensor before using the sensor to measure the presence or concentration of a substance of interest; wherein the controlled current is applied at a density and for a time to reduce the settling time of the electrode to less than about 25 minutes.

5,411,648

# METHOD AND APPARATUS FOR ON-LINE MONITORING THE QUALITY OF A PURIFIED METAL SULPHATE SOLUTION

George Houllachi, Ste-Anne-de-Bellevue; M. Barakat I. Janjua, Pointe-Claire; Frank Kitzinger, Montreal; Gregory A. Wint, Pierrefonds, and Vladimir M. Labuc, Hudson, all of Canada, assignors to Noranda Inc., Toronto, Canada

Filed Jan. 14, 1994, Ser. No. 181,503

Claims priority, application Canada, Jan. 21, 1993, 2087801  
Int. Cl.<sup>6</sup> G01N 27/26

U.S. Cl. 204-153.19

9 Claims

I. A method for on-line monitoring the quality of a purified metal sulphate solution, comprising the steps of:

- depositing metal from the purified metal sulphate solution onto a working electrode submerged in the solution by passing constant current through the solution at a current density in the range of 25 to 150 mA/cm<sup>2</sup> for a set time interval;
- transferring the metal deposited on the working electrode to a counter electrode by reversing the polarity of the potential applied between the working electrode and the counter electrode to pass a reverse current of the same current density as in step a) through the solution until all zinc is removed from the working electrode as sensed by a sudden change in electrode potential;
- calculating the ratio of the dissolution time over the deposition time to obtain a quality index of the solution; and
- restoring the surface of the counter electrode by galvanically effecting the dissolution of the metal deposited on the counter electrode at the end of each measurement.

5,411,649

# CATALYTIC PROCESS FOR CONTROLLED OXIDATION OF METHANE USING MICROWAVES FOR THE SYNTHESIS OF ETHANE AND ETHYLENE AND CATALYSTS USED IN THIS PROCESS

Georges Roussy, Laxou; Christophe Marchand, Thomery; Jean-Marie Thiebaut, Heillecourt; Mina Souiri, Tunisie; Alain Kiennemann, Illkirch; Corinne Petit, Strasbourg, and Gilbert Maire, Haguenau, all of France, assignors to Electricite De France, Service National, France

Filed Oct. 4, 1993, Ser. No. 131,428

Claims priority, application France, Oct. 2, 1992, 92 11676  
Int. Cl.<sup>6</sup> C01B 3/00

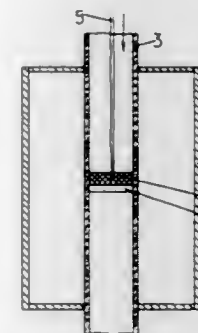
U.S. Cl. 204-157.43

9 Claims

I. A catalytic process for controlled oxidation of methane

using microwaves for the synthesis of ethane and ethylene comprising

- introducing methane over the surface of a catalyst exhibiting in its structure electrical charge defects and geometric deformations enabling it to absorb electromagnetic energy or microwaves,



- subjecting the methane and the catalyst to an electromagnetic field, said catalyst comprising a rare-earth oxide or a rare-earth alkali metal mixed oxide.

5,411,651

# METHOD FOR ELECTROSTATIC LIQUID/LIQUID CONTACTOR

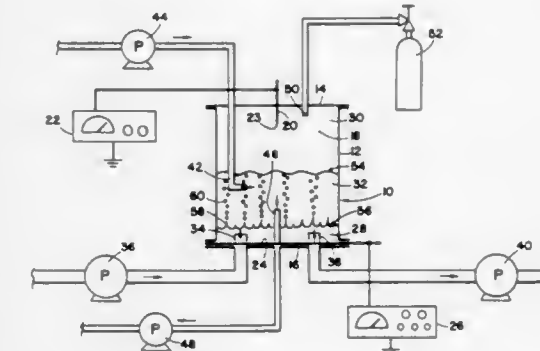
Manabu Yamaguchi, Kobe, and Masaaki Kanno, Nishiojiya, both of Japan, assignors to National Tank Company, Houston, Tex.

Filed Mar. 1, 1993, Ser. No. 24,737

Int. Cl.<sup>6</sup> C02F 1/48; C10G 33/02

U.S. Cl. 204-186

4 Claims



I. A method for conducting liquid-liquid extraction comprising the following steps:

- introduction into an interior chamber of a first electrostatic contactor an aqueous phase comprised of an aqueous solution containing a component to be extracted;
- introducing an organic phase comprised of an extractant and organic solvent mixture into the chamber of the first electrostatic contactor which step may be accomplished before step (a) to form a liquid/liquid interface with said organic phase being above said aqueous phase;
- introducing a gaseous phase comprised of a gas into the chamber of the first electrostatic contactor which step may be accomplished before either step (a) or step (b) to establish a liquid/gas interface with said gaseous phase being above said organic phase;
- applying high voltage electrical current to a rod electrode located within the gaseous phase in order to create an electrical field within the chamber between the rod electrode and a plate electrode located within the aqueous phase adjacent the bottom of the tank;
- maintaining the electrical field within the chamber of the electrostatic contactor a sufficient time for the component to be extracted into the organic phase; and
- removing the organic phase which contains the extracted component from the first electrostatic contactor.

5,411,652

# OPTIMUM CONVERSION CHAMBER

Jeffrey K. Smith, Clarksville, Tenn., and Sean A. Stapulionis, Aurora, Ohio, assignors to AlliedSignal Inc., Morristown, N.J.

Filed Dec. 15, 1993, Ser. No. 167,495

Int. Cl.<sup>6</sup> C25D 5/02, 11/02, 17/00, 21/12

U.S. Cl. 204-224 R

11 Claims

I. An electrochemical processor for providing a coating on a workpiece comprising:

- a first chamber for receiving said workpiece;
- a plurality source of process liquids;
- means for selectively supplying said liquids to said first chamber;
- valve means for selectively supplying a first liquid from said plurality source of process liquids to said first chamber for initial workpiece processing and drainage of said first liquid from said first chamber and sequentially supplying to and draining a second, third, and fourth liquid from said plurality source of process liquids from said first chamber to protect said workpiece without removal of said workpieces from said first chamber;

5,411,650

# CAPTIVE VORTEX HIGH AGITATION DEVICE

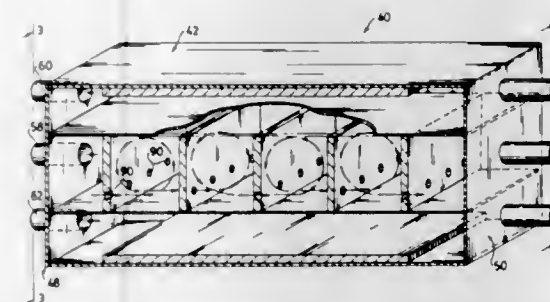
Lee F. Frank, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 21, 1993, Ser. No. 95,385

Int. Cl.<sup>6</sup> B01D 61/48

U.S. Cl. 204-182.4

21 Claims

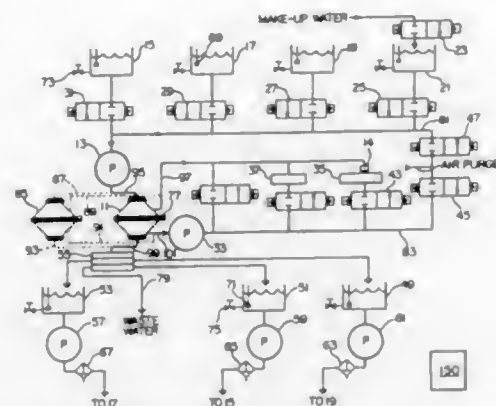


I. An apparatus for recovering of ions present in a pressurized fluid stream comprising:

- a generally flat anode and cathode located in planes on opposite sides of the apparatus;
- a plurality of ion exchange chambers between said anode and cathode;
- a plurality of connecting passages provided in said plurality of ion exchange chambers for fluidly connecting said plurality of chambers in series and to a pressurized fluid stream, said connecting passages being positioned such that a substantially spiral vortex is created in said fluid stream in said plurality of ion exchange chambers; said vortex having an axis that is substantially parallel to the planes of said anode and cathode.



a recirculating system connected to said first chamber for selectively supplying for withdrawing process liquid from said the first chamber, treating said process liquid, and subsequently returning said process liquid to said first chamber; and



means for maintaining the temperature of the liquid communicated to said first chamber at a predetermined temperature.

5,411,653

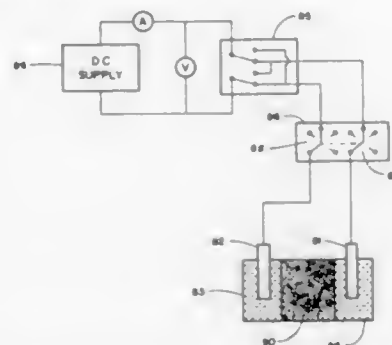
# SEPARATED ELECTRODE SYSTEM IN ELECTROLYTICALLY SETTING OR HARDENING REACTIVE CEMENT PASTES

Cameron L. Young, Madison; Dan Y. Eng, Vicksburg; Fred E. Causey, Vicksburg; Phillip G. Malone, Vicksburg, and William N. Brabston, Vicksburg, all of Miss., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 5, 1994, Ser. No. 238,610  
Int. Cl.<sup>6</sup> C25B 9/00, 15/00; C25D 17/00

U.S. Cl. 204—228

8 Claims



1. A molding apparatus for hardening, finishing and shaping reactive cement paste by electrolysis and electrophoresis comprising:

- a porous mold having a filter and a nonporous cast, yielding a chamber;
- said chamber being strong enough to support and shape a reactive paste contained therein;
- said nonporous cast being adapted for containing an electrolyte;
- a plurality of electrodes adapted for immersion in said electrolyte and said electrodes adapted to be positioned separate and out of contact with said reactive paste when in said chamber;
- said electrodes provide electrical contact with said reactive paste as an electric current passes through said porous mold via said electrodes and said electrolyte causing said paste to harden, and

said porous mold shaping and imparting a finish onto said reactive paste upon hardening.

8. The molding apparatus of claim 1, further comprising a switching means for alternating the flow of said current between a pair of electrodes, said pair positioned opposite one another, for varying intervals of time as is required for uniformly hardening said paste.

5,411,654

# METHOD OF MAXIMIZING ANHARMONIC OSCILLATIONS IN DEUTERATED ALLOYS

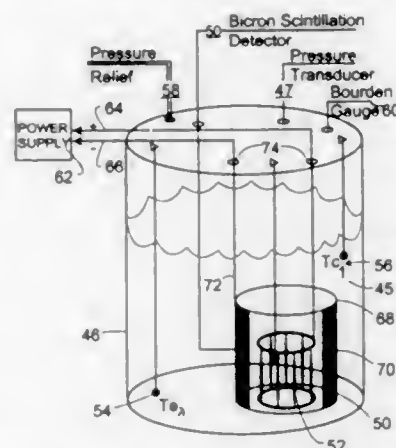
Brian S. Ahern, Boxboro; Keith H. Johnson, Cambridge, and Harry R. Clark, Jr., Townsend, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jul. 2, 1993, Ser. No. 86,821

Int. Cl.<sup>6</sup> C25B 9/00, 11/08; C25C 7/00, 7/02

U.S. Cl. 204—242

16 Claims



1. Apparatus for producing dynamic anharmonic oscillations of a condensed matter guest species comprising:

- a condensed matter host lattice having surfaces upon at least a portion of which are provided surface features, said features having a radius of curvature less than 0.5 microns, and

means for dissolving said guest species in said host lattice in a ratio of at least 0.5, the guest species undergoing said dynamic anharmonic oscillations upon dissolution in said host lattice.

5,411,655

# ELECTROLYTIC CELL AND ELECTRODES THEREFOR

Charles T. Sweeney, 3223 S. Loop 289, Lubbock, Tex. 79423

Division of Ser. No. 808,223, Dec. 16, 1991, Pat. No. 5,352,340,

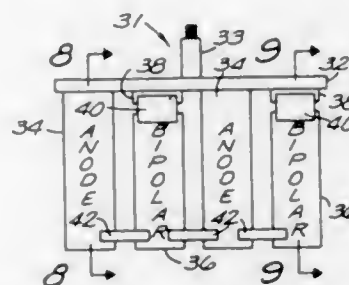
which is a continuation-in-part of Ser. No. 593,028, Oct. 5, 1990,

Pat. No. 5,118,397. This application Jan. 11, 1994, Ser. No. 180,071

Int. Cl.<sup>6</sup> C25B 15/00

U.S. Cl. 204—256

14 Claims



1. An electrolytic cell for generation of a gaseous mixture of chlorine- and oxygen-containing oxidant species comprising

a hollow container having a wall dividing the same into two compartments and including an ion-permeable membrane permitting flow of cations therethrough, a steel plate cathode in one of said compartments, a titanium anode assembly in the other of said compartments comprising at least one titanium plate anode and at least two titanium bipolar elements supported on said anode in closely spaced insulated relation thereto, said cathode compartment having an opening adapted to be filled with water, said anode compartment having an opening adapted to be filled with an aqueous chloride salt solution, means for passing a direct current through said water and said chloride salt solution to produce a mixed oxidant gas in said anode compartment comprising a plurality of oxygen and chlorine containing oxidizing species and to produce hydrogen and sodium hydroxide in said cathode compartment, and means for removing said mixed oxidant gas from said anode compartment.

5,411,656

# GAS ABSORPTION ADDITIVES FOR ELECTROPHORETIC SUSPENSIONS

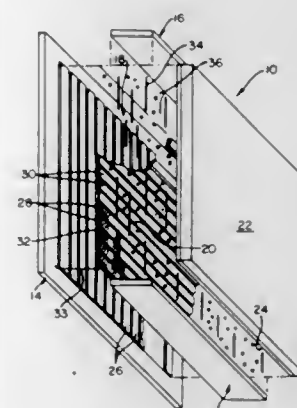
Frederic E. Schubert, Shoreham, N.Y., assignor to Copytele, Inc., Huntington Station, N.Y.

Filed Aug. 12, 1993, Ser. No. 106,395

Int. Cl.<sup>6</sup> C25D 1/12

U.S. Cl. 204—299 R

19 Claims



1. An electrophoretic display comprising:

- a structure defining an enclosed space and including a first electrode and an opposed matrix structure, said matrix structure having a second electrode and a third electrode with a dielectric spacer therebetween; and
- a dielectric fluid disposed within said enclosed space, said dielectric fluid having a plurality of pigment particles movable between positions adjacent said electrodes in response to an electric potential applied to said electrodes during an operation of said electrophoretic display, said electric potential causing arcing between said second and third electrodes of said matrix structure, said arcing causing a chemical breakdown of said fluid, said chemical breakdown of said fluid resulting in the generation of hydrogen gas, chlorine gas, and hydrogen chloride gas in said fluid wherein said dielectric fluid includes an effective amount of at least one additive for absorbing said at least one of said gases in said fluid to substantially reduce said at least one of said gases in said fluid, said at least one additive having a liquid state temperature range and a viscosity suitable for use in said electrophoretic display.

5,411,657

# MOLDED PLASTIC ELECTROPHORESIS CASSETTES

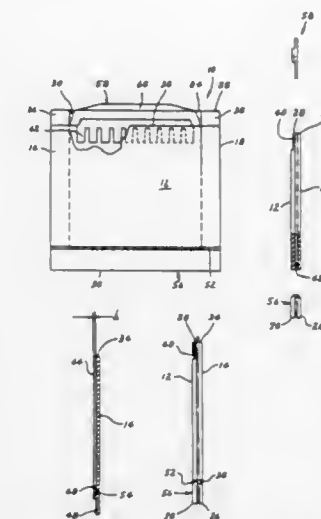
George T. Leka, 4444 Madison Ave., Trumbull, Conn. 06611

Filed Sep. 14, 1993, Ser. No. 121,601

Int. Cl.<sup>6</sup> G01N 27/26, 27/447

U.S. Cl. 204—299 R

15 Claims



1. An electrophoresis cassette comprising, in combination: a pair of thin, flat, rectangular, molded plastic plates overlying one another in opposing relationship, said plates being separated from each other by an embossment formed on one of said plates, said embossment extending continuously along the marginal edges of said one of said plates except at the top edge thereof; a liquid-tight seal extending along said embossment and joining said plates together, said plates defining therebetween a narrow gap for holding a gel medium, said plates having elongated narrow grooves within the non-opposing surfaces thereof extending in substantially coinciding relation across the bottom of said plates at a point just above said seal, said grooves being of sufficient depth so as to substantially weaken said plates along the length of said grooves whereby the bottom of said plates can be easily broken off to expose said gap.

5,411,658

# GASOLINE UPGRADING PROCESS

Birbal Chawla, Cherry Hill; Dominik N. Mazzone, Wenonah; Michael S. Sarli, Haddonfield; Stuart S. Shih, Cherry Hill, and Hye Kyung C. Timken, Woodbury, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 891,124, Jun. 1, 1992, abandoned, which is a continuation-in-part of Ser. No. 850,106,

Mar. 12, 1992, which is a continuation-in-part of Ser. No. 745,311, Aug. 15, 1991, Pat. No. 5,346,609. This application Oct. 8, 1993, Ser. No. 133,403

Int. Cl.<sup>6</sup> C10G 69/02

U.S. Cl. 208—89

25 Claims

1. A process of upgrading a cracked, olefinic sulfur-containing feed fraction boiling in the gasoline boiling range and having a 95 percent point of at least 325° F. which comprises: contacting the cracked, olefinic sulfur-containing feed fraction with a hydrodesulfurization catalyst in a first reaction zone, operating under a combination of elevated temperature, elevated pressure and an atmosphere comprising hydrogen, to produce an intermediate product comprising a normally liquid fraction which has a reduced sulfur content and a reduced octane number as compared to the feed;

contacting at least the gasoline boiling range portion of the intermediate product in a second reaction zone with an acidic catalyst comprising zeolite beta in combination

with a molybdenum hydrogenation component, to convert the gasoline boiling range portion of the intermediate product to a product comprising a fraction boiling in the gasoline boiling range having a higher octane number than the gasoline boiling range fraction of the intermediate product.

5,411,659

## REUSABLE LIQUID FILTERING SYSTEM

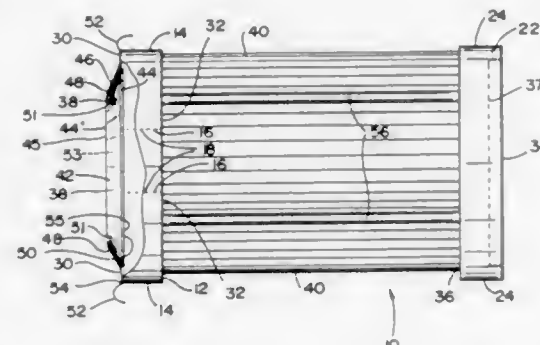
Bret E. Nichols, 8646 Mahogany Ct., Manassas, Va. 22110

Filed Mar. 4, 1994, Ser. No. 205,643

Int. Cl.<sup>6</sup> B01D 27/10

U.S. Cl. 210—130

14 Claims



1. A liquid filter, comprising:
  - a first annular end member of a predetermined material defining a first outer perimeter surface and an opposed first inner perimeter surface spaced radially inwardly from said first outer perimeter surface by a first predetermined distance, said inner perimeter surface defining a perimeter of a first interior opening;
  - a second end member of predetermined material defining a second outer perimeter surface;
  - said first end member further defining a first annular surface extending between said first outer perimeter surface and said first inner perimeter surface and a second annular surface opposed from said first annular surface and extending between said first outer perimeter surface and said first inner perimeter surface;
  - said second end member further defining a third surface connected with said second outer perimeter surface and a fourth surface opposed from said third surface and connected with said second outer perimeter surface;
  - a substantially cylindrically configured filter material connected to and extending between said second annular surface and said fourth surface; and
  - a liquid bypass valve connected to said first annular surface around said first interior opening and projecting outwardly from said first annular surface, said bypass valve including:
    - a hollow conical frustum element defining first and second opposed open ends and a tapered sidewall extending between said open ends, said frustum element connected at said first open end thereof to said first annular surface around said first interior opening and projecting outwardly from said first annular surface by a second predetermined distance, said first open end having a diameter greater than a diameter of said second open end;
    - said sidewall defining a plurality of openings therein and an inner sidewall surface; and
    - a spring member connected to said first annular surface and defining a plurality of tab elements positioned for normally resiliently engaging said inner sidewall surface and covering said plurality of openings in substantially liquid-tight sealing relationship.

5,411,660  
 APPARATUS FOR DISSOLVING GAS IN LIQUID  
 INCLUDING PRESSURIZED BUBBLE CONTACTOR IN  
 SIDESTREAM

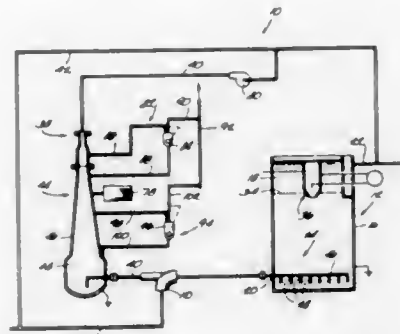
Eugene E. Mazewski, Pewaukee; Peter J. Petit, Brookfield, both of Wis., and Richard E. Speece, Nashville, Tenn., assignors to Envirex Inc., Waukesha, Wis.

Filed Nov. 6, 1992, Ser. No. 972,742

Int. Cl.<sup>6</sup> C02F 3/06

U.S. Cl. 210—151

9 Claims



1. A liquid treatment apparatus comprising a reactor including a media bed for treating liquid, a first conduit connected to said reactor for delivering a first liquid to said reactor for treatment, the first liquid having a first concentration of contaminants and a first dissolved gas content, and means for adding dissolved gas to the first liquid in said first conduit to increase the first dissolved gas content of the first liquid, said means for adding dissolved gas including a source of second liquid, the second liquid having a second concentration of contaminants which is substantially less than said first concentration of contaminants, a second conduit connected between said first conduit and said source of the second liquid for delivering the second liquid to said first conduit, a vessel connected to said second conduit between said source of the second liquid and said first conduit such that the second liquid flowing through said second conduit flows through said vessel, and means for introducing the gas into the second liquid in said vessel to provide the second liquid with a second dissolved gas content which is higher than the first dissolved gas content of the first liquid so that the first dissolved gas content of the first liquid is raised when the second liquid is delivered to said first conduit, the second liquid in said vessel being pressurized.

5,411,661

## WATER FILTER MODULE

Randy B. Heiligman, Minnetonka, Minn., assignor to UltraPure Systems, Inc., Plymouth, Minn.

Continuation-in-part of Ser. No. 67,120, May 26, 1993, Pat. No. 5,318,703. This application Aug. 18, 1993, Ser. No. 107,643

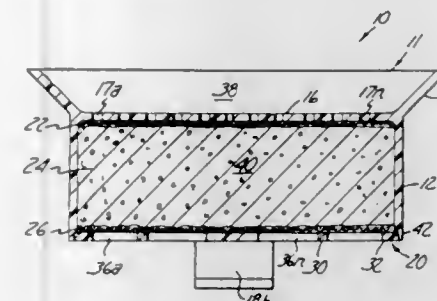
Int. Cl.<sup>6</sup> B01D 27/08

U.S. Cl. 210—264

19 Claims

1. A water filter for a drip coffee brewer comprising:
  - a water permeable housing formed by a first horizontal porous media surface forming an inlet for receiving unfiltered water, a second horizontal porous media surface opposite the first porous media surface forming an outlet for dispensing filtered water, and a side porous media surface between the first and second surfaces wherein the side porous media surface also acts as an outlet for dispensing filtered water, the first, second and side porous

media surfaces being constructed together to form a fully enclosed chamber; and



a carbon-based water filtration media entirely contained within the chamber between the first, second and side porous media surfaces for filtering the water.

5,411,662  
 FLUID SEPARATION ASSEMBLY HAVING AN PURGE  
 CONTROL VALVE

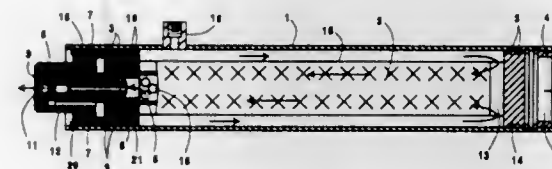
Patrick S. Nicolas, Jr., Needham; Benjamin Bikson, Brookline; Salvatore Giglia, Norwood, all of Mass., and David R. Thompson, Grand Island, N.Y., assignors to Praxair Technology, Inc., Danbury, Conn.

Filed Feb. 25, 1994, Ser. No. 201,529

Int. Cl.<sup>6</sup> B01D 63/00

U.S. Cl. 210—321.8

12 Claims



1. A fluid separation assembly comprising:
  - (a) an elongated inner core member;
  - (b) a hollow fiber membrane bundle having permeate and non-permeate sides at least partially surrounding a length of said elongated inner core member;
  - (c) an integral purge control valve having a valve body defining at least one passageway communicating with the non-permeate side of said hollow fiber membrane bundle with one end of said at least one passageway terminating with at least one non-permeate exit port and defining at least one sweep fluid port communicating with said at least one passageway and said permeate side of said hollow fiber membrane bundle so that said at least one sweep fluid port is capable of passing at least a portion of a non-permeate stream in said at least one passageway to said permeate side of said hollow fiber membrane bundle, and a fluid flow controlling means for adjusting or specifying the flow of a non-permeate stream into said at least one sweep fluid port from said at least one passageway; and
  - (d) a shell containing at least one fluid feed entrance port and at least one permeate exit port surrounding said hollow fiber membrane with at least one end of said shell accommodating said integral purge control valve, wherein said non-permeate side is outside of the hollow fiber membrane and said permeate side is inside of the hollow fiber membrane.

5,411,663  
 ALCOHOL-INSOLUBLE NYLON MICROPOROUS  
 MEMBRANES

James S. Johnson, Acton, Mass., assignor to Micron Separations, Inc., Westborough, Mass.

Filed Mar. 17, 1993, Ser. No. 32,792

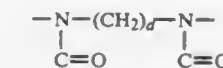
Claims priority, application WIPO, Mar. 20, 1992, PCT/US92/02293

Int. Cl.<sup>6</sup> B01D 71/56

U.S. Cl. 210—500.38

25 Claims

1. A hydrophilic alcohol-insoluble polyamide microporous membrane containing crosslinked amide groups of the structure:



wherein d is an integer of about 1 to 3.

5,411,664

METHOD FOR DEHALOGENATION AND  
 DEGRADATION OF HALOGENATED ORGANIC  
 CONTAMINANTS

Alan G. Seech, Mississauga; James E. Cairns, Toronto, and Igor J. Marvan, Mississauga, all of Canada, assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Sep. 24, 1993, Ser. No. 126,343

Claims priority, application Canada, Sep. 28, 1992, 2079282

Int. Cl.<sup>6</sup> C02F 1/58

U.S. Cl. 210—602

20 Claims

1. A method of dehalogenating and/or degrading halogenated organic chemical contaminants in water, sediment, or soil comprising adding to the water, sediment or soil a combination of fibrous organic matter which is capable of supporting bacterial or fungal growth and multi-valent metal particles in amounts which promote reductive dehalogenation of the halogenated organic compounds.

5,411,665

METHODS FOR REDUCING AND SEPARATING  
 EMULSIONS AND HOMOGENEOUS COMPONENTS  
 FROM CONTAMINATED WATER

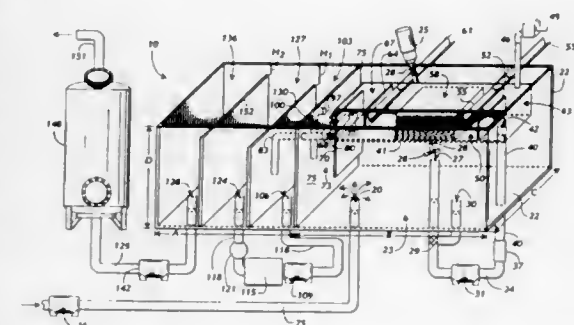
Charles R. Scrags, 1000 Abingdon La., Alpharetta, Ga. 30202; Jack R. Creel, 10803 Tupper Lake, and Alonzo L. DeCell, 10030 Cedar Creek, both of Houston, Tex. 77042

Filed Jul. 20, 1993, Ser. No. 94,684

Int. Cl.<sup>6</sup> C02F 1/40, 3/00

U.S. Cl. 210—610

56 Claims



1. A method of separating highly emulsified and/or immiscible components mixed in a fluid, which comprises the steps of:
  - (a) providing a coalescer comprising a plurality of spaced apart plates, each plate having corrugations running along the plate forming crests and valleys, said plate having bleed holes for passage of the immiscible components;



- (b) adding oil metabolizing microorganisms to the fluid to break the emulsion; and  
(c) passing the fluid through the coalescer to separate the immiscible constituents of the waste stream.

5,411,666

# **METHODS FOR REMOVING BIOFILM FROM OR PREVENTING BUILDUP THEREOF ON SURFACES IN INDUSTRIAL WATER SYSTEMS**

C. George Hollis; John P. Terry, and Percy A. Jaquess, all of Germantown, Tenn., assignors to Buckman Laboratories International, Inc., Memphis, Tenn.

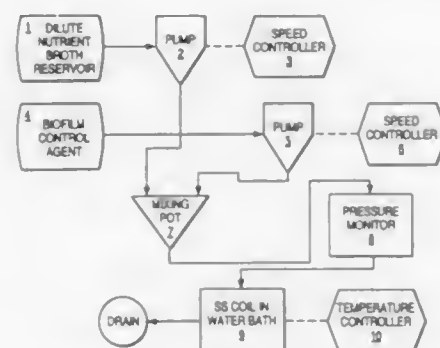
Continuation of Ser. No. 654,007, Feb. 12, 1991, abandoned.

This application Mar. 22, 1994, Ser. No. 215,653

Int. Cl.<sup>6</sup> C02F 1/50

U.S. Cl. 210—632

25 Claims



1. A method of removing a biofilm from a solid substrate or preventing buildup of a biofilm on a solid substrate, said biofilm being formed by at least one sessile microorganism in a water system comprising the step of contacting a water system in recognized need of such removal or prevention with a composition consisting essentially of (1) at least one acidic protease or alkaline protease, (2) at least one glucoamylase or alpha amylase, and (3) at least one surfactant, said combination of (1), (2), and (3) being capable of destroying polysaccharide material which surrounds the sessile microorganisms.

5,411,667

# **METHOD OF SELECTIVELY SEPARATING LEAD IONS**

Kazuhiisa Hiratani; Hideki Sulgibara, both of Tsukuba, and Kazuyuki Kasuga, Tsuchiura, all of Japan, assignors to Director-General of Agency of Industrial Science and Technology, Japan

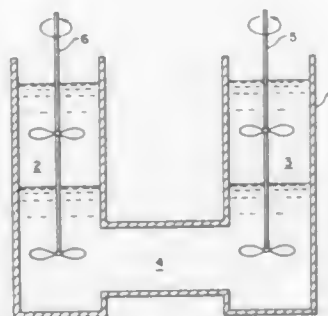
Filed Aug. 3, 1994, Ser. No. 285,155

Claims priority, application Japan, Aug. 26, 1993, 5-234087

Int. Cl.<sup>6</sup> C02F 1/26

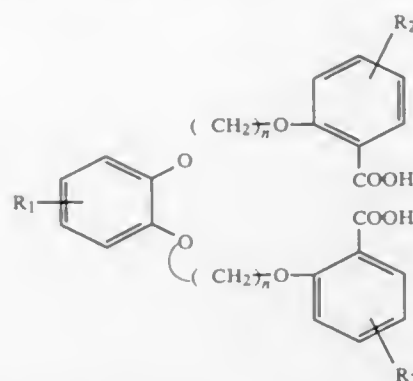
U.S. Cl. 210—638

5 Claims



1. A method of transporting lead ions contained in a first aqueous liquid having a pH of greater than 3 to a second aqueous liquid having a pH of 3 or less, comprising the steps of: contacting a carrier solution containing a polyether derivative dissolved in a water-insoluble organic solvent with

said first liquid so that lead ions contained in said first liquid are captured by said polyether derivative; and contacting said carrier solution containing the lead ions captured by said polyether derivative with said second liquid so that the lead ions captured by said polyether derivative are released to said second liquid, said polyether derivative being a compound expressed by the general formula:



wherein R<sub>1</sub> and R<sub>2</sub> stand independently from each other for a hydrogen atom or an alkyl group and n is an integer of 2 or 3.

5,411,668

# **PROCESS FOR THE RECLAMATION OF USED GLYCOLIC AIRCRAFT DEICING COMPOSITIONS**

Klaus Pöhlmann, Dr.-Enk-Strasse 7, D-84489 Burghausen, and Jörg Von Eysmond, Kibitzweg 23, D-65719 Hofheim am Taunus, both of Germany

Filed Aug. 4, 1994, Ser. No. 285,791

Claims priority, application Germany, Aug. 5, 1993, 43 26 345.3

Int. Cl.<sup>6</sup> B01D 61/16

U.S. Cl. 210—638

10 Claims

1. A process for the reclamation of used aircraft deicing compositions containing at least one glycol at least one polymer thickener, at least one salt or ionic compound, and water, which comprises

- (1) initially filtering the used aircraft deicing composition to substantially remove essentially suspended contaminants,
- (2) subjecting the filtrate obtained in step (1) to an ultrafiltration to substantially remove at least the polymer thickener or thickeners,
- (3) treating the ultrafiltration permeate obtained in step (2) with an anion exchanger and a cation exchanger to substantially remove salt or salts or ionic compound or compounds which are present and
- (4) distilling the solution obtained in step (3) to remove water and thus adjust the glycol content to a predetermined desired value.

5,411,669

# **PROCESS AND APPARATUS FOR TREATING PRE-CONCENTRATED SOLID-LIQUID MIXTURE STREAMS**

Josef Narath, Kalsdorf, Austria, assignor to Andritz-Patentverwaltungs-Gesellschaft m.b.H., Graz, Austria

Filed Apr. 6, 1993, Ser. No. 42,764

Claims priority, application Austria, Apr. 6, 1992, A709/92

Int. Cl.<sup>6</sup> B01D 33/80

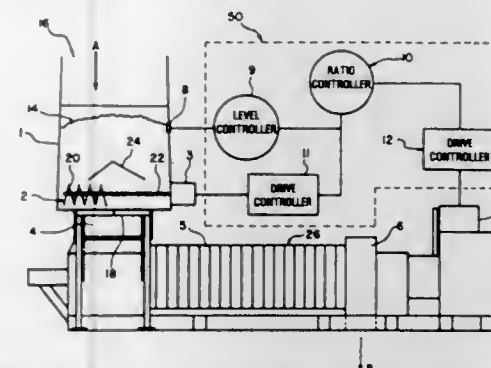
U.S. Cl. 210—744

28 Claims

23. A process for separating liquid from solid-liquid mixtures comprising:

- introducing said solid-liquid mixture into an intermediate storage container;
- continuously measuring the mixture level in said intermedi-

ate storage container by level sensing means in said intermediate storage container; conveying a preselected volume of said mixture at a first rate by metering said mixture from said intermediate storage container to a liquid separating device, said intermediate storage container including metering means for metering said mixture;



passing said mixture through said liquid separating device at a throughput rate responsive to said metering rate, and separating liquid from said mixture and adjusting the speed of said liquid separating device to obtain a desired solid-liquid content of said mixture and maintain a selected level of said mixture in said container.

26. The process of claim 23, comprising metering said mixture from said intermediate storage container at a rate responsive to said mixture level in the intermediate storage container.

5,411,670

# **METHOD AND COMPOSITION FOR PROTECTING METAL SURFACES FROM OXIDATIVE ENVIRONMENTS**

Michael L. Walker, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 889,212, May 27, 1992, abandoned, which is a continuation-in-part of Ser. No. 608,877, Nov. 5, 1990, abandoned. This application Jul. 26, 1993, Ser. No. 97,445

Int. Cl.<sup>6</sup> C23F 11/04, 11/14

U.S. Cl. 507—117

34 Claims

1. A method of coating antimony on a metal surface comprising:

- contacting the metal surface with a composition substantially free of acetylenic alcohols and having a pH below 7 at a temperature and for a period of time sufficient to coat antimony on the metal surface, said composition including an aqueous liquid carrier, a condensation product and at least one antimony compound,

said antimony compound being capable of activation by said condensation product,

said condensation product being prepared by reacting at least four reaction constituents together in the presence of from about 0.8 to about 1.2 equivalents of an aqueous mineral acid catalyst at a temperature in the range of from about 140 to about 250 F. for in the range of from about 4 to about 48 hours, said reaction constituents including:

- about one equivalent of a group (i) constituent having at least one reactive hydrogen atom and no groups reactive under the conditions of reaction other than hydrogen, said group (i) constituent including at least one member selected from the group consisting of amines, amides, thioamides, aldehydes, nitrogen heterocycles, ketones, phenols, acetylenic alcohols, carboxylic acids, and esters of carboxylic acids;

from about 0.6 to about 10 equivalents of a group (ii) constituent, said group (ii) constituent including a carbonyl group and having at least one hydrogen atom on the carbon atom adjacent to the carbonyl group;

from about 0.5 to about 10 equivalents of a group (iii)

constituent, said group (iii) constituent being an aldehyde; and

from about 0.10 to about 10 equivalents of a group (iv) constituent, said group (iv) constituent being selected from a fatty compound having from 5 to 60 carbon atoms, an alkyl nitrogen heterocycle having at least one alkyl group having from 1 to 18 carbon atoms and 3 to 9 carbon atoms in the heterocyclic ring structure and admixtures thereof, wherein each of said group (i) constituent, group (ii) constituent, group (iii) constituent and group (iv) constituent are different compounds or different mixtures of compounds, the method of claim 1 wherein said antimony compound is present in said composition in an amount sufficient to impart a molar concentration of antimony ions in said composition of from about 0.0001 to about 0.1.

5,411,671

# **FABRIC CONDITIONING COMPOSITIONS AND PROCESS FOR MAKING THEM**

Herbert E. Bauer, Saddle Brook; Michael G. Clarke, Basking Ridge; John E. Lovas, Kearny; William R. Narath, Parsippany, and Andrew N. Williams, Franklin Lakes, all of N.J., assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 909,359, Jul. 6, 1992, Pat. No. 5,288,417. This application Jan. 5, 1994, Ser. No. 177,505

Int. Cl.<sup>6</sup> B01F 3/08, 5/06

U.S. Cl. 252—8.6

6 Claims

1. A concentrated aqueous fabric conditioning composition comprising:

- a homogeneous dispersion of from about 15% to about 80% by weight of cationic conditioning active particles, the cationic particles having a particle size distribution such that the mean particle size is from 0.7 to 10 microns and the particle size at which 10% of the distribution, in Malvern terminology, is calculated as at least 29% of the mean particle size,

the concentrated aqueous fabric conditioning composition being stable and pourable and having a viscosity below about 1000 centipoises after 2 weeks storage at 105° F. measured by a Brookfield Viscometer on Spindle No. 1 at 12 rpm.

5,411,672

# **LUBRICATION OIL COMPOSITION**

Mineo Kagaya, Fujisawa; Mitsuaki Ishimaru, Kanagawa, and Hiroaki Isbii, Kawasaki, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 951,143, Sep. 15, 1992, abandoned. This application Nov. 10, 1993, Ser. No. 149,973

Int. Cl.<sup>6</sup> C10M 105/34, 105/42

U.S. Cl. 252—56 S

8 Claims

1. A method of lubricating a two-cycle engine which consists of

- a) mixing
  - (A) 60–95% by weight of an ester of a hindered alcohol with a straight-chain saturated fatty acid having 8–12 carbon atoms with
  - (B) 5–40% by weight of a complex ester of a hindered alcohol with a straight-chain saturated fatty acid having 8–12 carbon atoms and also with a dibasic acid having 20–50 carbon atoms to obtain a mixture and
- b) applying said mixture to said two-cycle engine.

5,411,673

**PEROXYACID BLEACH PRECURSOR COMPOSITIONS**  
Joseph T. H. Agar, and Douglas G. Fraser, both of Newcastle upon Tyne, Great Britain, assignors to The Procter & Gamble Company, Cincinnati, Ohio

PCT No. PCT/US92/00664, § 371 Date Jul. 30, 1993, § 102(e) Date Jul. 30, 1993, PCT Pub. No. WO92/13798, PCT Pub. Date Aug. 20, 1992

PCT Filed Jan. 28, 1992, Ser. No. 94,090

Claims priority, application United Kingdom, Feb. 6, 1991, 9102507

Int. Cl.<sup>6</sup> C11D 3/395, 7/54; C01B 15/04; C09K 3/00

U.S. Cl. 252—95 18 Claims

1. A granular detergent composition having a bulk density of at least 800 g/liter and comprising:

- (a) from about 2 to 6% by weight of the composition of a solid peroxyacid bleach precursor consisting essentially of particles of peroxyacid bleach precursor material or agglomerates, said precursor material having a Mpt > 30° C. and being selected from the group consisting of compounds containing at least one N-acyl group and compounds containing at least one O-acyl group, the external surfaces of said bleach precursor material particles or agglomerates being treated with an organic acid compound so as to adhere said organic acid compound to said external surface of said bleach precursor material particles or agglomerates, said organic acid compound being selected from a group consisting of glycolic, l-lactic and citric acids and mixtures thereof and being present in an amount from about 3% to about 10% by weight of the treated particles or agglomerates thereof, said organic acid compound having an aqueous solubility of at least about 20 g/100 g of water at 20° C. and a Mpt in excess of 50° C., wherein said treated bleach precursor material particles or agglomerates thereof produce, after 3 minutes in a Beaker Perhydrolysis Test at 20° C., at least about 90% of the peroxy acid that is produced under the same conditions by said bleach precursor material particles or agglomerates thereof in untreated form;
- (b) from about 8 to 18% by weight of the detergent composition of a granular inorganic perhydrate salt bleach selected from the group consisting of sodium perborate and sodium percarbonate, wherein said granular inorganic perhydrate salt bleach is present as a component separate from said solid peroxyacid bleach precursor; and
- (c) from about 10 to 15% by weight of the detergent composition of an organic surfactant selected from the group consisting of anionic, non-ionic, cationic, amphoteric surfactants and mixtures thereof, wherein said surfactant is present in said detergent composition as a component separate from said solid peroxyacid bleach precursor and separate from said inorganic perhydrate, said surfactant component comprising particles of which no more than about 5% by weight have a particulate size of less than about 250 micro-meters.

5,411,674

# **DETERGENT COMPOSITION HAVING A SULFOSUCCINIC AMIDE**

Shuji Tagata, Kaminokawa, and Fumio Sai, Utsunomiya, both of Japan, assignors to Kao Corporation, Tokyo, Japan

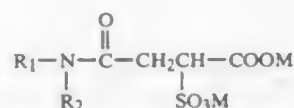
Continuation of Ser. No. 588,832, Sep. 27, 1990, abandoned. This application Sep. 10, 1992, Ser. No. 943,123

Claims priority, application Japan, Oct. 6, 1989, 1-261750

Int. Cl.<sup>6</sup> C11D 1/10, 1/04, 1/66, 1/12

U.S. Cl. 252—117 5 Claims

1. A detergent composition which comprises 15–40% by weight of (a) at least one nonionic surfactant selected from the group consisting of polyoxyethylene alkyl ethers, polyoxyethylene alkylphenyl ethers and alkyl glycosides, 2–15% by weight of (b) fatty acid having 8–22 carbon atoms or salt thereof, and 5–20% by weight of (c) sulfosuccinic amide of the formula (I)



wherein R<sub>1</sub> is C<sub>6</sub>–C<sub>22</sub> alkyl or alkenyl, R<sub>2</sub> is hydrogen, C<sub>1</sub>–C<sub>3</sub> alkyl, carboxylalkyl having C<sub>1</sub>–C<sub>3</sub> alkyl or 1,2-dicarboxylalkyl having C<sub>1</sub>–C<sub>3</sub> alkyl, M is alkali metal, alkaline earth metal, alkanolamine or ammonium, and the balance, water.

5,411,675

# **POLYMER SCALE PREVENTIVE AGENT, POLYMERIZATION VESSEL EFFECTIVE IN PREVENTING POLYMER SCALE DEPOSITION, AND PROCESS OF PRODUCING POLYMER USING SAID VESSEL**

Masahiro Usuki, Ibaraki, and Susumu Ueno, Hazaki, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 24, 1992, Ser. No. 950,228

Claims priority, application Japan, Sep. 24, 1991, 3-271948; Sep. 24, 1991, 3-271949

Int. Cl.<sup>6</sup> C09D 5/16

U.S. Cl. 252—181 9 Claims

1. A polymer scale preventive agent for use in polymerization of a monomer having an ethylenically unsaturated double bond, comprising:

- (A) at least one compound selected from the group consisting of 1,2-diaminonaphthalene, 1,4-diaminonaphthalene, 1,5-diaminonaphthalene, 1,8-diaminonaphthalene, 2,3-diaminonaphthalene, 2,6-diaminonaphthalene, and 2,7-diaminonaphthalene;
- (B) a hydroxynaphthoquinone selected from the group consisting of 2-hydroxy-1,4-naphthoquinone, 2-hydroxy-3-methyl-1,4-naphthoquinone, 2-hydroxy-3-ethyl-1,4-naphthoquinone, 2-hydroxy-6,7-dimethyl-1,4-naphthoquinone, 2-hydroxy-6-methyl-1,4-naphthoquinone, 6-methyl-2-hydroxy-3-ethyl-1,4-naphthoquinone, 6-chloro-2-hydroxy-1,4-naphthoquinone, 6-chloro-2-hydroxy-3-methyl-1,4-naphthoquinone, 5,8-dihydroxy-1,4-naphthoquinone, and 2,6-dihydroxy-1,4-naphthoquinone;
- (C) an acid; and
- (D) a silica sol, wherein said silica sol contains dispersed silica having a particle diameter of 2–20 nm.

5,411,676

# **CHIRAL DOPANTS FOR LIQUID CRYSTALLINE MIXTURES**

Stephen Kelly, Möhlin, Switzerland, and Frans Leenhouts, Achel, Belgium, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

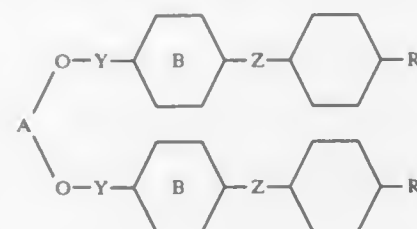
Continuation of Ser. No. 796,518, Nov. 21, 1991, abandoned, which is a division of Ser. No. 570,677, Aug. 22, 1990, Pat. No. 5,093,027. This application Sep. 12, 1994, Ser. No. 304,601

Claims priority, application Switzerland, Sep. 1, 1989, 3169/89

Int. Cl.<sup>6</sup> C09K 19/30, 19/52, 19/06; C07C 69/76

U.S. Cl. 252—299,630 4 Claims

1. An optically active compound of formula



wherein:

A represents an optically active group selected from the group consisting of (R,R)-CH(COOR<sup>3</sup>)-CH(COOR<sup>4</sup>)-, or (S,S)-CH(COOR<sup>3</sup>)-CH(COOR<sup>4</sup>)-; Z denotes a group —(CH<sub>2</sub>)<sub>4</sub>—, —O(CH<sub>2</sub>)<sub>3</sub>—, or the trans-form of —OCH<sub>2</sub>—CH=CH—; R<sup>3</sup> and R<sup>4</sup> are C<sub>1</sub>–C<sub>4</sub>-alkyl; Y stands for —CO— or —CH<sub>2</sub>—; R is hydrogen, C<sub>1</sub>–C<sub>12</sub>-alkyl, C<sub>1</sub>–C<sub>12</sub>-alkoxy or cyano; and ring B represents 1,4-phenylene or trans-1,4-cyclohexylene.

5,411,677

# **METHOD AND COMPOSITION FOR PREVENTING COPPER CORROSION**

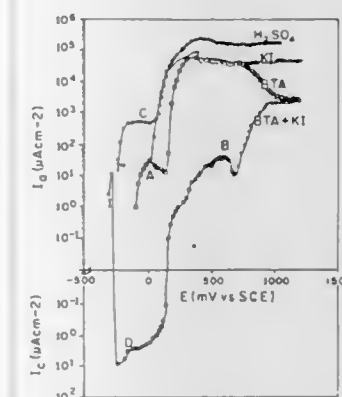
Howard W. Pickering, State College, Pa., and Yongchun Wu, Hoboken, N.J., assignors to The Penn State Research Foundation, University Park, Pa.

Filed Apr. 26, 1993, Ser. No. 52,875

Int. Cl.<sup>6</sup> C23F 11/14

U.S. Cl. 252—389.1

16 Claims



1. A corrosion inhibition composition for metal which comprises:

- a) at least one compound selected from the group consisting of heterocyclic compounds known as triazoles;
- b) at least one compound selected from the group consisting of compounds providing in aqueous solution iodide ions and compounds providing in aqueous solution bromide ions; and
- c) an aqueous medium wherein the compounds a) and b) are present in said aqueous medium c) at concentrations sufficient for the purpose of forming on the surface of the metal in contact with said inhibition composition a corrosion inhibiting film.
8. A method of inhibiting the corrosion of a metal in contact with an aqueous medium comprising formation of a protective film on the surface of said metal by exposing the metallic surface to the composition of claim 1.

5,411,678

# **PAINT STRIPPER**

Johnny O. Sim, Alhambra, Calif., assignor to McGean-Rohco, Inc., Cleveland, Ohio

Filed Feb. 7, 1994, Ser. No. 192,644

Int. Cl.<sup>6</sup> C11D 3/28, 3/44, 1/68, 1/835

U.S. Cl. 252—548

7 Claims

1. A paint-stripper composition comprising

(A) from about 10% to about 80% by weight of at least one organic solvent selected from the group consisting of benzyl alcohol alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl-substituted furfuryl alcohols and acetylenic alcohols containing from 3 to about 5 carbon atoms;

(B) from about 1% to about 20% by weight of pyrrole;

(C) from about 0.1% to about 8% by weight of at least one other organic amine compound as an activator; and

(D) water.

5,411,679

# **BENZOPYRANS**

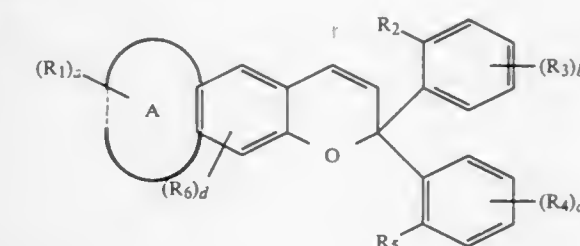
Anil Kumar, Pittsburgh, Pa., assignor to Transitions Optical, Inc., Picoas Park, Fla.

Continuation of Ser. No. 201,948, Feb. 25, 1994, abandoned, which is a continuation-in-part of Ser. No. 30,932, Mar. 12, 1993, abandoned. This application Sep. 13, 1994, Ser. No. 304,970

Int. Cl.<sup>6</sup> G02B 5/23; C07D 333/50, 311/78

U.S. Cl. 252—586 22 Claims

1. A benzopyran compound represented by the following graphic formula:



wherein,

- (a) A is a substituted or unsubstituted heterocyclic ring selected from the group consisting of benzothieno and benzofurano, the 2,3 position or 3,2 position of said heterocyclic ring being fused to the f, g, or h side of said benzopyran compound, each R<sub>1</sub> is C<sub>1</sub>–C<sub>10</sub> alkyl, C<sub>5</sub>–C<sub>7</sub> cycloalkyl, C<sub>1</sub>–C<sub>5</sub> alkylcarbonyl, C<sub>1</sub>–C<sub>5</sub> alkoxy, halo(C<sub>1</sub>–C<sub>5</sub>alkylcarbonyl, C<sub>1</sub>–C<sub>5</sub> monoalkylaminocarbonyl, formyl, hydroxy, halogen, R(R')N—, the group —O—L, or is a substituted or unsubstituted benzo fused to the benzo portion of the benzothieno or benzofurano group, said benzo substituents being C<sub>1</sub>–C<sub>4</sub> alkyl, C<sub>1</sub>–C<sub>4</sub> alkoxy, halogen, C<sub>5</sub>–C<sub>7</sub> cycloalkyl, or C<sub>1</sub>–C<sub>4</sub> alkyl substituted C<sub>5</sub>–C<sub>7</sub> cycloalkyl, R is a C<sub>1</sub>–C<sub>3</sub> alkyl, R' is hydrogen or a C<sub>1</sub>–C<sub>3</sub> alkyl, L is C<sub>1</sub>–C<sub>10</sub> alkyl, phenyl(C<sub>1</sub>–C<sub>3</sub>alkyl), C<sub>1</sub>–C<sub>5</sub> alkylcarbonyl, (C<sub>1</sub>–C<sub>5</sub>)alkoxy, halo(C<sub>1</sub>–C<sub>5</sub>)alkylcarbonyl, C<sub>1</sub>–C<sub>5</sub> monoalkylaminocarbonyl, acrylyl, methacrylyl, acetonyl, pyridyl, substituted or unsubstituted arylcarbonyl, said aryl of the arylcarbonyl group being phenyl or naphthyl, said aryl substituents being the same as said benzo substituents, and said halogen (or halo) groups being chloro, fluoro, or bromo;
- (b) R<sub>2</sub> and R<sub>5</sub> are each hydrogen, C<sub>1</sub>–C<sub>5</sub> alkyl, C<sub>1</sub>–C<sub>5</sub> alkoxy, fluoro, or chloro; each R<sub>3</sub> and each R<sub>4</sub> are hydroxy, C<sub>1</sub>–C<sub>10</sub> alkyl, C<sub>1</sub>–C<sub>10</sub> alkoxy, C<sub>5</sub>–C<sub>7</sub> cycloalkyl, halogen, R(R')N—, or the group, —O—L', said L' is phenyl(C<sub>1</sub>–C<sub>3</sub>alkyl), acrylyl, or methacrylyl; R<sub>6</sub> is C<sub>1</sub>–C<sub>10</sub> alkyl, C<sub>5</sub>–C<sub>7</sub> cycloalkyl, C<sub>1</sub>–C<sub>5</sub> alkylcarbonyl, C<sub>1</sub>–C<sub>5</sub> alkoxy, halo(C<sub>1</sub>–C<sub>5</sub>alkylcarbonyl, C<sub>1</sub>–C<sub>5</sub> monoalkylaminocarbonyl, formyl, hydroxy, halogen, cyano, R(R')N—, or the group, —O—L, said halogen or halo substituents being chloro, fluoro or bromo; and a and d are each the integer 0 or 1, b and c are each the integers 0, 1, or 2, provided that when R<sub>2</sub> and R<sub>5</sub> are each hydrogen and b and c are each the integer 0, A is fused to the g or h side of said benzopyran compound, and provided further that at least one of R<sub>2</sub> and R<sub>5</sub> is other than hydrogen when A is fused to the f side of said benzopyran compound.
5. A photochromic article comprising an organic host material and a photochromic amount of at least one photochromic benzopyran compound of claim 1.



# 5,411,680 CARBURETOR

Gerard McCarthy, and Roger Bowles, both of Tralee, Ireland, assignors to Tillotson, Ltd., Tralee, Ireland

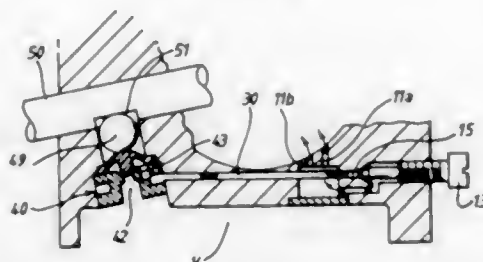
Filed Nov. 12, 1993, Ser. No. 150,973

Claims priority, application Ireland, Nov. 16, 1992, 922821

Int. Cl.<sup>6</sup> F02M 17/04

U.S. Cl. 261—35

3 Claims



1. In a diaphragm-type carburetor comprising a carburetor body defining a mixing passage having an air intake side and an engine outlet side, a fuel pump, a throttle shutter mounted within the mixing passage, a throttle shaft for controlling the throttle shutter, and a metering chamber for supplying fuel from the fuel pump into the mixing passage via a high speed adjusting needle and a low speed/idle adjusting needle, the improvement comprising means for enabling fuel to be fed independently from the metering chamber to the mixing passage via the high speed adjusting needle and the low speed/idle adjusting needle, and valve means for controlling the flow of fuel via the low speed/idle adjusting needle so that when the throttle shutter is closed or substantially closed the valve means is open to permit the flow of fuel to the carburetor mixing passage via the low speed/idle adjusting needle, and when the throttle shutter is open or substantially open the valve means is closed to prevent the flow of fuel to the carburetor mixing passage via the low speed/idle adjusting needle, wherein the valve means comprises a sphere which is resiliently biased against and acts as a cam follower to the circumference of the throttle shaft, the throttle shaft having a recess in part of its circumference such that the sphere is engaged in or displaced out of the recess according to the rotational position of the throttle shaft, the movement of the sphere into and out of the recess controlling the opening and closing of the valve means.

# 5,411,681 RANDOM PACKING

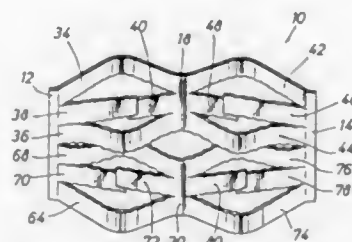
Alexander M. Seah, deceased, late of Houston, Tex.; Beverly Derrick, beir, Chicago, Ill.; Zobtan Seah, beir, Chicago, Ill., and Jamel Seah, beir, Chicago, Ill., assignors to Jaeger Products, Inc., Houston, Tex.

Continuation of Ser. No. 49,573, Apr. 19, 1993, abandoned. This application Aug. 16, 1994, Ser. No. 291,723

Int. Cl.<sup>6</sup> B01F 3/04

U.S. Cl. 261—94

16 Claims



1. A packing element for use in exchange apparatus wherein a plurality of such packing elements may be disposed and within which first and second fluids may interact, said packing element comprising material forming a plurality of strips, with

each strip attached at both of its ends and generally bowed, one or more projections, with each projection being attached at one of its ends, a laterally-extending end attachment area at each of two opposite ends of the material, and at least one laterally-extending intermediate attachment area, with strips extending between and attached to one intermediate attachment area and the end attachment areas.

# 5,411,682 METHOD AND APPARATUS FOR DETECTING THE POSITION OF DEFECT IN A HOLLOW FIBER MEMBRANE MODULE

Hideyuki Nagashima, Fujisawa, Japan, assignor to Nok Corporation, Tokyo, Japan

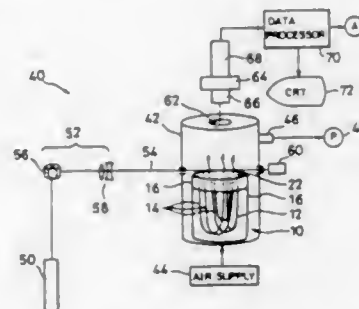
Filed Nov. 1, 1993, Ser. No. 144,019

Claims priority, application Japan, Oct. 30, 1992, 4-316480

Int. Cl.<sup>6</sup> B01D 65/10

U.S. Cl. 264—36

16 Claims



1. A method of detecting a two dimensional position of a defect in a hollow-fiber-membrane module, said module including a plurality of microporous hollow fibers having at least one end thereof sealingly bonded to and supported by a partition wall with the inner channels thereof opening onto an end face of said partition wall, said method comprising the steps of:

- placing the module within a substantially dust-free enclosure;
- forcing a gaseous fluid to flow through the module from unfiltered to filtered sides thereof, said fluid carrying fine particles of light scattering material suspended therein, said particles having a particle size larger than the effective pore size of the micropores of the hollow fibers so that, in the presence of a defect, said particles are carried by said fluid to pass therethrough and are brought downstream of said end face;
- projecting light rays along a plane parallel to and closely adjacent to said end face to irradiate said particles as they traverse said plane, said particles upon being irradiated scattering the incident light rays to generate a visualized scene of scattered light rays; and
- identifying the two dimensional position of said defect as reflected on said end face according to said scene of scattered light rays.

# 5,411,683 METHOD FOR MAKING THERMOPLASTIC FOAM WITH COMBINED 1,1-DIFLUOROETHANE AND CO<sub>2</sub> BLOWING AGENT

Basit H. Shah, Evans, Ga., assignor to Sweetheart Cup Company Inc., Chicago, Ill.

Filed Aug. 20, 1993, Ser. No. 110,276

Int. Cl.<sup>6</sup> B29C 44/20

U.S. Cl. 264—50

19 Claims

1. In a method of preparing a thermoplastic foam body including the steps of

- providing a molten composition of thermoplastic resin and an effective amount of nucleating agent,

- introducing a quantity of 1,1-difluoroethane into the molten composition,
- dispersing the 1,1-difluoroethane through the molten composition, and
- extruding the molten composition through a die from a region of higher pressure to a region of lower pressure such that the composition foams upon extrusion to form a foam body;

the improvement comprising introducing a quantity of CO<sub>2</sub> into said molten composition and dispersing said CO<sub>2</sub> through said molten composition prior to the extruding step, such that the quantity of CO<sub>2</sub> and 1,1-difluoroethane together in said molten composition is in a range of about 0.1–5.0 parts per 100 parts thermoplastic resin by weight, and such that the ratio of the mass of 1,1-difluoroethane to the mass of CO<sub>2</sub> is in a range of about 0.5–8.0.

# 5,411,684

## PROCESS FOR MAKING LARGE CROSS-SECTION OLEFINIC POLYMER FOAM STRUCTURE BLOWN WITH 1, 1-DIFLUOROETHANE

Martin H. Tusim, Newark, and Chung P. Park, Pickerington, both of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 30, 1993, Ser. No. 56,231

Int. Cl.<sup>6</sup> B29C 67/22

U.S. Cl. 264—53

14 Claims

1. The process for making an extruded, closed-cell olefin polymer foam structure in plank form having a cross-section in one dimension of 2 or more inches and 18 or more inches in the other dimension and a density of 48 kilograms per cubic meter or less, comprising:

- heating an olefin polymer material comprising greater than 50 percent by weight olefin monomeric units to form a melt polymer material, the olefin polymer material having a melt index of about 3.5 grams/10 minutes or less;
- incorporating into the melt polymer material at an elevated pressure a blowing agent to form a foamable gel wherein the blowing agent consists essentially of 1,1-difluoroethane;
- cooling the foamable gel to an optimum foaming temperature; and
- extruding the foamable gel through a die at a shear rate of about 400/second or more into a region of reduced pressure to form the foam structure.

# 5,411,685

## GAS CONTROL UNIT AND PROCESS FOR GAS-ASSISTED INJECTION MOLDING

Stephen A. Burgis, Birmingham, Mich., assignor to Design-Rite, Inc., Sterling Heights, Mich.

Filed Oct. 8, 1992, Ser. No. 957,987

Int. Cl.<sup>6</sup> B29C 45/00, 45/03, 45/76

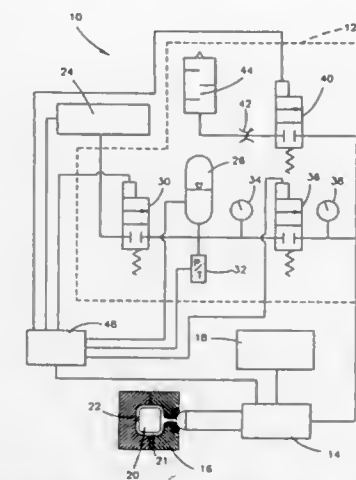
U.S. Cl. 264—40.5

21 Claims

1. A gas-assisted injection molding system for introducing a predetermined mass of a gas into a mold cavity in combination with a quantity of plastic material, said gas-assisted injection molding system comprising:

- fixed volume means for accumulating a predetermined constant mass of said gas;
- passage means in fluidic communication with said fixed volume accumulating means for communicating said predetermined constant mass of said gas to said mold cavity such that said predetermined constant mass of said gas is distributed between said fixed volume accumulating means, said passage means and said mold cavity whereby said predetermined constant mass of said gas remains substantially contained within said gas-assisted injection molding system;
- means in communication with said fixed volume accumulating means for sensing a pressure of said gas within said

fixed volume accumulating means after said gas is communicated to said mold cavity; and means for comparing said sensed pressure of said fixed volume accumulating means after said gas is communicated



to said mold cavity with a predetermined pressure so as to verify that said predetermined constant mass of said gas in said fixed volume accumulating means has fully expanded throughout said injection molding system.

# 5,411,686

## METHOD AND APPARATUS FOR CONTROLLING INJECTION MOLDING

Masaharu Hata, Utsunomiya, Japan, assignor to Kao Corporation, Tokyo, Japan

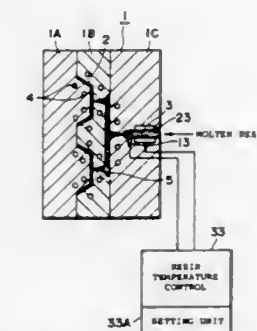
Filed Dec. 23, 1992, Ser. No. 995,715

Claims priority, application Japan, Dec. 26, 1991, 3-356697

Int. Cl.<sup>6</sup> B29C 45/72, 45/73

U.S. Cl. 264—40.6

19 Claims



1. An injection molding control method for controlling the temperature of an injection mold when injection molding is performed using the mold, wherein the mold has mold cooling channels arranged around a cavity and a temperature adjusting portion for adjusting the temperature of a molten resin is arranged in a passageway leading from an injection molding machine to the cavity, said method comprising the steps of: measuring characteristic quantities of mold temperature in a molding cycle; measuring coolant temperature of the cooling channels; measuring the temperature of the molten resin maintained in the temperature adjusting portion; identifying a response model of a variation in mold temperature using measured values obtained at the foregoing measurement steps; determining whether there is a cause of fluctuation in mold temperature at the start of injection; in a case where there is a cause of fluctuation in mold temperature, calculating a target value of coolant tempera-

ture, which is for holding the mold temperature constant at the start of injection, using the response model; and controlling temperature or flow rate of the coolant in such a manner that the temperature of the coolant in the cooling channels will attain the calculated target value.

5,411,687

**EXTRUDED, OPEN-CELL ALKENYL AROMATIC POLYMER FOAM AND PROCESS FOR MAKING**  
Daniel D. Imeokparia, Pickerington; Creston D. Schmidt, Nashport, and Kyung W. Suh, Granville, all of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 23, 1994, Ser. No. 264,669

Int. Cl.<sup>6</sup> C08J 9/08

U.S. Cl. 264—50

11 Claims

1. A process for making an extruded, open-cell alkenyl aromatic polymer foam, the foam having a minor dimension in cross-section of greater than 0.25 inches or more, the foam having from about 30 percent to about 80 percent open cell content, comprising:

- heating an alkenyl aromatic polymer material comprising more than 50 percent by weight alkenyl aromatic monomeric units to form a melt polymer material;
- incorporating into the melt polymer material an amount of a nucleating agent sufficient to result in a foam having from about 30 percent to about 80 percent open cell content;
- incorporating into the melt polymer material at an elevated pressure a blowing agent to form a foamable gel;
- cooling the foamable gel to a foaming temperature of from about 118° C. to about 145° C. wherein the foaming temperature is from about 3° C. to about 15° C. higher than the highest foaming temperature for a corresponding closed-cell foam, and
- extruding the foamable gel through a die into a region of reduced pressure to form the foam.

5,411,688

**METHOD FOR FORMING PLASTIC MOLDED PANELS WITH INSERTS**

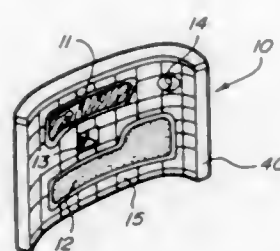
Clark Morrison, West Bloomfield, and Vittorio Strapazzini, Warren, both of Mich., assignors to Duotec Products Associates, Troy, Mich.

Filed Jun. 29, 1992, Ser. No. 905,799

Int. Cl.<sup>6</sup> B29C 67/22

U.S. Cl. 264—45.4

7 Claims



1. A method for forming molded plastic panels having inserts, for use as trim panels, interior door panels and the like, comprising the steps of:

- positioning an insert into a first mold;
- adding a polyurea elastomer material into said mold;
- forming a thin, flexible, polyurea sheet, from said polyurea elastomer material, of a predetermined size and shape such that said insert is secured to said polyurea sheet to provide a blank having an outer surface adjacent said first mold and an inner surface on an opposite side of said blank;
- positioning a mating mold adjacent said first mold and forming a cavity between said mating mold and said blank;
- applying and bonding a relatively thick plastic substrate

against the inner surface of the blank for bonding together surfaces of the blank and substrate;

- thereafter, removing the molded panel from the mold to provide a composite plastic panel having an exposed exterior surface formed of outer surfaces of the blank and the insert; and
- removing a portion of the sheet, which forms the blank, that overlaps the insert before bonding the substrate to the blank so as to simultaneously bond an inner face of the insert directly to the substrate.

5,411,689

**METHOD FOR ACCELERATING REMOVAL OF RESIDUAL BLOWING AGENT FROM EXTRUDED FLEXIBLE FOAMS**

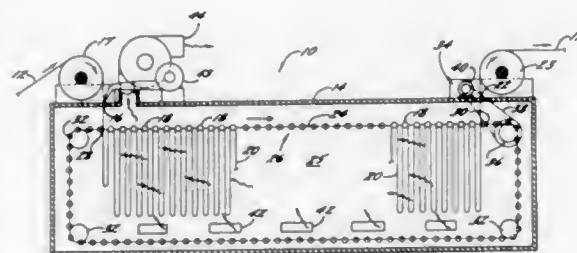
Shau-Tarng Lee, Oakland, and Andrew Oiestad, New Providence, both of N.J., assignors to Sealed Air Corporation, Saddle Brook, N.J.

Filed Mar. 25, 1993, Ser. No. 37,036

Int. Cl.<sup>6</sup> B29C 67/22

U.S. Cl. 264—53

11 Claims



1. A method for accelerating the removal of residual blowing agent from elongate, flexible foam bodies of an extruded thermoplastic polymer, said method comprising the steps of:

- draping an elongate, flexible foam body over a plurality of substantially parallel supporting members extending in a direction substantially transverse to the lengthwise direction of the elongate foam body so as to form free hanging foam loops between the supporting members substantially to maximize the exposed surface area of the foam body;
- transporting the parallel supporting members through a heating zone so as to transport the free hanging foam loops through the heating zone substantially in the absence of tension on the foam body to minimize breakage; and
- removing a substantial portion of the residual blowing agent from the foam body by forcing heated air over the exposed surface of the foam body at a predetermined temperature and for a predetermined time sufficient to remove a substantial portion of the residual blowing agent from the foam body and to cause sufficient air to diffuse into the foam body so as not to cause substantial collapse of the foam body.

5,411,690

**PROCESS FOR PRODUCING A TETRAGONAL PHASE ZIRCONIA CERAMIC**

Syamal K. Ghosh; Dilip K. Chatterjee, and Dennis R. Koziol, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 999,171, Dec. 21, 1992, Pat. No. 5,336,282, which is a continuation of Ser. No. 816,646, Dec. 31, 1991, abandoned. This application Feb. 14, 1994, Ser. No. 169,884

Int. Cl.<sup>6</sup> C04B 35/64

U.S. Cl. 264—63

14 Claims

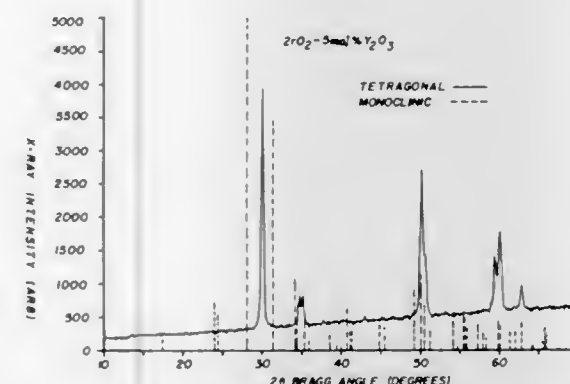
1. A process for producing a zirconia ceramic having a tetragonal phase crystal grain structure, said ceramic comprising zirconium oxide and a dopant that is an oxide of a rare earth

element, calcium, or magnesium, or mixtures thereof, and wherein said ceramic has a molar ratio of dopant to zirconium oxide from above about 3:97 to about 5:95 when said ceramic comprises less than about 0.5 mole percent of magnesium oxide, said ceramic has a molar ratio of dopant to zirconium oxide from about 0.5:99.5 to about 1.0:99.0 when said ceramic comprises from about 0.5 mole percent to about 1.0 mole percent of magnesium oxide, and said ceramic does not comprise more than about 1.0 mole percent of magnesium oxide, said process comprising the steps of:

compacting a powder comprising the zirconium oxide and the dopant in the presence of an organic water-soluble binder, the powder having an average grain size from about 0.1  $\mu$ m to about 0.6  $\mu$ m and a moisture content of from about 0.2 to about 1.0 percent by volume of the powder when compacted, at a compacting pressure of from about 12,000 psi to about 18,000 psi for a time sufficient to compact the powder to form a green part having a density; and

sintering the green part by sequentially:

- heating the green part from room temperature at a heating ramp from about 0.1° C./min. to about 0.5° C./min. to a temperature  $T_1$  from about 200° C. to about 400° C., wherein when  $T_1$  is about 400° C. then step (b) is not performed but instead step (c) is performed next;



- heating the green part from temperature  $T_1$  at a heating ramp from about 0.05° C./min. to about 0.2° C./min. to a temperature  $T_2$  of about 400° C.;
- heating the green part from temperature  $T_2$  at a heating ramp from about 0.2° C./min. to about 0.5° C./min. to a temperature  $T_3$  from about 500° C. to about 700° C.;
- heating the green part from temperature  $T_3$  at a heating ramp from about 1.0° C./min. to about 2.0° C./min. to a temperature  $T_4$  from about 1400° C. to about 1600° C.;
- maintaining the green part at temperature  $T_4$  within about 1400° C. to about 1600° C. for about 3 hours when  $T_4$  is about 1400° C., for about 1 hour when  $T_4$  is about 1600° C., and when  $T_4$  has an intermediate value therebetween maintaining  $T_4$  for a time interval between 3 hours and 1 hour, to form a sintered part;
- cooling the sintered part from temperature  $T_4$  at a cooling ramp from about 0.5° C./min. to about 3.0° C./min. to a temperature  $T_5$  from about 900° C. to about 700° C.; and
- cooling the sintered part from temperature  $T_5$  at a cooling ramp from about 1.5° C./min. to about 3.0° C./min. to about room temperature to thereby form said ceramic.

5,411,691

**METHOD OF MANUFACTURING CONTAINERS FROM HUSKS**

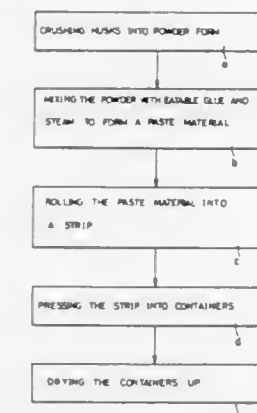
Ta S. Hwang, Taichung, assignor to Kuo-Chung Chang-Chien; Fong-Ying Cheng-Chang and Ming Ta Wang, all of Taichung, Taiwan, Prov. of China

Filed Feb. 9, 1994, Ser. No. 194,043

Int. Cl.<sup>6</sup> B29C 43/00

U.S. Cl. 264—115

5 Claims



1. A method of manufacturing containers from husks comprising the steps of:

- crushing husks into powder form;
- mixing said powder with edible glue and steam to form a paste material;
- rolling said paste material into a strip;
- pressing said strip into containers with desired configuration; and
- drying said containers.

5,411,692

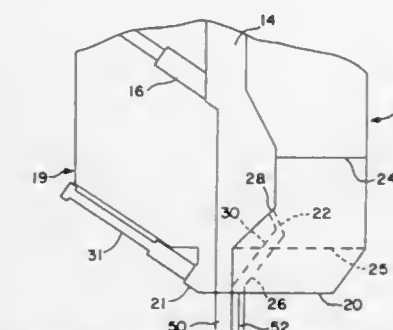
**INTEGRAL RECLOSABLE BAG DIE ASSEMBLY**  
David DiPietro, and Mladimir Tomic, both of Appleton, Wis., assignors to Reynolds Consumer Products Inc., Appleton, Wis.

Filed Apr. 11, 1994, Ser. No. 225,862

Int. Cl.<sup>6</sup> B29C 47/14

U.S. Cl. 264—177.16

16 Claims



1. An integral reclosable bag die assembly for extruding a bag film and a closure profile integrally connected thereto, comprising a die including an inlet port for receiving molten polymeric material, an elongated outlet port for discharging the molten material, and a plenum extending between said inlet and outlet ports for channeling the molten material from said inlet port to said outlet port and for spreading the molten material across the die therein, said outlet port including a pair of elongated lips disposed opposite one another, one of said lips having a closure profile extrusion site configured in the form of the closure profile, said plenum opening into a diverting channel positioned within the die and beginning at a location up-



stream of said closure profile extrusion site of said one of said lips and downstream of at least the majority of said spreading within said plenum to divert a portion of the molten material from said plenum into said diverting channel, said diverting channel extending from said location to said closure profile extrusion site of said one of said lips so as to feed the diverted portion of the molten material to said closure profile extrusion site and form the closure profile.

14. A method for extruding a bag film and a closure profile integrally connected thereto, comprising the steps of: feeding a stream of molten polymeric material into an inlet port of a die; channeling the stream of molten polymeric material through a plenum extending between the inlet port and an outlet port of the die, the plenum spreading the stream of molten polymeric material across the die and shaping the stream of molten polymeric material into the bag film; diverting a portion of the stream of molten polymeric material from the plenum into a diverting channel tapping the stream of molten polymeric material subsequent to said spreading; feeding the diverted portion of the molten polymeric material to a closure profile extrusion site configured in the form of a closure profile; and reuniting the diverted portion with the stream of molten polymeric material prior to exiting the outlet port of the die.

5,411,693

**HIGH SPEED SPINNING OF MULTI-COMPONENT FIBERS WITH HIGH HOLE SURFACE DENSITY SPINNERETTES AND HIGH VELOCITY QUENCH**  
Carl J. Wust, Jr., Conyers, Ga., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jan. 5, 1994, Ser. No. 177,749  
Int. Cl.<sup>6</sup> D01F 8/06

U.S. Cl. 264—171

51 Claims

1. A process for high speed spinning of multi-component polymer filaments, comprising:  
feeding a first polymeric component at a first melt temperature into at least one spin pack assembly;  
feeding a second polymeric component at a second melt temperature into the at least one spin pack assembly;  
combining the first and second polymeric components into a multi-component configuration and extruding through at least one high hole surface density spinnerette to form molten multi-component filaments; and  
quenching the molten multi-component filaments by blowing a fluid at a high velocity across the direction of extrusion of the multi-component molten filaments, to effectively prevent slubs and marrying of the multi-component filaments.

5,411,694

**PROCESS FOR POST-SPIN FINISHING OF POLYBENZOXAZOLE FIBERS**

Willard E. Alexander; Chieh-Chun Chau, and Timothy L. Faley, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 929,272, Aug. 13, 1992, Pat. No. 5,273,703. This application Nov. 18, 1993, Ser. No. 154,237. The portion of the term of this patent subsequent to Dec. 28, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> D01D 10/02, 10/06

U.S. Cl. 264—184

10 Claims

1. A process for finishing a spun and drawn dope fiber, which contains polybenzoxazole polymer and polyphosphoric acid, comprising the steps of:  
(a) coagulating the dope fiber in an aqueous coagulant;  
(b) washing the coagulated fiber with an aqueous washing fluid for less than 72 hours under conditions such that the

fiber contains no more than 8,000 ppm residual phosphorus;  
(c) drying the fiber at a temperature of about 120° C.-300° C. until it retains no more than about 3 weight percent residual moisture; and  
(d) heat-treating the fiber at a temperature of at least about 300° C. under tension.

5,411,695

**THERMOPLASTIC RESIN FILM AND A METHOD FOR PRODUCING THE SAME**

Toshirou Yamada, and Chisato Nonomura, both of Ohtsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 890,366, May 26, 1992, abandoned, which is a continuation of Ser. No. 584,465, Sep. 18, 1990, abandoned. This application Oct. 13, 1993, Ser. No. 135,852. Claims priority, application Japan, Oct. 16, 1989, 1-269366; Dec. 22, 1989, 1-333777; Jan. 22, 1990, 2-13085; Jul. 17, 1990, 2-189172

Int. Cl.<sup>6</sup> B29C 47/88

U.S. Cl. 264—211.13

11 Claims

1. A method for producing a thermoplastic polyamide resin film at least oriented in the transverse direction, wherein the difference between the molecular orientation angles at any different two points on a straight line in the transverse direction measured by microwave techniques satisfies the following formula V:

$$\Delta\theta_{or} \times w/wf \leq 64.0 \quad (V)$$

wherein  $\Delta\theta_{or}$  is the difference of the molecular orientation angles (°) measured at said two points, wf is the distance (m) of said points, and w is the width (m) of said film, which comprises the steps of drawing a thermoplastic polyamide resin film in the transverse direction in a drawing zone, said film containing at least 1.0% by weight of water based on the total weight of said film and water, cooling said film to a temperature lower than the glass transition temperature of said polyamide resin in a cooling zone, heat-setting said film in a heat-setting zone, and allowing said film to shrink by a positive amount in the longitudinal direction, wherein the length of said cooling zone satisfies the following formula VI:

$$(L/W) \geq 1.0 \quad (VI)$$

wherein L is the length (m) of said cooling zone, and W is the width (m) of said film after the drawing is carried out.

5,411,696

**PROCESS OF MAKING A PANEL UNIT**

Toshikazu Ito, and Yoshihiro Suita, both of Obu, Japan, assignors to Tokai Kogyo Kabushiki Kaisha, Obu, Japan

Continuation-in-part of Ser. No. 727,945, Jul. 10, 1991, abandoned. This application Jul. 1, 1993, Ser. No. 88,520. Claims priority, application Japan, Dec. 27, 1990, 2-415994. Int. Cl.<sup>6</sup> B29C 47/02

U.S. Cl. 264—252

4 Claims

1. A method of manufacturing a panel unit including a window glass panel having upper, lower and end surfaces, and a frame mounted on a peripheral edge of said window glass panel, said method comprising the steps of:  
providing a window glass panel;  
preparing molding die means having an extrusion port for extruding a molding material forming said frame, said extrusion port having an inner circumferential surface configured to a cross section of a frame to be mounted on the peripheral edge of said window glass panel, and an open side surface shaped to externally receive the peripheral edge of said window glass panel;  
inserting a part of the peripheral edge of said window glass panel into said open side surface of said extrusion port to

form a molding space defined by the peripheral edge of said window glass panel and the inner circumferential surface of said extrusion port, said molding space corresponding to the cross section of said frame and having an opening;  
extruding said molding material from said extrusion port of said molding die means into said molding space;  
controllably tilting said window glass panel such that the peripheral edge inserted into said open side surface maintains a constant angle to said molding die means; and  
providing continuous movement of said window glass panel relative to said molding die means so that the extrusion port of said molding die means is virtually moved around the peripheral edge of said window glass panel, thereby forming said frame covering the end surface and a part of the upper and lower surfaces of said window glass panel and extending along the peripheral edge of said window glass panel at a constant angle to the upper surface thereof, thereby forming said panel unit.

5,411,697

**METHOD FOR PROCESSING CONTAMINATED PLASTIC WASTE**

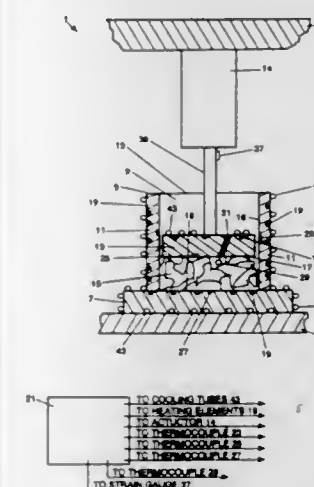
Peter S. McGraw, Severna Park; John L. Drake, Jr., Arnold, and Thomas H. Hane, Annapolis, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 30, 1993, Ser. No. 128,410

Int. Cl.<sup>6</sup> B29C 43/02

U.S. Cl. 264—294

12 Claims



I. A method for processing contaminated plastic waste to produce a sanitary end product suitable for long-term storage, the method comprising the steps of:

- feeding the contaminated plastic waste into a chamber defined by a plurality of walls;
- compacting the contaminated plastic waste within said chamber by applying a compaction pressure of between approximately 40 psi to 50 psi thereto, said compaction pressure being applied by relatively moving said chamber and a compaction ram, the compacted plastic waste forming a slug;
- heating outer surfaces of said slug while concurrently continuing said compacting of said slug;
- melting at least some of the contaminated plastic waste of said slug by continuing said heating until a melted layer forms along the outer surfaces of said slug;
- cooling said slug while continuing said compacting of said slug until said melted layer hardens to form a plastic coating at the outer surfaces of said slug, said plastic coating encapsulating said slug; and
- ejecting said cooled slug from said chamber.

5,411,698  
**PROCESS AND APPARATUS FOR BLOW MOLD ANNEALING AND SUBSEQUENTLY HEAT TREATING THERMOPLASTIC ARTICLES**

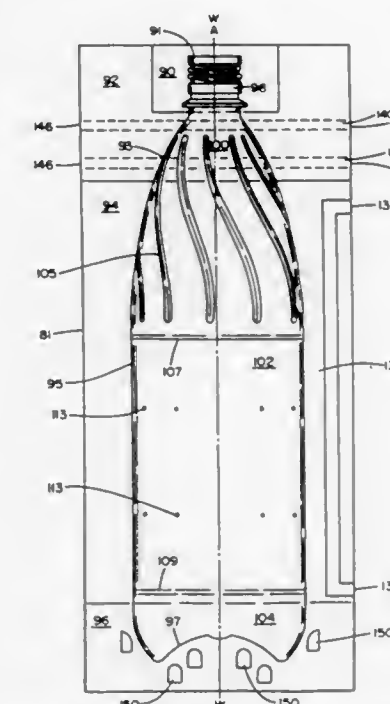
Christopher Mero, New Millford, Conn., and John Cahill, Yorktown Heights, N.Y., assignors to PepsiCo., Inc., Purchase, N.Y.

Continuation of Ser. No. 949,799, Sep. 22, 1992, abandoned. This application Mar. 7, 1994, Ser. No. 207,797

Int. Cl.<sup>6</sup> B29C 49/18, 49/64

U.S. Cl. 264—521

6 Claims



1. A process for preparing a heat treated transparent biaxially oriented blown thermoplastic container comprising:

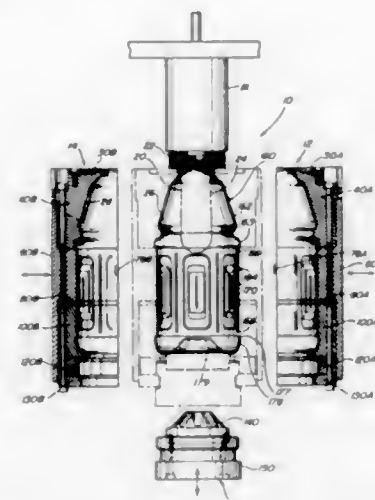
introducing a thermoplastic material in the form of a hollow preform heated to a temperature of 90° C. to 110° C. into a first mold and blowing the thermoplastic material to the shape of the first mold to form a container, holding said container against the surfaces of said first mold to heat anneal said blown container, said first mold having thermally controlled temperature portions, including a neck-shoulder portion maintained at about 60° C. to 70° C., a body portion maintained at about 65° C. to 85° C. but differing in temperature from said neck-shoulder portion, and a bottom portion and shoulder portion each maintained at below 70° C. but differing in temperature from said body portion wherein the heat annealed container differs in temperature in correspondence with the temperature differentials of the neck-shoulder portion, the body portion and the bottom portion and shoulder portion of the first mold;

transferring the container to a second mold up to 10% larger in volume than said first mold and pressurizing said container to force it against the surfaces of said second mold, said second mold having thermally controlled temperature portions to heat treat the blown container to increase temperature induced crystallinity, including a neck portion maintained at 65° C. to 85° C., a body portion maintained at about 110° C. to 220° C., a neck-shoulder portion maintained at about 110° C. to 220° C. but below that of the body portion, and a bottom portion and shoulder portion each maintained at 95° C. or less; and cooling the heat-treated container.

# 5,411,699 MODULAR MOLD

Wayne N. Collette, Merrimack; David P. Piccoli, Auburn, and Suppayan M. Krishnakumar, Nashua, all of N.H., assignors to Continental PET Technologies, Inc., Florence, Ky.  
Continuation of Ser. No. 792,449, Nov. 15, 1991, Pat. No. 5,255,889. This application Jul. 2, 1993, Ser. No. 86,103  
The portion of the term of this patent subsequent to Oct. 26, 2010, has been disclaimed.  
Int. Cl.<sup>6</sup> B29C 33/30, 49/48  
U.S. Cl. 264—523

4 Claims



4. In a method of blow molding a plastic hot-fill container in a mold assembly of the type including a central mold section for forming at least a part of a panel portion of the container, wherein the panel portion of the container has vacuum panels, and the mold assembly further has upper and lower mold sections positionable above and below the central mold section for forming a shoulder and base portion of the container respectively, the improvement comprising:

- providing a plurality of shims each having an inner molding surface for forming at least a part of the vacuum panels;
- providing the lower mold section with an inner molding surface for forming a lower panel portion;
- selecting shims of a predetermined overall height in order to vary the overall vacuum panel height, wherein a larger height is selected for a larger container in order to compensate for the greater vacuum contraction of the container during cooling.

# 5,411,700 FABRICATION OF GAMMA (TiAl) ALLOY ARTICLES BY POWDER METALLURGY

Ricky L. Martin, Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.  
Filed Dec. 14, 1987, Ser. No. 132,733  
Int. Cl.<sup>6</sup> C21D 1/00; C22C 14/00  
U.S. Cl. 419—29

3 Claims



1. A method for producing gamma (TiAl) titanium alloy articles including the steps of:

- a) compacting a mixture of Al<sub>3</sub>Ti and Ti<sub>3</sub>Al powders, whose

overall composition lies within the TiAl phase field, into a preform;  
b) hot working the preform into a final shape; and  
c) homogenizing the hot worked article under conditions which promote interdiffusion and TiAl formation.

# 5,411,701 STAINLESS STEEL

Hakan Holmberg, Gävle, Sweden, assignor to Sandvik AB, Sandviken, Sweden  
Continuation of Ser. No. 895,426, Jun. 5, 1992, Pat. No. 5,242,655, which is a continuation of Ser. No. 660,999, Feb. 26, 1991, abandoned. This application Jun. 7, 1993, Ser. No. 71,978  
Claims priority, application Sweden, Feb. 26, 1990, 9000673  
Int. Cl.<sup>6</sup> C22C 38/58

U.S. Cl. 420—48 18 Claims  
1. A precipitation-hardenable non-magnetic cold worked steel alloy with high strength, comprising in percent by weight:

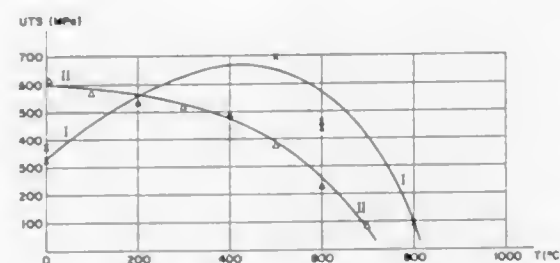
C	0.04–0.25%
Si	0.1–2%
Mn	2–15%
Cr	16–20.37%
Ni	8–14%
N	0.10–1.5%
V	0.1–<1%

the remainder being iron and normal impurities, the contents of said elements being balanced so that the austenitic phase remains sufficiently stable so as to resist transformation into martensite during cold working, said steel alloy having a magnetic permeability of 1,025 or less.

5,411,702  
IRON-ALUMINUM ALLOY FOR USE AS  
THERMAL-SHOCK RESISTANCE MATERIAL  
Mohamed Nazmy, Fislisbach; Corrado Nosedà, Dietikon, and Markus Staubli, Dottikon, all of Switzerland, assignors to ABB Management AG, Baden, Switzerland  
Filed Dec. 28, 1993, Ser. No. 174,352  
Claims priority, application European Pat. Off., Nov. 8, 1993, 93118045.9

Int. Cl.<sup>6</sup> C22C 38/06

U.S. Cl. 420—79 4 Claims



I = 16Al-5Cr-1Nb-1Si-3.53B-1.51Ti-300ppm C-100ppm Zr-Res Fe

II = 4.0Si-3.35C-1Mo-0.5Mn-0.01P-0.05S-Res Fe

1. An alloy on the basis of iron and aluminum, which comprises the following constituents in atom percent:

12–18	aluminum
0.1–10	chromium
0.1–2	niobium
0.1–2	silicon
0.1–5	boron
0.01–2	titanium
100–500	ppm carbon

-continued

50–200 ppm zirconium  
remainder iron.

# 5,411,703 LEAD-FREE, TIN, ANTIMONY, BISMTUH, COPPER SOLDER ALLOY

Stephen G. Gonya; James K. Lake, both of Endicott, N.Y.; Randy C. Long, Friendsville, Pa., and Roger N. Wild, Owego, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 16, 1993, Ser. No. 79,065

Int. Cl.<sup>6</sup> C22C 13/02

U.S. Cl. 420—561 1 Claim

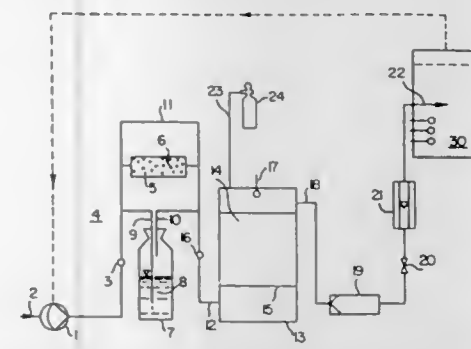
1. A high solidus temperature, high service temperature, high strength multi-component, lead-free solder alloy consisting of 93.0 to 94.0 weight percent Sn, 2.5 to 3.5 weight % Sb, 1.5 to 2.5 weight % Bi, and 1.0 to 2.0 weight % Cu.

# 5,411,704 PROCESS AND APPARATUS FOR GENERATING A PESTICIDAL GAS

Rainer Schellhaas, Laudenbach, and Martin Muenzel, Bensheim, both of Germany, assignors to Detia Freyberg GmbH, Laudenbach/Bergstrasse, Germany  
Division of Ser. No. 820,832, Jan. 15, 1992, Pat. No. 5,260,022, which is a division of Ser. No. 275,830, Nov. 25, 1988, Pat. No. 5,098,664. This application Sep. 16, 1993, Ser. No. 121,479  
Claims priority, application South Africa, Nov. 27, 1987, 87/8913

Int. Cl.<sup>6</sup> A61L 9/00; C01B 25/10; A01N 59/26; A23K 3/02

U.S. Cl. 422—29 25 Claims

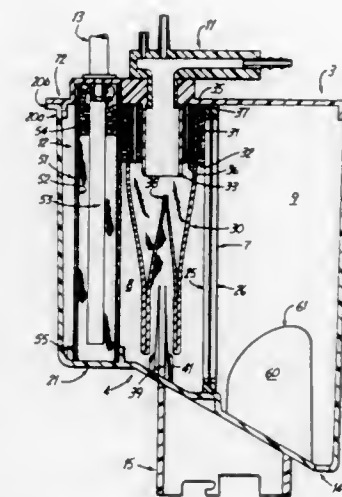


1. A fumigation process, which comprises the steps of
  - (a) providing an enclosed generating space supplied with a hydrolysable metal phosphide and an enclosed fumigating space which is separate and distinct from the generating space,
  - (b) generating a mixture of phosphine gas and air having a phosphine gas concentration below the level at which an explosion can occur by bringing into contact in the generating space so as to react with one another the hydrolysable metal phosphide and water, causing phosphine to be released into air to form said mixture;
  - (c) withdrawing from the generating space the phosphine gas so generated and propelling it so as to feed it as said mixture of air and phosphine gas in an air flow into the fumigating space; and
  - (d) preventing the build-up of autoignitable concentrations of air and phosphine gas in the generating space and in said mixture of air and phosphine gas by regulating and controlling the combination of steps (b) and (c).

# 5,411,705 COMBINED CARDIOTOMY AND VENOUS BLOOD RESERVOIR

Eric J. Thor, Columbia Heights; Kevin D. McIntosh, Albertville; Bruce R. Jones, and Jeremy D. Dando, both of Plymouth, all of Minn., assignors to Avecor Cardiovascular Inc., Plymouth, Minn.

Filed Jan. 14, 1994, Ser. No. 182,731

Int. Cl.<sup>6</sup> A61M 1/14, 1/34; B01D 27/00  
U.S. Cl. 422—45 26 Claims

1. A combined venous and cardiomy blood reservoir, comprising:

- (a) a rigid shell having a top, a bottom, and a continuous sidewall, said top and bottom connected to the sidewall to form an enclosed reservoir;
- (b) a filter unit having two faces and four sides, said filter unit disposed within the reservoir where two of the sides are opposed and connected to the sidewall and the other two of the sides are opposed and connected, respectively, to the top and bottom, said filter unit dividing the enclosed reservoir into an enclosed inlet chamber and an enclosed outlet chamber, said inlet chamber and outlet chamber in fluid communication through said filter unit;
- (c) a cardiomy blood filter and defoamer located within the inlet chamber and extending substantially from the top to the bottom of the shell, and a cardiomy blood inlet in fluid communication with the cardiomy blood filter and defoamer;
- (d) a venous blood filter and defoamer located within the inlet chamber separate of the cardiomy blood filter and defoamer and extending substantially from the top to the bottom of the shell, and a venous blood inlet in fluid communication with the venous blood filter and defoamer;
- (e) a blood outlet in fluid communication with the outlet chamber.

5,411,706  
PUMP/OXYGENATOR WITH BLOOD RECIRCULATION  
Lloyd C. Hubbard, 20645 Bayview Ct., Excelsior, Minn. 55331, and Earl W. Clausen, 16489 Ellerdale La., Eden Prairie, Minn. 55346

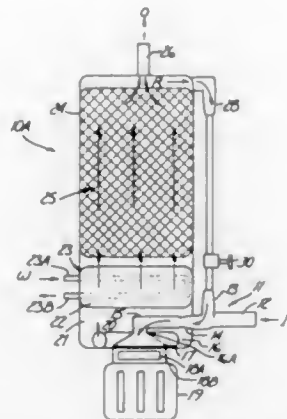
Filed Feb. 9, 1994, Ser. No. 193,736

Int. Cl.<sup>6</sup> A61M 1/18; B01D 19/00, 61/00  
U.S. Cl. 422—46 12 Claims

1. A system for processing blood during a surgical procedure comprising:
- a system inlet for receiving blood;
  - a system outlet for delivering blood;
  - a blood pump for circulating blood received at the system inlet under pressure to the system outlet, the blood pump



having an inlet connected to the system inlet through which blood is supplied to the blood pump and a pump outlet through which blood is expelled from the blood pump;  
means for oxygenating the blood expelled from the outlet of

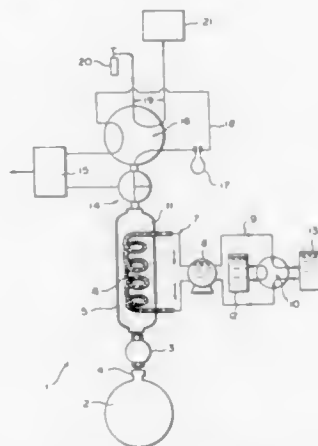


the blood pump, wherein the means for oxygenating the blood is connected to the system outlet to supply a first portion of oxygenated blood to the system outlet; and means for recirculating a second portion of the oxygenated blood from the means for oxygenating to the pump inlet of the blood pump.

5,411,707

# VACUUM EXTRACTOR INCORPORATING A CONDENSER COLUMN

Michael H. Hiatt, Las Vegas, Nev., assignor to The United States of American as represented by the Administrator of the Environmental Protection Agency, Washington, D.C.  
Continuation of Ser. No. 904,100, Jun. 25, 1992, abandoned.  
This application Jan. 12, 1994, Ser. No. 180,518  
Int. Cl.<sup>6</sup> G01N 30/02, 30/12, 30/14  
U.S. Cl. 422—68.1 16 Claims



1. An apparatus comprising a sample chamber, a sole condensing means for selectively condensing distillate, a cryotrap for sample focussing, a vacuum pump, a source of inert gas, a gaseous compound detection means and valve means for connecting said condenser column, said vacuum pump, said source of inert gas, said cryotrap and said gaseous compound detection means;

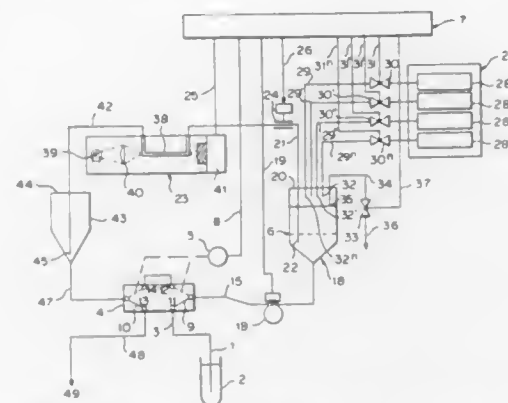
said sole condensing means consisting essentially of a single condenser column having temperature regulation means for continually sensing, adjusting and maintaining the temperature of the condenser column,

said valve means having at least two positions, a loading position and an injection position, wherein when said valve means is in the loading position, said sample chamber is fluidly connected to a first end of said condenser column, a second end of said condenser column is fluidly connected to said cryotrap, and said cryotrap is fluidly connected to said vacuum pump, wherein when said valve means is in the injection position, said source of inert gas is fluidly connected to said cryotrap and said cryotrap is fluidly connected to said gaseous compound detection means, while said sample chamber is fluidly connected to the first end of said condenser column, and the second end of said condenser column is fluidly connected to said vacuum pump without being fluidly connected to said cryotrap, wherein when said valve means is in said loading position such that said vacuum pump is fluidly connected to the cryotrap, said vacuum pump causes a vacuum distillation of compounds in a sample in said sample chamber, said compounds being trapped by said cryotrap, and wherein when said valve means is in said injection position, said compounds in said cryotrap are analyzed by said gaseous compound detection means.

5,411,708

# APPARATUS FOR THE DETERMINATION OF ANALYTES IN LIQUID SAMPLES

Pompeo Moschetta, 186 Via Eschilo, I-00125 Casalpalocco RM, Italy  
PCT No. PCT/IT92/00093, § 371 Date Apr. 6, 1993, § 102(e) Date Apr. 6, 1993, PCT Pub. No. WO93/03345, PCT Pub. Date Feb. 18, 1993  
PCT Filed Aug. 5, 1992, Ser. No. 39,101  
Claims priority, application Italy, Aug. 6, 1991, RM91A0601  
Int. Cl.<sup>6</sup> G01N 35/08, 35/10  
U.S. Cl. 422—81 17 Claims



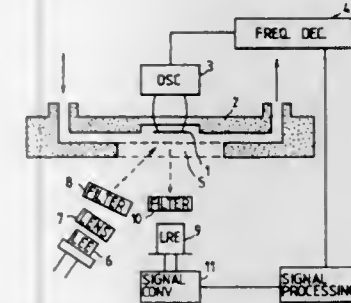
1. Apparatus for determining analytes in liquid samples which comprises

- a) means for sampling;
- b) bidirectional pump means in fluid connection with said means for sampling;
- c) an injection chamber in fluid connection with said pump means, through a bottom input, said injection chamber comprising a first outlet tube which draws to an inside thereof;
- d) means for controlling addition of at least one reagent and calibrator into said injection chamber while in fluid connection with said injection chamber;
- e) means for determining concentration of said analytes, in fluid connection with said injection chamber through said first outlet tube;
- f) means for interrupting the fluid connection between said injection chamber and said means for determining the concentration of analytes;
- g) an expansion chamber in fluid connection with said means

for determining concentration, through an inlet tube which draws to an inside thereof, said expansion chamber comprising a second outlet tube;  
h) means for discharging and recirculating the liquid samples in fluid connection with said expansion chamber through said second outlet tube and with said means for sampling and  
i) means for operating and controlling the apparatus, wherein said means for controlling addition is responsive to the fluid flow from said injection chamber to said expansion chamber, whereby said apparatus operates as a single hydraulic circuit closed to the external air.

5,411,709  
GAS DETECTOR

Makoto Furuki, and Lyong S. Pu, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan  
Filed Mar. 24, 1992, Ser. No. 860,754  
Claims priority, application Japan, Mar. 25, 1991, 3-084658; Aug. 23, 1991, 3-237113; Feb. 4, 1992, 4-047634  
Int. Cl.<sup>6</sup> G01N 21/64  
U.S. Cl. 422—91 6 Claims



1. A gas detector comprising:  
a gas detecting element having a vibrating member and a gas sensitive thin film disposed on said vibrating member, said thin film being adapted to generate either fluorescence or phosphorescence when irradiated with light;  
vibrating means for vibrating said vibrating member;  
frequency detecting means for detecting an oscillation frequency of said vibrating member, said oscillation frequency indicating a concentration of a gas;  
light means for radiating light to said gas sensitive thin film; and  
light detecting means for receiving the fluorescence or phosphorescence generated from said gas sensitive thin film to detect the intensity thereof, said intensity indicating a concentration of the gas.

5,411,710

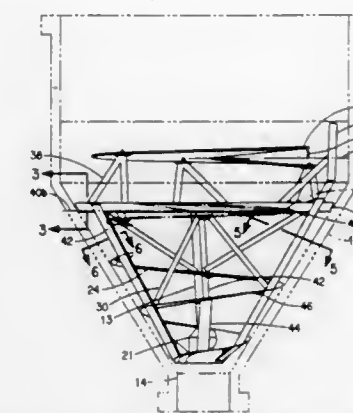
# APPARATUS FOR PROCESSING MATERIALS

John M. Iwasyk, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.  
Filed Jun. 30, 1993, Ser. No. 85,850  
Int. Cl.<sup>6</sup> C08F 2/00; B01F 7/00  
U.S. Cl. 422—137 17 Claims

1. An apparatus for processing at least one material, comprising:

- (a) an agitator section having an outlet adjacent the bottom thereof;
- (b) a transfer screw attached to the agitator section;

(c) a spiral ribbon extending upwardly from the transfer screw end attached thereto;  
(d) a ring disposed vertically above the spiral ribbon; and



(e) means for pumping the material baffle disposed vertically above the spiral ribbon and connected to the ring.

5,411,711

# ELECTRICALLY HEATABLE HONEYCOMB BODY, IN PARTICULAR CATALYST CARRIER BODY, WITH INTERNAL SUPPORT STRUCTURES

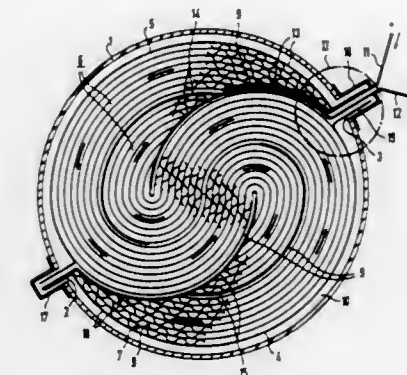
Helmut Swars, Bergisch Gladbach, Germany, assignor to Emitec Gesellschaft fuer Emissionstechnologie mbH, Lohmar, Germany

Filed Feb. 1, 1993, Ser. No. 31,953

Int. Cl.<sup>6</sup> F01N 3/26

U.S. Cl. 422—177

39 Claims



1. A honeycomb assembly, comprising a honeycomb body, said honeycomb body having: an interior, two end surfaces, cross-sectional regions and a cross-sectional plane;  
sheet metal layers having a structure for forming a multiplicity of channels through which a fluid can flow, said channels extending from one of said end surfaces to the other; insulating means subdividing said honeycomb body and extending from one of said end surfaces to the other for reducing electrical conductivity of said honeycomb body in each of said cross-sectional regions and developing at least one wound, electrically cohering conductive current path extending in said cross-sectional plane; and primarily metal support structures extending at least partly in said interior of said honeycomb body and retaining said sheet metal layers;  
said insulating means being at least one planar gap, and said support structures being disposed in said at least one planar gap, being stabilizers of said at least one planar gap, and extending at least intermittently parallel to said at least one planar gap.

5,411,712

## BATCH SYSTEM FOR MICROWAVE DESORPTION OF ADSORBENTS

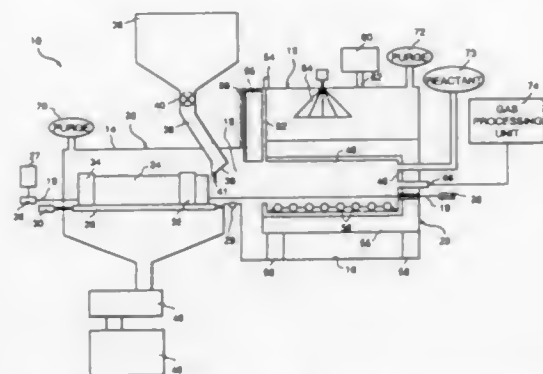
Donald E. Woodmansee, Schenectady, N.Y.; Philip J. Caliendo, Trumbull, Conn., and Andrew P. Shapiro, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 24, 1993, Ser. No. 21,937

Int. Cl.<sup>6</sup> B01J 19/08; H05B 6/64, 6/80

U.S. Cl. 422—186

46 Claims



1. An apparatus for desorbing a sorbated adsorbent, said apparatus comprising:  
 a microwave desorbing station;  
 an adsorbent handling station positioned adjacent to said desorbing station;  
 an adsorbent carrier tray arranged so as to be displaceable between said adsorbent handling station and said desorbing station; and  
 means for displacing said adsorbent carrier tray between said adsorbent handling station and said desorbing station.

5,411,713

## OZONE GENERATING APPARATUS

Masao Iwanaga, Tokyo, Japan, assignor to I.T.M. Corporation, Tokyo, Japan

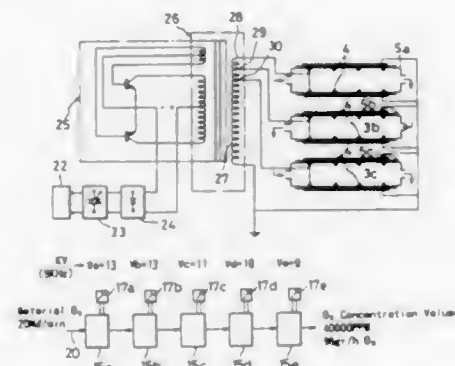
Filed Jul. 1, 1992, Ser. No. 907,780

Claims priority, application Japan, Jul. 3, 1991, 3-189196

Int. Cl.<sup>6</sup> B01J 19/08; C01B 13/11

U.S. Cl. 422—186.15

27 Claims



1. An ozone generating apparatus comprising:  
 a plurality of ozone generating units connected in series to form a plurality of stages along the flow path of a gas, each said ozone generating unit including an ozonizing chamber having a material gas inlet and a product gas outlet and ozonizer discharge electrodes disposed in said ozonizing chamber; and  
 an AC high-voltage power supply having a plurality of outputs with different voltage levels, wherein ozonizing discharge electrodes associated with ozone generating units of downstream stages as viewed in the direction of the flow of the gas are connected to an output of said

power supply having a lower voltage level than the power supply output to which ozonizer discharge electrodes associated with ozone generation units of upstream stages are connected.

27. An ozone generating method comprising the steps of:  
 connecting a plurality of ozone generating units in series to form successive stages, each ozone generating unit including an ozonizing chamber having a material gas inlet and a product gas outlet and at least one ozonizer discharge electrode disposed in said ozonizing chamber;  
 making a material gas flow in turn from ozone generating units connected at upstream stages to ozone generating units connected at downstream stages; and  
 applying a voltage to the ozonizing discharge electrodes of units associated with successive stages such that the ozonizing discharge electrode in a downstream stage as viewed in the direction of the flow of the gas is supplied with a lower voltage than the voltage supplied to said ozonizer discharge electrode connected in an upstream stage.

5,411,714

## THERMAL CONVERSION PYROLYSIS REACTOR SYSTEM

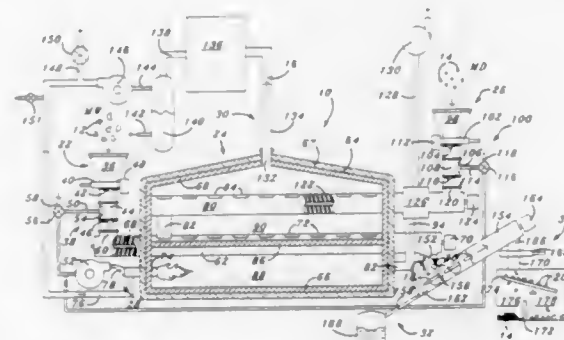
Arthur C. Wu, and Sabrina C. Chen, both of 9 Binnacle La., Foster City, Calif. 94404

Continuation-in-part of Ser. No. 863,747, Apr. 6, 1992, abandoned. This application Feb. 3, 1993, Ser. No. 12,911

Int. Cl.<sup>6</sup> B01J 8/08; F23K 3/10; C10B 1/60

U.S. Cl. 422—232

20 Claims



1. A pyrolysis reactor system for use in pyrolyzing carbonizable input material (MW), comprising:  
 a reactor chamber subsystem including an enclosed reactor chamber;  
 an MW input subsystem for inputting carbonizable material into said reactor chamber subsystem;  
 an MD input subsystem for inputting diffusion material (MD) into said reactor chamber subsystem;  
 heating means for maintaining the interior of said reactor chamber subsystem at a temperature sufficient to pyrolyze the carbonizable material;  
 a gaseous phase output subsystem for receiving and processing the gaseous phase products of pyrolysis reactions from said reactor chamber subsystem; and  
 transport means for transporting the MW and MD from said associated input subsystem, through said reactor chamber subsystem, and through nongaseous phase output subsystems situated at an end thereof;  
 wherein, the MD is preheated to a higher temperature than a MW temperature and mixed with the MW near the location at which the MW enters said reactor chamber subsystem, such that the MD acts to conductively heat the MW and enhance the pyrolysis process thereon as the MW and MD are carried together through said reactor chamber subsystem.

5,411,715

## APPARATUS FOR PREPARING AQUEOUS AMORPHOUS PARTICLE DISPERSIONS OF HIGH-MELTING MICROCRYSTALLINE SOLIDS

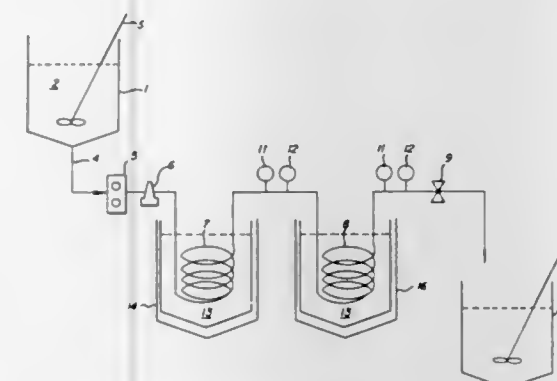
David A. Czekai, Honeoye Falls, and John F. Bishop, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 896,069, Jun. 9, 1992, abandoned. This application Oct. 21, 1993, Ser. No. 140,703

Int. Cl.<sup>6</sup> B01D 8/00

U.S. Cl. 422—243

10 Claims



1. An apparatus for forming dispersions of amorphous particles of photographically active materials in water comprising:  
 (a) a diaphragm pump;  
 (b) a first heat exchanger maintained at from 100° to 200° C.;  
 (c) a second heat exchanger maintained below a glass transition temperature of said amorphous particles;  
 (d) a spring-loaded back-pressure valve capable of generating a back pressure from 1 to 18 atmospheres; and  
 (e) conduits connecting said diaphragm pump to said first heat exchanger, said first heat exchanger to said second heat exchanger and said heat exchanger to said valve.

5,411,716

## SOLID DETERGENT DISPENSER FOR FLOOR SCRUBBER MACHINE

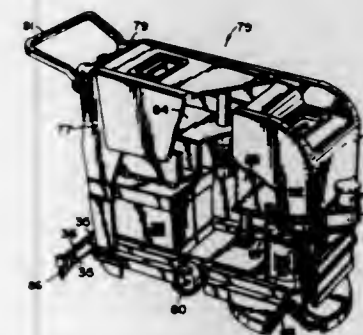
John E. Thomas, River Falls, Wis.; Daniel K. Boche, Eagan, Minn.; James D. Decker, Apple Valley, Minn., and James L. Copeland, Burnsville, Minn., assignors to Ecolab Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 131,653, Oct. 5, 1993. This application Dec. 17, 1993, Ser. No. 169,325

Int. Cl.<sup>6</sup> B01D 11/02; B08B 7/00

U.S. Cl. 422—264

24 Claims



1. A floor scrubber comprising:  
 (a) brush means for scrubbing a floor;  
 (b) a water tank;  
 (c) a rinse conduit in fluid communication with said water tank for directing water proximate a brush means;  
 (d) a cleaning chemical dispenser positioned on a floor scrubber, said cleaning chemical dispenser including a

screen for supporting a solid block detergent, said detergent being located within a housing, and including a spray nozzle capable of directing water toward an eroding surface of said solid detergent so as to produce a diluted chemical solution, said spray nozzle being in fluid communication with said water tank, said solution being formed as said floor scrubber cleans the floor;

- (e) a cleaning solution conduit positioned within said floor scrubber and in fluid communication with said cleaning chemical dispenser for directing cleaning solution proximate said brush means; and

- (f) adjustment means for adjusting the concentration of said diluted cleaning solution dispensed, wherein said adjustment means comprises means for varying a distance between the solid detergent and said spray nozzle between a first, high concentration setting and a second low concentration setting.

5,411,717

## SALT PLATFORM

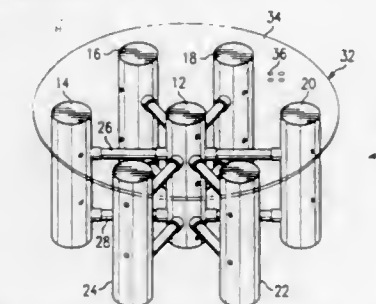
Steven M. Peddicord, 5310 Rustle Leaf, Arlington, Tex. 76017, and Donald B. Peddicord, 2811 Misty Cr., Durant, Okla. 74701

Continuation-in-part of Ser. No. 888,869, May 27, 1992, abandoned. This application Jan. 27, 1994, Ser. No. 188,141

Int. Cl.<sup>6</sup> B01D 15/00

U.S. Cl. 422—275

19 Claims



1. A salt platform for supporting a load of salt in a water softener brine tank comprising:  
 a plurality of vertically oriented members;  
 at least one horizontal bracing member secured between adjacent vertically oriented members to form a stable platform to support salt thereon; and  
 a salt grid supported on the plurality of vertically oriented members, salt being supported on the salt grid.

5,411,718

Patent Not Issued For This Number

5,411,719

## PRODUCTION OF ACID SOLUBLE TITANIA

Michael J. Hollitt, S. Melbourne, and Brian A. O'Brien, Bentley, both of Australia, assignors to Wimmera Industrial Minerals Pty. Ltd., South Melbourne, Australia

Continuation of Ser. No. 776,242, Dec. 27, 1991, abandoned.

This application Sep. 24, 1993, Ser. No. 127,296

Claims priority, application Australia, May 11, 1989, PJ4122

Int. Cl.<sup>6</sup> C22B 1/02; C01G 23/047, 23/08

U.S. Cl. 423—69

29 Claims

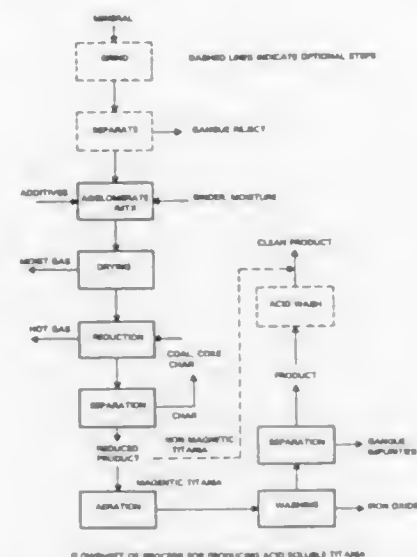
1. A process for producing acid soluble titania which process consists essentially of the steps of:

- (i) adding a manganese or magnesium compound to a titaniferous mineral if the mineral does not contain sufficient manganese and magnesium to satisfy the following relationship:

$$\frac{1.98a + 1.14b}{d} \geq 0.08$$



wherein a represents the percentage by weight of MgO contained in the mineral,  
b represents the percentage by weight of MnO contained in the mineral, and  
d represents the percentage by weight of TiO<sub>2</sub> contained in the mineral;  
(ii) heating the titaniferous mineral in the presence of a reductant at a temperature and for a time sufficient to permit contained iron to be reduced to its metallic form

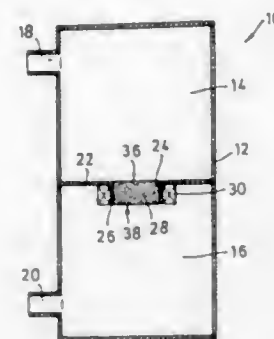


and contained titania to convert to an acid soluble form without significant accretion of the mineral occurring;  
(iii) cooling the product of step (ii); and  
(iv) subjecting the product of step (iii) to an aqueous chemical treatment to substantially remove iron from the mineral  
wherein the manganese or magnesium compound is an oxide or is capable of decomposing to an oxide under reaction conditions.

**5,411,720**  
**METHOD AND DEVICE FOR THE SEPARATION AND CONVEYANCE OF GASES AND/OR OF GAS MOLECULE FRAGMENTS GENERATED BY DISSOCIATION ON SURFACES BY SURFACE DIFFUSION**  
Dietmar Neuhaus, Duesseldorf, Germany, assignor to Deutsche Forschungsanstalt für Luft- und Raumfahrt, e.V., Cologne, Germany  
PCT No. PCT/EP92/00422, § 371 Date Nov. 3, 1992, § 102(e) Date Nov. 3, 1992, PCT Pub. No. WO92/15389, PCT Pub. Date Sep. 17, 1992  
PCT Filed Feb. 27, 1992, Ser. No. 940,910  
Claims priority, application Germany, Mar. 6, 1991, 41 07 089.5

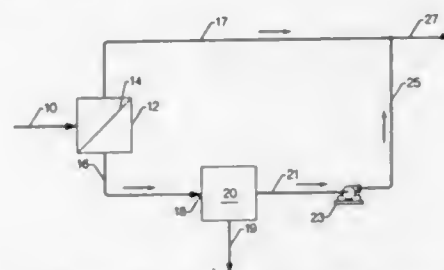
Int. Cl.<sup>6</sup> C01B 13/00; B01D 61/00  
U.S. Cl. 423—210 24 Claims  
1. A device for the separation by surface diffusion of a gaseous mixture comprising at least one of a gas and a gas molecule fragment, the device comprising:  
a chamber for the mixture, the chamber defining an outlet opening,  
a gas-adsorbing solid body arranged in the outlet opening, the solid body having a plurality of passages formed therein through which at least one of the gas and the gas molecule fragment is conveyable, each of the plurality of passages defining a surface, a cross sectional area and a flow resistance, the cross sectional area being selected such that the flow resistance has a value at which the

conveyance of the at least one of the gas and the gas molecule fragment through the solid body is essentially



performed by diffusion along the surface of the passage, and  
heater means for heating the solid body.

**5,411,721**  
**PROCESS FOR THE REJECTION OF CO<sub>2</sub> FROM NATURAL GAS**  
Kishore J. Doshi, Somers, and William B. Dolan, Dobbs Ferry, both of N.Y., assignors to UOP, Des Plaines, Ill.  
Filed Dec. 29, 1992, Ser. No. 997,810  
Int. Cl.<sup>6</sup> B01D 53/04, 53/22  
U.S. Cl. 423—220 22 Claims

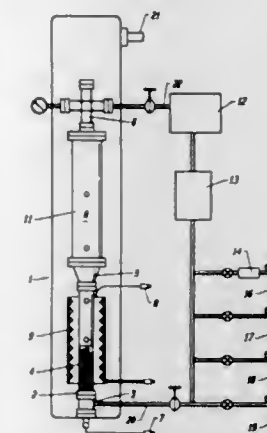


1. A process for the rejection of carbon dioxide from a natural gas feedstream comprising carbon dioxide and methane comprising the following steps:  
(a) passing the natural gas feedstream to a gas permeable membrane operating at a pressure effective to separate said natural gas feedstream into a methane-depleted permeate stream comprising carbon dioxide and into a carbon dioxide-depleted non-permeate stream;  
(b) passing the methane-depleted permeate stream to a pressure swing adsorption zone to produce a methane-rich stream essentially free of carbon dioxide and a tail gas stream comprising carbon dioxide; and  
(c) combining said carbon dioxide-depleted non-permeate stream with said methane-rich stream to provide a combined product natural gas stream having a desired concentration of carbon dioxide reduced relative to the feedstream.

**5,411,722**  
**COMPACT REACTION CELL FOR HOMOGENIZING AND DOWN-BLANDING HIGHLY ENRICHED URANIUM METAL**  
William McLean, II, Oakland; Philip E. Miller, and James A. Horton, both of Livermore, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Oct. 27, 1993, Ser. No. 141,753  
Int. Cl.<sup>6</sup> C01G 43/00  
U.S. Cl. 423—253 15 Claims

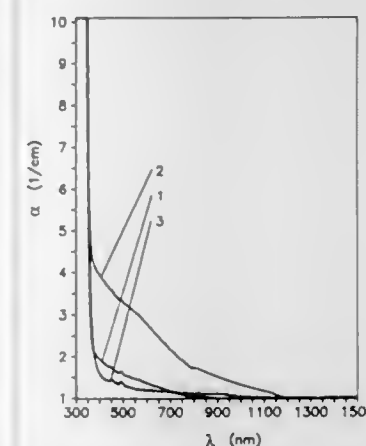
1. A reaction cell for converting uranium metal to uranium oxide comprising:

(a) a housing defining a reaction chamber, said chamber including a lower portion and an upper portion, the lower portion including a diffuser plate having openings therethrough and being adapted to support the uranium metal;  
(b) means for flowing a gas from the lower portion to the upper portion along a gas path, the gas path passing through the openings in the diffuser plate;



(c) means for reducing a velocity of the gas passing from said lower portion to said upper portion;  
(d) a gas inlet port for allowing entry of hydrogen and oxygen containing reactant gases into said lower portion of said reaction chamber and through said gas path; and  
(e) a gas outlet port for allowing the exit of residue and reaction product gases from said upper portion of said reaction chamber.

**5,411,723**  
**PROCESS FOR REDUCING THE DAMAGE SUSCEPTIBILITY IN OPTICAL QUALITY CRYSTALS**  
Patricia A. Morris, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Continuation of Ser. No. 860,862, Mar. 31, 1992, abandoned.  
This application Sep. 22, 1993, Ser. No. 123,662  
Int. Cl.<sup>6</sup> C01B 25/26; C01G 28/02; C30B 31/00  
U.S. Cl. 423—306 9 Claims



1. A process for treating a grown crystal of MTiOXO<sub>4</sub> which has crystal structure deficiencies of M and O, wherein M is selected from the group consisting of K, Rb, Tl, NH<sub>4</sub> and mixtures thereof and X is selected from the group consisting of P, As and mixtures thereof, comprising:  
placing said crystal in a container in the presence of proximity to a mixture of MTiOXO<sub>4</sub> wherein M is selected from the group consisting of K, Rb, Tl, NH<sub>4</sub> and mixtures thereof and X is selected from the group consisting of P,

As and mixtures thereof and at least one inorganic compound of one or more monovalent cations selected from the group consisting of Rb<sup>+</sup>, K<sup>+</sup>, Cs<sup>+</sup> and Tl<sup>+</sup> for vapor transport of the one or more monovalent cations from the mixture to the crystal at a treatment temperature of from about 400° C. to 950° C., and a treatment pressure of at least 100 psi, and heating in the presence of a gaseous source of oxygen at said treatment temperature and said treatment pressure for a time sufficient for the vapor transport of the one or more monovalent cations from the mixture to the crystal and for the vapor transport of oxygen to the crystal to decrease the optical damage susceptibility of said crystal relative to its optical damage susceptibility prior to treatment;  
wherein said inorganic compound is present in an amount sufficient to provide at least a 0.1 mole % excess of the monovalent cation in relation to the M in the MTiOXO<sub>4</sub> in said mixture and is selected to provide a source of vapor phase monovalent cation at the treatment temperature.

**5,411,724**  
**METHOD FOR SUBSTITUTION OF ALUMINA IN THE FRAMEWORK OF ZEOLITES BY SILICON**  
Herman K. Beyer, and Gabriella Pál-Borbély, both of Budapest, Hungary, assignors to W. R. Grace & Co.-Conn., New York, N.Y.  
Filed Jun. 2, 1993, Ser. No. 70,574  
Int. Cl.<sup>6</sup> C01B 33/26; B01J 29/06  
U.S. Cl. 423—328.2 15 Claims

1. A solid-state dealumination process for removing aluminum from tetrahedral framework sites of zeolite frameworks and substitution with another element, said process comprising the steps:

(a) forming a solid reaction mixture having at least one Component A and at least one Component B, wherein Component A is selected from hydrated ammonium or alkaline metal forms of zeolites and Component B is a crystalline ammonium fluoro-halometallate salt which is thermally stable at the temperature at which substitution within the zeolite frameworks proceeds and which is small enough to penetrate the pore openings of the zeolite;  
(b) reacting Component A and Component B of the reaction mixture in a solid-state reaction by heating the reaction mixture at an elevated temperature to remove aluminum from the zeolite framework and produce (i) a corresponding zeolite framework having another element substituted in place of the aluminum and (ii) a fluoro-halo-aluminate complex salt; and  
(c) removing the fluoro-halo-aluminate complex salt.

**5,411,725**  
**PROCESS FOR THE CONTINUOUS CONVERSION OF ONE HYDROXYLAMINE SALT TO ANOTHER HYDROXYLAMINE SALT**  
Dominique Pareau, Verrieres le Buisson; Andre Chesne, Le Vesinet; Gerard Durand, Le Pecq, and Michel DeRuberger, Le Vesinet, all of France, assignors to Societe Generale Pour les Techniques Nouvelles, SGN, Saint Quentin en Yvelines, France  
Filed Oct. 18, 1993, Ser. No. 138,587  
Claims priority, application France, Oct. 19, 1992, 92 12485  
Int. Cl.<sup>6</sup> C01B 21/20; C07C 51/41  
U.S. Cl. 423—387 17 Claims

1. A process for the conversion of hydroxylamine sulfate or chloride to hydroxylamine nitrate or formate comprising the steps of  
(a) extraction of the hydroxylamine cation from the initial salt solution by bringing said solution into contact, in countercurrent, with a solvent containing an extractant for said hydroxylamine cation, wherein said extraction is carried out with a partially salified extractant;  
(b) re-extraction of said cation by bringing said solvent

containing the extractant charged with said cation into contact, in countercurrent, with an aqueous solution whose anion is that of the hydroxylamine salt which it is desired to obtain; and  
(c) recycling of said solvent containing the extractant, after basic regeneration of the latter.

5,411,726

**PROCESS FOR PURIFYING HYDROGEN FLUORIDE**  
Andreas Bulan, Langenfeld; Rainer Weber, Odenthal; Hans-Dieter Block, and Hans-Heinrich Moretto, both of Leverkusen, all of Germany, assignors to Bayer AG, Leverkusen, Germany

Filed Jan. 31, 1994, Ser. No. 188,683

Claims priority, application Germany, Feb. 10, 1993, 43 03 837.9

Int. Cl.<sup>6</sup> C01B 7/19

U.S. Cl. 423—484 13 Claims

1. Process for purifying anhydrous hydrogen fluoride which contains water in an amount of less than 5,000 mg of water per kilogram of hydrogen fluoride and at least one other impurity selected from the group consisting of compounds of the elements arsenic, phosphorus, boron, silicon and sulphur, wherein said process consists essentially of removing at least a portion of said at least one impurity from said hydrogen fluoride by introducing oxygen difluoride, in undiluted form, directly into the hydrogen fluoride at temperatures of between 20° and 200° C., and wherein the oxygen difluoride is produced in a separate step before it is introduced into said hydrogen fluoride.

5,411,727

**METHOD FOR THE DISSOLUTION OF CALCIUM CARBONATE SOLIDS IN THE PRESENCE OF AQUEOUS CHLORINE SOLUTIONS**

Richard M. Mullins, Madison, and Jeffrey J. Glen, Meriden, both of Conn., assignors to Olin Corporation, Stamford, Conn.

Filed Aug. 10, 1994, Ser. No. 288,119

Int. Cl.<sup>6</sup> B01F 1/00; C07C 59/08

U.S. Cl. 423—658.5 4 Claims

1. A process for dissolving calcium carbonate solids in an aqueous chlorinated solution without the formation of chlorine gas comprising the step of adding a sufficient amount of lactic acid to said aqueous chlorinated solution to dissolve said solids into said solution.

5,411,728

USE OF DERIVATIVES OF

6,6-DIMETHYL-2-ACYLCYCLOHEX-4-EN-1,3-DIONES IN THE SUN PROTECTION SECTOR OF THE COSMETICS INDUSTRY, PREPARATIONS CONTAINING THESE DERIVATIVES, NOVEL DERIVATIVE AND PROCESS FOR THE PRODUCTION THEREOF

Daniel Joulain, Grasse, and Philippe Racine, Magagnosc, both of France, assignors to Robertet S.A., Grasse, France

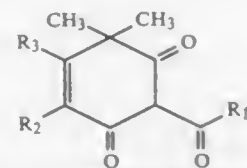
Filed Mar. 2, 1994, Ser. No. 204,432

Claims priority, application France, Mar. 3, 1993, 93 02734; Mar. 3, 1993, 93 02735

Int. Cl.<sup>6</sup> A61K 7/42

U.S. Cl. 424—59 19 Claims

1. Cosmetic preparation containing at least one sunscreen and at least one non-aqueous vehicle, containing as active ingredient a sun-shielding effective concentration of at least one derivative of 6,6-dimethyl-2-acylcyclohex-4-en-1,3-dione of the formula (I)



in which R<sub>1</sub> is a C<sub>1</sub>-C<sub>6</sub> alkyl radical, R<sub>2</sub> is a hydrogen atom or

a C<sub>1</sub>-C<sub>6</sub> alkyl radical, R<sub>3</sub> is a hydrogen atom, a hydroxy radical or a C<sub>1</sub>-C<sub>6</sub> alkoxy radical.

5,411,729

**SILICONE POLYESTER POLYMERS AS DURABLE HUMECTANTS**

Anthony J. O'Lenick, Jr., Lilburn, Ga., assignor to Siltech Inc., Norcross, Ga.

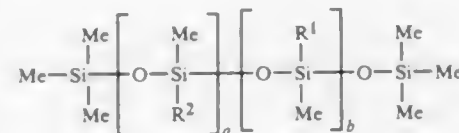
Filed Feb. 14, 1994, Ser. No. 195,177

Int. Cl.<sup>6</sup> A61K 7/075, 7/08; C08G 77/16

U.S. Cl. 424—70.12 20 Claims

1. A silicone polyester prepared by the esterification reaction of:

(a) a hydroxyl containing silicone compound selected from dimethicone copolyol conforming to the following structure;



wherein;

Me is methyl;

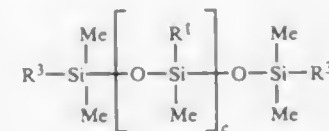
a is an integer ranging from 2 to 20;

b is an integer ranging from 0 to 200;

R<sup>1</sup> is selected from the group consisting of methyl and phenyl;

R<sup>2</sup> is (CH<sub>2</sub>)<sub>3</sub>-O-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>x</sub>-(CH<sub>2</sub>(CH<sub>3</sub>)C-H<sub>2</sub>-O)<sub>y</sub>-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>z</sub>-H

x, y, and z are independently integers ranging from 0 to 20; terminal dimethicone copolyols conforming to the following structure;



wherein;

Me is methyl;

c is an integer ranging from 1 to 200;

R<sup>1</sup> is selected from the group consisting of methyl and phenyl;

R<sup>2</sup> is (CH<sub>2</sub>)<sub>3</sub>-O-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>x</sub>-(CH<sub>2</sub>(CH<sub>3</sub>)C-H<sub>2</sub>-O)<sub>y</sub>-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>z</sub>-H

and

silanol compounds conforming to the following structure;



wherein;

Me is methyl;

d is an integer ranging from 10 to 1200;

R<sup>1</sup> is selected from the group consisting of methyl and phenyl;

R<sup>2</sup> is OH;

(b) a diacid selected the group consisting of;

HO-C(O)-(CH<sub>2</sub>)<sub>r</sub>-C(O)-OH,

HO-C(O)-(CH<sub>2</sub>)<sub>r</sub>-CH=CH-(CH<sub>2</sub>)<sub>s</sub>-C(O)-OH;

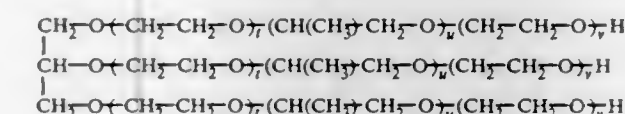
q is an integer from 2 to 10;

r is an integer from 2 to 10;

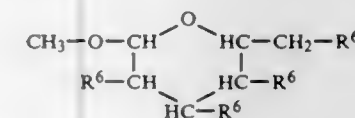
s in an integer from 2 to 10;

dimer acid and hydrogenated dimer acid;

(c) a poly-hydroxyl compound selected from the group consisting of glycerine and it's alkoxyates which conforms to the following structure:

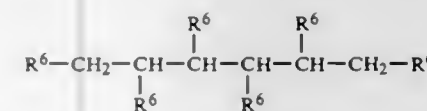


t, u and v are independently integers ranging from 0 to 20; methyl glucoside and it's alkoxyates which conforms to the following structure:



R<sup>6</sup> is —O-(CH<sub>2</sub>CH<sub>2</sub>-O)<sub>r</sub>-(CH(CH<sub>3</sub>)-CH<sub>2</sub>-O)<sub>u</sub>-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>v</sub>-H

t, u and v are independently integers ranging from 0 to 20; and sorbitol and it's alkoxyates which conforms to the following structure:



R<sup>6</sup> is —O-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>r</sub>-(CH(CH<sub>3</sub>)-CH<sub>2</sub>-O)<sub>u</sub>-(CH<sub>2</sub>-CH<sub>2</sub>-O)<sub>v</sub>-H

t, u and v are independently integers ranging from 0 to 20; and optional

(d) a mono functional fatty acid conforming to the following structure;



R<sup>5</sup> is selected from the group consisting of alkyl and alkylene and has from 6 to 20 carbon atoms, said esterification reaction being conducted at a temperature of between 140° and 240° C. for a time sufficient to boil off water and form a reaction product of low acid value.

5,411,730

**MAGNETIC MICROPARTICLES**

Dmitri Kirpotin; Daniel C. F. Chan, both of Denver, and Paul A. Bunn, Jr., Evergreen, all of Colo., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.

Filed Jul. 20, 1993, Ser. No. 94,790

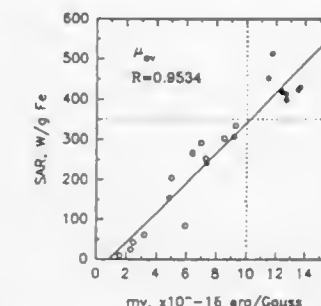
Int. Cl.<sup>6</sup> A61B 5/055; A61K 31/715

U.S. Cl. 424—322 13 Claims

1. A composition comprising particles of an iron oxide and a polymer, said iron oxide being superparamagnetic, the ratio of polymer to iron being 0.1 to 0.5 (w/w), said particles having sedimentation constants in the range of 150-5000S, said particles having at least one of the following magnetic properties:

a) specific power absorption rate (SAR) greater than 300

w/g Fe, measured in an electromagnetic field of 1 MHz frequency and 100 Oe field strength;



b) initial magnetic susceptibility greater than 0.7 EMU/gFe/-Gauss; and

c) magnetic moment greater than 10<sup>-15</sup> erg/Gauss.

5,411,731

**BATH ADDITIVE COMPOSITION COMPRISING ALUMINUM SALT AND CARBONATE OR BICARBONATE WHICH YIELDS A BATH WATER OF PH 8 TO 9**

Norihito Tanaka, Kaminokawa; Kazuyuki Okui, Ichikai; Yasuhiro Doi, Ishibashi; Hirotsuka Sato, and Hidenori Yorozu, both of Utsunomiya, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jul. 21, 1993, Ser. No. 94,441

Claims priority, application Japan, Jul. 21, 1992, 4-194121; Aug. 18, 1992, 4-219320; Feb. 24, 1993, 5-035313; Feb. 24, 1993, 5-035314; Feb. 26, 1993, 5-038389; Feb. 26, 1993, 5-038391

Int. Cl.<sup>6</sup> A61K 31/74, 7/50; A01N 59/06

U.S. Cl. 424—78.02 21 Claims

1. A bath additive composition comprising (a) from 1 to 10 wt. % of an aluminum salt and (b) from 10 to 98 wt. % of a bicarbonate or carbonate, wherein a 0.01% by weight solution of said composition in water gives a pH of 8 to 9, said water having a pH of 7.0, wherein said bath composition imparts an improved gentle feel to the skin during bathing and an improved refreshing feel after bathing.

5,411,732

**PREPARATION OF FUSED PROTEINS, ANTIBODIES AND PROCESSES THEREFORE**

Björn Löwenadler, Solna; Erik Holmgren, Lidö; Mathias Uhlén, Upsala, all of Sweden, and Björn Nilsson, Foster City, Calif., assignors to Kabi Pharmacia Aktiebolag, Upsala, Sweden

Continuation of Ser. No. 596,319, Oct. 12, 1990, abandoned, which is a continuation of Ser. No. 42,117, Apr. 24, 1987, abandoned. This application Oct. 1, 1993, Ser. No. 130,430

Claims priority, application Sweden, Apr. 25, 1986, 8601940 Int. Cl.<sup>6</sup> A61K 39/00; C12N 15/00

U.S. Cl. 424—192.1 10 Claims

1. A process for preparing polyclonal antibodies specific for an amino acid sequence comprising the steps of (i) immunizing a mammal with a fused protein comprising said amino acid sequence fused to an immunogenic IgG binding protein, said fused protein being prepared by a process comprising the steps of (A) introducing a cloned or synthetic DNA segment encoding said amino acid sequence into a procaryotic expression vector, wherein said DNA segment is fused to a gene encoding said immunogenic IgG binding protein, (B) transforming a procaryotic host cell using such expression vector, and (C) allowing said host cell to express the fused protein and (D) recovering same, said IgG binding protein providing recognition of said amino acid sequence by an immune system of an inoculated mammal; (ii) bleeding said immunized mammal to obtain serum; and (iii) recovering generated antibodies from said serum.



5,411,733

**ANTIVIRAL AGENT CONTAINING CRUDE DRUG**  
Toyoharu Hozumi, 30-9, Toyotamakita 5-chome, Nerima-ku, Tokyo; Takao Matsumoto, 1-31, Kamimaizumi 6-chome, Ebina-shi, Kanagawa; Haruo Ooyama, 89-203, Tsurugamine 1-chome, Asahi-ku, Yokohama-shi, Kanagawa; Tsuneo Namba, 1-104, 2556-4, Gofukusehiro-cho, Toyama-shi, Toyama; Kimiyasu Shiraki, 2-202, 2556-4, Gofukusehiro-cho, Toyama-shi, Toyama; Masao Hattori, 2-203, 2556-4, Gofukusehiro-cho, Toyama-shi, Toyama; Masahiko Kurokawa, 2-101, 2-2, Minamitaikouyama, Kosugi-machi, Imizu-gun, Toyama, and Shigetoshi Kadota, 2-402, 2556-4, Gofukusehiro-cho, Toyama-shi, Toyama, all of Japan  
Filed Apr. 26, 1993, Ser. No. 51,647

Claims priority, application Japan, Apr. 27, 1992, 4-107659; Apr. 27, 1992, 4-107672

Int. Cl.<sup>6</sup> A61K 35/78

U.S. Cl. 424—195.1

5 Claims

1. A method for treating herpes virus infection, comprising orally administering to a subject in need thereof a therapeutically effective amount of an antiherpesviral agent containing at least one crude drug selected from the group consisting of the whole plant or *Ainsliaea fragrans* Champ., the rhizome of *Alpinia officinarum* Hance, the bark of *Alyxia stellata* Roem., the root of *Andropogon zizanioides* (L.) Urban, the seed of *Areca catechu* L., the leaf of *Artemisia princeps* Pamp., the rhizome of *Brainia insignis* (Hook.) J. Sm., the seed of *Brucea javanica* (L.) Merr., the bark of *Caesalpinia sappan* L., the leaf of *Camellia japonica* L., the bark of *Cassia fistula* L., the whole plant of *Chamaesyce hyssopifolia*, the bark and branch of *Cinnamomum cassia* Blume, the bark of *Cinnamomum sintok* Blume, the rhizome of *Coptis chinensis* Franch., the leaf of *Cordia spinescens*, the rhizome of *Cyrtomium fortunei* J. Sm., the rhizome of *Drynaria fortunei* (Kunze) J. Smith, the rhizome of *Dryopteris crassirhizoma* Nakai, the fruit of *Elaeocarpus grandiflorus* Smith, the leaf of *Epimedii koreanum* Nakai, the leaf of *Erythroxylum lucidum*, the trunk of *Erythroxylum citrifolium*, the fruit of *Foeniculum vulgare* Mill., the whole plant of *Geranium thunbergii* Sieb. et Zucc., the whole plant of *Geum japonicum* Thunb., the leaf of *Hamelia xillaris* Swartz, the branch and leaf of *Jatropha curcas* L., the bark of *Juglans madnsurica* Maxim., the bark of *Machilus thunbergii* Sieb. et Zucc., the root bark of *Paonia suffruticosa* Andrews, the leaf of *Perilla frutescens* Britton var. *acuta* Kudo, the bark of *Phellodendron amurense* Ruprecht, the rhizome of *Plagiogyria matsumureana* Makino, the root of *Polygala tenuifolia* Willd., the root and rhizome of *Polygonum cuspidatum* Sieb. et Zucc., the spike of *Prunella vulgaris* L. subsp. *asiatica* Hara, the root bark and fruit peel of *Punica granatum* L., the bark of *Quercus acutissima* Carruthers, the rhizome of *Rheum palmatum* L., the gall of *Rhus javanica* L., the root of *Salvia miltiorrhiza* Bunge, the leaf of *Sarcandra glabra* (Thunb.) Nakai, the flores of *Schizonepeta tenuifolia* Briquet, the whole plant of *Serjania mexicana*, the stem of *Spatholobus suberectus* Dunn, the bark of *Terminalia belerica* Roxb., the fruit of *Terminalia chebula* Retz., the branch and leaf of *Waltheria indica* L., the flower and leaf of *Woodfordia floribunda* Salisb., the rhizome of *Woodwardia orientalis* Sw., and the fruit peel of *Zanthoxylum bungeanum* Maxim.

5,411,734

# NON-IRRITATING $\alpha$ -HYDROXY CARBOXYLIC ACID COMPOSITIONS

Anthony Vargas, Monroe; Pamela C. Asplund, Shelton, and Cathleen Corcoran, Bridgeport, all of Conn., assignors to Elizabeth Arden Company, Division of Conopco, Inc., New York, N.Y.

Filed Nov. 15, 1993, Ser. No. 152,152

Int. Cl.<sup>6</sup> A61K 7/00, 31/19

U.S. Cl. 424—401

3 Claims

1. A cosmetic composition comprising:  
(i) from about 0.0001 to about 20% of a C<sub>2</sub>–C<sub>28</sub>  $\alpha$ -hydroxy carboxylic acid selected from the group consisting of glycolic acid, lactic acid and combinations thereof; and

(ii) from about 30 to about 95% by weight of an ester carrier base comprising:

- from about 1 to about 90% of a C<sub>7</sub>–C<sub>60</sub> neoalkanol ester;
- from about 1 to about 90% of a C<sub>12</sub>–C<sub>40</sub> fatty glyceride ester alkoxylated with from 1 to 100 moles C<sub>2</sub>–C<sub>3</sub> alkylene oxide per mole of glyceride; and
- from 1 to 50% of a polyglycerol C<sub>8</sub>–C<sub>22</sub> fatty acid ester.

5,411,735

# PASTILLE FOR FACILITATING THE INGESTION OF MEDICINAL TABLETS BY PETS

José Daoudal, Laval, France, assignor to Sogeval S.A., Laval Cedex, France

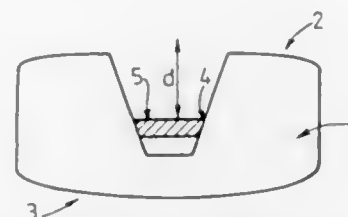
Filed Jun. 8, 1993, Ser. No. 73,595

Claims priority, application France, Jun. 9, 1992, 92 06908

Int. Cl.<sup>6</sup> A01N 25/24, 25/34

U.S. Cl. 424—408

3 Claims



1. Pastille for facilitating the ingestion of a tablet by a pet, the tablet having a repellent smell and taste, said pastille comprising:

- a matrix made of a material which is appetizing to the pet, having two principal faces, one of said faces having a recess for receiving the tablet, and the other of said faces being substantially smooth and adapted for presentation to the pet, said recess having a frustoconical shape and dimensions corresponding to those of the tablet, whereby tablets of different dimensions can be inserted by force and held in the appetizing matrix wherein said Pastille is substantially disc shaped.

5,411,736

# HYDROPHIC EXTRACTED NEEM OIL—A NOVEL INSECTICIDE

James C. Locke, Silver Spring; James F. Walter, Ashton, and Hiram G. Larew, III, Hyattsville, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Division of Ser. No. 947,867, Sep. 21, 1992, abandoned, which is a continuation-in-part of Ser. No. 456,762, Dec. 26, 1989, abandoned. This application Jul. 9, 1993, Ser. No. 89,084

Int. Cl.<sup>6</sup> A01N 25/08

U.S. Cl. 424—410

7 Claims

1. A method for protecting a plant from insect pest infestation comprising:  
extracting neem oil from neem seeds using a non-polar, hydrophobic solvent having neem oil solubility and substantially no azadirachtin and water solubility; and  
contacting the plant with a neem oil formulation containing 0.1 to 10% of the hydrophobic extracted neem oil which is substantially free of azadirachtin, 0.005 to 5% of emulsifying surfactant and 0 to 99% water.

5,411,737

# SLOW RELEASE SYNERGISING POLYMERIC DRUG DELIVERY DEVICE

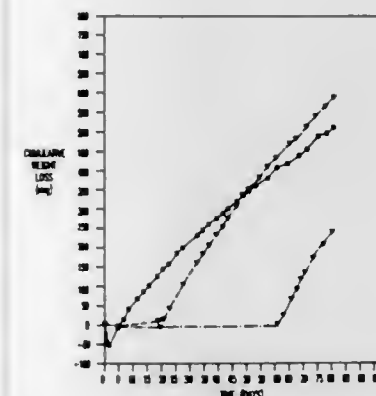
Terry T. Hsu, North Wales, Pa., and Alan S. Michaels, Chestnut Hill, Mass., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 15, 1991, Ser. No. 776,913

Int. Cl.<sup>6</sup> A01N 25/34

U.S. Cl. 424—411

27 Claims



1. A drug delivery device compounded of a polymeric matrix, a vehicle and a drug such that:

- the polymeric matrix is a linear thermoplastic polymer with a low intrinsic water absorption capability; and where the polymeric matrix is at ambient temperature at least partially resistant to the absorption of the vehicle but which will imbibe sufficient quantities of the vehicle at elevated temperature to form a stable homogeneous organogel when cooled to ambient temperature;
- the vehicle is a plasticizing solvent compatible with the polymeric matrix in an anhydrous condition which is fusible in the polymeric matrix at elevated temperature and wherein water is at least 1% soluble by weight in the vehicle and that the vehicle becomes incompatible with the polymeric matrix as water is dissolved therein; and
- the drug is non-volatile and soluble in the vehicle.

5,411,739

# APPARATUS FOR THE CONTROLLED DELIVERY OF NICOTINE, PROCESS FOR THE PRODUCTION THEREOF AND USE THEREOF

Halvor Jaeger, New-Ulm; Hans-Ranier Hoffmann, Neuwied; Reinhold Meconi, Neuwied, and Robert-Peter Klein, Neuwied, all of Germany, assignors to LTS Lohmann Therapie-Systeme GmbH & Co. KG, Neuwied, Germany

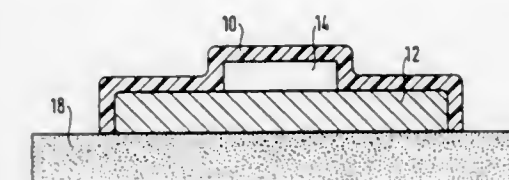
Continuation of Ser. No. 974,682, Nov. 12, 1992, abandoned, which is a continuation of Ser. No. 566,855, Aug. 10, 1990, abandoned, which is a continuation of Ser. No. 353,672, filed as PCT/DE88/00479, Aug. 3, 1988, published as WO 89/01789, Mar. 9, 1989, abandoned. This application May 3, 1994, Ser. No. 237,322

Claims priority, application Germany, Sep. 1, 1987, 37 29 165.3; Dec. 23, 1987, 37 43 947.2

Int. Cl.<sup>6</sup> A61F 13/02; A61L 15/16

U.S. Cl. 424—448

29 Claims



1. Process for the production of an apparatus for controlled transdermal release of nicotine having a hot melt pressure sensitive adhesive-nicotine reservoir in which there is a distribution of nicotine, said process comprising heating hot melt pressure sensitive adhesive to form a melt at a processing temperature of 40° to 80° C. under conditions to introduce nicotine into the melt, and applying the mixture from the melt to a carrier material, thereby to provide an apparatus for controlled transdermal delivery of nicotine.

5,411,740

# TRANSDERMAL ADMINISTRATION OF OXYBUTYRIN

Eun S. Lee, Redwood City; Diane E. Nedberge, and Su I. Yum, both of Los Altos, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

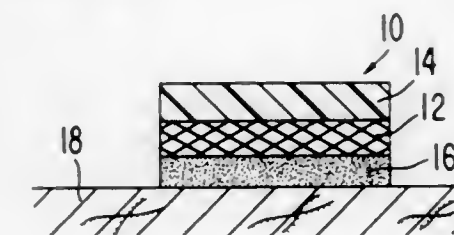
Continuation of Ser. No. 882,652, May 13, 1992, abandoned.

This application Feb. 8, 1994, Ser. No. 193,661

Int. Cl.<sup>6</sup> A61F 13/02

U.S. Cl. 424—448

28 Claims



1. A device for the transdermal administration, at a therapeutically effective rate, of oxybutynin, which device comprises:

- a reservoir consisting essentially of a therapeutically effective amount of an oxybutynin base, a skin permeation-enhancing amount of a monoglyceride or a mixture of monoglycerides of fatty acids with a total monoesters content of at least 51%, and ethylene vinyl acetate copolymer having from about 9% to about 60% vinyl acetate;
- a backing on the skin-distal surface of the reservoir; and
- an adhesive means for maintaining the reservoir in oxybutynin- and permeation enhancer-transmitting relation with the skin.

5,411,738

# METHOD FOR TREATING NERVE INJURY PAIN ASSOCIATED WITH SHINGLES (HERPES-ZOSTER AND POST-HERPETIC NEURALGIA) BY TOPICAL APPLICATION OF LIDOCAINE

Harry Hind, Los Altos, Calif., assignor to Hind Health Care, Inc., Los Altos, Calif.

Continuation-in-part of Ser. No. 526,771, May 18, 1990, which is a continuation of Ser. No. 325,373, Mar. 17, 1989, abandoned.

This application Feb. 16, 1994, Ser. No. 198,223

Int. Cl.<sup>6</sup> A61K 9/70, 9/06

U.S. Cl. 424—445

10 Claims

1. A method for the relief of pain of a host suffering from herpes zoster or post-herpetic neuralgia by inducing analgesia for an extended period of time, said method comprising:  
maintaining lidocaine intradermally at a concentration sufficient to induce analgesia, at the site of said pain; whereby said pain is relieved by said lidocaine.

5,411,741

METHOD AND COMPOSITION FOR SKIN  
DEPIGMENTATION

Nardo Zaias, 9-Island Ave. #2101, Miami Beach, Fla. 33139  
Filed Jul. 29, 1993, Ser. No. 99,491  
Int. Cl.<sup>6</sup> A61K 9/127

U.S. Cl. 424—450 7 Claims  
1. A method of depigmentation of skin comprising the steps of:

- encapsulating an effective amount of a water-soluble melanin inhibiting compound within a liposome, said melanin inhibiting compound is 3-pyridinecarboxamide;
- suspending the encapsulated melanin inhibiting compound in a topical vehicle; and
- typically applying to the epidermis of the skin the suspended and encapsulated melanin inhibiting compound whereby the liposomes are transdermally delivered through the basal cell region of the epidermis to cause interference with the biochemical synthesis of melanin in situ and subsequent depigmentation of the skin.

5,411,742

COMPOSITIONS FOR THE TREATMENT OF ACNE  
CONTAINING A DERIVATIVE OF SALICYLIC ACID  
AND DERIVATIVES OF SALICYLIC ACID

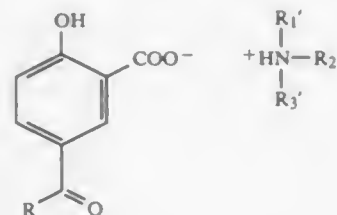
Henri Sebag, Alain Riblier, both of Paris; Pascal Simon, Vitry-sur-Seine, and Laurence Sebillotte, Paris, all of France, assignors to L'Oreal, Paris, France

Filed Aug. 23, 1993, Ser. No. 110,174

Claims priority, application France, Aug. 24, 1992, 92 10227  
Int. Cl.<sup>6</sup> A61K 9/127

U.S. Cl. 424—450 15 Claims

1. A composition for the treatment of acne by topical application to the skin, said composition comprising a dispersion of amphiphilic lipid vesicles in an aqueous phase, said amphiphilic lipid vesicles encapsulating an aqueous phase; the lipid phase of said amphiphilic lipid vesicles comprising an amphiphilic lipid and a charged lipid, said charged lipid is a salicylic acid derivative having the formula



wherein

R represents a linear or branched C<sub>11</sub>–C<sub>17</sub> alkyl, R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, each independently, represent C<sub>1</sub>–C<sub>18</sub> alkyl or hydroxyalkyl, with one of R, R<sub>2</sub> and R<sub>3</sub> optionally being benzyl.

5,411,743

## PREVENTION OF SYNOVIAL ADHESIONS

Larry J. Moore, and Jill Adler-Moore, both of Altadena, Calif., assignors to Vestar, Inc., San Dimas, Calif.

Continuation of Ser. No. 621,625, Dec. 3, 1990, abandoned. This application Nov. 23, 1993, Ser. No. 157,841

Int. Cl.<sup>6</sup> A61K 9/127

U.S. Cl. 424—450 3 Claims

1. A method for the prevention of adhesion formation in a synovial tissue, produced by trauma or surgery, comprising the administration of liposomal intercalated tolmetin to the synovial tissue in an amount which is effective for such prevention.

5,411,744

## SILICONE VESICLES AND ENTRAPMENT

Randal M. Hill, Midland, and Steven A. Snow, Sanford, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 212,753, Mar. 14, 1994, Pat. No. 5,364,633.

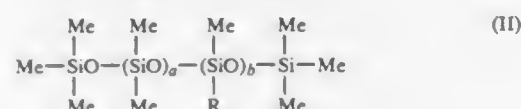
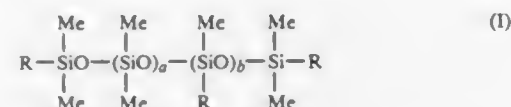
This application Jun. 6, 1994, Ser. No. 254,855

Int. Cl.<sup>6</sup> A61K 9/127

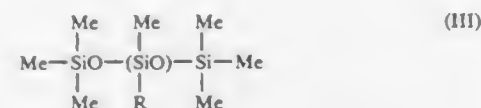
U.S. Cl. 424—450 12 Claims



1. A composition comprising a water-soluble substance entrapped in a vesicle formed from 0.1 to 40.0 percent by weight of a siloxane surfactant, the vesicle being formed by dissolving 0.1 to 10.0 percent by weight of the substance to be entrapped in water, adding the siloxane surfactant, and mildly agitating the mixture, the siloxane surfactant being an organo-silicon compound having a formula selected from the group consisting of:



and



wherein Me is the methyl group; R is a radical selected from the group consisting of methyl,  $-(\text{CH}_2)_x\text{O}(\text{C}_2\text{H}_4\text{O})_y\text{C}_3\text{H}_6\text{O}_2\text{R}'$ , and  $-(\text{CH}_2)_x\text{N}^+\text{R}_3'\text{A}^-$ , with the proviso that at least one R radical in the molecule cannot be a methyl radical; R' is selected from the group consisting of hydrogen, a methyl radical, and an acyl radical; R'' is selected from the group consisting of alkyl radicals having from one to six carbon atoms, a phenyl radical, a benzyl radical, and the radical  $-\text{CH}_2\text{CH}_2\text{OH}$ ; A<sup>-</sup> is a counterion selected from the group consisting of chloride, bromide, iodide, cyanide, a methyl sulfate radical, a salicylate radical, and a dodecylsulfate radical; a has a value of 0 to 200; b has a value of 0 to 50; with the proviso that a and b cannot each be zero; x has a value of 3 to 6; y has a value of 4 to 30; and z has a value of 0 to 5.

5,411,745

POWDER-LAYERED MORPHINE SULFATE  
FORMULATIONS

Benjamin Oshlack, New York, and Frank Pedi, Jr., Yorktown Heights, both of N.Y., assignors to Euro-Celtique, S.A., Luxembourg, Luxembourg

Filed May 25, 1994, Ser. No. 249,150

Int. Cl.<sup>6</sup> A61K 9/48, 9/14

U.S. Cl. 424—456 25 Claims

1. A bioavailable immediate release multiparticulate oral dosage form of morphine, comprising a plurality of pharmaceutically acceptable inert beads hav-

5,411,748

## PROSTATE EXTRACT SUPPLEMENTED WITH ZINC

Moon K. Song, 10922 Yolanda Ave., Northridge, Calif. 91326  
Continuation of Ser. No. 964,879, Oct. 22, 1992, abandoned.

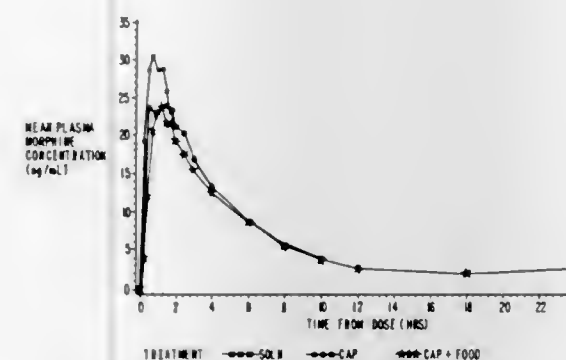
This application Jan. 7, 1994, Ser. No. 179,761

Int. Cl.<sup>6</sup> A61K 33/30, 35/48

U.S. Cl. 424—559 7 Claims

1. A composition of matter comprising zinc and extract of animal prostatic tissue, said tissue comprising a first group of molecules soluble in a first solvent which is a non-polar solvent having less polarity or the same polarity as petroleum ether or hexane, and also comprising a second group of molecules substantially insoluble in the first solvent, said extract being obtained by a process comprising:

- extracting the first group of molecules from the tissue in the first solvent;
- discarding the first solvent containing the first group of molecules;
- extracting said second group of molecules in a second solvent more polar than the first solvent; and
- removing the second solvent to create said extract.



and hydrous lactose impalpable, said morphine or said salt thereof having a bulk density of from about 0.4 to about 0.6 g/ml and said hydrous lactose impalpable having a bulk density of from about 0.4 to about 0.9 g/ml.

5,411,746

DYE COMPOSITIONS AND METHODS FOR FILM  
COATING TABLETS AND THE LIKE

Charles A. Signorino, Norristown, Pa., and Harry Meggos, Alton, Ill., assignors to Warner-Jenkinson Company, Inc., St. Louis, Mo.

Filed Feb. 24, 1993, Ser. No. 21,785

Int. Cl.<sup>6</sup> A61K 9/36

U.S. Cl. 424—464 26 Claims

1. A stable, aqueous suspension composition for use in preparing a coating composition for coating tablets and the like comprising a water-soluble, nontoxic dye, an opacifying agent selected from the group consisting of titanium dioxide and iron oxide, a nontoxic immobilizing agent for immobilizing said dye and preventing it from migrating when applied to a tablet, said nontoxic immobilizing agent being constituted by a nontoxic metal salt present in an amount of from approximately 0.1 to approximately 10 equivalents of metal per mole of said dye, and water.

5,411,747

## PROCESS FOR THE TREATMENT OF ASPARTAME

Hubertus J. M. Slangen, Stein, Netherlands, assignor to Holland Sweetener Company V.o.F., Maastricht, Netherlands

Filed Jun. 10, 1993, Ser. No. 74,446

Claims priority, application Netherlands, Jun. 11, 1992, 9201029

Int. Cl.<sup>6</sup> A61K 9/14

U.S. Cl. 424—489 4 Claims

1. Process for the treatment of dried aspartame characterised in that, in a first separation step, particles smaller than 50 μm are removed, with the aid of a stream of air, from aspartame having a particle size distribution with which more than 5 wt. % of the aspartame has a particle size of less than 20 μm and more than 10 wt. % of the aspartame has a particle size of more than 400 μm and that, in a second separation step, the product resulting from the first step is subjected to a screening step using a screen that separates at a value between 150 and 250 μm, after which the fraction of the smaller particles thus obtained is recovered as a first product and the fraction of the larger particles is recovered as second product or is optionally subjected to a further separation step using a screen that separates at a value between 400 and 1000 μm, the fraction of smaller particles thus obtained being recovered as second product.

5,411,750

## ULTRAFINE SODIUM BICARBONATE POWDER

M. Stephen Lajoie, Basking Ridge, and Anthony E. Winston, East Brunswick, both of N.J., assignors to Church & Dwight Co., Inc., Princeton, N.J.

Filed Apr. 27, 1993, Ser. No. 53,800

Int. Cl.<sup>6</sup> A01N 39/00, 25/12; A61K 9/14; C01D 7/00

U.S. Cl. 424—717 3 Claims

1. Alkali metal bicarbonate powder which consists of submicron monoclinic crystalline particles having an average particle size less than about one micron and a particle size distribution between about 0.1–1 micron, a surface area between about 6–15 square meters per gram, and a loose bulk density between about 0.05–0.2 gram per cubic centimeter.



5,411,751

## REDUCING GASTROINTESTINAL IRRITATION IN INFANT NUTRITION

Karen D. Crissinger, and Patrick Tso, both of Shreveport, La., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.

Continuation of Ser. No. 867,947, Apr. 13, 1992, abandoned. This application Jan. 26, 1994, Ser. No. 187,772

Int. Cl.<sup>6</sup> A23L 1/30

U.S. Cl. 426—2

14 Claims

1. A method of feeding an infant without damaging the intestinal epithelium of said infant, comprising enterally administering to said infant a food product

- (i) comprising one or more components selected from the group consisting of a protein source, a carbohydrate source, a vitamin source, a source of medium-chain fatty acids, and a mineral source;
- (ii) which is free of free fatty acids containing 16 to 22 carbon atoms or comprises such acids in amounts insufficient to damage the intestinal epithelium of said infant;
- (iii) which is free of triglycerides of fatty acids containing 16 to 22 carbon atoms or comprises such triglycerides in amounts insufficient to damage the intestinal epithelium of an infant; and
- (iv) which further comprises an ester component selected from the group consisting of lower alkyl esters of fatty acids containing 16 to 22 carbon atoms and mixtures of said esters.

5,411,752

## PASTA-BASED FOOD PRODUCT

William L. Taylor, 427 Conway Village, Creve Coeur, Mo. 63141

Continuation of Ser. No. 897,609, Jun. 10, 1992, Pat. No. 5,283,071, which is a continuation-in-part of Ser. No. 772,222, Oct. 7, 1991, abandoned. This application Jan. 31, 1994, Ser. No. 189,183

The portion of the term of this patent subsequent to Feb. 1, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A23L 1/16; A23P 1/08

U.S. Cl. 426—94

2 Claims

1. A pasta-based food product produced by a method comprising the steps of:

- mixing a plurality of discrete pieces of cooked pasta with a binding composition comprising a binding agent, in a cooked pasta to binding agent weight ratio of from about 40:1 to about 10:1, to form a pasta/binding agent mixture;
  - forming a desired amount of the mixture into a desired shape; and
  - baking the desired shape in a manner to adhere together the discrete pieces of cooked pasta to form a mass, containing voids free of binding agent, yet being sufficiently rigid to be held by hand and retain in the pasta a desired texture and degree of moistness;
- the binding agent being selected from the group consisting of (1) soy protein and (2) egg white compositions comprising a sufficient proportion of egg white to permit the adherence of the discrete pieces of cooked pasta by the baking step.

5,411,753

## SUBATMOSPHERIC PRESSURE COOK-AND-HOLD STEAMING METHOD

Eugene R. Tippmann, 251 Country Lake Dr., Lexington, S.C. 29072

Division of Ser. No. 79,594, Jun. 22, 1993, Pat. No. 5,318,792, which is a division of Ser. No. 852,785, Mar. 17, 1992, Pat. No. 5,235,903. This application May 2, 1994, Ser. No. 235,990

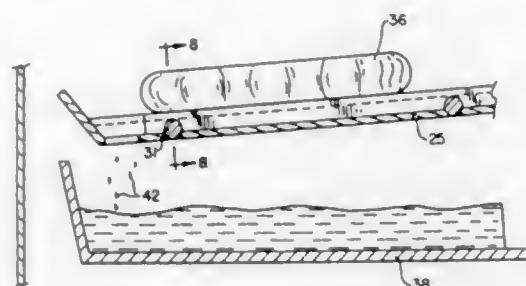
Int. Cl.<sup>6</sup> A23L 1/00

U.S. Cl. 426—510

2 Claims

1. A method of preparing a food product without the usual excess heat induced shrinkage comprising the steps of supporting the food product on a plurality of relatively thin rails hav-

ing substantial free spaces therebetween, hermetically enclosing the rail supported food product, reducing the ambient pressure surrounding the food product and allowing steam to surround the food product in direct contact therewith for a



predetermined period of time thereby transferring heat to the food product to cook the food product, restoring the ambient pressure surrounding the food product to atmospheric pressure and maintaining the food product at a predetermined temperature without further cooking the food product.

5,411,754

Patent Not Issued For This Number

5,411,755

## PROCESS AND COMPOSITION FOR SWEET JUICE FROM CUCURBITACEAE FRUIT

Galen E. Downton, Erlanger; Michael W. Maxwell, Dayton, both of Ky.; Heather J. Harper, Hamilton, Ohio; M. Joseph Mohlenkamp, Jr.; George P. Rizzi, both of Cincinnati, Ohio; Manfred Litke, Waldems-Steinfischbach, Germany; Karin Romer, Bad Soden, Germany, and Ruediger Engel, Osthofen, Germany, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 56,459, May 3, 1993, abandoned, which is a continuation-in-part of Ser. No. 17,936, Feb. 16, 1993, abandoned, and Ser. No. 17,937, Feb. 16, 1993, abandoned. This application Jan. 26, 1994, Ser. No. 182,601

Int. Cl.<sup>6</sup> A23L 2/78

U.S. Cl. 426—599

23 Claims

1. A process for preparing sweet juice from fruit of the Cucurbitaceae family comprising:

- (a) separating peel and seeds from unprocessed juice of the fruit;
- (b) removing of pulp solids from the fruit juice, whereby the juice consists of less than 2% pulp solids;
- (c) acidifying the juice to a pH of less than 5.3;
- (d) removing off-flavor precursors, which comprise sulfur-containing amino acids, from the juice; and
- (e) removing a methylene chloride extractable volatiles fraction from the juice.

5,411,756

## REDUCED CALORIE TRIGLYCERIDE MIXTURES

Edward L. Wheeler, Fairfield, N.J.; Ronald P. D'Amelia, Hicks, N.Y.; Gilbert A. Leveille, Denville, N.J.; Michael S. Otterburn, Randolph, N.J.; Lawrence P. Klemann, Somerville, N.J.; John W. Finley, Whippany, N.J.; Allan D. Roden, Nobelsville, Ind.; Michael M. Chrysam, Blairstown, N.J.; Turiddu A. Pelloso, Carmel, Ind., and Peter S. Given, Jr., Glencoe, Ill., assignors to Nabisco, Inc., Passippany, N.J.

Division of Ser. No. 83,795, Jun. 28, 1993, Pat. No. 5,378,490, which is a continuation-in-part of Ser. No. 624,056, Dec. 7, 1990, abandoned, which is a continuation-in-part of Ser. No. 410,161, Sep. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 665,629, Mar. 6, 1991, abandoned, and a continuation-in-part of Ser. No. 732,518, Jul. 19, 1991, abandoned. This application Dec. 29, 1993, Ser. No. 175,332

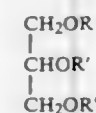
The portion of the term of this patent subsequent to Jan. 3, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> A23D 7/00

U.S. Cl. 426—607

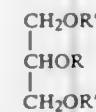
22 Claims

1. A reduced-calorie dairy composition comprising a dairy protein and a fat component, wherein at least about 25% of the fat component comprises low calorie triglycerides selected from the group consisting of

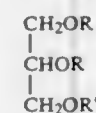


(SSL) U.S. Cl. 427—8

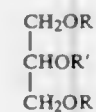
11 Claims



(SLS)



(LLS)



(LSL)

wherein

the R groups are, independently, long chain saturated fatty acid residues having between 16 and 22 carbons;

and

the R' groups are short chain acid residues having 2 to 4 carbons and mixtures thereof.

5,411,757

## PALATABLE BALANCED AMINO ACID-MODIFIED DIET

Neil R. M. Bulst, 8510 SW. White Pine La., Portland, Oreg. 97225, and Annie P. Prince, 1935 Maryhurst Dr., West Linn, Oreg. 97068

Continuation of Ser. No. 742,855, Aug. 8, 1991, abandoned, which is a continuation-in-part of Ser. No. 433,714, Nov. 9, 1989, abandoned. This application Aug. 31, 1993, Ser. No. 114,975

Int. Cl.<sup>6</sup> A23J 1/00

U.S. Cl. 426—656

10 Claims

1. In a balanced palatable medical diet for treatment of patients with inborn errors of essential amino acid metabolism including natural foods which are unbalanced or limited for said patients due to deficiencies in essential amino acids and sources of energy and protein, the improvement comprising a palatable protein-equivalent of L-amino acids which comprises an amount of L-glutamine comprising from about 90 to 100% by weight of the total combined weight of L-glutamic acid and L-glutamine in said protein-equivalent of L-amino acids, an

amount of L-asparagine which comprises about 90 to 100% by weight of the total combined weight of L-aspartic acid and L-asparagine in said protein-equivalent of L-amino acids, an amount of L-citrulline which comprises up to about 50% by weight of the total combined weight of L-citrulline and L-arginine in said protein-equivalent of L-amino acids, and an amount of L-cystine which comprises from about 20 to 80% by weight of the total combined weight of L-cystine and L-methionine in said protein-equivalent of L-amino acids, the balanced palatable formulation and natural foods together comprising a protein source for about 100% of the protein intake of said patients with inborn errors of metabolism and being nutritionally equivalent to protein from natural food, being compatible with the maintenance of good nutrition and being incorporable into Medical Foods without compromising the organoleptic properties thereof.

5,411,758

## METHOD OF MAKING SYNTHETIC DIAMOND WEAR COMPONENT

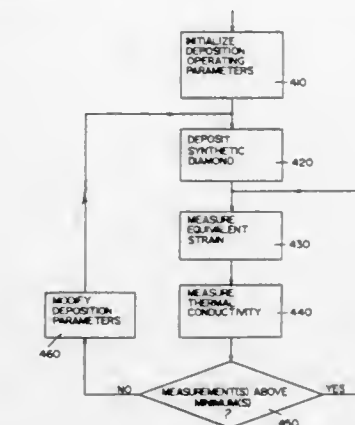
Matthew Simpson, Arlington, Mass., assignor to Norton Company, Worcester, Mass.

Filed Oct. 9, 1991, Ser. No. 773,465

Int. Cl.<sup>6</sup> C23C 16/26

U.S. Cl. 427—8

11 Claims



1. A method for producing synthetic diamond for use as a wear surface, comprising the steps of: depositing synthetic diamond by chemical vapor deposition utilizing initial diamond parameters; monitoring the equivalent strain of the synthetic diamond; modifying at least one of said deposition parameters when the equivalent strain of the synthetic diamond is less than a preselected percentage, so as to effect a modification of equivalent strain; and depositing further synthetic diamond utilizing the modified deposition parameters.

5,411,759

## ELECTRO-LUMINESCENCE INDICATING PANEL AND METHOD OF MANUFACTURE

Tomoyuki Kawashima, Yokohama; Hisato Kato, Yokosuka; Kazuyoshi Shibata, Yokohama, and Harutaka Taniguchi, Yokosuka, all of Japan, assignors to Fuji Electric Co., Ltd., Japan

Division of Ser. No. 751,004, Aug. 28, 1991, abandoned. This application Jun. 10, 1993, Ser. No. 74,566

Claims priority, application Japan, Sep. 1, 1990, 2-230777; Apr. 2, 1991, 3-068654

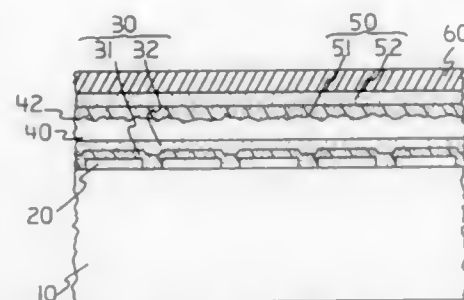
Int. Cl.<sup>6</sup> C23C 26/00

U.S. Cl. 427—58

11 Claims

1. A method of manufacturing an electro-luminescence indicating panel comprising the steps of: forming a lower electrode film on a substrate;

forming a light emitting film on the lower electrode film;  
forming an upper electrode film on the light emitting film;  
and  
forming an insulating film between at least one of the lower



electrode film and the light emitting film, and the light emitting film and the upper electrode film by coating a fluidic material comprising methyl silanol dissolved in isopropyl alcohol, and sintering the fluidic material to obtain a coated film.

5,411,760

# PROTECTIVE COATING AND METHOD OF USING SUCH COATING

Edward W. Woodhall, Los Altos, and Nicholas Kondrats, Goleta, both of Calif., assignors to Cal-West Equipment Company, Inc., Los Altos, Calif.

Division of Ser. No. 16,872, Feb. 11, 1993, Pat. No. 5,362,786, which is a continuation-in-part of Ser. No. 614,330, Nov. 16, 1990, abandoned. This application Mar. 10, 1994, Ser. No. 209,796

The portion of the term of this patent subsequent to Feb. 16, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> B05D 1/32

U.S. Cl. 427—156

24 Claims

1. A method of temporarily protecting portions of an automobile surface from paint, said method comprising the steps of:  
a) applying a masking material to said surface portions of said automobile, wherein said applying is effective to produce a substantially continuous film of a masking material over said surface portions of said automobile, said masking material comprising:  
(i) between about 5% to 25% polyvinyl alcohol by weight;  
(ii) between about 0.3% and about 10% surfactant by weight, and  
(iii) at least about 60% water by weight;  
b) painting said surface of said automobile, wherein said masking material is effective to prevent paint to cause contact with said surface portions of said automobile to be protected; and  
c) removing said masking material from said surface portions of said automobile to be protected with a water wash, whereby paint applied to said protected portions of said surface of said automobile is removed together with said masking material.

5,411,761

# PROCESS OF PRODUCING HYDROPHOBIC TITANIUM OXIDE FINE PARTICLE

Yoshinori Inokuchi, and Satoshi Kuwata, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 17, 1993, Ser. No. 18,554

Claims priority, application Japan, Feb. 17, 1992, 4-061167

Int. Cl.<sup>6</sup> B05D 7/00

U.S. Cl. 427—220

6 Claims

1. A process of producing hydrophobic titanium oxide fine particles, comprising the steps of dispersing titanium oxide fine particles in an aqueous alkaline solution having a pH of 10.0 to 13.0, adding a trialkoxysilane in an amount of 1 to 1,000 parts

by weight per 100 parts by weight of the titanium oxide fine particles to the resulting dispersion, and carrying out the hydrolysis condensation reaction, whereby a coating of a hydrolysis condensation product of the trialkoxysilane is formed on the surface of the titanium oxide fine particles.

5,411,762

# METHOD OF OBTAINING A SIALON-BASED CERAMIC MATERIAL BY REDUCING AN ALUMINOSILICATE MATERIAL, AND USE THEREOF IN FORMING A CERAMIC COATING ON A REFRACTORY SUBSTRATE

Jacques Thebault, Bordeaux; Alain Seron, Viennes en Val, and Francois Beguin, Olivet, all of France, assignors to Societe Europeenne De Propulsion, Suresnes, France

Filed Feb. 2, 1994, Ser. No. 190,319

Claims priority, application France, Feb. 8, 1993, 93 01360

Int. Cl.<sup>6</sup> B05D 3/04; C04B 35/599

U.S. Cl. 427—226

17 Claims

13. The method of forming a Sialon-based ceramic coating on a refractory substrate, comprising the steps of:  
providing an aluminosilicate material in suspension in a liquid vehicle;  
depositing the suspension on the substrate;  
eliminating the liquid vehicle; and  
reducing the aluminosilicate material by a gas phase comprising a mixture of hydrogen and of nitrogen doped with a gaseous carbon compound, with said aluminosilicate material remaining substantially free of solid elemental carbon.

5,411,763

# METHOD OF MAKING A MODIFIED CERAMIC-CERAMIC COMPOSITE

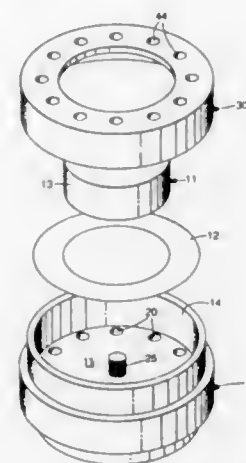
Billy L. Weaver, Eagan, Minn.; Jerry C. McLaughlin, Oak Ridge, and David P. Stinton, Knoxville, both of Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn. and Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 11, 1993, Ser. No. 2,935

Int. Cl.<sup>6</sup> C23C 16/00

U.S. Cl. 427—249

18 Claims



1. A method of making a modified, shaped ceramic-ceramic composite article, said method comprising the steps of:

- (a) providing first fiber selected from the group consisting of ceramic fiber, carbon fiber, and combinations thereof, said first fiber (i) being in a fibrous form, (ii) capable of being provided in a fibrous form, (iii) or a combination thereof;  
(b) providing a shaped ceramic-ceramic composite article comprising second fiber having a surface which is available for coating and a coating comprising silicon carbide, silicon nitride, or a combination thereof at least partially covering said surface which is available for coating, said

second fiber being selected from the group consisting of ceramic fiber, carbon fiber, and combinations thereof;

- (c) providing a chemical vapor deposition chamber assembly capable of holding a fibrous form adjacent to at least a portion of a surface of said shaped ceramic-ceramic composite article, said assembly including means for providing a thermal gradient between first and second sides of said fibrous form;

- (d) assembling the components of (a), (b), and (c) to provide a chemical vapor deposition chamber assembly holding a fibrous form comprising said first fiber adjacent to at least a portion of a surface of said shaped ceramic-ceramic composite article, said fibrous form being arranged such that said first and second sides of said fibrous form are arranged in said assembly such that said means for providing a thermal gradient can provide a thermal gradient between said first and second sides of said fibrous form; and

- (e) providing a thermal gradient between said first and second sides of said fibrous form such that there is a hot region and a cold region, infiltrating and depositing via chemical vapor deposition silicon carbide, silicon nitride, or a combination thereof onto at least a portion of said surface of said first fiber and depositing said silicon carbide, silicon nitride, or a combination thereof onto at least a portion of said surface of said shaped ceramic-ceramic composite article, wherein said infiltration of silicon carbide, silicon nitride, or combination thereof proceeds from said hot region to said cold region of said fibrous form of said first fiber.

5,411,764

# METHOD OF MAKING LITHIUM ELECTRODE

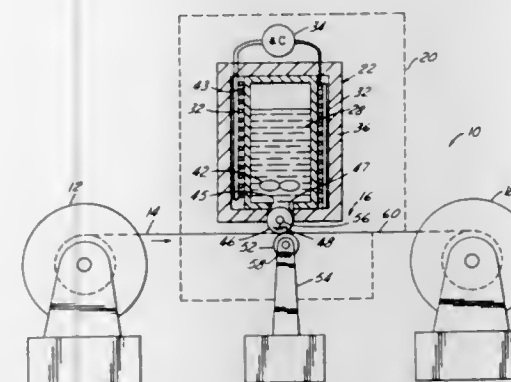
Rene Koksang, San Jose, Calif., assignor to Valence Technology, Inc., San Jose, Calif.

Continuation of Ser. No. 40,226, Mar. 30, 1993, abandoned. This application Jun. 14, 1994, Ser. No. 259,746

Int. Cl.<sup>6</sup> B05D 1/28, 1/30

U.S. Cl. 427—383.7

19 Claims



1. In a process for forming a layer of lithium on a substrate by utilizing a bath of molten lithium metal material of compound or alloy thereof, a heat sink disposed adjacent the bath, and a substrate having first and second opposed major surfaces, wherein the substrate is transported along a path which traverses between the bath and the heat sink, wherein a relatively constant quantity of the molten material is continuously applied to the first surface of the substrate, wherein the second surface of the substrate is immediately contacted with a heat sink opposite the site of molten metal application for causing solidification of the molten metal in the form of a thin film on the substrate, having a thickness less than about 100 microns, and wherein the bath, heat sink and substrate are surrounded by controlled atmosphere inert to lithium during the steps of applying and solidifying the metal material, an improved

method of practicing such a process comprising in combination therewith the steps of:

- a) maintaining said bath of molten material in a closed and heat insulated vessel disposed above said path and within said controlled atmosphere to thereby further isolate said bath from any contaminants in said surrounding controlled inert atmosphere;
- b) orienting said substrate first surface facing upwardly as it traverses between the bath and heat sink, and
- c) applying the molten metal material by allowing said molten metal material to flow by gravity from the bath via a gravity fed outlet of the vessel downwardly onto said upwardly facing substrate first surface.

5,411,765

# FLEXIBLE MULTI-LAYER POLYIMIDE FILM LAMINATES AND PREPARATION THEREOF

Kuppusamy Kanakarajan, Dublin, and John A. Kreuz, Columbus, both of Ohio, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

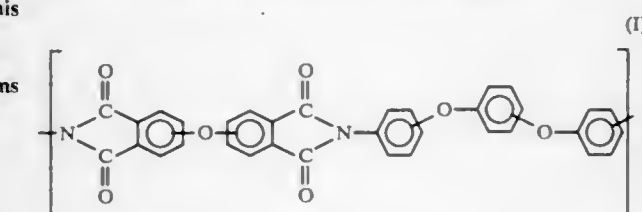
Division of Ser. No. 878,483, May 5, 1992, Pat. No. 5,298,331, which is a continuation-in-part of Ser. No. 571,913, Aug. 27, 1990, abandoned. This application Dec. 14, 1993, Ser. No. 168,866

Int. Cl.<sup>6</sup> B05D 3/02, 3/10

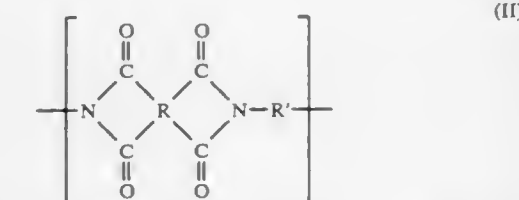
U.S. Cl. 427—385.5

10 Claims

1. A process for preparing a polyimide laminate comprising coating at least one side of a base film selected from the group consisting of polyamic acid green film, polyimide gel film and cured polyimide film with a solution of a copolyamic acid precursor of a copolyimide in an inert organic solvent and subsequently treating the copolyamic acid coated base film to completely convert the copolyamic acid precursor to the copolyimide, wherein the copolyimide comprises at least 60 mole % of repeating imide units of the formula



and not greater than 40 mole % of other repeating imide units of the formula



wherein R is the radical of a tetravalent organic carboxylic dianhydride selected from the group consisting of pyromellitic dianhydride, 4,4'-oxydiphthalic dianhydride, 3,3',4,4'-benzophenone tetracarboxylic dianhydride, 2,2',3,3'-benzophenone tetracarboxylic dianhydride, 3,3',4,4'-biphenyl tetracarboxylic dianhydride, 2,2',3,3'-biphenyl tetracarboxylic dianhydride, 2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride, bis(3,4-dicarboxyphenyl)sulfone dianhydride and m-phenylene bis(trimellitate)dianhydride; and wherein R' is the radical of a divalent aromatic or aliphatic diamine selected from the group consisting of p-phenylene diamine, hexamethylene diamine, heptamethylene diamine, octamethylene diamine, 4,4'-diaminodiphenyl ether, 3,4'-diaminodiphenyl ether, 1,3-bis(4-aminophenoxy)benzene, 1,2-bis(4-aminophenoxy)-



benzene, 1,3-bis(4-aminobenzoyloxy)benzene, 4,4'-diaminobenzanilide, 4,4'-bis(4-aminophenoxy)phenyl ether and a polysiloxane diamine, provided that said repeating imide units of formula (I) are different from said repeating imide units of formula (II).

5,411,766

# SUBSTRATES TREATED WITH POLYFLUORO NITROGEN CONTAINING ORGANIC COMPOUNDS

Jack R. Kirchner, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 52,421, Mar. 30, 1993, abandoned, which is a continuation of Ser. No. 815,753, Jan. 2, 1992, abandoned, which is a continuation-in-part of Ser. No. 459,040, Dec. 29, 1989, abandoned. This application Dec. 10, 1993, Ser. No. 166,331

Int. Cl.<sup>6</sup> B05D 3/02

U.S. Cl. 427—393.4

29 Claims

1. A process for imparting oil-repellency, water-repellency, soil-repellency, or soil release properties to a substrate which comprises applying to the substrate a polyfluoro organic compound comprising a compound having at least one urea linkage which compound is prepared by reacting: (A) at least one polyisocyanate which contains at least three isocyanate groups per molecule with (B) at least one fluorochemical compound which contains per molecule (i) a single functional group having one or more Zerewitinoff hydrogen atoms and (ii) at least two carbon atoms each of which contains at least two fluorine atoms, and with (C) water in an amount sufficient to react with from about 5% to about 60% of the isocyanate groups in said polyisocyanate.

5,411,767

# METHOD FOR PRODUCING INTERCONNECTOR FOR SOLID ELECTROLYTE TYPE FUEL CELL

Takao Soma, Aichi; Shinji Kawasaki, Nagoya; Shigenori Ito, Kasugai, and Katsuki Yoshioka, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

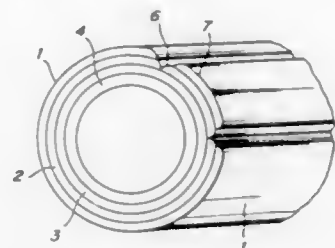
Filed Sep. 8, 1992, Ser. No. 941,890

Claims priority, application Japan, Jul. 27, 1992, 4-199754

Int. Cl.<sup>6</sup> B05D 1/08, 5/12; H01M 8/10

U.S. Cl. 429—453

11 Claims



1. A method for producing an interconnector for a solid electrolyte fuel cell, comprising the steps of:

preparing an interconnector material comprising a powder of at least one perovskite complexed oxide, having ABO<sub>3</sub> structure, selected from the group consisting of:

- i) lanthanum chromite represented by the formula  $(La_{1-x}D_x)_{1-u}(Cr_{1-y}E_y)_{1-w}O_3$ , wherein  $0 < x \leq 0.3$ ,  $0 \leq y \leq 0.3$ ,  $u \geq 0$ ,  $w \leq 0.1$ , D partially substitutes for lanthanum crystallographic positions at the A site, D being at least one element selected from the group consisting of yttrium, cerium, praseodymium, neodymium, samarium, gadolinium, dysprosium, holmium, erbium, ytterbium, calcium, strontium and barium, E partially substitutes for chromium crystallographic positions at the B site, E being at least one element selected from the group consisting of titanium, vanadium, manganese, iron, cobalt, nickel, copper, zinc, magnesium, aluminum, lead, ruthenium, rhodium, niobium, molybdenum and tungsten;

- ii) chromium series complexed oxides represented by the formula



wherein  $0 \leq x \leq 0.3$ ,  $u \geq 0$ ,  $w \leq 0.1$ , D is the same as in paragraph i), E partially substitutes for chromium crystallographic positions at the B site, E being the same as in paragraph i);

- iii) lanthanum series complexed oxides represented by the formula



wherein  $0 \leq x \leq 0.3$ ,  $u \geq 0$ ,  $w \leq 0.1$ , D partially substitutes for lanthanum crystallographic positions at the A site, D being the same as in paragraph i), and E is the same as in paragraph i); and

- iv) complexed oxides represented by the formula



wherein  $u \geq 0$ ,  $w \geq 0.1$ , and D and E are the same as in paragraph i);

said interconnector material powder being produced by the following steps:

- (a) mixing powders of compounds of metallic elements to form a mixture;
  - (b) firing the mixture to form an intermediate product of the perovskite complexed oxide;
  - (c) pulverizing the intermediate product to provide a pulverized powder;
  - (d) mixing the pulverized powder with a medium to form a slurry; and
  - drying the slurry to provide a granulated powder having an average grain diameter of 3–100  $\mu$ m;
- thermal spraying the granulated interconnector material powder onto the surface of an electrode of a solid electrolyte fuel cell to form a thermally sprayed film; and heat treating the thermally sprayed film at a temperature of at least 1,250° C. to form an interconnector.

5,411,768

# THERMOPLASTIC/THERMOSET TABLE COATINGS OR INKS FOR GLASS CERAMIC AND OTHER HARD SURFACES

Timothy A. Knell, McMurray, and Gilbert B. Burkhart, III, Washington, both of Pa., assignors to Cerdec Corporation, Washington, Pa.

Division of Ser. No. 998,628, Dec. 30, 1992, Pat. No. 5,346,933. This application May 11, 1994, Ser. No. 241,404

Int. Cl.<sup>6</sup> B05D 3/02; C08L 63/02

U.S. Cl. 427—386

2 Claims

1. A method for the application of a coating or ink to glass, ceramic or other hard surface which comprises

- (1) heating a composition which comprises
  - (a) a blend of epoxy resins selected from the group consisting of bisphenol A epoxy resin, bisphenol F epoxy resin, epoxy cresyl novolac resin and epoxy phenol novolac resin, the said epoxy resins having an epoxide equivalent weight of 150 to 2000 and the blend having a viscosity, determined by Brookfield HBT Viscometer at 200° F. 5 RPM, in the range of 500 to 15,000 cps,
  - (b) a dicyandiamide curing agent for said epoxy blend which provides a latency period of about 30 minutes at a screening temperature of about 120°–270° F.,
  - (c) an adhesion promoter in an amount up to about 5% by weight of the composition,
  - (d) a wetting agent in an amount up to about 5% by weight of the composition, and
  - (e) a rheological modifier in an amount up to about 10% by weight of the composition, the melting or softening point of said composition being in the range of about 10° C. to about 120° C.

to the melting or softening point of the composition,

- (2) applying said melted or softened composition through a

- heated metal screen to a glass, ceramic or other hard surface, removing said metal screen, and
- (3) heating the resultant coating on the said surface to the curing temperature of the composition and maintaining at said temperature until curing is complete.

5,411,769

# METHOD OF PRODUCING MICROMECHANICAL DEVICES

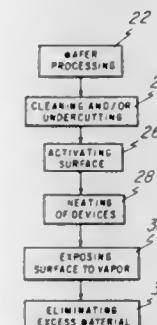
Larry J. Hornbeck, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 823,580, Jan. 16, 1992, Pat. No. 5,331,454, which is a continuation of Ser. No. 612,946, Nov. 13, 1990, abandoned. This application Sep. 29, 1993, Ser. No. 128,459

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 427—534

19 Claims



1. A method for producing a low surface energy wear resistant thin film on the surface of a micromechanical device comprising the steps of:

- a) cleaning said device;
- b) activating the surface of said cleaned device;
- c) heating said activated surface;
- d) heating a source material to produce a vapor, wherein said source material is a long-chain aliphatic halogenated polar compound; and
- e) exposing said activated surface to said source material vapor to deposit a passivating layer on said surface.

5,411,770

# METHOD OF SURFACE MODIFICATION OF STAINLESS STEEL

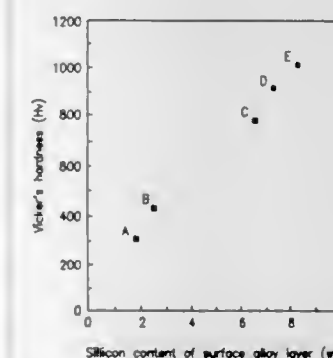
Wen-Ta Tsai; Ju-Tung Lee, both of Tainan, and Tai-Hwang Lai, I-Lan, all of Taiwan, Prov. of China, assignors to National Science Council, Taipei, Taiwan, Prov. of China

Filed Jun. 27, 1994, Ser. No. 266,046

Int. Cl.<sup>6</sup> C23C 24/10

U.S. Cl. 427—556

28 Claims



1. A method of modifying the surface of stainless steel, comprising the following steps of:

- (a) cleaning the surface by mechanical means;

- (b) coating a silicon nitride gel on the surface;
- (c) drying the surface; and
- (d) scanning and melting the surface by CO<sub>2</sub> laser, thereby causing the gel to react with the surface of the stainless steel to form a hardened surface alloy layer with increased silicon content.

5,411,771

# METHOD FOR COATING METAL COOKWARE

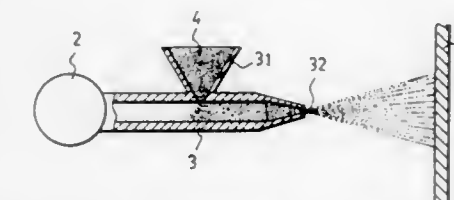
Tung-Hung Tsai, No. 20, Lane 104, Ta-Liao Rd., Ta-Liao Tsun, Ta-Liao Hsiang, Kaohsiung Hsien, Taiwan, Prov. of China

Filed Apr. 29, 1993, Ser. No. 55,680

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 427—456

5 Claims



1. A method for coating metal cookware which has a metal container with an interior cooking surface, comprising the steps of:

- a) providing a roughening layer with a roughness of 4.5–5.5  $\mu$ m (Ra) on said interior cooking surface by spraying aluminum oxide onto said interior cooking surface;
- b) providing a metallic abrasion-resistant layer with a roughness of 5.0–8.0  $\mu$ m on said roughening layer by electric-arc spraying a metal onto said roughening layer; and
- c) providing a lubricative layer with a roughness of 2.5–5.5  $\mu$ m on said metallic abrasion-resistant layer by spraying a PTFE (polytetrafluoroethylene) coating material onto said metallic abrasion resistant layer.

5,411,772

# METHOD OF LASER ABLATION FOR UNIFORM THIN FILM DEPOSITION

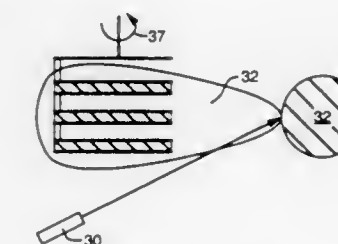
Jeffrey T. Cheung, Thousand Oaks, Calif., assignor to Rockwell International Corporation, Seal Beach, Calif.

Filed Jan. 25, 1994, Ser. No. 187,424

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 427—586

20 Claims



14. A method of depositing a thin film on a substrate by pulsed laser ablation of a target of ablative material, comprising the steps of:

- providing a deposition chamber containing a background gas;
- placing the target of laser ablative material within said chamber;
- focusing a pulsed laser beam along a line on said target to form a plume including atoms, ions, molecules, and particulates of ablated material extending in a propagation direction outward from said target in said chamber;
- providing said background gas at a low pressure sufficient to cause lateral diffusion of said atoms, ions, and molecules of said ablated material within said plume;

placing a deposition surface of a substrate within said plume of ablated material;  
orienting said deposition surface on or generally parallel to a plane normal to said target and not in direct line-of-sight with said line of focus of said laser beam on said target;  
rotating said deposition surface about an axis perpendicular to said deposition surface; and  
depositing said ablated material other than said particulates on said rotating deposition surface.

5,411,773

## FRICTION MATERIAL

Kazuyuki Ohya, and Shunichi Shinohara, both of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Dec. 2, 1993, Ser. No. 160,200

Claims priority, application Japan, Dec. 9, 1992, 4-329377  
Int. Cl.<sup>6</sup> C09K 3/14

U.S. Cl. 428—1

6 Claims

1. A friction material comprising fibrous reinforcing substrate other than asbestos, selected from the group consisting of organic fibrous reinforcing substrate and mixtures of organic fibrous reinforcing substrate and inorganic fibrous reinforcing substrate, a binder and a friction wear regulator wherein said organic fibrous reinforcing substrate comprises a fibrillated pulp of an aromatic liquid crystal polyester resin as a main component, said fibrillated pulp having a melting point of 330° C. or higher.

5,411,774

## RIBBON ASSEMBLY FORMING CURVED SEGMENT FOR MAKING A BOW OR RUFFLE

Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.

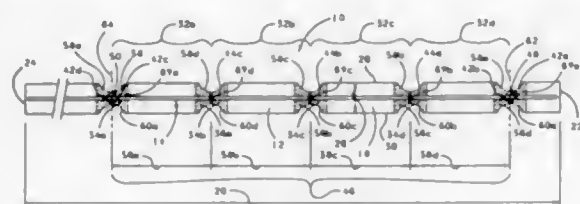
Continuation of Ser. No. 101,210, Aug. 3, 1993. This application Aug. 5, 1994, Ser. No. 286,853

The portion of the term of this patent subsequent to Feb. 7, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—4

16 Claims



1. A ribbon assembly comprising:

a strip of material having an upper surface and a lower surface and a strip width extending between a first strip side and a second strip side, the strip of material being divided into a plurality of strip segments with each strip segment having a first segment end and a second segment end with the second segment end of each strip segment being disposed about adjacent the first segment end of the adjacent strip segment;

means disposed on the strip of material having a stretched condition and an unstretched condition, the strip of material being extendable in about a straight line in the stretched condition of said means, wherein the means having the stretched condition and the unstretched condition comprises a heat shrinkable material, the heat shrinkable material being in the stretched condition prior to heat being applied thereto and the heat shrinkable material

shrinking when heat is applied thereto for moving the heat shrinkable material to the unstretched condition; and  
adhesive or cohesive means disposed on the strip of material for adhesively or cohesively connecting portions of the strip of material after said heat shrinkable material has been heated to form the curved segments, to adhesively or cohesively hold each of the curved segments in the curved form.

5,411,775

## ARTIFICIAL CATTAILS AND METHOD FOR MAKING ARTIFICIAL CATTAILS

Warren F. Wilson, 212 Birch St., Rte. 1, Storm Lake, Iowa 50588

Filed Apr. 26, 1994, Ser. No. 233,306

Int. Cl.<sup>6</sup> A41G 1/00

U.S. Cl. 428—17

20 Claims



1. An artificial cattail, comprising:

a stem;

an elongated tubular member mounted on the stem; and  
flocking adhered to the tubular member.

5,411,776

## SEALANTS

Gerald Schmidt, Worms, and Rainer Jung, Ketsch, both of Germany, assignors to Morton International, Inc., Chicago, Ill.

Filed Mar. 25, 1994, Ser. No. 218,220

Claims priority, application Germany, Apr. 6, 1993, 43 11 185.8

Int. Cl.<sup>6</sup> C08G 23/00, 75/14

U.S. Cl. 428—34

8 Claims

1. A sealant comprising a mercapto-terminal liquid oligomer containing plasticizers, fillers and additives wherein the improvement comprises as curing agent an acrylic or methacrylic compound with at least two acrylic or methacrylic groups per molecule and a guanidine derivative as a curing catalyst.

5,411,777

## HEAT SHRINKABLE PROTECTIVE SHEETS

Robert E. Steele, Richmond Hill; Michael A. Romano, Hamilton, and Peter Jackson, Etobicoke, all of Canada, assignors to Shaw Industries, Ltd., Rexdale, Canada

Continuation of Ser. No. 660,866, Feb. 26, 1991, abandoned, which is a continuation-in-part of Ser. No. 519,473, May 7, 1990, Pat. No. 5,134,000, which is a continuation-in-part of Ser. No. 392,043, Aug. 10, 1989, abandoned. This application Dec. 10, 1993, Ser. No. 164,995

The portion of the term of this patent subsequent to Jul. 28, 2009, has been disclaimed.

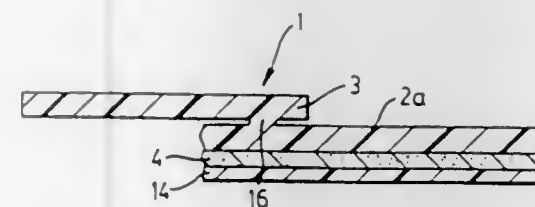
Int. Cl.<sup>6</sup> B65D 65/02; B32B 7/00

U.S. Cl. 428—34.9

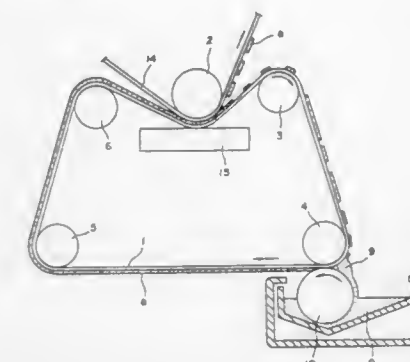
44 Claims

1. A heat shrinkable wrap-around sleeve adapted to be applied to an article in wrapping relation thereto comprising a sheet of dimensionally heat unstable flexible material having longitudinally spaced end portions capable of being brought into overlapping relation when the sheet is applied to the article, the material having been stretched in the longitudinal

direction from an original heat stable form to a dimensionally heat unstable form capable of moving in the direction of its original form by the application of heat alone, and a cross-linked dimensionally heat unstable closure strip having one edge disposed on one of the end portions of said sheet and welded thereto, said strip being of sufficient width that when the end portions of the sheet are brought together and the end portion having the closure strip is overlapped on the opposite



end portion, the free edge of the closure strip can be applied on the underlapping end portion and welded thereto by direct heating applied thereon, said closure strip having a covering of a hold-down adhesive across a transverse zone of a side of the closure strip to be overlapped on said opposite end portion; and wherein said closure strip exhibits shrinkage in said longitudinal direction on heating of about 10% to about 50% based on the length of the unshrunk strip.



tubular inner layer made of a polyimide resin and a tubular outer layer made of a fluoroplastic, characterized by that the outer circumferential surface of said fluoroplastic tubular outer layer has a surface roughness ( $R_z$ ) of 1 to 10  $\mu\text{m}$ .

5,411,780

## DECORATIVE APPARATUS WITH INTERCONNECTABLE ELEMENTS

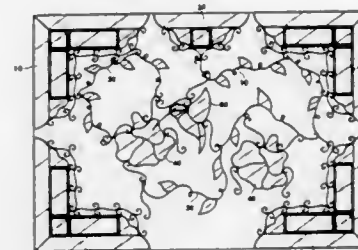
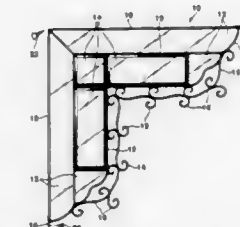
Pamela A. Kaefer, 1042 Vernal St., Manteca, Calif. 95336

Filed Oct. 29, 1992, Ser. No. 968,395

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—38

4 Claims



1. A hanging assembly of separate and discrete decorative glass modules, comprising:

a series of decorative glass modules, at least some of which differ in design and shape from others, each being generally planar in shape, the glass modules being interconnected in a generally planar, free-hanging array, the series of modules being positioned relative to one another so as to define open spaces between adjacent modules, the modules not being abutted edge to edge,

hanging connection means for connecting the modules to each other in the hanging assembly, comprising hook connectors extending from module to module across open space between modules, the hook connectors comprising manually pliable, bendable members which connect adjacent modules only by hooking with the adjacent modules.

5,411,779

## COMPOSITE TUBULAR ARTICLE AND PROCESS FOR PRODUCING THE SAME

Toshio Nakajima; Masayuki Kaneto; Toshihiko Tomita; Tokio Fujita; Hitoshi Ishizaka; Chiaki Harada; Gosei Uemura; Taizo Sasaki; Masao Nakamura; Mamoru Hondo; Tadanori Michimoto, and Toshiaki Iwamoto, all of Osaka, Japan, assignors to Nitto Denko Corporation, Osaka, Japan

PCT No. PCT/JP90/00941, § 371 Date Mar. 21, 1991, § 102(e) Date Mar. 21, 1991, PCT Pub. No. WO91/01220, PCT Pub. Date Feb. 7, 1991

PCT Filed Jul. 20, 1990, Ser. No. 877,578

Claims priority, application Japan, Jul. 21, 1989, 1-190038; Jul. 17, 1990, 2-189139

Int. Cl.<sup>6</sup> B32B 7/02, 27/00

U.S. Cl. 428—36.91

13 Claims

1. A composite tubular article for a fixing belt comprising a



5,411,781

**REINFORCED COMPOSITE BACKING TAPE**

Fernand Sergerie, Robert Sergerie, and Luc Sergerie, all of Timmins, Canada, assignors to Modern Carpet Tools Ltd., Timmins, Canada

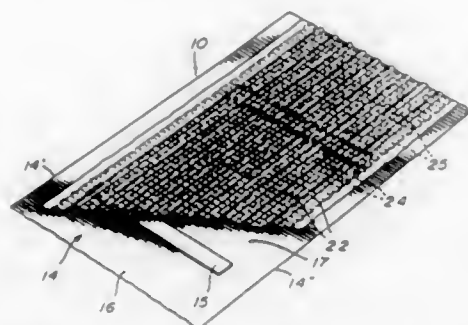
Continuation of Ser. No. 889,235, May 28, 1992, Pat. No. 5,254,407. This application Oct. 18, 1993, Ser. No. 137,515

Claims priority, application Canada, May 7, 1992, 2068191

Int. Cl.<sup>6</sup> B32B 3/00

U.S. Cl. 428—57

12 Claims



1. A carpet tape, comprising:
  - a) an elongated length of a backing sheet having laterally spaced parallel edges, said sheet having a metal foil coating on a first surface thereof;
  - b) a plurality of longitudinally spaced metal bars overlying said coating and extending generally transverse to said edges;
  - c) an array of reinforcing strands overlying said bars and exposed portions of said coating; and
  - d) an adhesive material securing said bars to said array, said material being meltable for thereafter being adapted to adhesively secure adjacent carpet edges.

5,411,782

**INTERFITTING PLASTIC PANELS**

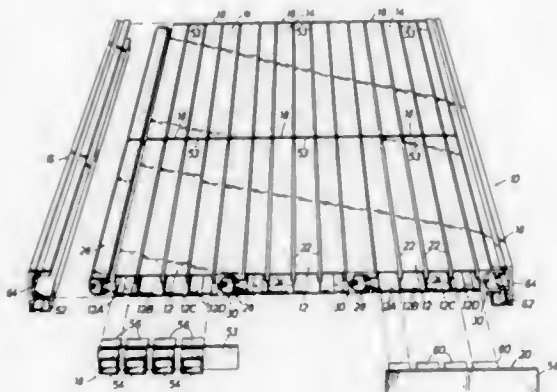
Barry M. Jarvis, and Carolyn E. Morse, both of 9829 Larston, Houston, Tex. 77055

Filed Dec. 20, 1993, Ser. No. 170,034

Int. Cl.<sup>6</sup> B32B 3/00; E04H 3/16

U.S. Cl. 428—57

13 Claims



1. A planar structure comprising:
  - a) a plurality of interfitting panels of an extruded material extending in a common plane in side by side relation; each of said panels having opposed parallel faces connected by opposed sides and having a plurality of parallel hollow compartments therein, each of said panels having a generally rectangular shape and a plurality of longitudinally extending parallel grooves in the upper surface of said panels;
  - one of said sides of each panel having a male connector

thereon and the other side having a female connector thereon, said male and female connectors on adjacent panels being in interfitting relation; cooperating means on said interfitting male and female connectors restricting relative articulated movement therebetween while forming said planar structure, wherein said female connector includes upper and lower flanges with a groove therebetween to receive the male connector, additional mutually interfitting extensions and hollow sockets located on said flanges and on said male connector; and an edge support structure having a longitudinal channel adapted to fit about a side or end of said structure.

5,411,783

**HEAT ACTIVATED APPLIQUE WITH UPPER THERMOPLASTIC ELASTOMER LAYER**

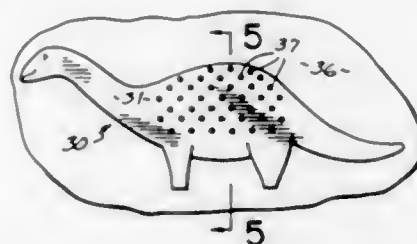
John Mahn, Jr., Cincinnati, Ohio, assignor to Specialty Adhesive Film Co., Cleves, Ohio

Continuation-in-part of Ser. No. 123,570, Sep. 20, 1993, Pat. No. 5,364,688, which is a continuation-in-part of Ser. No. 27,954, Mar. 8, 1993, Pat. No. 5,380,391. This application Jan. 27, 1994, Ser. No. 187,218

Int. Cl.<sup>6</sup> B32B 31/00

U.S. Cl. 428—79

9 Claims



1. A heat activated applique comprising an upper thermoplastic elastomeric sheet providing indicia, said sheet having a lower surface bonded to a lower heat activated adhesive layer selected from the group consisting of thermoplastic adhesives and heat activated thermosettable adhesives wherein said applique is bonded to a cloth substrate by said heat activated adhesive layer.

5,411,784

**SELF-LAMINATING POLYESTER DATA-TAG**

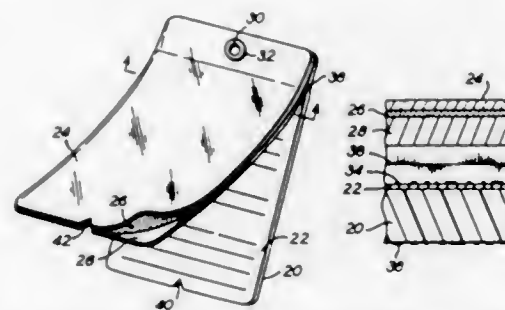
Blair M. Brewster, Brooklyn Heights, N.Y., assignor to Permar Systems, Inc., Wolcott, N.Y.

Filed Mar. 31, 1993, Ser. No. 41,402

Int. Cl.<sup>6</sup> B32B 3/10

U.S. Cl. 428—131

26 Claims



1. A durable, non-conducting self-laminating data-tag resistant to wet and windy weather conditions and to tampering for securely attaching to a piece of equipment to provide instructions to users comprising:
  - a) a tear resistant polyester substrate from about 5 mils (0.125

- mm) to about 15 mils (0.375 mm) thick having a mounting hole for receiving a fastener;
- a non-conducting, strong, locking, two piece plastic snap-grommet less than about 200 mils (5 mm) thick mounted in said mounting hole for preventing substrate damage by the fastener and increasing pull strength to the data-tag, whereby the plastic snap-grommet securely locks on the data-tag and is hard to disassemble;
- a pencil receptive coating on said polyester substrate for writing thereon whereby pencil markings are shown in a blacker, more durable form; and
- a sheet of clear material consisting of an ultra-violet blocking plastic overlying and laminated with said receptive coating and adhesively attached thereon and not extending beyond said substrate thereby forming a laminate for protecting the receptive coating and the readability of the instructions thereon.

5,411,785

**MANUFACTURE OF COMPOSITE EXTRUSIONS**

John E. Cook, Aslockton, United Kingdom, assignor to Schlegel U.K. Holdings Limited, Seacroft, United Kingdom

Continuation of Ser. No. 439,790, Nov. 21, 1989, abandoned.

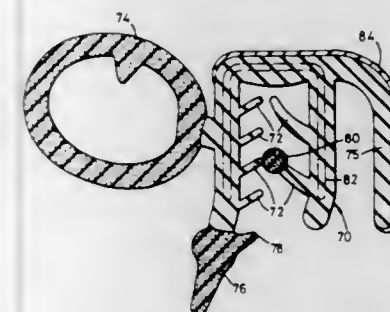
This application Jul. 23, 1993, Ser. No. 97,180

Claims priority, application United Kingdom, Nov. 21, 1988, 8827180

Int. Cl.<sup>6</sup> B60R 13/06

U.S. Cl. 428—122

1 Claim



1. A composite extrusion for use as a combined edge trim and door seal for a motor car comprising a main body formed from an extruded thermosetting polymeric material, the body comprising at least one outer surface portion of the extrusion formed of a thermoplastic polymer material bonded to the thermosetting material, the thermoplastic material having a color selected in accordance with the color of the motor car; the extrusion comprising a generally U-shaped thermosetting body portion having encapsulated therein a generally U-shaped metallic carrier for gripping a flange around a door opening and a hollow thermosetting sealing portion; wherein the U-shaped body portion comprises thermosetting gripping fins on inner surfaces of arms of the U-shaped thermosetting body portion; and in which the thermoplastic material is located on an outer surface portion of the body portion which is visible in use and is of a color selected to match the paint work of a vehicle to which it is to be fitted.

5,411,786

**CORRUGATED BOARD-MADE SCAFFOLD BOARD STRUCTURE WITH HIGH STRENGTH**

Shin C. Kuo, Changhua City, Taiwan, Prov. of China, assignor to Ta Yen Paper Box Container Co., Ltd., Changhua City, Taiwan, Prov. of China

Filed Oct. 18, 1993, Ser. No. 137,476

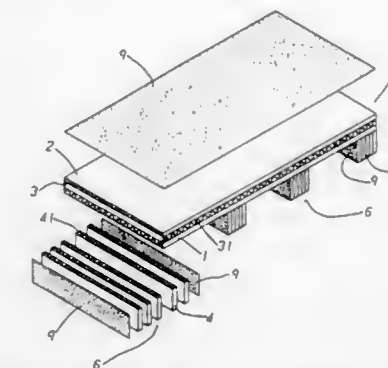
Int. Cl.<sup>6</sup> B32B 3/28; B65D 19/34

U.S. Cl. 428—184

6 Claims

1. A corrugated board-made scaffold board structure with high strength, comprising a bearing board and several leg boards disposed thereunder, said bearing board being com-

posed of a lower longitudinal corrugated board, a middle transverse corrugated board and an upper longitudinal corrugated board which are attached to one another, each of said leg boards being composed of several corrugated boards attached to one another, shock-absorbing and supporting rib members



being respectively disposed within corrugations of said lower, middle and upper corrugated boards for reinforcing the same, on an upper surface of said bearing board and two lateral sides of each said leg board being attached several layers of carton boards to increase bearing strength and collision-resistance of said bearing board and leg boards against a forklift.

5,411,787

**WATER BASED TRANSPARENT IMAGE RECORDING SHEET**

Subodh K. Kulkarni, Woodbury; Jeffrey C. Chang, North Oaks, both of Minn.; Robert M. Henry, Round Rock, Tex.; Robert E. Martinson, West St. Paul, and John J. Stofko, Jr., St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

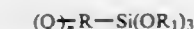
Filed Oct. 19, 1993, Ser. No. 139,219

Int. Cl.<sup>6</sup> B32B 3/00

U.S. Cl. 428—195

20 Claims

1. A water-based transparent image-receptive recording sheet comprising a substrate and a layer suitable for imaging in a thermal printer, and in electrophotographic or xerographic copiers, said layer having a microstructured surface, said surface having nanometer sized asperities, said layer having a thickness of at least about 0.20 μm, comprising a mixture of:
  - a) from about 5 parts to about 30 parts of at least one amino silane coupling agent having the general formula:



wherein Q is selected from the group consisting of primary, secondary and tertiary amino groups; R is selected from aliphatic and aromatic groups; R<sub>1</sub> is selected from the group consisting of alkyl and aryl groups, and n is 1 or 2;

- b) from about 60 parts to about 80 parts of basic colloidal particles, said particles having an average particle size of less than 200 Å;
- c) from about 10 to about 29.9 parts of a water-dispersible polymeric binder;
- d) from about 0.1 part to about 5 parts of an antiblocking agent.

5,411,788

## HEAT-SEALABLE ORIENTED WEB

Patrick D. Hyde, Mendota Heights, and Andrew J. Ouderkirch, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

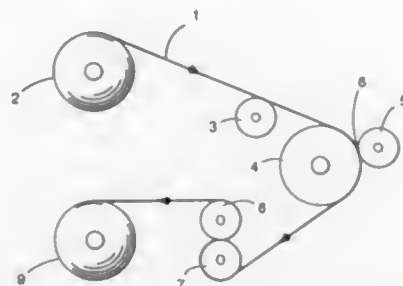
Division of Ser. No. 047,807, Apr. 15, 1993, Pat. No. 5,328,653.

This application Apr. 18, 1994, Ser. No. 229,168

Int. Cl.<sup>6</sup> B32B 7/00

U.S. Cl. 428—200

19 Claims



1. A thin heat sealable oriented thermoplastic article comprising film or film layer of a multilayer film, said film or film layer polymer having a crystalline or semi-crystalline structure and having a heat sealable treated surface layer or layer region of the same polymer, said treated surface layer or layer region being from about 1 to 15 microns thick and having a similar type of crystalline structure, a lower amount of crystallinity and a lower softening point, compared to the untreated film or film layer polymer.

5,411,789

## BEND SENSOR HAVING CONDUCTIVE GRAPHITE AND CARBON BLACK PARTICLES

Keith J. Margolin, Gilbertsville, Pa., assignor to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Division of Ser. No. 518,343, May 3, 1990, Pat. No. 5,250,227.

This application Feb. 26, 1992, Ser. No. 846,268

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—209

5 Claims

1. A bend sensor comprising a flexible polyester substrate coated with an electrically conductive composition comprising

- a polymeric binder system comprising phenolic resin that dries and/or cures to a brittle coating which cracks when bent around a mandrel;
- an amount of discontinuous conductive carbon black ranging from about 3 to 20 wt. percent based on the weight of the binder effective to produce a desired electrical resistance in the composition;
- graphite particles in an amount effective to stabilize the resistance profile of the composition after cracking on a mandrel and less than the amount that produces a composition having a resistance ratio (bent/straight) equal to 1:1, and
- a thermoplastic additive to improve adhesion of the composition to said polyester substrate, said additive comprising thermoplastic resin, surfactant and organic solvent therefor;

and provided with at least two means for attachment to an electrical circuit which means are conductively connected by a length of said composition.

5,411,790

## SIGNAL INPUT SHEET

Kilchiro Ogawa, Saitama; Hiroshi Yamada; Youzou Nouno, both of Koganei, and Yasuo Kagami, Tokyo, all of Japan, assignors to Toppan Moore Co., Ltd., Chivoda, Japan

Filed Feb. 26, 1993, Ser. No. 23,356

Claims priority, application Japan, Feb. 29, 1992, 4-078141

The portion of the term of this patent subsequent to Jan. 13,

2004, has been disclaimed.

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—209

3 Claims



1. In a signal input sheet of a horizontal sheet-like input device, wherein a conductive layer and a resistance layer are vertically arranged in an isolated state, an upper layer of one of said conductive layer and said resistance layer formed on a flexible sheet made of a soft material to provide a flexible signal input sheet, a lower layer of the other of said conductive layer and said resistance layer formed on a base, said signal input sheet being formed by aligning said flexible signal input sheet with said base so that said conductive layer and resistance layer are aligned, said conductive layer contacts a writing pressure point of said resistance layer according to a writing pressure given from the surface of said signal input sheet, said flexible signal input sheet having a first degree of hardness, and a variable electric circuit is formed between said conductive layer and said resistance layer, upon application of writing pressure on seal sheet-like input device, to obtain a position signal; said sheet-like input device characterized in that at least a cover film having a second degree of hardness greater than said first degree of hardness, film layer having a third degree of hardness greater than said second degree of hardness, an adhesive layer, and a shield layer are laminated in order from the top on said signal input sheet.

5,411,791

## CERAMIC VENEER COMPOSITE STRUCTURE

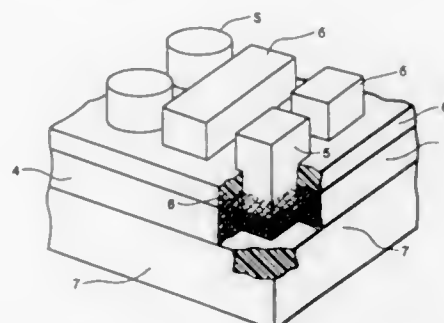
John S. Forry, Lancaster; Thomas C. Simonton, Willow Street; William C. Welch, and Jerome D. Wisnosky, both of Lancaster, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed May 5, 1992, Ser. No. 878,554

Int. Cl.<sup>6</sup> B32B 18/00, 33/00, 13/02, 27/14

U.S. Cl. 428—210

11 Claims



1. A composite layer comprising a fibrous mat, a first ceramic composition and a second composition comprising a non-ceramic component, the first ceramic composition forming a plurality of discrete elements which penetrate into the fibrous mat, a portion of the fibrous mat being embedded in a

portion of each of the discrete elements and a portion of the fibrous mat between adjacent discrete elements being free at the ceramic composition, the second composition being interposed between a portion of adjacent discrete elements, the composite layer being free of the second composition between the portion of the discrete elements opposite the fibrous mat, the surface of the discrete elements opposite the fibrous mat being free of the second composition.

5,411,792

## TRANSPARENT CONDUCTIVE SUBSTRATE

Masaya Yukinobu; Munekazu Kawata, both of Niihama, and Yasuo Tsukui, Nasu, all of Japan, assignors to Sumitomo Metal Mining Co., Ltd. and Tohoku Chemical Industries, Co., Ltd., both of Tokyo, Japan

Filed Feb. 23, 1993, Ser. No. 21,338

Claims priority, application Japan, Feb. 27, 1992, 4-041275;

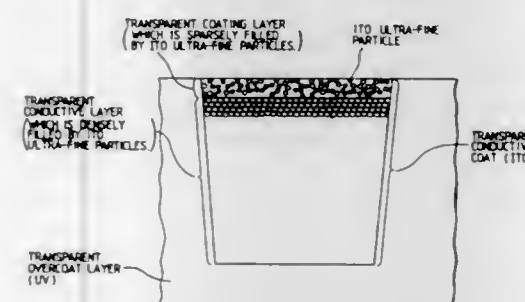
Apr. 9, 1992, 4-088980; Sep. 21, 1992, 4-251515; Sep. 21, 1992,

4-251516

Int. Cl.<sup>6</sup> B32B 5/16

U.S. Cl. 428—212

4 Claims



1. A transparent electroconductive substrate comprising: a visible light transmitting base plate member; a visible light transparent overcoat layer formed on said base plate member, said layer including a material selected from the group consisting of an ultraviolet-setting resin and a thermosetting resin; and a visible light transparent electroconductive film formed on said overcoat layer, including a material selected from the group consisting of an ultraviolet-setting resin and a thermosetting resin, and further including ultra-fine particles of indium-tin oxide dispersed therein, said ultra-fine particles having a particle size of 0.1  $\mu\text{m}$  or smaller, said visible light transparent electroconductive film exhibiting specific resistance between  $6 \times 10^{-3}$  and  $5 \times 10^{-2} \Omega \cdot \text{cm}$ .

5,411,793

## MOLDED BOARDS OF CALCIUM SILICATE AND PROCESS FOR PRODUCING THE SAME

Tsutomu Ide, Mie; Suguru Hamada, Gifu, and Masahiro Kawai, Hajima, all of Japan, assignors to Kabushiki Kaisha Osaka Packing Seizosho, Osaka, Japan

Continuation of Ser. No. 547,002, Jul. 2, 1990, abandoned, which is a continuation-in-part of Ser. No. 360,928, Feb. 21, 1989, abandoned, which is a continuation-in-part of Ser. No. 347,959, Feb. 3, 1989, abandoned. This application Feb. 1, 1993, Ser. No. 13,215

Claims priority, application Japan, Jun. 26, 1987, 62-160280; WIPO, Jun. 24, 1988, PCT/JP88/00630

Int. Cl.<sup>6</sup> B32B 7/02

U.S. Cl. 428—215

7 Claims

1. A molded board comprising calcium silicate composed of a laminate of a plurality of thin sheets, each off said sheets having a thickness of 2 mm or less and comprising secondary particles of calcium silicate crystals, a fibrous material, a non-coagulant polymer and a coagulant, wherein the amount of said polymer is about 3 to about 8% by weight based on total weight of board; wherein said polymer and said coagulant are adsorbed on the surface of secondary particles; wherein said

secondary particles are interconnected with one another directly and by means of said polymer adsorbed thereon; and wherein said laminated thin sheets are firmly united with one another into an integral board by means of said secondary particles of calcium silicate crystals and said polymer on the surface of said sheets.

5,411,794

## HEAT-SCREENING GLASS

Jun Kawaguchi; Hiroaki Kobayashi, and Hideaki Nakai, all of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

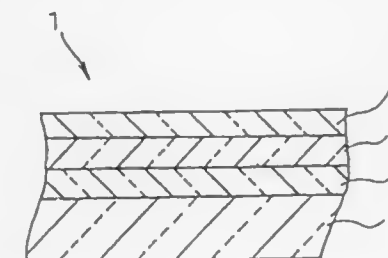
Filed Aug. 24, 1992, Ser. No. 933,791

Claims priority, application Japan, Aug. 29, 1991, 3-218234

Int. Cl.<sup>6</sup> C03C 17/34

U.S. Cl. 428—216

8 Claims



1. Heat-screening glass consisting essentially of a transparent glass substrate having consecutively thereon a heat-screening film, a first transparent protective film, and a second transparent protective film, said first transparent protective film comprising at least one member selected from the group consisting of silicon nitride, silicon dioxide, stannic oxide, oxynitride of silicon carbide, and oxynitride of tantalum carbide, and having a thickness of from 3 to 35 nm, and said second transparent protective film comprising at least one member selected from the group consisting of zirconium oxide, tantalum pentoxide, niobium oxide, zirconium oxynitride, tantalum oxynitride, and niobium oxynitride, and having a thickness of from 2 to 15 nm.

5,411,795

## ELECTROLESS DEPOSITION OF METAL EMPLOYING THERMALLY STABLE CARRIER POLYMERS

Bernard Silverman, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 14, 1992, Ser. No. 960,972

Int. Cl.<sup>6</sup> D03D 3/00; B32B 9/00, 5/16

U.S. Cl. 428—229

7 Claims

1. A metallized textile article comprising a substrate coated successively with a polymer layer and a metal layer wherein said polymer layer comprises palladium and a water-insoluble organic polymer which maintains its integrity at 200° C., said polymer selected from the group consisting of polysulfones, polyetherimides, polyimides and polysiloxanes, and wherein said metal layer comprises electrolessly deposited metal providing said article with a surface resistivity of at most about 0.3 ohms/square.



5,411,796

Patent Not Issued For This Number

5,411,797

## NANOPHASE DIAMOND FILMS

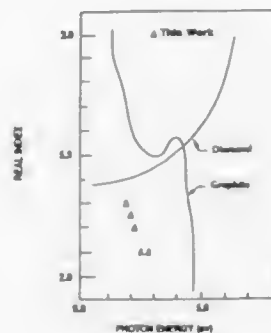
Farzin Davanloo, Dallas, and Carl B. Collins, Richardson, both of Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Continuation-in-part of Ser. No. 602,155, Oct. 22, 1990, and Ser. No. 821,642, Jan. 16, 1992, which is a division of Ser. No. 521,694, May 9, 1990, Pat. No. 5,098,737, said Ser. No. 602,155, is a continuation-in-part of Ser. No. 521,694, May 9, 1990, which is a continuation-in-part of Ser. No. 264,224, Oct. 28, 1988, abandoned, which is a continuation-in-part of Ser. No. 183,022, Apr. 18, 1988, Pat. No. 4,987,007. This application Apr. 1, 1993, Ser. No. 42,104

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 428—336

14 Claims



1. A nanophase diamond film, comprising nodules of carbon bonded predominantly in three dimensional sp<sup>3</sup> bonds, said film comprising less than about 20% hydrogen, having an imaginary index of refraction less than 0.5 for a light wavelength of about 632.8 nm, and said nodules having a diameter of less than about 500 angstroms.

5,411,798

## MAGNETIC RECORDING SHEET COMPRISING A GEL BINDER

Haruyoshi Funae, and Shigetoshi Hiraishi, both of Tokyo, Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan

Filed Jul. 1, 1991, Ser. No. 721,334

Claims priority, application Japan, Jul. 2, 1990, 2-174691; Jul. 17, 1990, 2-190189

Int. Cl.<sup>6</sup> G11B 5/66; B32B 27/08

U.S. Cl. 428—341

11 Claims

1. A magnetic recording sheet comprising:  
a fibrous substrate,  
a magnetic recording layer which comprises a binder having a gel content of 5–75 wt % and ferromagnetic powders and is provided on one side of the substrate, and  
a visible information recording layer which comprises at least one binder selected from the group consisting of a synthetic resin binder and a natural resin binder and is provided on another side of the substrate, said visible

recording layer being applied to the substrate in amounts ranging from about 1 g/m<sup>2</sup> to about 30 g/m<sup>2</sup>.

5,411,799

## MICROTAG AND METHOD

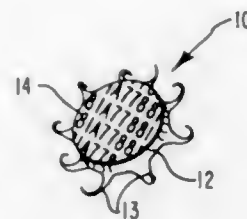
Charles D. Loving, 426 Country Club, Stansbury Park, Utah 84074

Continuation-in-part of Ser. No. 862,217, Apr. 2, 1992, abandoned, which is a continuation-in-part of Ser. No. 631,968, Dec. 21, 1990, abandoned, which is a division of Ser. No. 481,897, Feb. 20, 1990, abandoned. This application Dec. 2, 1993, Ser. No. 161,778

Int. Cl.<sup>6</sup> B32B 5/16, 27/36; B42D 15/00

U.S. Cl. 428—343

6 Claims



1. A microtag comprising:  
a body fabricated from a sheet of elastomeric material, said body having an upper surface, a lower surface and an external periphery;  
at least one complete serial number on said upper surface;  
a plurality of acuminate snags extending outwardly from said periphery of said body; and  
a hook-like projection on the end of at least one of said acuminate snags.

5,411,800

## DOLL'S HAIR

Masaaki Yokoe, Kakogawa; Hiroshi Yokoyama, Akashi, and Yoshinori Kashita, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kaisha, Osaka, Japan Division of Ser. No. 780,517, Oct. 22, 1991, abandoned. This application Sep. 22, 1992, Ser. No. 948,479

Claims priority, application Japan, Oct. 27, 1990, 2-290515

Int. Cl.<sup>6</sup> A63H 3/44; D06M 15/00, 101/16

U.S. Cl. 428—362

9 Claims



1. A doll having hair comprising synthetic fibers to which a water repellent is applied, said fiber having such a water repellency that when a liquid droplet of 2.0% by weight aqueous isopropyl alcohol solution is placed on the bundle of said fibers, the droplet is kept as it is for not less than one minute on the bundle.

5,411,801

## PLATE-LIKE MAGNETITE PARTICLES AND PROCESS FOR PRODUCING THE SAME

Torayuki Honmyo, Uji, Japan, assignor to Toda Kogyo Corp., Hiroshima, Japan

Continuation of Ser. No. 526,819, May 22, 1990, abandoned.

This application Feb. 23, 1993, Ser. No. 24,105

Claims priority, application Japan, May 31, 1989, 1-140091

Int. Cl.<sup>6</sup> C01G 49/02

U.S. Cl. 428—402

4 Claims



1. Poreless, plate-shaped magnetite particles having an average particle diameter of 0.1 to 0.5 μm, a plate ratio of 11:1 to 20:1 and a specific surface area of 2.0 to 30.0 m<sup>2</sup>/g, which particles are discrete from each other.

5,411,802

## COLORANT COMPOSITIONS AND PROCESSES

Kanta Kumar, Maplewood; Robert A. Davis, Cottage Grove; Sheila M. Nichols, Richfield, and Howard J. Buttery, Newport, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 29, 1993, Ser. No. 145,492

Int. Cl.<sup>6</sup> B32B 5/16

U.S. Cl. 428—402

16 Claims

1. A process for making solid colored particles comprising  
a) preparing a reaction solution in water comprising  
i) formaldehyde,  
ii) urea,  
iii) a cyclic polyamine functional triazine compound, and  
iv) acid to form a reaction solution having only a water phase and a polymer phase and  
b) heating said reaction solution under high shear mixing to polymerize the reactive components of said reaction solution, thereby forming particles having a mean particle size between 1 and 100 microns without the need for post-reaction physical processing to break up agglomerates.

5,411,803

## GRANULAR MATERIALS HAVING AN IMPROVED CERAMIC COATING, METHODS OF PREPARING SAME, AND COMPOSITE SHEETS INCLUDING SAME

Billy L. George, Hudson, Wis.; Donald R. Williams, White Bear Township, Ramsey County, Minn., and Stefan A. Babirad, Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 15, 1992, Ser. No. 945,128

The portion of the term of this patent subsequent to Jan. 17, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> B32B 9/00; D06N 7/04

U.S. Cl. 428—403

21 Claims

1. An inorganic granule comprising an inorganic substrate and a ceramic coating thereon, said ceramic coating comprising at least one ceramic layer comprising a reaction product of an alkali metal silicate and an aluminosilicate which is reactive with said alkali metal silicate, from about 1 to about 5 grams zinc oxide made by French process per kilogram of inorganic substrate, said zinc oxide having an average particle size less than about 0.13 micrometer, and a borate compound, said zinc oxide having an average particle size less than about 0.13 micrometer and said borate compound being contained in a weight ratio ranging from about 0.5:1 to about 2:1.

5,411,804

## WATER-DISPERSIBLE, HEAT-RESISTANT COMPOSITION AND USE THEREOF

Nobuhiro Sugitani, Tokyo, Japan, assignor to Sugianikin-zokukogyo Co. Ltd., Tokyo, Japan

Division of Ser. No. 635,505, Aug. 7, 1991, abandoned. This

application Aug. 4, 1993, Ser. No. 101,907

Int. Cl.<sup>6</sup> B22C 9/06, 3/00; D21H 13/46; B32B 18/00

U.S. Cl. 428—404

6 Claims

2. A process for producing a heat resistant fiber-containing sheet, comprising the steps of pouring, onto a peelable, water-permeable substrate, a dispersion of at least one heat resistant short fiber selected from the group consisting of a potassium titanate (K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub>) fiber, a polytitanocarbonylsilane fiber, a carbon fiber, a ceramic fiber and another whisker dispersed into an aqueous dispersion resulting from addition of water into a coating agent composition comprising a powder mixture consisting of 20% by weight or more of zirconium oxide, 1 to 10% by weight of sodium aluminate, 2 to 15% by weight of yttria as based on the amount of zirconium oxide and the balance of silica; and sodium silicate containing a small amount of water added thereto, the sodium silicate being in an amount of 40 to 50 parts by weight based on 100 parts by weight of the powder mixture, to a water content of up to 20% by weight, removing water at a temperature in a range of room temperature to 90° C., and peeling off the resulting sheet from the substrate.

3. A heat resistant fiber-containing sheet produced in a process according to claim 2.

5,411,805

## TRIAXIALLY ORIENTED POLYMER MEMBRANE

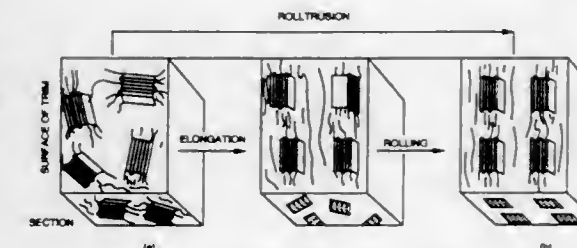
Joseph H. Magill, Pittsburgh, Pa., assignor to University of Pittsburgh of the Commonwealth System of Higher Education, Pittsburgh, Pa.

Continuation of Ser. No. 796,074, Nov. 20, 1991, abandoned, which is a continuation of Ser. No. 576,009, Aug. 31, 1990, abandoned, which is a continuation-in-part of Ser. No. 275,707, Nov. 22, 1988, abandoned, which is a continuation of Ser. No. 922,035, Oct. 22, 1986, abandoned. This application Jun. 9, 1993, Ser. No. 74,684

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—411.1

31 Claims



1. A synthetic polymer membrane comprising a triaxial morphology produced by a rolltrusion process which is a one-step solid state processing technique involving simultaneous rolling and stretching operations performed on a work-piece to produce said membrane, and a periodicity of crystallites having a main axis oriented generally along the stretching direction and amorphous materials connecting said crystallites and lying in three generally perpendicular directions with a substantially small amount or no spherulite texture remaining after said rolltrusion process thereby enhancing the transparency characteristics and the mechanical properties of said membrane in said three directions.

5,411,806

## METHOD FOR THE MANUFACTURE OF A PHOSPHOR SCREEN AND RESULTING ARTICLE

John C. Dahlquist, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 7, 1994, Ser. No. 319,933

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 428—411.1

28 Claims

1. A process for preparing a phosphor screen comprising the steps of:

- mixing particulate phosphors with a polymerizable binder composition to form a polymerizable mixture;
- coating said polymerizable mixture onto a substrate; and
- polymerizing said polymerizable mixture, wherein the said polymerizable binder composition comprises less than 5% by weight of the total weight of said polymerizable binder composition of non-curable organic materials having a molecular weight less than 500.

5,411,807

## HEAT CURABLE PRIMERLESS SILICONE HARDCOAT COMPOSITIONS

Gautam A. Patel, Clifton Park, and Steven J. Kubisen, Waterford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 9, 1994, Ser. No. 239,786

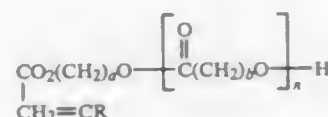
Int. Cl.<sup>6</sup> B32B 9/04

U.S. Cl. 428—412

5 Claims

1. A heat curable primerless silicone hardcoat composition comprising by weight,

- an aqueous/organic solvent silicone dispersion having 10–50% by weight of solids and consisting essentially of 10–70% by weight of colloidal silica and 30–90% by weight of a partial condensate of an organoalkoxysilane, and
- 1 to 10 parts, per 100 parts (A), of an acrylate or methacrylate ester of the formula,



where R is hydrogen or methyl, a is an integer having a value of 2–4, b is an integer having a value of 3–7 and n is  $\geq 1$ .

5,411,808

## ORIENTED ELECTRICAL STEEL SHEET HAVING LOW CORE LOSS AND METHOD OF MANUFACTURING SAME

Takao Kanai, Kei Tanemoto, both of Kawasaki; Shuichi Yamazaki, and Takeo Nagashima, both of Futsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Feb. 12, 1993, Ser. No. 17,673

Claims priority, application Japan, Feb. 13, 1992, 4-026972; Aug. 21, 1992, 4-222850

Int. Cl.<sup>6</sup> C23C 22/00

U.S. Cl. 428—472

8 Claims

1. A low core loss oriented electrical steel sheet having a surface coating that has a Young's modulus that is not less than 100 GPa and/or a differential of thermal expansion coefficient relative to the sheet base metal that is not less than  $2 \times 10^{-6}/\text{K}$  and which contains not less than 10 percent, by weight, of crystallites with an average size of not less than 10 nm and an average crystal grain diameter that does not exceed 1000 nm.

5,411,809

## REACTIVE COATINGS COMPRISING AN ACID-FUNCTIONAL COMPOUND, AN ANHYDRIDE-FUNCTIONAL COMPOUND AND AN EPOXY-FUNCTIONAL COMPOUND

Mohamad D. Shalati, Richton Park; James A. Marquart, Chicago Heights; John L. Petty, Homewood, and Rodney M. Harris, Chicago, all of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Continuation of Ser. No. 763,036, Sep. 20, 1991, abandoned, which is a division of Ser. No. 120,893, Nov. 16, 1987, abandoned. This application Mar. 15, 1993, Ser. No. 31,940

Int. Cl.<sup>6</sup> B32B 15/08, 27/08, 27/36

U.S. Cl. 428—480

1 Claim

1. In a substrate coated with a multi-layer decorative and/or protective coating which comprises:

- a basecoat comprising a pigmented film-forming polymer; and
- a transparent clearcoat comprising a film-forming polymer applied to the surface of the basecoat composition; the improvement which comprises utilizing as the clearcoat and/or the basecoat a multicomponent curable composition which is reactive upon mixing of the components, wherein the curable composition comprises:
  - an acid-functional polymer having an average of at least two carboxylic acid groups per molecule and wherein the polymer is obtained by the half-ester reaction of a hydroxy-functional polymer with a cyclic carboxylic acid anhydride; and
  - an anhydride-functional polymer having an average of at least two cyclic carboxylic acid anhydride groups per molecule and wherein the anhydride-functional polymer is the addition polymerization reaction product of (a) 5 to about 40 weight percent of an ethylenically unsaturated monoanhydride and (b) 60 to about 95 weight percent of at least one other ethylenically unsaturated monomer copolymerizable with the ethylenically unsaturated anhydride; and
  - an epoxy-functional compound having an average of at least two cycloaliphatic epoxy groups per molecule.

5,411,810

## VISCOELASTIC RESIN COMPOSITION FOR A VIBRATION DAMPING MATERIAL

Hiroshi Hirakouchi, Tokyo; Masanori Nakamura; Takeshi Yatsuka, both of Ohtsu, and Nobuo Kadowaki, Futsu, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1993, Ser. No. 84,296

Claims priority, application Japan, Jun. 30, 1992, 4-197681

Int. Cl.<sup>6</sup> B32B 15/06, 27/06, 27/36; C08F 22/10

U.S. Cl. 428—480

5 Claims

1. A viscoelastic resin composition for a vibration damping material, comprising:

- a low T<sub>g</sub> resin (A) with a glass transition temperature of  $-60^\circ\text{C}$ . to  $0^\circ\text{C}$ . and a number average molecular weight of 5000 to 50000, the low T<sub>g</sub> resin (A) being a polyester containing an acid component having 50 to 90 mol % of aromatic dicarboxylic acid and 10 to 50 mol % of dimer acid, and a glycol component having at least 30 mol % of glycol with an alkyl group as its side chain and the glycol having at least four carbon atoms; and
- high T<sub>g</sub> resin (B) which is at least one selected from the group consisting of amorphous polyester resins, phenoxy resins, and epoxy resins, the epoxy resins having a number average molecular weight of at least 1000, the respective resins having a glass transition temperature in the range of  $0^\circ\text{C}$ . to  $80^\circ\text{C}$ ., wherein the weight ratio between the low T<sub>g</sub> resin (A) and the high T<sub>g</sub> resin (B) is in the range of 90:10 to 30:70, and wherein the difference in specific gravity at  $30^\circ\text{C}$ . between the low T<sub>g</sub> resin (A) and the high T<sub>g</sub> resin (B) is in the range of 0.17 to 0.25.

5,411,811

## INLAID VINYL SHEETING PROCESS AND PRODUCT

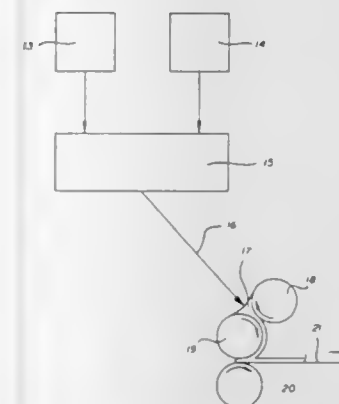
Anthony N. Piacente, Lawrenceville; George J. Papp, Browns Mills; Richard E. Whitehouse, Yardville, and Robert D. Mansillo, Bloomfield, all of N.J., assignors to Congoleum Corporation, Lawrenceville, N.J.

Continuation of Ser. No. 502,109, Mar. 29, 1990, Pat. No. 5,178,912. This application Nov. 6, 1992, Ser. No. 972,583

Int. Cl.<sup>6</sup> A47G 35/00; B32B 3/00

U.S. Cl. 428—542.2

9 Claims



1. In multi-layered sheeting having a predetermined width and including at least first and second layers substantially co-extensive with the width of said sheeting, said second layer being a monolithic layer containing decorative particles, the improvement comprising:

- said second layer of said sheeting having a substantially uniform thickness of from about 0.015 inch to about 0.075 inch,
- said second layer having been formed by continuously applying to the surface of said first layer a fluid composition having a viscosity of from about 1000–15000 cps and comprising liquid material having substantially uniformly dispersed therein said decorative particles,
- said liquid composition having been continuously applied to the surface of said first layer in a zone extending across substantially the entire width of the surface as the sheeting is continuously moved transversely of said zone and under conditions such that: (i) the surface of said liquid composition as applied is substantially smooth; (ii) the thickness of the monolithic layer formed from said liquid composition is substantially uniform; and (iii) said decorative particles are substantially uniformly dispersed in said monolithic layer.

5,411,812

## GALVANIZED ULTRA-HIGH STRENGTH STEEL STRIP

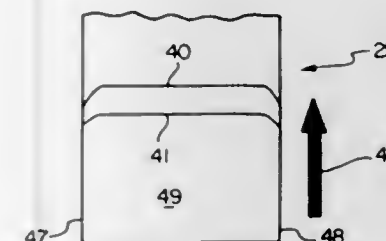
Yaz F. Bilimoria, Munster, Ind., assignor to Inland Steel Company, Chicago, Ill.

Division of Ser. No. 874,029, Apr. 27, 1992. This application Oct. 14, 1993, Ser. No. 136,543

Int. Cl.<sup>6</sup> B32B 15/18

U.S. Cl. 428—595

17 Claims



10. A deformed, fabricated, galvanized steel product having

at least one inside corner and a planar area thereon, said product comprising a plain carbon steel substrate and an adherent, hot dip, metal coating consisting essentially of zinc or zinc alloy covering said substrate at said inside corner and at said planar area, said product being characterized by:

a substrate composition consisting essentially of, in wt %:

carbon	.03–.25
manganese	.20–1.50
phosphorous	.05 max.
sulfur	.03 max.
iron	essentially the balance;

a substrate microstructure consisting essentially of tempered martensite comprising a martensitic matrix with iron carbide particles dispersed throughout; a tensile strength substantially greater than 120,000 psi (827 MPa); and a coating weight substantially greater than about 30 g/m<sup>2</sup>/side; there being no substantial difference between the coating weight at said inside corner and the coating weight at said planar area.

5,411,813

## FERHGASI SOFT MAGNETIC MATERIALS FOR INDUCTIVE MAGNETIC HEADS

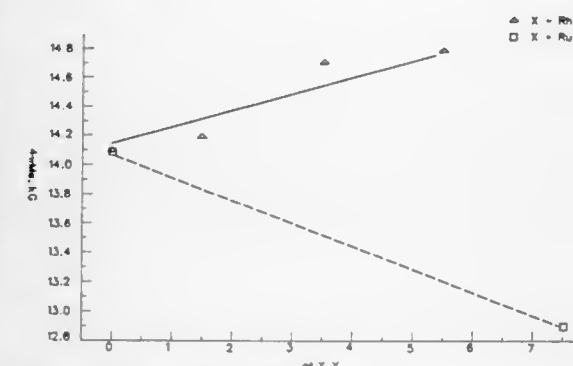
Alexander M. Zeltser, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 8, 1993, Ser. No. 45,001

Int. Cl.<sup>6</sup> H01F 1/147

U.S. Cl. 428—606

8 Claims



8. A magnetic head comprising a nonmagnetic substrate; and a soft magnetic material on said substrate having a thickness of 0.1 micron to 10 microns; said magnetic material consisting of  $\text{Fe}_i\text{Rh}_j\text{Ga}_k\text{Si}_l$ , where i, j, k, and l denote the concentrations in atomic percent, the concentration being within the following ranges:  
 $69.0 \leq i \leq 80.0$   
 $1.0 \leq j \leq 6.0$   
 $4.0 \leq k \leq 8.0$   
 $13.0 \leq l \leq 18.0$   
 and  $i + j + k + l = 100$ ;  
 wherein said Rh is present in an amount effective to increase the saturation magnetization of said material; and wherein said soft magnetic material has been annealed at a temperature between about  $350^\circ\text{C}$ . and  $600^\circ\text{C}$ . so as to improve the saturation magnetization of said magnetic head.



5,411,814

# ARTICLE COMPRISING MAGNETORESISTIVE OXIDE OF LA, CA, MN ADDITIONALLY CONTAINING EITHER OF BOTH OF SR AND BA

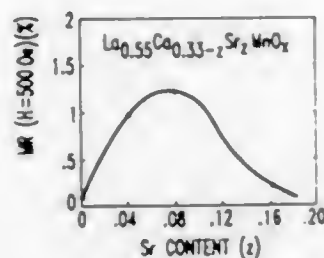
Sungbo Jin, Millington; Mark T. McCormack, Summit, and Thomas H. Tiesel, North Plainfield, all of N.J., assignors to AT&T Corp., Murray Hill, N.J.

Filed Jan. 26, 1994, Ser. No. 187,668

Int. Cl.<sup>6</sup> B32B 9/00; G01R 33/02; H01F 1/00

U.S. Cl. 428—692

14 Claims



1. An article comprising a first material that exhibits magnetoresistance and comprises La, Ca, Mn and oxygen, associated with the first material is a derivative  $[dp/dH]$  at a given value of applied field H and temperature T, where p is the electrical resistivity of the first material at the given values of H and T; CHARACTERIZED IN THAT

the first material comprises a further constituent selected from the group consisting of Sr, Ba, and Sr and Ba, the amount of said further constituent selected to provide said first material, at a given value of H less than or equal to 0.05 Tesla and at a temperature of 25° C., with a value of  $[dp/dH]$  that is at least twice the value of said derivative associated, at the given values of H and T, with a second material that is identical to the first material except that the second material does not comprise said constituent.

5,411,815

# TRANSPORT AND STORAGE VESSEL FOR ELECTRIC FUEL

Jonathan Goldstein, Jerusalem, Israel, assignor to Electric Fuel (E.F.L.) Ltd., Jerusalem, Israel

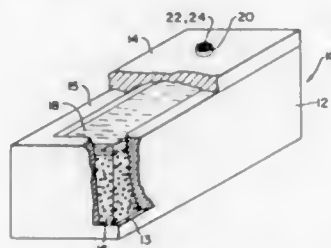
Filed Sep. 15, 1993, Ser. No. 122,718

Claims priority, application European Pat. Off., Sep. 15, 1992, 92308403

Int. Cl.<sup>6</sup> H01M 10/52

U.S. Cl. 429—50

12 Claims



1. A rigid reusable transport and storage vessel containing a slurry of zinc particles and an aqueous alkaline solution utilizable as an electric fuel for a zinc-air battery, said vessel being provided with at least one hydrogen combination device having an external surface at least part of which projects into the air surrounding the vessel for venting any H<sub>2</sub> produced by said slurry for contact and combination at said external surface with oxygen in the air surrounding said vessel, whereby contact of the H<sub>2</sub> internally generated and emitted from said vessel with the oxygen in the air surrounding said vessel eliminates potentially explosive hydrogen.

5,411,816

# METHOD AND APPARATUS FOR DETERMINING BATTERY CHARACTERISTICS

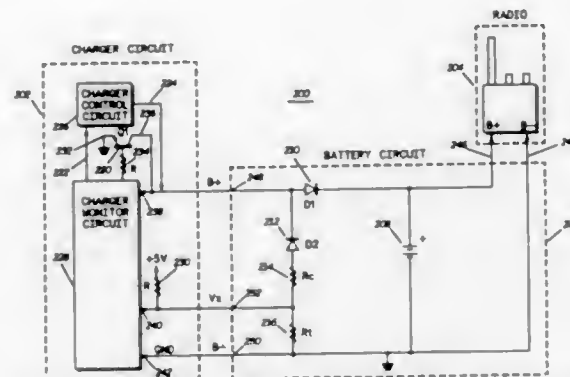
Joseph Patino, Plantation, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 908,118, Jul. 2, 1992, abandoned. This application Feb. 10, 1994, Ser. No. 193,773

Int. Cl.<sup>6</sup> H02J 7/10

U.S. Cl. 429—7

9 Claims



1. A method for determining first and second battery characteristics of a battery using a charger having an input terminal, the battery including first, second and third battery contacts and a diode having an anode and a cathode, the anode of the diode being electrically coupled to the second battery contact and the cathode of the diode being electrically coupled to the third battery contact, the method comprising the steps off:

determining the first battery characteristic at the charger input terminal;  
forward biasing the diode in order to place the third battery contact at substantially the same voltage potential as the first battery contact; and  
determining the second battery characteristic independently of the first battery characteristic at the charger input terminal.

5,411,817

# BATTERY WITH CHARGE INDICATOR

Michael Ridgway, Aldbury; Stephen J. Edwards, Pinner, and Christopher P. Moore, Rayners Lane Harrow, all of Great Britain, assignors to Eastman Kodak Company, Rochester, N.Y.

PCT No. PCT/EP91/01478, § 371 Date Jul. 16, 1993, § 102(e) Date Jul. 16, 1993, PCT Pub. No. WO92/03852, PCT Pub. Date Mar. 5, 1992

PCT Filed Aug. 6, 1991, Ser. No. 975,562

Claims priority, application United Kingdom, Aug. 11, 1990, 9017668

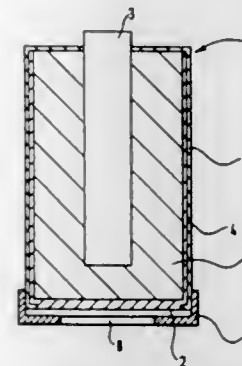
Int. Cl.<sup>6</sup> H01M 2/02

U.S. Cl. 429—90

9 Claims

1. An electrochemical device for providing a visual indica-

tion of the remaining life of a battery, the device comprising an electrode pair with a layer therebetween, the layer comprising



a mixture of a photographic color coupler dispersion, an anti-oxidant and a photographic color developer in a binder.

5,411,818

# PERIMETER SEAL ON BIPOLAR WALLS FOR USE IN HIGH TEMPERATURE MOLTEN ELECTROLYTE BATTERIES

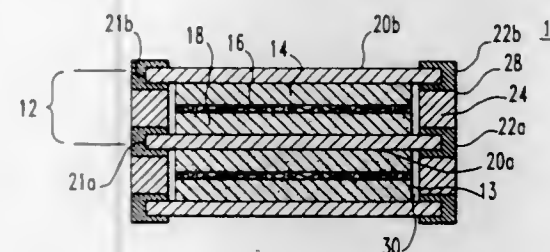
Geoffrey Barlow, South Russell, and Steven J. Specht, Concord, both of Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 18, 1993, Ser. No. 137,329

Int. Cl.<sup>6</sup> H01M 2/08

U.S. Cl. 429—185

18 Claims



1. A battery comprised of cells stacked in series, each cell having a positive and a negative electrode and separator that contain an electrolyte, each cell having an outer periphery and each cell being separated from adjacent cells by a bipolar wall such that, each cell is bounded by first and second bipolar walls; and

a plurality of continuous edge seals, each edge seal being affixed to and encapsulating an outer edge of a bipolar wall.

5,411,819

# PROCESS FOR PREPARING A SOLID, POLYMERIC ELECTROLYTE BASED ON POLYVINYL ETHERS

Luca Marchese, Milan; Maria Andrei, Berceto, and Arnaldo Roggero, San Donato Milanese, all of Italy, assignors to Eniricerche S.p.A., Milan, Italy

Filed Mar. 3, 1993, Ser. No. 25,883

Claims priority, application Italy, Mar. 4, 1992, MI92A0474

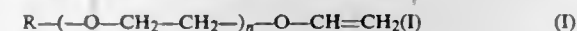
Int. Cl.<sup>6</sup> H01M 6/18

U.S. Cl. 429—192

18 Claims

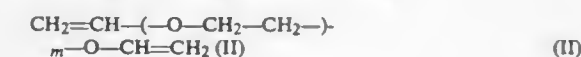
1. Process for preparing a solid, polyvinyl ether-based polymeric electrolyte in the form of a membrane, which comprises the steps of:

(1) preparing a mixture (M) which contains:  
(a) a vinyl ether having the formula

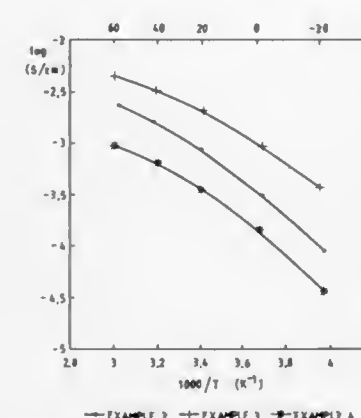


where R is methyl or ethyl and n is an integer of from 1 to 16;

(b) a divinyl ether having the formula



where m is an integer of from 1 to 10, in a molar ratio to the vinyl ether (I) of from 2:98 to 60:40;



(c) an ionic compound in an amount of from 1 to 30% by weight; and

(d) an oligomer or a dipolar aprotic liquid in an amount of from 0 to 80% by weight;

(2) applying the mixture to an inert support; and

(3) polymerizing the mixture (M) in the presence of an ultra-violet light source or an electron beam ray source to form the polymeric electrolyte.

5,411,820

# SOLID, GLYME-CONTAINING ELECTROLYTES INCLUDING ION SALT DERIVATIVES AND ELECTROLYTIC CELLS PRODUCED THEREFROM

Benjamin Chaloner-Gill, Santa Clara, Calif., assignor to Valence Technology, Inc., San Jose, Calif.

Filed Jun. 8, 1993, Ser. No. 73,910

Int. Cl.<sup>6</sup> H01M 6/18, 6/14

U.S. Cl. 429—192

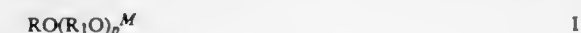
37 Claims

1. A solid, single-phase, solvent-containing electrolyte which comprises:

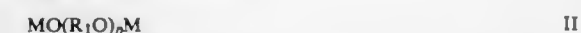
a solid polymeric matrix; and

a solvent comprising about a 10:1 to 1:4 (w/w) mixture of an organic carbonate and a glyme, and an ionically conducting amount of an ion salt derivative selected from the group consisting of:

(a) an alkylene glycol(ether) derivative represented by Formula I:



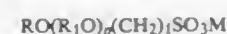
or represented by Formula II:



where R is selected from the group consisting of alkyl of from 1 to 6 carbon atoms, phenyl, alkphenyl of from 7 to 12 carbon atoms, and phenyl substituted with 1 to 3 substituents selected from the group consisting of alkyl of from 1 to 4 carbon atoms, alkoxy of from 1 to 4 carbon atoms, chloro and bromo;

R<sub>1</sub> is (CR<sub>3</sub>R<sub>4</sub>)<sub>q</sub> where R<sub>3</sub> and R<sub>4</sub> are independently selected from the group consisting of hydrogen and alkyl of from 1 to 4 carbon atoms, q is an integer from 1 to 6, and wherein when q is greater than 1, the R<sub>3</sub> and on each carbon atom may be the same or different;

M is a metal ion selected from the group consisting of Li, Na, K and Mg; and  
p is an integer of from 2 to 6; and  
(b) an ion sulfonate salt represented by Formula III:



III

or represented by Formula IV:



IV

where M, R and  $\text{R}_1$  are as defined above and r and s are independently integers from 1 to 6; and  
(c) mixtures thereof.

5,411,821

# INTEGRAL BATTERY ELECTRODE STRUCTURE FOR LEAD/ACID BATTERIES

Robert S. Feldstein, Pelham, N.Y., assignor to Derafe, Ltd., Buffalo, N.Y.

Filed Jun. 10, 1993, Ser. No. 74,361

Int. Cl.<sup>6</sup> H01M 4/36

U.S. Cl. 429—226

11 Claims

1. An integral battery electrode structure for lead/acid battery plates, wherein a principal structural material of said integral battery electrode structure is elemental lead or a lead alloy, and wherein at least the surface of said lead or lead alloy has an ion implantation or atomic embedded graded junction of at least one other atomic species.

5,411,822

# SHADOW MASK FOR COLOR CATHODE RAY TUBE, SHADOW MASK PRINTING NEGATIVE PLATE USED FOR MANUFACTURE OF THE SHADOW MASK, AND METHOD AND MANUFACTURING THE NEGATIVE PLATE

Yasuhisa Ohtake, Seiji Sago, and Yasushi Magaki, all of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 796,346, Nov. 22, 1991, Pat. No. 5,280,215.

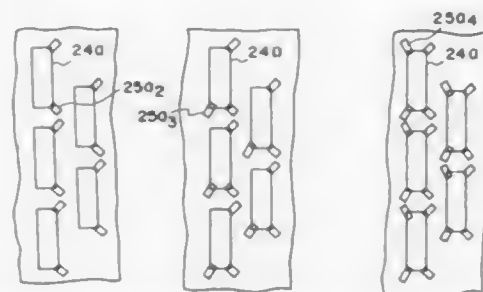
This application Aug. 18, 1993, Ser. No. 108,520

Claims priority, application Japan, Nov. 22, 1990, 2-320424; Nov. 22, 1990, 2-320425; Nov. 22, 1990, 2-320426; Nov. 22, 1990, 2-320427

Int. Cl.<sup>6</sup> G03F 9/00

U.S. Cl. 430—5

10 Claims



1. A printing negative plate assembly for forming a mask substrate used to generate a shadow mask, said printing negative plate assembly comprising:

- a first negative plate having a plurality of larger-opening patterns corresponding to larger openings in said shadow mask, said first negative plate being pasted on one side of said mask substrate; and
- a second negative plate having a plurality of smaller-opening patterns corresponding to smaller openings in said shadow mask, said second negative plate being pasted on a side of said mask substrate opposing said first negative plate, each of said larger-opening patterns and said smaller-opening patterns having a rectangular main pattern and rectan-

gular projecting patterns, said projecting patterns individually projecting outward from the four corners of said main pattern;  
a width and length of projection of said projecting patterns varying based on the coordinate positions of each corresponding main pattern on said negative plates.

5,411,823

# EXPOSURE METHOD, PHASE SHIFT MASK USED IN THE SAME, AND PROCESS OF FABRICATING SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE USING THE SAME

Yoshihiko Okamoto, Shin, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

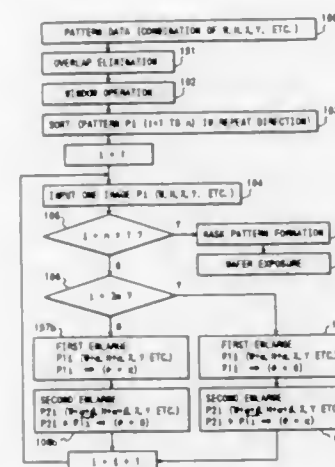
Filed Dec. 6, 1993, Ser. No. 161,462

Claims priority, application Japan, Dec. 18, 1992, 4-338477; Aug. 26, 1993, 5-211180

Int. Cl.<sup>6</sup> G03F 9/00

U.S. Cl. 430—5

20 Claims



1. An exposing method using, when a plurality of repeating patterns arranged in a repeating manner with a pattern pitch equal to or less than an exposure wavelength are to be transferred to a photoresist film deposited on a predetermined substrate, a phase shift mask including: a primary transparent pattern so arranged on each of the plurality of repeating transparent patterns arranged on a mask substrate for transferring said plurality of repeating patterns that the lights individually having passed through the repeating transparent patterns adjoining one another across an opaque pattern may have phases inverted from each other; and an auxiliary transparent pattern so arranged in at least one portion of the outer periphery of said primary transparent pattern in each of said repeating transparent patterns that its transmitted light may have a phase inverted from the phase of the light having passed through said primary transparent pattern, comprising the following steps:

- (a) a first enlarging step of making the data of said primary transparent pattern, when the pattern data on said phase shift mask are to be made, by enlarging the width of said repeating patterns on the basis of a process condition and to a predetermined extent of at least 30% in at least the direction of the repeating arrangement but without changing the relative position coordinates of said repeating patterns;
- (b) a second enlarging step of making the data of said auxiliary transparent pattern, by enlarging the width of said primary transparent pattern in the data state obtained at said first enlarging step to a predetermined extent on the basis of the characteristic condition of a reducing projection exposure optical system, and subsequently by eliminating the data of said primary transparent pattern from the data of the pattern obtained by the width enlargement;
- (c) a step of forming the phase shift mask having said repeat-

ing transparent patterns on said mask substrate, on the basis of the data of said primary transparent pattern and the data of said auxiliary transparent pattern;  
(d) an exposure step of transferring said plurality of repeating transparent patterns to the photoresist film on said predetermined substrate by irradiating said phase shift mask with an exposure light having a predetermined wavelength to establish both an interference of the lights having passed through said primary transparent pattern and said auxiliary transparent pattern and an interference of the lights having passed through said adjoining primary transparent patterns at the boundary between said primary transparent pattern and said auxiliary transparent pattern; and  
(e) a step of correcting the process condition during or before and after the exposure such that the individual effective sizes of said plurality of repeating transparent patterns to be transferred to said photoresist film may be prevented from being made larger than an object size due to said first enlarging step.

5,411,824

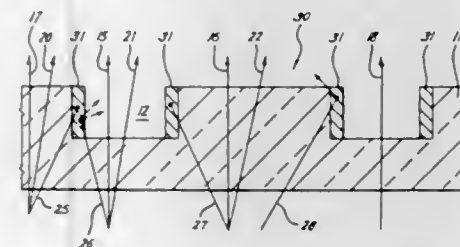
# PHASE SHIFTING MASK STRUCTURE WITH ABSORBING/ATTENUATING SIDEWALLS FOR IMPROVED IMAGING

Prahalad K. Vasudev, and Kah K. Low, both of Austin, Tex., assignors to Sematech, Inc., Austin, Tex.  
Continuation of Ser. No. 7,638, Jan. 21, 1993, abandoned. This application Jun. 9, 1994, Ser. No. 257,424

Int. Cl.<sup>6</sup> G03F 9/00

U.S. Cl. 430—5

16 Claims



1. A photolithography mask having phase shifting regions disposed thereon for phase shifting incident light transmission therethrough such that a phase difference occurs between light traversing through said phase shifting regions as compared to other regions of said mask, said other regions being defined as nonshifting regions, comprising:

- a substrate having vertical trenches formed therein, wherein said trenches function as said phase shifting regions, said trenches having vertical sidewalls which delineate a separation between said phase shifting and nonshifting regions; conductive regions being formed along sidewalls of said vertical trenches for absorbing or attenuating light energy impinging on said sidewalls;
- wherein said conductive regions inhibit scattering of light within said phase shifting regions in order to improve resolution of a projected image field.

5,411,825

# HEAT DEVELOPMENT PROCESS OF MIGRATION IMAGING MEMBERS

Man C. Tam, Mississauga, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 16, 1990, Ser. No. 598,279

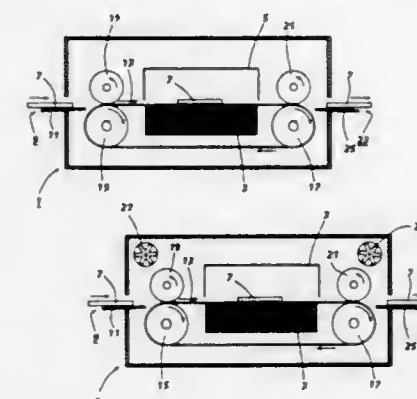
Int. Cl.<sup>6</sup> G06G 13/70, 13/78

U.S. Cl. 430—41

10 Claims

1. An imaging process which comprises (1) providing a migration imaging member comprising (a) a substrate and (b) a softenable layer comprising a softenable material, optional charge transport material, and migration marking material situated contiguous to the surface of the softenable layer

spaced from the substrate; (2) uniformly charging the imaging member; (3) exposing the charged imaging member to activating radiation in an imagewise pattern, thereby forming an electrostatic latent image on the imaging member; and (4) developing the imaging member with a heat development apparatus which comprises a heating source, a conveyance means for conveying the migration imaging member past the heating source, a first pinch roller in contact with the conveyance means, and a second pinch roller in contact with the conveyance means, wherein the imaging member passes through a nip between the conveyance means and the first pinch roller subsequent to entering the apparatus and prior to exposure to the heating source and passes through a nip between the conveyance means and the second pinch roller



subsequent to exposure to the heating source and prior to exiting the apparatus, wherein the surface temperature of the first pinch roller is maintained at a temperature at least 20° C. below the development temperature of the migration imaging member during the period in which the first pinch roller contacts the migration imaging member, wherein the surface temperature of the second pinch roller is maintained at a temperature at least 20° C. below the development temperature of the migration imaging member during the period in which the second pinch roller contacts the migration imaging member, and wherein the heating source is maintained at the development temperature of the migration imaging member during development, thereby causing migration marking material to migrate through the softenable material toward the substrate in imagewise fashion.

5,411,826

# IMAGE-HOLDING MEMBER AND PRODUCTION METHOD THEREOF, METHOD FOR FORMING IMAGE-FORMING MASTER USING THE IMAGE-HOLDING MEMBER AND THE FORMING APPARATUS, AND IMAGE-FORMING METHOD USING THEM

Yuichi Yashiki, Minami-Ashigara, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Division of Ser. No. 848,276, Mar. 9, 1992, Pat. No. 5,310,612.

This application Feb. 17, 1994, Ser. No. 197,707

Claims priority, application Japan, Mar. 11, 1991, 3-69442; Mar. 11, 1991, 3-69443; Mar. 28, 1991, 3-87387; Jul. 4, 1991, 3-190675

Int. Cl.<sup>6</sup> G03G 17/10, 15/22

U.S. Cl. 430—41

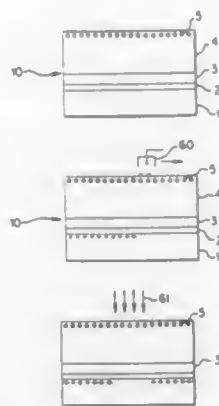
6 Claims

1. A method of forming an image-forming master comprising the steps of:

- providing an image holding member comprising a substrate having an electrically conductive surface, a charge generating layer formed on said electrically conductive substrate, and a heat softening layer formed on said charge generating layer and containing a charge transporting material, electrically conductive particles, and a heat softening resin, said electrically conductive particles exist-



ing in the inside of the heat softening layer and in the vicinity of the surface thereof, applying uniform negative charging onto said image holding member,



applying an image exposure onto said image holding member, and heating said heat softening layer to a temperature of at least the softening point of said heat softening resin.

5,411,827

## ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR

Hiroshi Tamura, Susono; Naoshi Mishima, Numazu, and Yoshiaki Kawasaki, Shizuoka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 29, 1993, Ser. No. 10,868

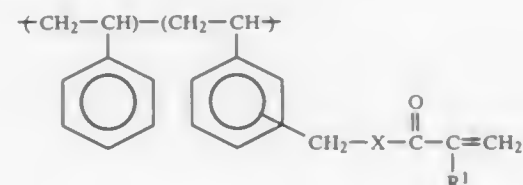
Claims priority, application Japan, Jan. 31, 1992, 4-041937  
Int. Cl.<sup>6</sup> G03G 5/047

U.S. Cl. 430—58

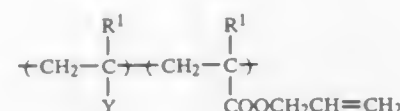
9 Claims

1. An electrophotographic photoconductor, comprising an electroconductive substrate, and a photoconductive layer, which comprises a charge generation layer and a charge transport layer successively formed on said substrate in this order, said charge transport layer comprising a reaction product of i) a carbon-carbon double-bond-containing charge transporting material and ii) a binder resin which comprises a carbon-carbon double-bond-containing polymer, said component i) and ii) reacting with each other by the application of light or heat thereto,

and wherein said carbon-carbon double-bond-containing polymer of said binder resin is selected from the group consisting of an unsaturated polyester obtained from a condensation reaction between maleic anhydride or fumaric acid and a polyhydric alcohol; a polyester of phthalic anhydride and glycidyl acrylate obtained by ring opening polymerization; a polyester made from acrylic acid, phthalic anhydride and propylene oxide; a polystyrene polymer of the formula:



wherein R<sup>1</sup> represents hydrogen or methyl group; and X represents —O— or —CH<sub>2</sub>O—; and an acrylic-allyl ester copolymer of the formula:



wherein R<sup>1</sup> represents hydrogen or methyl group; and Y represents a phenyl group or —COO(CH<sub>2</sub>)<sub>n</sub>H, in which n is an integer of 1–10.

5,411,828

## ELECTROPHOTOGRAPHIC PHOTOCENSITIVE MEMBER, AND ELECTROPHOTOGRAPHIC APPARATUS, DEVICE UNIT AND FACSIMILE MACHINE HAVING THE PHOTOCENSITIVE MEMBER

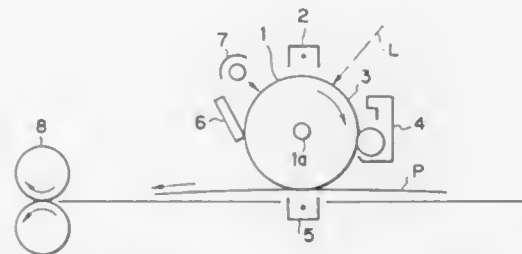
Yoshio Kashizaki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 4, 1993, Ser. No. 13,734

Claims priority, application Japan, Feb. 5, 1992, 4-047725  
Int. Cl.<sup>6</sup> G03G 15/02

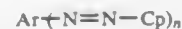
U.S. Cl. 430—58

11 Claims



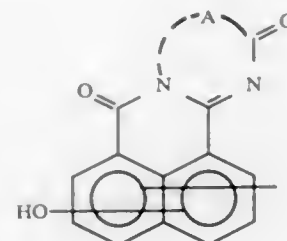
1. An electrophotographic photosensitive member comprising a conductive support and a photosensitive layer provided thereon, wherein said photosensitive layer contains an azo pigment represented by the following Formula (1),

Formula (1):



wherein Ar represents a substituted or unsubstituted aromatic hydrocarbon group which may be bonded through a linking group, or a substituted or unsubstituted heterocyclic group which may be bonded through a linking group; Cp represents a coupler residual group having a phenolic hydroxyl group, at least one of said Cp representing a coupler residual group represented by the following Formula (2); and n represents an integer of 2 to 4,

Formula (2):



wherein A represents a divalent group of a substituted or unsubstituted aromatic hydrocarbon ring or a divalent group of a substituted or unsubstituted heterocyclic ring containing a nitrogen atom in the ring.

5,411,829

## POLYIMIDE TONER COMPOSITIONS

Guerino G. Sacripante, Oakville; B. W. Anissa Yeung, Mississauga; T. Brian McAneney, Burlington, all of Canada, and J. Stephen Kittelberger, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

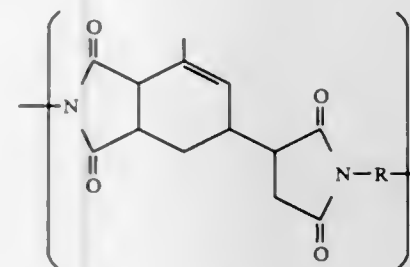
Filed May 31, 1994, Ser. No. 251,161

Int. Cl.<sup>6</sup> G03G 9/087

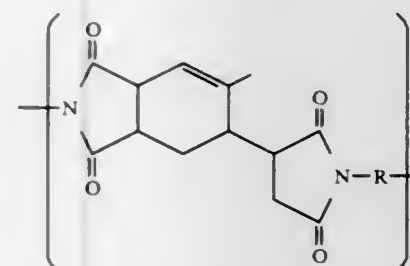
U.S. Cl. 430—106

25 Claims

1. A toner composition comprised of pigment, and a polyimide of the formulas



OR



wherein n represents the number of monomer segments, and R is alkylene, oxyalkylene, or polyoxyalkylene.

5,411,830

## MAGNETIC DEVELOPER, ELECTROPHOTOGRAPHIC APPARATUS AND RECOGNITION METHOD OF MAGNETIC INK CHARACTER

Satoshi Matsunaga, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

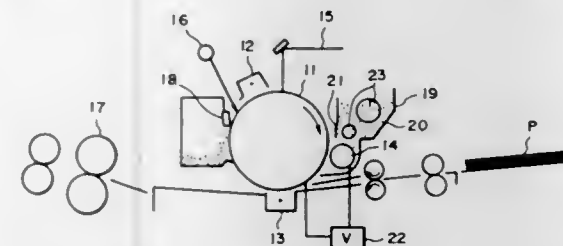
Filed Jul. 26, 1991, Ser. No. 736,633

Claims priority, application Japan, Jul. 27, 1990, 2-199751; Jul. 27, 1990, 2-199752; Oct. 4, 1990, 2-265037; Oct. 4, 1990, 2-265038; Oct. 4, 1990, 2-265043

Int. Cl.<sup>6</sup> G03G 9/083

U.S. Cl. 430—166.6

22 Claims



1. A magnetic developer, comprising:

black magnetic toner particles comprising an iron oxide-based magnetic material and a binder, wherein the magnetic material has a silicon content calculated as SiO<sub>2</sub> of 0.1 to 1.0 wt. % and an aluminum content calculated as Al<sub>2</sub>O<sub>3</sub> of 0.1 to 1.0 wt. %, respectively, based on the magnetic material, and the magnetic material has a coercive

force H<sub>c</sub> of 130–300 Oersted and a residual magnetization δ<sub>r</sub> of 12–30 emu/g.

5,411,831

## TONER WITH CROSSLINKED POLYIMIDES OBTAINED FROM THE REACTION OF AN UNSATURATED POLYIMIDE AND A PEROXIDE

Guerino G. Sacripante, Oakville, and Stephan V. Drappel, Toronto, both of Canada, assignors to Xerox Corporation, Stamford, Conn.

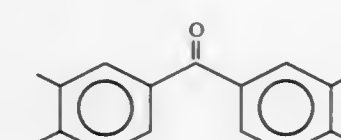
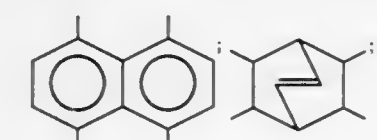
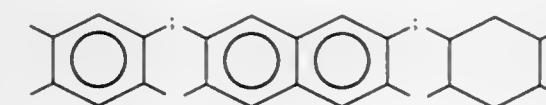
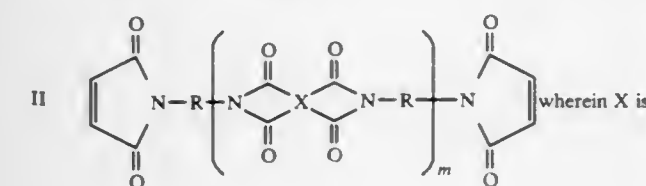
Filed Oct. 28, 1993, Ser. No. 144,075

Int. Cl.<sup>6</sup> G03G 9/087

U.S. Cl. 430—107

23 Claims

1. A toner composition comprised of a pigment and a crosslinked polyimide, and wherein said crosslinked polyimide is obtained from the reaction of a peroxide with an unsaturated polyimide of the formula



R is alkyl or oxyalkylene; and m represents the number of monomer segments present, and is a number of from about 10 to about 1,000.

5,411,832

## METHOD OF MODIFYING THE CHARGING PROPENSITY OF CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPERS AND MODIFIED CARRIER PARTICLES

William E. Yoerger, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 24, 1993, Ser. No. 127,382

Int. Cl.<sup>6</sup> G03G 9/10

U.S. Cl. 430—108

24 Claims

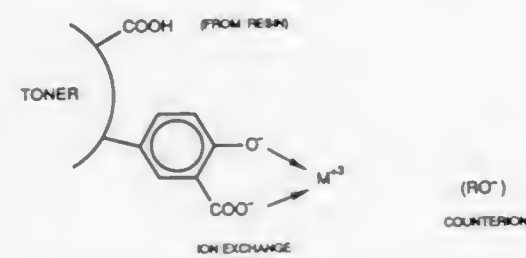
1. A method for modifying the triboelectric charging propensity of particles coated with fluorohydrocarbon polymer for use as carriers in electrostatographic development, said method comprising contacting said particles with a basic solution including a reducing agent for said particles.

5,411,833  
ELECTROPHOTOGRAPHIC TONER AND DEVELOPER  
COMPOSITIONS AND COLOR REPRODUCTION  
PROCESSES USING SAME

Ronald Swidler, Palo Alto, Calif., assignor to Lommtech International Management Corporation, Menlo Park, Calif.  
Continuation of Ser. No. 780,526, Oct. 18, 1991, abandoned, which is a continuation of Ser. No. 464,896, Jan. 16, 1990, abandoned, which is a continuation-in-part of Ser. No. 356,264, May 23, 1989, Pat. No. 5,069,995, and a continuation-in-part of Ser. No. 355,484, May 23, 1989, abandoned, and a continuation-in-part of Ser. No. 398,460, Aug. 25, 1989, Pat. No. 5,045,425. This application Feb. 10, 1993, Ser. No. 16,660  
Int. Cl.<sup>6</sup> G03G 9/00

U.S. Cl. 430—109

49 Claims



31. An electrophotographic liquid developer composition comprising, dispersed in an electrically insulating carrier liquid, (a) a charge control agent comprising a metal salt and (b) particles comprising a colored resinous phase having specific surface ion exchange sites available for complexation with the metal salt, said sites being comprised of a monomeric compound physically admixed in said resinous phase, and wherein the ion exchange sites are selected relative to the charge control agent so that the equilibrium of complexation therebetween is such that virtually all of the charge control agent is associated with the particles.

5,411,834  
LIQUID DEVELOPER COMPOSITIONS WITH  
FLUOROALKYL GROUPS

Timothy J. Fuller, Pittsford; James R. Larson, Fairport; John W. Spiewak, Webster; David H. Pan, Rochester; Ralph A. Mosher, Rochester, and Frank J. Bonsignore, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.  
Filed Feb. 24, 1994, Ser. No. 204,012  
Int. Cl.<sup>6</sup> G03G 9/135

U.S. Cl. 430—115

15 Claims

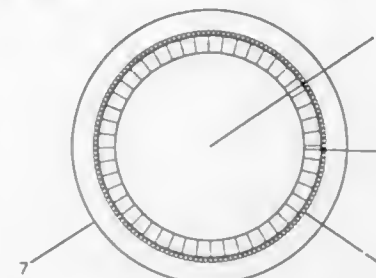
1. A negatively charged liquid electrostatographic developer comprised of (A) a liquid with a viscosity of from about 0.5 to about 20 centipoise and resistivity greater than or equal to from about  $5 \times 10^9$  ohm-cm to about  $1 \times 10^{20}$  ohm-cm; (B) thermoplastic resin particles with an average volume particle diameter of from about 0.1 to about 30 microns, and pigment; (C) second charge adjuvant; (D) first charge adjuvant of a copolymer comprised of ethylene and an  $\alpha$ - $\beta$ -ethylenically unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid derivatives, and which copolymer contains pendant fluoroalkyl or fluoroaryl groups; and (E) a charge director; and wherein the charge adjuvants are associated with or combined with said resin and said pigment; and wherein said second charge adjuvant is selected from the group consisting of aluminum stearate, and aluminum-hydroxy-bis(di-tert-butylsalicylate).

5,411,835  
DRY PHOTOCHROMATIC FILM  
Steven L. Brinser, 6184 Greenbriar La., Fayetteville, Pa.  
17222-9678

Filed Dec. 1, 1993, Ser. No. 158,789  
Int. Cl.<sup>6</sup> G03C 1/73

U.S. Cl. 430—138

4 Claims



1. A dry color or colorless photochromatic film comprising microcapsules with components which chemically change upon exposure to ultraviolet light into acidic products, triggering a change in the color in the film, wherein said microcapsules comprise:

- an interior molecular grouping which is a mixture of acid sensitive dye and ultraviolet-A and ultraviolet-B absorbing chemistry,
- said interior molecular grouping is surrounded by, and bonded to, a chlorinated rubber compound encapsulant, forming an interior microencapsulation,
- said interior microencapsulation is then coated with epoxides;
- said interior microencapsulation with epoxide coating has a second microencapsulation of polyvinyl chloride, said epoxide coating aids in the bonding of the microencapsulation of polyvinyl chloride and allows for the alteration of the time required to achieve a full color change of the dye.

5,411,836  
POSITIVE TYPE PHOTORESIST COMPOSITION  
COMPRISING A POLYMER HAVING  
CARBON-CARBON DOUBLE BONDS WITH A MALEIC  
HALF ESTER AND A MALEIMIDE ATTACHED TO THE  
BACKBONE

Elji Yoda, Yokohama; Haruyoshi Sato, Kawasaki; Yukio Yamasita, Yokohama; Hltoshi Yuasa, Yokohama, and Yutaka Otsuki, Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

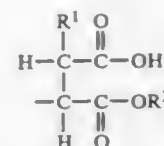
Filed Aug. 8, 1991, Ser. No. 742,622

Claims priority, application Japan, Aug. 14, 1990, 2-213731  
Int. Cl.<sup>6</sup> G03F 7/021, 7/30

U.S. Cl. 430—190

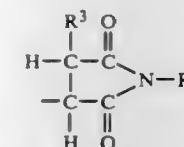
18 Claims

1. A positive photoresist composition comprising in admixture (a) 100 parts by weight of a resin which is a polymer compound (A) including carbon-carbon double bonds and having a molecular weight of 300 to 30,000 and an iodine value of 50 to 500, wherein, to at least a part of the double bonds of said polymer compound (A), a group represented by the formula (I) is present



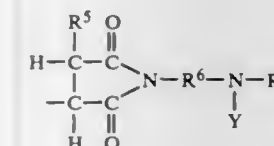
wherein R<sup>1</sup> denotes a hydrogen atom, a halogen atom or an alkyl group having 1 to 3 carbon atoms and R<sup>2</sup> denotes an alkyl group having 1 to 10 carbon atoms, a cycloalkyl group or an aryl group, a content of said group represented by the formula

(I) being 0.05 to 0.7 mol per 100 g of said polymer compound (A) and (b) 25 to 100 parts by weight of a compound containing a quinone diazide unit; wherein an imide group represented by the formula (III)

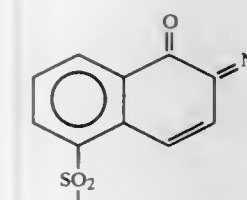


wherein R<sup>3</sup> denotes a hydrogen atom, a halogen atom or an alkyl group having 1 to 3 carbon atoms and R<sup>4</sup> denotes an alkyl group having 1 to 10 carbon atoms, a cycloalkyl group or an aryl group, is present into said polymer compound (A).

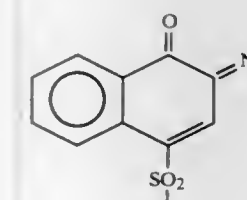
14. A composition as claimed in claim 1 wherein said compound containing said quinone diazide unit (b) is a compound which is said polymer compound (A) to at least a part of the double bonds of which compound a group represented by the formula (VI)



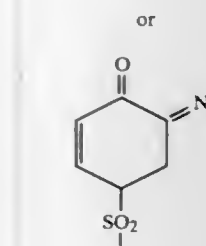
wherein R<sup>5</sup> denotes a hydrogen atom, a halogen atom or an alkyl group having 1 to 3 carbon atoms, R<sup>6</sup> denotes a bivalent hydrocarbon residue having 1 to 10 carbon atoms, R<sup>7</sup> denotes an alkyl group having 1 to 10 carbon atoms, a cycloalkyl group or an aryl group and Y denotes a quinone diazide unit represented by the formulas



(IV-1)



(IV-2)



(IV-3)

is introduced.

5,411,837  
WATERBORNE PHOTOESISTS HAVING BINDERS  
WITH SULFONIC ACID FUNCTIONALITY

Stephen E. Bottomley, Brea; Daniel E. Lundy, Pamona; Betsy Dadah, Irvine, and Robert K. Barr, Laguna Niguel, all of Calif., assignors to Morton International, Inc., Chicago, Ill.  
Continuation-in-part of Ser. No. 199,037, Feb. 18, 1994, Pat. No. 5,364,737, which is a continuation-in-part of Ser. No. 186,875, Jan. 25, 1994, abandoned. This application May 12, 1994, Ser. No. 241,872

Int. Cl.<sup>6</sup> G03C 1/73

U.S. Cl. 430—281

3 Claims

1. A photoimageable composition that can be borne in water comprising

- A) between about 30 and about 80 wt. % of a latex binder polymer having acid functionality, at least about 50 mole percent of which is sulfonic acid functionality, the acid functionality providing, in total, an acid number of between about 40 and about 250,
- B) between about 15 and about 50 wt % of alpha,beta-ethylenically unsaturated monomer(s),
- C) between about 0.1 and about 25 wt % of a photoinitiator or photoinitiator chemical system which generates free radicals, and
- D) between about 1 and about 40 wt % of a neutralizing base and/or polyether polyurethane associate thickener in amounts sufficient to stabilize the photoimageable composition as an aqueous emulsion, the weight percentages being based on total weight of components A-D.

5,411,838  
METHOD FOR THE PREPARATION OF OPTICAL  
RECORDING MEDIA CONTAINING OVERCOAT

Andrew J. G. Strandjord; Steven P. Webb, both of Midland, Mich., and Floyd E. Woodard, Los Altos, Calif., assignors to The Dow Chemical Company, Midland, Mich.  
Division of Ser. No. 906,905, Jun. 30, 1992, Pat. No. 5,328,813.  
This application Nov. 23, 1993, Ser. No. 156,607

(IV-2) The portion of the term of this patent subsequent to Jul. 12, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> G11B 7/26

U.S. Cl. 430—321

1 Claim

1. A method for producing an optical storage medium comprising:

- a. vacuum-depositing a laser recordable thin reflective layer of reflective metal which is written on by evaporation or melting to produce readable spots onto at least one surface of a substrate, and
- b. vacuum-depositing over the thin laser recordable reflective layer a first overcoating layer comprising one or more transparent inorganic materials selected from the group consisting of oxide, nitride, carbide, hydride, carbonyl, and mixtures thereof of chromium, aluminum, bismuth, zinc, zirconium, tantalum, tin, tungsten, niobium, titanium, indium, silicon, vanadium, antimony and hafnium to a reflectivity at 830 nm of from 40 to 80%, and
- c. and vacuum-depositing a second overcoating layer consisting of silicon carbonyl over and in contact with the first overcoating layer.



3. A coating composition for applying a layer to a photographic element which comprises gelatin, water and from 0.3 to 1 gm/100 gms of the composition of a surfactant mixture of 15 to 70 percent by weight of a dioctyl sulfosuccinate, sodium salt or di-fluoroalkylsulfosuccinate, sodium salt, from 35 to 75 percent by weight of a nonylphenoxy polyglycidyl alcohol, and from 3 to 13 percent by weight of perfluoro-octyl sulfonamido, N-hydrogen, N-propylene trimethylammonium iodide based on the total weight of the surfactant mixture with the proviso that when employed, the minimum amount of dioctyl sulfosuccinate, sodium salt is 0.15 gm/100 gms of coating composition.

5,411,845

**POLYMERIC FILM COATED WITH A SUBBING LAYER CONTAINING CROSS-LINKING AGENT AND (N-SUBSTITUTED) MONOALLYLAMINE POLYMER**

Julian N. Robinson, Maltby, England, assignor to Imperial Chemical Industries PLC, London, England  
Continuation of Ser. No. 18,500, Feb. 17, 1993, abandoned. This application Aug. 4, 1994, Ser. No. 283,909

Claims priority, application United Kingdom, Feb. 17, 1992, 9203350

Int. Cl.<sup>6</sup> G03F 7/09

U.S. Cl. 430—531

8 Claims

1. A coated film comprising a polymeric film substrate having on at least one surface thereof a subbing layer comprising 0.5% to 70% by weight of a cross-linking agent and greater than 30% by weight of a polymer consisting essentially of repeating units derived during the polymerization of monoallylamine and/or N-substituted monoallylamine, and/or salts thereof, said subbing layer exhibiting improved adhesion to a subsequently applied layer.

5,411,846

**SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL**  
Nobuo Seto, Yasuhiro Yoshioka, and Masakazu Morigaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Jul. 21, 1993, Ser. No. 94,217

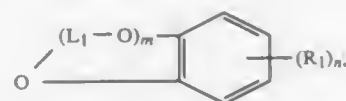
Claims priority, application Japan, Jul. 23, 1992, 4-216626

Int. Cl.<sup>6</sup> G03C 7/388, 7/392

U.S. Cl. 430—546

16 Claims

1. A silver halide color photographic material comprising a support having provided thereon at least one layer containing at least one compound represented by the formula:



wherein L<sub>1</sub> is an alkylene or arylene group, R<sub>1</sub> has no more than 50 carbon atoms and represents a substituent which can be substituted for a hydrogen of the benzene ring; m is an integer of from 2 to 7, and n represents 0 or an integer of from 1 to 4, with the proviso that when m is at least 2, the plurality of L<sub>1</sub> groups may be the same or different, when n is 1, R<sub>1</sub> has 8 to 36 carbon atoms, when n is 2 to 4, at least one R<sub>1</sub> group has 8 to 36 carbon atoms, when n is at least 2, the plurality of R<sub>1</sub> groups may be the same or different.

5,411,847

**COLOR-PHOTOGRAPHIC RECORDING MATERIAL**  
David G. Leppard, Marly, and Hugh S. Laver, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 30, 1993, Ser. No. 114,130

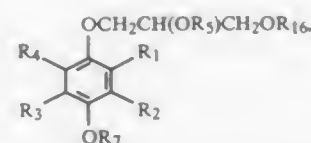
Claims priority, application Switzerland, Sep. 1, 1992, 2731/92

Int. Cl.<sup>6</sup> G03C 1/34, 7/392

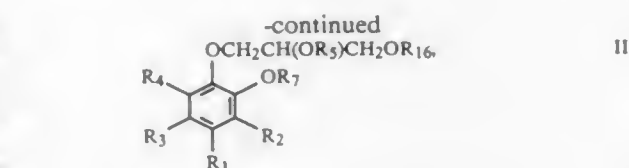
U.S. Cl. 430—551

8 Claims

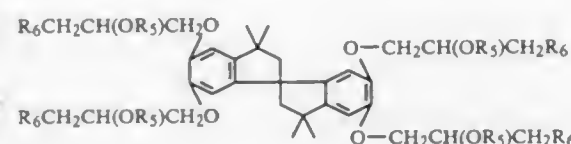
1. A colour-photographic recording material which contains a magenta coupler and, as stabilizer, at least one compound of the formula



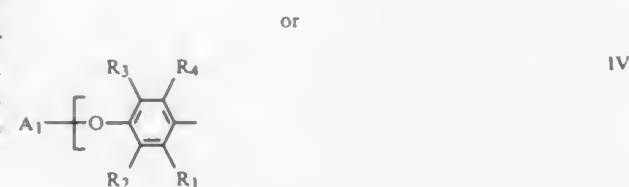
I



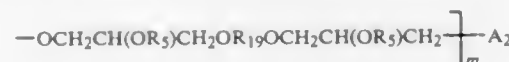
II



III

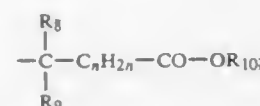


IV



where

R<sub>1</sub> and R<sub>3</sub>, independently of one another, are hydrogen, C<sub>1</sub>–C<sub>12</sub>alkyl, C<sub>5</sub>–C<sub>7</sub>cycloalkyl, which is unsubstituted or substituted by one or two C<sub>1</sub>–C<sub>4</sub>alkyl groups, phenyl, C<sub>1</sub>–C<sub>4</sub>alkoxy, phenyl, C<sub>1</sub>–C<sub>4</sub>alkoxy or a group of the formula V



V

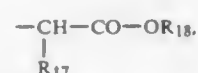
in which R<sub>8</sub> and R<sub>9</sub>, independently of one another, are C<sub>1</sub>–C<sub>8</sub>alkyl,

n is 1–10, and

R<sub>10</sub> is hydrogen, C<sub>1</sub>–C<sub>24</sub>alkyl, which is unsubstituted or interrupted by one or more O atoms and is unsubstituted or substituted by one —OH group, or is C<sub>2</sub>–C<sub>18</sub>alkenyl, C<sub>5</sub>–C<sub>12</sub>cycloalkyl, which is unsubstituted or substituted by 1 to 3 C<sub>1</sub>–C<sub>4</sub>alkyl, or is phenyl, which is unsubstituted or substituted by one or two C<sub>1</sub>–C<sub>4</sub>alkyl, or is phenyl-C<sub>1</sub>–C<sub>4</sub>alkyl or furfuryl;

R<sub>2</sub> and R<sub>4</sub>, independently of one another, are hydrogen or C<sub>1</sub>–C<sub>12</sub>alkyl;

R<sub>5</sub> is hydrogen, —CO—R<sub>11</sub>, —CO—OR<sub>12</sub> or —Si(R<sub>13</sub>)(R<sub>14</sub>)(R<sub>15</sub>), in which R<sub>11</sub> is C<sub>1</sub>–C<sub>18</sub>alkyl, C<sub>2</sub>–C<sub>18</sub>alkenyl or phenyl, R<sub>12</sub> is C<sub>1</sub>–C<sub>4</sub>alkyl and R<sub>13</sub>, R<sub>14</sub> and R<sub>15</sub>, independently of one another, are C<sub>1</sub>–C<sub>6</sub>alkyl or phenyl; the radicals R<sub>6</sub>, independently of one another, are —OR<sub>16</sub> or C<sub>1</sub>–C<sub>15</sub>alkyl, in which R<sub>16</sub> is hydrogen, C<sub>1</sub>–C<sub>18</sub>alkyl, C<sub>2</sub>–C<sub>18</sub>alkenyl, phenyl-C<sub>1</sub>–C<sub>4</sub>alkyl, C<sub>3</sub>–C<sub>24</sub>alkyl or C<sub>2</sub>–C<sub>14</sub>hydroxyalkyl, each of which is interrupted by one or more O atoms, or is phenyl, which is unsubstituted or substituted by C<sub>1</sub>–C<sub>4</sub>alkyl, C<sub>1</sub>–C<sub>4</sub>alkoxy or halogen, tolyl, C<sub>5</sub>–C<sub>6</sub>cycloalkyl, which is unsubstituted or substituted by 1 to 3 C<sub>1</sub>–C<sub>8</sub>alkyl, or is —CO—R<sub>11</sub>, in which R<sub>11</sub> is C<sub>1</sub>–C<sub>18</sub>alkyl, C<sub>2</sub>–C<sub>18</sub>alkenyl or phenyl;

R<sub>7</sub> is a group of the formula VI

VI

or a group of the formula VII



VII

in which R<sub>5</sub> and R<sub>6</sub> are as defined for formula I,

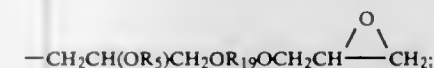
R<sub>17</sub> is hydrogen or C<sub>1</sub>–C<sub>18</sub>alkyl, and

R<sub>18</sub> is C<sub>1</sub>–C<sub>12</sub>alkyl, which is unsubstituted or interrupted by one or more O atoms, or is C<sub>2</sub>–C<sub>18</sub>alkenyl, benzyl or phenyl, which is unsubstituted or substituted by 1–3 C<sub>1</sub>–C<sub>4</sub>alkyl;

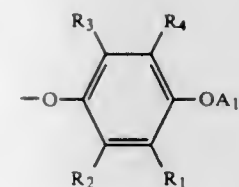
R<sub>19</sub> is C<sub>2</sub>–C<sub>10</sub>alkylene, phenylene or a -phenylene-R<sub>20</sub>-phenylene- group, in which R<sub>20</sub> is —O—, —S—, —SO<sub>2</sub>—, —CH<sub>2</sub>— or —C(CH<sub>3</sub>)<sub>2</sub>—;

m is 1–100;

A<sub>1</sub> is hydrogen, —CH<sub>2</sub>CH(OR<sub>5</sub>)CH<sub>2</sub>OR<sub>19</sub>OCH(OR<sub>5</sub>)CH<sub>2</sub>OR<sub>5</sub> or



and

A<sub>2</sub> is —OH or

or R<sub>3</sub> and R<sub>7</sub> in the formula I, together with the atoms to which they are bonded, form a C<sub>5</sub>–C<sub>6</sub> ring, which is unsubstituted or substituted by 1 to 3 C<sub>1</sub>–C<sub>8</sub>alkyl.

5,411,848

**PHOTOGRAPHIC COLOR COUPLERS AND PHOTOGRAPHIC MATERIALS CONTAINING THEM**

John D. Goddard, Pinner, and Danuta Gibson, Garston, both of United Kingdom, assignors to Eastman Kodak Company, Rochester, N.Y.

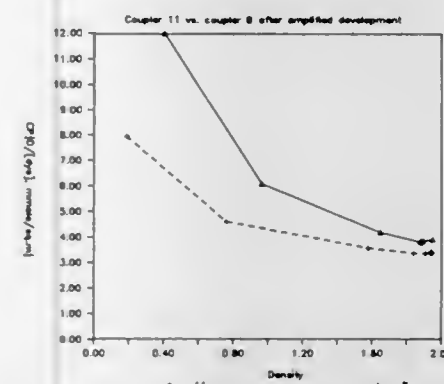
Filed Jul. 14, 1994, Ser. No. 275,218

Claims priority, application United Kingdom, Aug. 16, 1993, 9317035

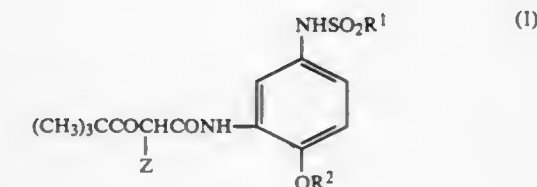
Int. Cl.<sup>6</sup> G03C 7/36

U.S. Cl. 430—557

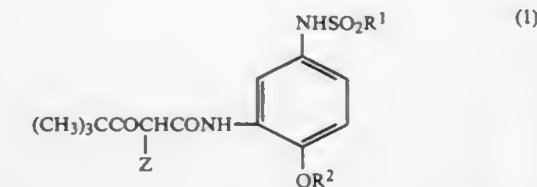
6 Claims



1. A photographic element comprising a photographic silver halide emulsion layer containing yellow dye-forming coupler having a the general formula:



(I)



(I)

wherein Z is a ballasted group which splits off on silver halide development which is of such size and configuration to render the coupler non-diffusible in photographic layers, prior to splitting off, and

R<sup>1</sup> and R<sup>2</sup> are each individually an alkyl or aryl group whose combined effect is to render the yellow dye formed on coupling sufficiently mobile to produce image smearing.

5,411,849

**SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL**

Takuji Hasegawa, Hino, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Dec. 6, 1993, Ser. No. 162,674

Claims priority, application Japan, Dec. 10, 1992, 4-330652

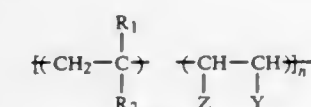
Int. Cl.<sup>6</sup> G03C 1/005, 1/08

U.S. Cl. 430—567

5 Claims

1. A silver halide photographic light-sensitive material comprising a support having thereon a silver halide emulsion layer containing a silver halide emulsion comprising silver iodobromide grains or Silver iodochlorobromide grains, which is prepared by a process comprising

- forming the silver halide emulsion by mixing a silver salt and a halide salt in a dispersion medium,
- subjecting the emulsion formed to washing to remove water-soluble salts, and then
- carrying out chemical sensitization of the emulsion wherein in (ii), the washing is carried out by coagulating the emulsion by a gelatin coagulant selected from a modified gelatin or a polymeric coagulant represented by the following formula (I); and in (iii), silver iodide fine grains having an average size of 0.2 μm or less, are added in an amount of 1 × 10<sup>-2</sup> to 1 × 10<sup>-6</sup> mole per mole of silver halide at a time during the course of the chemical sensitization,



formula (I)

wherein R<sub>1</sub> and R<sub>2</sub> are each an alkyl group having 1 to 8 carbon atoms; Z and Y represent each —COOM, —COOR<sub>3</sub> or —CON(R<sub>4</sub>) (R<sub>5</sub>) in which M is a hydrogen atom, an alkali metal atom or ammonium group, R<sub>3</sub> is an alkyl group having 1 to 20 carbon atoms or an aryl group, and R<sub>4</sub> and R<sub>5</sub> are each a hydrogen atom, an alkyl group having 1 to 20 carbon atoms, or an aryl group; and n is an integer of 10 to 10<sup>4</sup>.



5,411,850

## SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Satomi Kawabe; Katsuhiko Suzuki; Tomoyuki Nakayama, and Hiroyuki Hoshino, all of Hino, Japan, assignors to Konica Corporation, Japan

Continuation of Ser. No. 927,470, Aug. 10, 1992, abandoned. This application Dec. 7, 1993, Ser. No. 163,591

Claims priority, application Japan, Aug. 20, 1991, 3-208212 Int. Cl.<sup>6</sup> G03C 1/035

U.S. Cl. 430—567

13 Claims

1. A silver halide light-sensitive photographic material comprising: a support having provided thereon a silver halide emulsion layer, said silver halide emulsion layer comprising silver iodobromide grains, wherein an induced absorption peak A obtained by a microwave photoconductive measurement of said light-sensitive photographic material and, an induced absorption peak B obtained by the microwave photoconductive measurement of said light-sensitive photographic material under pressure treatment, satisfies the following relationship;

$$B/A \geq 0.85.$$

5,411,851

## GRAIN GROWTH PROCESS FOR THE PREPARATION OF HIGH BROMIDE ULTRATHIN TABULAR GRAIN EMULSIONS

Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 14, 1994, Ser. No. 195,807

Int. Cl.<sup>6</sup> G03C 1/07, 1/035

U.S. Cl. 430—569

20 Claims



1. A grain growth process for providing a tabular grain emulsion in which the equivalent circular diameter of tabular grains is increased while maintaining their thickness at less than 0.07 μm comprising

- (1) providing an aqueous dispersion containing at least 0.1 percent by weight silver in the form of silver halide seed grains containing at least 50 mole percent bromide having an average thickness of less than 0.06 μm, the dispersion having a pH in the range of from 4.6 to 9.0 and a stoichiometric excess of bromide ions to silver ions limited to a pBr of at least 1.5,
- (2) introducing into the dispersing medium a triaminopyrimidine grain growth modifier containing mutually independent 4, 5 and 6 ring position amino substituents, the 4 and 6 ring position substituents being hydroamino substituents, and
- (3) holding the aqueous dispersion containing the triaminopyrimidine grain growth modifier at a temperature of at least 15° C. until the average equivalent circular diameter of the seed grains remaining has increased at least 0.1 μm and greater than 50 percent of total grain projected area is accounted for by tabular grains having {111} major faces and an average thickness of less than 0.07 μm.

5,411,852

## CLASS OF GRAIN GROWTH MODIFIERS FOR THE PREPARATION OF HIGH CHLORIDE (111) TABULAR GRAIN EMULSIONS (II)

Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 27, 1994, Ser. No. 281,283

Int. Cl.<sup>6</sup> G03C 1/07

U.S. Cl. 430—569

10 Claims

1. A process of preparing a high chloride {111} tabular grain emulsion, wherein tabular grains are formed having {111} major faces, containing at least 50 mole percent chloride and less than 5 mole percent iodide, based on silver, and accounting for at least 50 percent of total grain projected area, comprising introducing silver ion into a gelatino-peptizer dispersing medium containing a stoichiometric excess of chloride ions with respect to silver ions and a grain growth modifier, wherein the grain growth modifier is a phenol that is incapable of reducing silver chloride and has at least two iodo substituents.

5,411,853

## GRAIN GROWTH PROCESS FOR THE PREPARATION OF HIGH BROMIDE ULTRATHIN TABULAR GRAIN EMULSIONS

Joe E. Maskasky, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 8, 1994, Ser. No. 302,557

Int. Cl.<sup>6</sup> G03C 1/07

U.S. Cl. 430—569

18 Claims



1. A grain growth process for providing a tabular grain emulsion in which the average equivalent circular diameter of tabular grains is increased while maintaining their average thickness at less than 0.07 μm comprising introducing silver and halide ions into a dispersing medium in the presence of a grain growth modifier,

wherein tabular grains having an average thickness of less than 0.07 μm and a bromide content of greater than 50 mole percent are formed by

- (1) providing an aqueous dispersion containing at least 0.1 percent by weight silver in the form of silver halide grains containing at least 50 mole percent bromide having an average thickness of less than 0.06 μm, the dispersion having a pH in the range of from 1.5 to 8 and a stoichiometric excess of bromide ions to silver ions limited to a pBr of at least 1.5,
- (2) introducing into the dispersing medium as the grain growth modifier a phenol that is incapable of reducing the grains provided in step (1) and has at least two iodo substituents, and
- (3) holding the aqueous dispersion containing the phenol grain growth modifier at a temperature of at least 40° C. until the average equivalent circular diameter of the grains in the dispersing medium is at least 0.1 μm greater than the average equivalent circular diameter of the grains provided in step (1) and greater than 50 percent of total grain projected area is accounted for by tabular grains having {111} major faces, an average aspect ratio of at least 5, and an average thickness of less than 0.07 μm.

5,411,854

## SENSITIVITY INCREASE FROM ALKYNYLAMINEAZOLE, SENSITIZING DYE, AND CHALCOGENAZOLIUM SALT ADDED BEFORE HEAT CYCLE

Thomas B. Brust, and Robert J. Newmiller, both of Webster, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

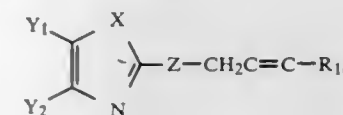
Filed Dec. 29, 1993, Ser. No. 174,998

Int. Cl.<sup>6</sup> G03C 1/16, 1/18, 1/28, 1/34

U.S. Cl. 430—572

13 Claims

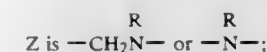
1. A combined process of chemical and spectral sensitization comprising providing a silver halide emulsion, adding at least one of a sulfur or gold chemical sensitizer, adding finish modifier, adding dye, and adding hydrolyzable quaternized chalcogenazolium salt of a middle chalcogen wherein said finish modifier is of the general structure



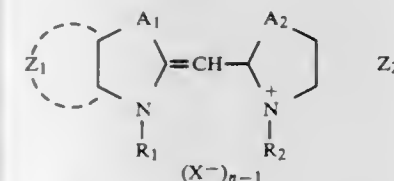
wherein X is —O—, —S—, —Se—, or



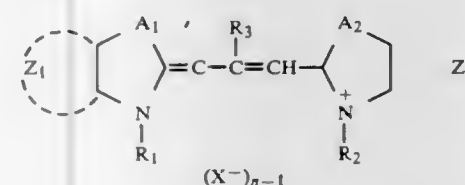
Y<sup>1</sup> and Y<sup>2</sup> individually represent hydrogen or an aromatic nucleus or together represent the atoms completing a fused aromatic nucleus;



R is hydrogen or lower alkyl of from 1 to 5 carbon atoms; and R<sub>1</sub> is a hydrogen or methyl, provided that Y<sup>1</sup> and Y<sup>2</sup> individually represent hydrogen or an aromatic nucleus when R<sub>1</sub> is hydrogen, said dye comprises dye II or III wherein dye II comprises

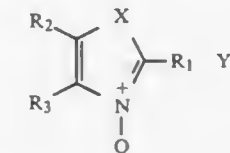


wherein A<sub>1</sub> and A<sub>2</sub> are —O—, —S—, —Se—, Z<sub>1</sub>, and Z<sub>2</sub> each is a group of non-metallic atoms necessary to complete a substituted or unsubstituted benzene or fused aromatic ring, R<sub>1</sub> and R<sub>2</sub> are sulfoalkyl or carboxyalkyl groups, and X<sup>-</sup> is an anion where n is 1 or 2, provided n is 1 when an intramolecular salt is formed, and dye III comprises



wherein A<sub>1</sub> and A<sub>2</sub> are —O—, —S—, —Se—, Z<sub>1</sub>, and Z<sub>2</sub> each is a group of non-metallic atoms necessary to complete a substituted or unsubstituted benzene or fused aromatic ring, R<sub>1</sub> and R<sub>2</sub> are sulfoalkyl or carboxyalkyl groups, R<sub>3</sub> is a hydrogen atom, or a lower alkyl or aryl

group, and X<sup>-</sup> is an anion where n is 1 or 2, provided n is 1 when an intramolecular salt is formed, and said hydrolyzable quaternized chalcogenazolium salt of a middle chalcogen comprises



wherein R<sub>1</sub> is hydrogen, alkyl of from 1 to 8 carbon atoms, or aryl of from 6 to 10 carbon atoms; R<sub>2</sub> and R<sub>3</sub> are independently hydrogen or halogen atoms; aliphatic or aromatic hydrocarbon moieties optionally linked through a divalent oxygen or sulfur atom; or cyano, amino, amido, sulfonamido, sulfamoyl, ureido, thioureido, hydroxy, —C(O)M, or —S(SO)<sub>2</sub>M groups, wherein M is chosen to complete an aldehyde, ketone, acid, ester, thioester, amide or salt; or R<sub>2</sub> and R<sub>3</sub> together represent the atoms completing a fused ring; X is a middle chalcogen atom; Y represents a charge balancing counter ion; n is the integer 0 or 1; and Q is a quaternizing substituent having a carbon chain interrupted by a divalent group of the formula:



wherein:

L is a divalent linking group;  
T is a carbonyl or sulfonyl;  
T<sup>2</sup> is independently in each occurrence carbonyl or sulfonyl;  
R<sup>4</sup> is a hydrocarbon residue or an amino group; and  
m is an integer from 1 to 3, heating to a temperature sufficient to cause sensitization of said silver halide to take place, and cooling to recover the sensitized emulsion wherein the order of addition comprises dye, then said at least one of sulfur and gold, then said salt of a middle chalcogen and then said finish modifier.

5,411,855

## PHOTOGRAPHIC ELEMENT EXHIBITING IMPROVED SPEED AND STABILITY

Gladys L. MacIetyre, Clyde, and Roger Lok, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 16, 1993, Ser. No. 168,834

Int. Cl.<sup>6</sup> G03C 1/34, 1/005

U.S. Cl. 430—603

20 Claims

1. A negative working photographic element comprising a support having thereon a silver halide emulsion layer, wherein said emulsion layer contains an amine borane, a thiosulfonate compound that satisfies the formula:



where

R<sup>1</sup> represents an aliphatic, carbocyclic, or heterocyclic group, which may be substituted or unsubstituted, and M<sup>1</sup> represents any mono-, di-, or tri-valent cation; and a sulfinate compound that satisfies the formula:



where

R<sup>2</sup> represents an aliphatic, carbocyclic, or heterocyclic group, which may be substituted or unsubstituted, and M<sup>2</sup> represents a mono-, di-, or tri-valent cation.

5,411,856

CARBAMYL-SUBSTITUTED BIS(VINYLSULFONYL)  
METHANE HARDENERS

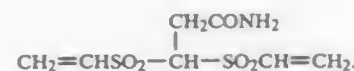
Edgar E. Riecke, Pittsford, and Kenneth G. Harbison, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 10, 1994, Ser. No. 179,471  
Int. Cl.<sup>6</sup> G03C 1/30

U.S. Cl. 430—622

4 Claims

1. Gelatin hardened with a compound represented by the formula:



5,411,857

PROBES FOR PAPILLOMAVIRUSES AND AN IN VITRO  
DIAGNOSTIC PROCEDURE FOR PAPILLOMA  
INFECTIONS

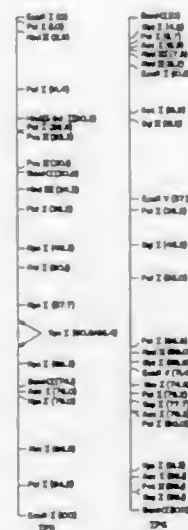
Sylvie Beaudenon, Clamart; Dina Kremsdorf; Odile Croissant, both of Paris, and Gérard Orth, Sceaux, all of France, assignors to Institut Nationale de la Santé et Institut Pasteur, both of Paris, France

Continuation of Ser. No. 714,347, Jun. 12, 1991, abandoned, which is a continuation of Ser. No. 584,397, Sep. 13, 1990, abandoned, which is a continuation of Ser. No. 453,219, Dec. 21, 1989, abandoned, which is a continuation of Ser. No. 275,953, Nov. 25, 1988, abandoned, which is a continuation of Ser. No. 8,003, Jan. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 760,993, Jul. 31, 1985, abandoned. This application Jul. 16, 1992, Ser. No. 914,005

Claims priority, application France, Jan. 31, 1986, 86 01425  
Int. Cl.<sup>6</sup> C12Q 1/70, 1/68

U.S. Cl. 435—5

8 Claims



1. Isolated DNA of a human papillomavirus (HPV), wherein said DNA is about 7,000 to about 8,000 base pairs; and said DNA is obtained from a virus selected from the group of papillomaviruses consisting of HPV-IP5 and HPV-IP6.

5,411,858

MANUFACTURING PROCESS FOR SAMPLE INITIATED  
ASSAY DEVICE

John K. McGeehan, Woodbury; Gerhard Ertingshausen, Princeton, both of N.J., and Timothy B. Meluch, Bear, Del., assignors to ActiMed Laboratories, Inc., Burlington, N.J.

Continuation of Ser. No. 824,252, Jan. 22, 1992, abandoned, which is a continuation-in-part of Ser. No. 749,521, Aug. 26, 1991, Pat. No. 5,234,813, which is a continuation-in-part of Ser. No. 352,985, May 17, 1989, Pat. No. 5,087,556. This application Aug. 12, 1993, Ser. No. 104,934  
Int. Cl.<sup>6</sup> G01N 33/531

U.S. Cl. 435—4

10 Claims

1. In a method for making a multilayer assaying device for fluid samples by assembling layers and sealing said layers together, said layers comprising elements corresponding to an assay initiation area and elements corresponding to a measurement zone to form an assaying device comprising a sample initiation area and a measurement zone, whereby a fluid sample to be assayed flows from the sample initiation zone through the measurement zone, the improvement comprising said measurement zone being produced by heat sealing a support material to a woven mesh material to form a seal along the sides of said measurement zone, wherein the material forming the support melts during heat sealing while the material forming the woven mesh does not melt during heat sealing whereby the melting points of the woven mesh material and the support material are chosen so that during heat sealing the material forming the support flows into the woven mesh, and that the amount of heat applied to the measurement zone determines how much support material flows into the mesh to define the volume of the measurement zone.

5,411,859

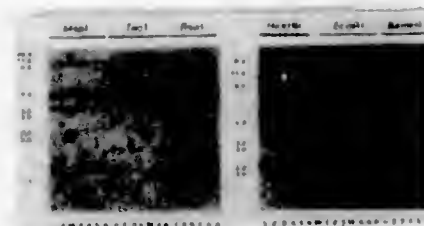
GENETIC IDENTIFICATION EMPLOYING DNA  
PROBES OF VARIABLE NUMBER TANDEM REPEAT  
LOCI

Raymond L. White; Yusuke Nakamura, both of Salt Lake City; Peter O'Connell; Midvale, and Mark F. Leppert, Salt Lake City, all of Utah, assignors to University of Utah Research Foundation, Salt Lake City, Utah

Continuation of Ser. No. 597,039, Oct. 15, 1990, abandoned, which is a division of Ser. No. 307,820, Feb. 8, 1989, Pat. No. 4,963,663, which is a continuation-in-part of Ser. No. 288,835, Dec. 23, 1988, abandoned, which is a continuation-in-part of Ser. No. 282,141, Dec. 9, 1988, abandoned, which is a continuation-in-part of Ser. No. 157,962, Feb. 18, 1988, abandoned. This application Jun. 10, 1991, Ser. No. 728,751  
Int. Cl.<sup>6</sup> C12Q 1/68

U.S. Cl. 435—6

29 Claims



1. A method for genetically identifying individuals comprising the steps of:

- obtaining DNA isolated from a sample from an individual;
- cleaving the DNA with a restriction enzyme to produce DNA fragments;
- electrophoretically fractionating the DNA fragments by size;
- denaturing the DNA fragments such that they exist in single-stranded form;
- hybridizing the DNA fragments with a labeled single-stranded nucleic acid fragment, said fragment comprising

a nucleic acid fragment selected from the group consisting of pYNH24, pCMM6, pCMM66, pCMM77, pCMM86, pMLJ14, pYNZ22, pJCZ3.1, pJCZ16.2, pJCZ67, pCMM101, cEFD64, cEFD52, pEFD139, pEFD126.3, pTHH59, cMHZ47, cYNA13, cYNA4, cKKA39, pMCT118, pCMI327, pEKMDA21, pRMU3, pMCOB17, cTBQ7, VNTR-containing fragments thereof and nucleic acid fragments which are capable of specifically hybridizing to one of the loci specified thereby; and

- detecting the location of the labelled nucleic acid fragment, whereby a genetic identification of an individual is performed.

5,411,860

AMPLIFICATION OF HUMAN MDM2 GENE IN HUMAN  
TUMORS

Bert Vogelstein, and Kenneth W. Kinzler, both of Baltimore, Md., assignors to The Johns Hopkins University, Baltimore, Md.

Continuation-in-part of Ser. No. 867,840, Apr. 7, 1992, abandoned. This application Jun. 23, 1992, Ser. No. 903,103  
Int. Cl.<sup>6</sup> C12Q 1/68; C12P 19/34

U.S. Cl. 435—6

12 Claims

1. A method of screening for a neoplastic tissue in a human comprising:

- detecting amplification of a human MDM2 gene or elevated expression of a human MDM2 gene by detecting human MDM2 mRNA in a tissue or body fluid isolated from a human, wherein amplification of the human MDM2 gene or elevated expression of the human MDM2 gene provides a method of screening for neoplasia or the potential for neoplastic development.

5,411,861

## RAPID MUTATIONAL ANALYSIS METHOD

Brian Seed, Boston, Mass., and Andrew Peterson, El Cerrito, Calif., assignors to The General Hospital Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 181,826, Apr. 15, 1988, abandoned. This application Feb. 27, 1992, Ser. No. 842,465  
Int. Cl.<sup>6</sup> C12Q 1/68

U.S. Cl. 435—6

19 Claims

1. A method of isolating mutant cDNAs encoding protein-binding domain loss mutants of a cell surface protein, said mutant cell surface protein's wild-type analog having a first binding domain and a second binding domain with a first monoclonal antibody and a second monoclonal antibody respectively thereto, said wild-type cell surface protein having a known cDNA sequence, said method comprising the steps of:

- expressing vector constructs comprising said mutant cDNA in host cells;
- exposing said expression products of said host cells to a negative selection agent, said negative selection agent comprising said first monoclonal antibody specific to said first binding domain to produce a first monoclonal antibody-expression product-host cell complex;
- killing those cells containing expression product that binds to said negative selection agent by exposing the first monoclonal antibody-expression product-host cell complex to complement under conditions causing lysis of said complex;
- exposing said expression product of said host cells to a positive selection agent, said positive selection agent comprising said second monoclonal antibody to said second binding domain to produce a second monoclonal antibody-expression product-host cell complex;
- recovering the unlysed host cells of step (d) by exposing said unlysed cells to the second monoclonal antibody-expression product-host cell complex to a third antibody-coated support, said third antibody being directed to said second monoclonal antibody;

- recovering said vector constructs from the recovered host cells of step (e); and
- transforming said recovered constructs of step (f) into an amplification host and amplifying said constructs.

5,411,862

METHOD FOR THE RAPID SEQUENCING OF LINEAR  
AND ORDERED BIOLOGICAL SEQUENCES

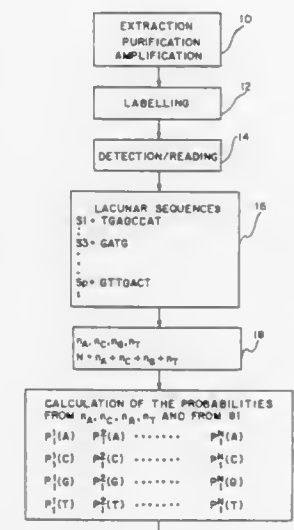
Gilles Ruggiu, Orsay, and Frédéric Ginot, Versailles, both of France, assignors to Bertin &amp; Cie, France

Filed Apr. 23, 1993, Ser. No. 30,411

Claims priority, application France, Sep. 28, 1990, 90 11977  
Int. Cl.<sup>6</sup> C12Q 1/68

U.S. Cl. 435—6

5 Claims



1. A method for determining the complete sequence of N bases of a nucleic acid fragment comprising:

- extracting nucleic acid and purifying a nucleic acid fragment;
- synthesizing copies of said fragment in the presence of all four nucleic acid bases and all four nucleic acid bases wherein each base is modified by the addition of a different detectable label to obtain a plurality of labelled copies; wherein said copies are partially and differentially labeled;
- detecting the labelled bases in each copy and determining the sequence of said labelled bases to form a set of p lacunar sequences S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub>, . . . S<sub>p</sub> of labelled bases;
- determining the complete sequence from said lacunar sequences by calculating the probability of presence of a base B<sub>j</sub>, j being a number from one to four wherein each number represents a particular nucleic acid base, at a position i in the complete sequence wherein:

$$P_p^i(B_j) = \frac{P_{p-1}^i(B_j) \cdot P(S_p/B_j)}{\sum_{j=1}^4 P_{p-1}^i(B_j) \cdot P(S_p/B_j)}$$

$P_p^i(B_j)$  being the probability of the presence of the base B<sub>j</sub> at position i of the complete sequence after consideration of p lacunar sequences,  
 $P_{p-1}^i(B_j)$  being the probability of the presence of the base B<sub>j</sub> at position i of the complete sequence after consideration of (p-1) lacunar sequences,  
 $P(S_p/B_j)$  being the probability of said lacunar sequence S<sub>p</sub> knowing the base B<sub>j</sub> at position i in said complete sequence,  
 repeating the process until, at each position of said complete sequence, probabilities of about 1 are arrived at for one of the four bases;

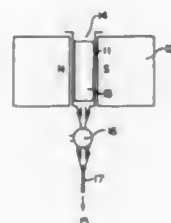


wherein the complete sequence of N bases is the sequence of bases at each position which have the probabilities of about 1.

5,411,863

# METHODS AND MATERIALS FOR IMPROVED HIGH GRADIENT MAGNETIC SEPARATION OF BIOLOGICAL MATERIALS

Stefan Miltenyi, Moltzfeld 60a, D-5060 Bergisch Gladbach 1, Cologne, Germany, assignor to S. Miltenyi, Germany  
Continuation of Ser. No. 291,177, Dec. 28, 1988, abandoned.  
This application Feb. 17, 1993, Ser. No. 20,019  
Int. Cl.<sup>6</sup> C12Q 1/68; G01N 33/53; C12M 1/40  
U.S. Cl. 435—6 17 Claims



1. A method to isolate a biological material from a sample which method comprises  
applying a sample containing the biological material coupled to superparamagnetic particles having a statistical distribution of magnetization when exposed to a magnetic field of sufficient strength to magnetize said particles to more than 90% of their saturation magnetization wherein 90% of said particles in said composition and exposed to said magnetic field have a magnetization within  $\pm 10\%$  of the mean magnetization of said distribution to a separation chamber which contains a magnetic gradient of sufficient strength to cause retention of the superparamagnetic particles in the chamber,  
allowing the remainder of the sample to pass through the chamber, and  
eluting the superparamagnetic particles from the chamber by introducing into said chamber an eluting fluid containing second superparamagnetic particles of higher saturation magnetization than said first superparamagnetic particles, thereby releasing said biological material from said chamber.

5,411,864

# METHOD OF PURIFYING RECOMBINANT PROTEINS FROM CORRESPONDING HOST CELL PROTEINS

Vincent R. Anicetti, Pacifica; Stuart E. Bulder, Belmont; Billie J. Marks, Pacifica; John R. Ogez, Union City; Eric J. Patzer, Orinda, and David A. Vetterlein, Union City, all of Calif., assignors to Genentech, Inc., South San Francisco, Calif.  
Filed Nov. 5, 1987, Ser. No. 117,705  
Int. Cl.<sup>6</sup> G01N 33/53

U.S. Cl. 435—7.4 17 Claims  
1. A method for purifying human tissue plasminogen activator derived from Chinese hamster ovary cells comprising the steps of:  
contacting a fluid containing human tissue plasminogen activator with antibodies specifically binding Chinese hamster plasminogen activator, and  
recovering said human tissue plasminogen activator.

# 5,411,865 METHOD OF DETECTING ANTI-LEISHMANIA PARASITE ANTIBODIES

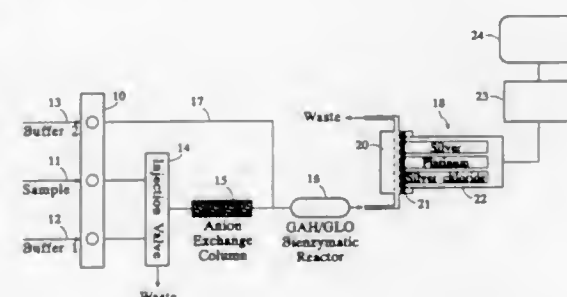
Steven Reed, Bellevue, Wash., assignor to Iasys Corporation, Seattle, Wash.  
Filed Jan. 15, 1993, Ser. No. 6,676  
Int. Cl.<sup>6</sup> G01N 33/569

U.S. Cl. 435—7.22 7 Claims  
1. A method for detecting anti-Leishmania parasite antibodies to a 230 kDa antigen present in *Leishmania chagasi* and *Leishmania donovani*, comprising:  
(a) obtaining a sample from an individual;  
(b) contacting the sample from the individual with a recombinant K39 repeat unit antigen comprising the amino acid sequence Leu Glu Gln Gln Leu Arg Xaa Ser Glu Xaa Arg Ala Ala Glu Leu Ala Ser Gln Leu Glu Xaa Thr Xaa Ala Ala Lys Xaa Ser Ala Glu Gln Asp Arg Glu Xaa Thr Arg Ala Xaa (SEQ ID NO:3), wherein Xaa at position 7 is Asp or Glu, at position 10 is Glu or Ala, at position 21 is Ala or Ser, at position 23 is Ala or Thr, at position 27 is Met or Ser, at position 35 is Asn or Ser, and at position 39 is Thr or Ala; and  
(c) detecting the presence of anti-Leishmania parasite antibodies in the sample which bind to the recombinant K39 repeat unit antigen.

5,411,866

# METHOD AND SYSTEM FOR DETERMINING BIOACTIVE SUBSTANCES

John H. T. Luong, Mount Royal; Keith B. Male, Pierrfonds, and Maurice V. Cattaneo, Outremont, all of Canada, assignors to National Research Council of Canada, Ottawa, Canada  
Filed Mar. 30, 1993, Ser. No. 39,998  
Int. Cl.<sup>6</sup> C12Q 1/54, 1/26, 1/00; C12M 1/40  
U.S. Cl. 435—14 7 Claims



1. A detection system for measuring glutamine in a liquid sample using enzymatic degradation of glutamine and amperometric detection of the resulting product or element, in the presence of compounds interfering with the measurement, the system comprising in combination:  
(a) an ion exchange means capable of at least partly removing from the sample passed therethrough the interfering compounds while leaving the measured glutamine therein by virtue of a difference in their respective electric charges,  
(b) immobilized enzymes glutaminase and glutamate oxidase for the enzymatic degradation of the measured glutamine, the enzymes being associated with the ion exchange means downstream thereof, and  
(c) a sensor capable of sensing a product or element resulting from the enzymatic degradation of said glutamine to produce a signal indicative of the concentration of glutamine in the sample.

5,411,867

# METHOD FOR DETERMINATION OF *E. COLI* IN WATER

George W. Chang, Berkeley, and Rosalind A. Lam, Saratoga, both of Calif., assignors to The Regents of the University of California, Oakland, Calif.  
Continuation of Ser. No. 887,471, May 22, 1992, abandoned, which is a continuation-in-part of Ser. No. 523,320, May 14, 1990, abandoned. This application Aug. 12, 1993, Ser. No. 91,528  
Int. Cl.<sup>6</sup> C12Q 1/34, 1/04, 1/10

U.S. Cl. 435—18 28 Claims  
28. A method for detecting coliform bacteria and *E. coli* in a water or food sample comprising a plurality of different bacteria, which method comprises steps:  
(a) forming an aqueous sample-medium mixture by contacting the sample with a medium comprising:  
(i) tryptophan;  
(ii) ortho-nitrophenyl- $\beta$ -D-galactopyranoside;  
(iii) a protein or peptide hydrolysate, wherein said hydrolysate is present at a concentration between 0.016 g/L and 20 g/L;  
(iv) trimethylamine-N-oxide;  
(b) incubating said mixture at an initial pH of between 6.0 and 6.4 and at first incubation temperature of 35° C. for 2 to 6 hours and then at a second incubation temperature of 44.5° C. for 2 to 46 hours;  
whereby enzymatic reduction of said trimethylamine-N-oxide causes the pH of said mixture to rise to from 6.8 to 7.4 during said incubating step; thereafter  
(c) determining the presence or absence of a yellow color in said mixture;  
(d) adding p-dimethylaminobenzaldehyde to said mixture; thereafter  
(e) determining the presence or absence of a red-purple color in said mixture;  
wherein the presence of said yellow color in said mixture indicates the presence of a coliform bacterium in said sample and the presence of said red-purple color in said mixture indicates the presence of *E. coli* in said sample.

5,411,868

# DIAGNOSTIC AND PREMONITORING USES OF A 65 KDA TUMOR-ASSOCIATED PROTEIN IN COMPANION AND DOMESTIC ANIMAL MALIGNANCY

Margaret Hannausk-Walaszek, and Lezlee Coghlan, both of Bastrop, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.  
Continuation of Ser. No. 460,045, Jan. 2, 1990, which is a continuation-in-part of Ser. No. 426,408, Oct. 24, 1989. This application Feb. 23, 1993, Ser. No. 21,738  
The portion of the term of this patent subsequent to May 10, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> G01N 33/543, 33/531, 33/53; C07K 15/06  
U.S. Cl. 435—7.23 11 Claims

1. (amended) A method of monitoring the status of cancer treatment in a mammal, including the steps of:  
providing a sample of biological material from mammal which has undergone therapy for cancer;  
contacting the sample with antibodies specific for an immunogen of a 65 kDa tumor-associated protein, the immunogen being prepared by the process comprising the steps of:  
(a) collecting from plasma, tumor cytosol or ascitic fluid of carcinoma-bearing mammals or from culture medium in which cancer cells were grown, the protein fraction which is precipitated from plasma, tumor, cytosol or ascitic fluid between 30% and 60% saturation of an aqueous ammonium sulfate solution or from culture medium at 90% saturation of an aqueous ammonium sulfate solution, respectively;  
(b) chromatographing the protein fraction on a molecular sieving column and collecting a protein fraction having a molecular weight in the range of about 50 to 90 kilodaltons;  
(c) applying the collected chromatographed protein frac-

tion to a high performance liquid chromatography (HPLC) phenyl hydrophobic interaction column and allowing protein to bind to the column;  
(d) eluting the bound protein on the phenyl hydrophobic interaction column with a buffer comprising about 16% ammonium sulfate;  
(e) collecting the first distinct protein peak eluted from the column;  
(f) electrophoresing the collected protein;  
(g) transblotting the electrophoresed protein to a nitro-cellulose sheet; and  
(h) cutting from the nitro-cellulose sheet that portion which contains a band of protein corresponding to about 65 kDa; and  
determining the presence of an immunological reaction product formed by reaction between the antibodies and the 65 kDa tumor-associated protein, the presence of an immunological reaction product being indicative of the presence of cancer.

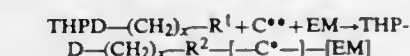
5,411,869

IMMUNOLOGICAL ANALOGS FOR CAPTAN  
Jeanne A. Itak, Hamilton, N.J.; James R. Fleeker, Fargo, N. Dak., and David P. Herzog, Warrington, Pa., assignors to Ohmicron Corporation, Newtown, Pa.  
Division of Ser. No. 830,594, Feb. 4, 1992, abandoned. This application Feb. 25, 1993, Ser. No. 22,283  
Int. Cl.<sup>6</sup> G01N 33/553

U.S. Cl. 435—7.93 8 Claims  
2. In a process for calibrating a standard for the immunoassay of captan by incubation of a labeled captan standard, a captan standard and an antibody to captan, including the steps of forming an antigen-antibody complex, detecting this complex, and correlating the amount of complex formed with the concentration of The standard, the improvement wherein the captan standard is



wherein THPD is cis-1,2,3,6-tetrahydrophthalimido, x is an integer from 1 to 10, and R<sup>1</sup> is selected from the group consisting of —COOH, —NH<sub>2</sub>, —NO<sub>2</sub>, —SH and —OH, wherein the labeled captan standard is the product of the reaction



wherein  
EM is an enzyme,  
C<sup>\*\*</sup> is the residue remaining from a coupling agent C<sup>\*\*</sup>, which is capable of coupling a member of the group R<sup>1</sup> of THPD-(CH<sub>2</sub>)<sub>x</sub>-R<sup>1</sup> to enzyme EM, and  
R<sup>2</sup> is the residue remaining when R<sup>1</sup> is coupled to EM with coupling agent C<sup>\*\*</sup>.

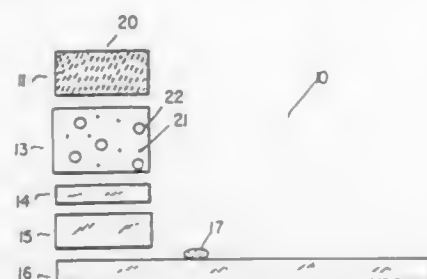
5,411,870

PROCESS AND APPARATUS FOR DIRECT DETERMINATION OF LOW DENSITY LIPOPROTEIN  
Wal T. Law, Sewell, and Gerhard Ertingshausen, Princeton, both of N.J., assignors to ActiMed Laboratories, Inc., Burlington, N.J.

Continuation-in-part of Ser. No. 806,183, Dec. 13, 1991, Pat. No. 5,286,626. This application Dec. 11, 1992, Ser. No. 987,962  
The portion of the term of this patent subsequent to Feb. 15, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C12Q 1/60, 1/00; G01N 33/92, 31/00  
U.S. Cl. 435—11 9 Claims  
1. A process for direct determination of low density lipoprotein in a fluid sample comprising:  
adding a polyanionic compound, a salt of a divalent metal, and an insoluble nucleating agent to the fluid sample to form clusters of low density lipoprotein;

adding enzymes to consume high density lipoprotein and very low density lipoprotein selectively from said fluid sample; and



resolubilizing the low density lipoprotein and determining the amount of low density lipoprotein in the sample.

5,411,871

# METHOD FOR IDENTIFYING TISSUE PLASMINOGEN ACTIVATOR HAVING ZYMOGENIC OR FIBRIN SPECIFIC PROPERTIES

Stephen Anderson, Princeton, N.J.; William F. Bennett, San Mateo, Calif.; David Botstein, Belmont, Calif.; Deborah L. Higgins, San Mateo, Calif.; Nicholas F. Paoni, Moraga, Calif.; and Mark J. Zoller, San Francisco, Calif., assignors to Genentech, Inc., South San Francisco, Calif.

Continuation of Ser. No. 88,451, Jul. 6, 1993, which is a continuation of Ser. No. 770,510, Oct. 3, 1991, Pat. No. 5,262,170, which is a continuation of Ser. No. 384,608, Jul. 24, 1989, Pat. No. 5,108,901, which is a continuation-in-part of Ser. No. 240,856, Sep. 2, 1988, abandoned. This application Jan. 7, 1994, Ser. No. 179,059

Int. Cl.<sup>6</sup> C12N 15/58; C12Q 1/37

U.S. Cl. 435—23

10 Claims

1. A method for identifying tissue plasminogen activator (t-PA) variants having one or more of the following properties: zymogenic character, fibrin specificity, or plasma clot specificity as compared to the corresponding wild-type t-PA, comprising

- substituting at least one amino acid within the range of amino acids 303-304 of the amino acid sequence of the corresponding wild-type human t-PA, and
- screening the resultant t-PA variant for one or more of the following biological properties: zymogenic character, fibrin specificity, and plasma clot specificity.

5,411,872

# METHOD FOR TRANSFECTED CELL SELECTION

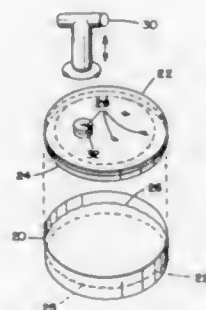
Ayyappan K. Rajasekaran, New York, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Sep. 8, 1993, Ser. No. 118,046

Int. Cl.<sup>6</sup> C12Q 1/24, 1/04; C12N 5/00

U.S. Cl. 435—30

3 Claims



1. A method for selecting transfected cell clones from a growth medium, said growth medium contained within a transparent container which includes a surface that is covered

with a transparent, thin sheet which is at least partially adhered to said surface, said method comprising the steps of:

- transfecting a cell population with foreign DNA;
- growing said cell population transfected in step (a) on said transparent sheet within said growth medium and in said transparent container;
- adding a drug to said transfected cell population to kill untransfected cells;
- growing remaining transfected cell clones on said transparent sheet within a growth medium and in said transparent container;
- excising an area of said transparent sheet that contains a transfected cell clone; and
- placing said transfected cell clone carried by the area of the transparent sheet excised in step (e) in a cell growth medium.

5,411,873

# PROCESS FOR PRODUCING HETEROLOGOUS POLYPEPTIDES

Robin M. Adams, San Francisco; Scott D. Power, San Bruno; David B. Powers, San Francisco; James A. Wells, San Mateo, and Daniel G. Yansura, Pacifica, all of Calif., assignors to Genencor, Inc., South San Francisco, Calif.

Continuation of Ser. No. 488,433, Feb. 27, 1990, abandoned, which is a continuation of Ser. No. 846,627, Apr. 1, 1986, abandoned, which is a continuation-in-part of Ser. No. 614,612, May 29, 1984, Pat. No. 4,760,025. This application Aug. 11, 1992, Ser. No. 928,697

Int. Cl.<sup>6</sup> C12P 21/02

U.S. Cl. 435—69.1

22 Claims

1. A process for producing a subtilisin which has an amino acid substitution in one or more amino acid residues of the catalytic triad of wild-type subtilisin and is incapable of auto-proteolytic maturation, wherein said process comprises:

- expressing a prepro form of said subtilisin in a host cell and transporting it to the surface of said host cell, wherein said host cell is incapable of releasing said subtilisin from the surface of said host cell, and wherein the prosequence of said prepro form of said subtilisin comprises the prosequence of a subtilisin; and
- contacting said host cell with an enzymatically active subtilisin to cleave said subtilisin from said prosequence to release said subtilisin from the surface of said host cell.

5,411,874

# PRODUCTION OF HYALURONIC ACID

Derek C. Ellwood, Cumbria; Charles G. T. Evans, Salisbury; Geoffrey M. Dunn, Livingston; Neil McInnes, Peebles; Richard G. Yeo, and Keith J. Smith, both of Edinburgh, all of United Kingdom, assignors to Fermentech Medical Limited, Edinburgh, Scotland

PCT No. PCT/GB91/01927, § 371 Date Jul. 6, 1993, § 102(e) Date Jul. 6, 1993, PCT Pub. No. WO92/08799, PCT Pub. Date May 29, 1992

PCT Filed Nov. 4, 1991, Ser. No. 50,046

Claims priority, application United Kingdom, Nov. 7, 1990, 9024223

Int. Cl.<sup>6</sup> C12P 19/26, 19/04; C12N 1/20

U.S. Cl. 435—84

14 Claims

1. A process for the production of hyaluronic acid comprising:

- culturing *Streptococcus equi* by fermentation in a nutrient medium containing:
  - an assimilable source of carbon;
  - a source of nitrogen;
  - sources of phosphorus, sodium, potassium, magnesium, iron, zinc and manganese;
  - sources of growth factors; and
  - a source of sulphur,

characterized in that the process comprises continuous fermentation of *Streptococcus equi* in a chemostat culture which is

maintained at a pH of from 6.0 to 7.0, a dilution rate of 0.05 to 0.12 h<sup>-1</sup>, and a dissolved oxygen tension of less than 1% saturation to produce a biomass containing hyaluronic acid, and

- recovering said hyaluronic acid from said biomass.

5,411,875

# METHOD FOR RETRIEVAL OF UNKNOWN FLANKING DNA SEQUENCE

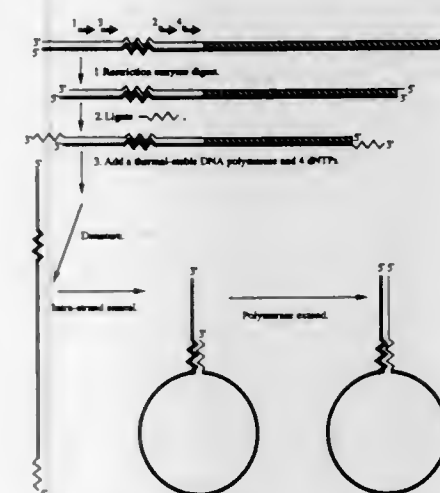
Douglas H. Jones, Iowa City, Iowa, assignor to University of Iowa Research Foundation, Oakdale, Iowa

Filed Nov. 1, 1991, Ser. No. 786,902

Int. Cl.<sup>6</sup> C12P 19/34

U.S. Cl. 435—91.2

52 Claims



1. A method for amplification of an unknown DNA sequence that flanks a known DNA sequence, comprising the steps of:

- digesting a double-stranded DNA fragment with a restriction enzyme to yield 5' nucleotide overhang sequences, wherein said DNA fragment comprises a region of known DNA sequence and a region of unknown flanking DNA sequence to be amplified;
- ligating a 5' phosphorylated single-stranded oligonucleotide whose 5' end is complementary to the cohesive ends generated in step (a) of said double-stranded DNA fragment to yield 3' nucleotide overhang sequences complementary to a sequence portion within said known sequence region of said DNA fragment, wherein said sequence portion is an annealing site for said 3' nucleotide overhang sequences;
- denaturing said 3' end-modified DNA fragment to produce single-stranded fragments containing said 3' nucleotide overhang sequences;
- intra-strand annealing of a 3' nucleotide overhang sequence to said annealing site within said known sequence region of a single-stranded fragment, wherein said single-stranded fragment is a fragment containing said annealing site located upstream (5') to said unknown flanking sequence region, to form a single-stranded loop, or panhandle structure, with a double-stranded portion of an otherwise single-stranded handle, of a panhandle structure;
- extending the recessed 3' end of said double-stranded portion of said handle with DNA polymerase to elongate said double-stranded portion of said handle of said panhandle structure; and
- performing a polymerase chain reaction using a set of oligonucleotide primers including a primer 1 annealing to said extended 3' end strand of step (e) of said double-stranded panhandle structure and homologous to a known sequence region upstream (5') from said annealing site for said 3' nucleotide overhang sequences and a primer 2 homologous to a known sequence region both upstream

5,411,876

# USE OF GREASE OR WAX IN THE POLYMERASE CHAIN REACTION

Will Bloch, El Cerrito; Jonathan Raymond, Oakland, and Alan R. Read, Alameda, all of Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 481,501, Feb. 16, 1990, abandoned.

This application May 27, 1992, Ser. No. 890,300

Int. Cl.<sup>6</sup> C12P 19/34

U.S. Cl. 435—91.2

27 Claims

1. A PCR reaction tube comprising a container, an aqueous mixture of PCR reagents, said mixture having contact with the atmosphere, and an amount of grease or wax sufficient in mass to separate completely the aqueous mixture from the atmosphere above it, when said grease or wax is liquified.

5,411,877

# OPTICALLY ACTIVE COMPOUNDING HAVING PLURAL CHIRAL CENTERS AND PRODUCTION THEREOF

Kazutoshi Miyazawa, and Naoyuki Yoshida, both of Ichihara, Japan, assignors to Chisso Corporation, Osaka, Japan

Division of Ser. No. 35,889, Mar. 23, 1993, Pat. No. 5,348,870, which is a division of Ser. No. 612,146, Nov. 13, 1990, abandoned. This application Jun. 8, 1994, Ser. No. 257,666

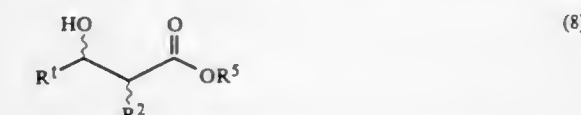
Claims priority, application Japan, Nov. 14, 1989, 1-295816

Int. Cl.<sup>6</sup> C12P 17/06

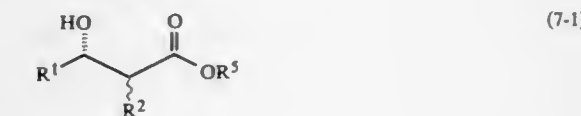
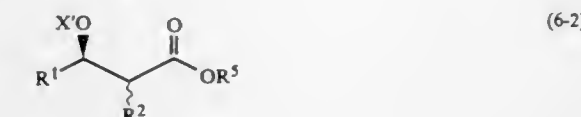
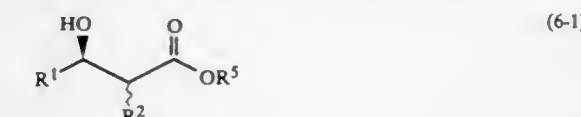
U.S. Cl. 435—125

2 Claims

1. A process for producing an optically active compound having plural chiral centers which comprises causing an ester to act on a 2-substituted-3-hydroxy-carboxylic acid ester as a racemate of the general formula (8)



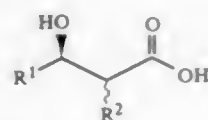
in the presence of a hydrolase under substantially anhydrous conditions to effect transesterification, resolving the resultant product into a compound of formula (6-1) and a compound of formula (7-2), or a compound of formula (6-2) and a compound of formula (7-1).



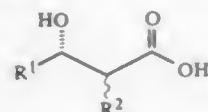
subjecting the compound obtained by resolution to hydroly-



sis, or alcoholysis plus hydrolysis to form optically active 2-substituted-3-hydroxycarboxylic acid of the following formulas



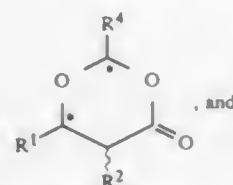
and



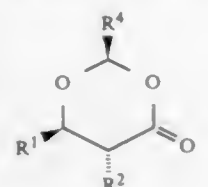
reacting said acid with an aldehyde of the formula



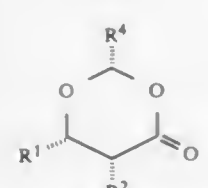
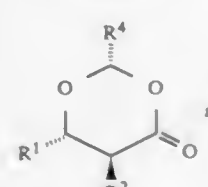
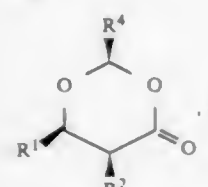
to give an optically active 2,6-cis-2,5,6-substituted-1,3-dioxan-4-one of the general formula (9)



recrystallizing the product of formula (9) to produce the following 2,5,6-substituted-1,3-dioxan-4-one compound having absolute configuration,



and



where formula 9 represents a mixture of compounds of formula 12 and formula 14, or a mixture of compounds of formula 13

and formula 15;  $R^1$ ,  $R^2$  and  $R^4$  are independently selected from the group consisting of alkyl, alkenyl and alkynyl having 1-40 carbon atoms, in which the carbon chain may contain at least one member selected from the group consisting of halogen, cyano, oxygen, nitrogen, silicon, sulfur, benzene ring, cyclohexane ring, pyridine ring, pyrimidine ring, pyridazine ring, pyrazine ring, dioxane ring, bicyclo-octane ring, and said rings with at least one substituent;  $R^5$  is selected from the group consisting of alkyl, alkenyl and alkynyl having 1-40 carbon atoms;  $X'$  is alkanoyl having 2-40 carbon atoms; and the carbon atoms with a \* sign are each an asymmetric carbon.

5,411,878

Patent Not Issued For This Number

5,411,879

#### FATTY ACYL REDUCTASES

(9) Michael R. Pollard, Madison, Wis., and James G. Metz, Woodland, Calif., assignors to Calgene Inc., Davis, Calif.  
Continuation of Ser. No. 659,975, Feb. 22, 1991, abandoned.  
This application Nov. 8, 1993, Ser. No. 149,007  
Int. Cl.<sup>6</sup> C12N 9/02, 9/04; C07K 3/00

U.S. Cl. 435—190

9 Claims

1. A jojoba embryo protein preparation comprising solubilized fatty acyl-CoA reductase wherein said reductase catalyzes the reduction of a fatty acyl substrate to the corresponding alcohol and wherein said reductase has an estimated molecular weight of less than about 90 kD by size exclusion chromatography.

5,411,880

#### D-KETOHEXOSE 3-EPIMERASE, AND ITS PREPARATION

Ken Izumori, Kagawa, and Keiji Tsusaki, Okayama, both of Japan, assignors to Kabushiki Kaisha Hayashibara Seitbutsu Kagaku Kenkyujo, Okayama, Japan  
Filed Oct. 7, 1993, Ser. No. 132,853

(14) Claims priority, application Japan, Oct. 8, 1992, 4-312580  
Int. Cl.<sup>6</sup> C12N 9/90

U.S. Cl. 435—233

3 Claims

1. A purified D-ketohexose 3-epimerase having the following physicochemical properties:

- (a) Activity  
Epimerizing free D-ketohexose at its C-3 position into its corresponding epimeric D-ketohexose; and epimerizing free D- and L- ketopentoses at their C-3 positions into their corresponding epimeric D- and L- ketopentoses;
- (b) Optimum pH  
A pH of 7-10;
- (c) pH stability  
Stable at a pH of 5-10;
- (d) Optimum temperatures  
Around 60° C.;
- (e) Thermal stability  
Stable at a temperature of 50° C.;
- (f) Ultraviolet absorption spectrum  
Exhibiting an absorption peak at a wavelength of 275-280 nm;
- (g) Molecular weight  
41,000±3,000 daltons on gel filtration chromatography; and
- (h) Isoelectric point  
4.3±0.2.

5,411,881

#### CHICKEN-SPECIFIC IMMUNOGLOBULIN G-PRODUCING HYBRIDOMA

Haruo Matsuda, Hiroshima; Shigeyuki Nishinaka, and Takashi Suzuki, both of Tokyo, all of Japan, assignors to NKK Corporation, Tokyo, Japan

PCT No. PCT/JP91/00923, § 371 Date May 5, 1992, § 102(e) Date May 5, 1992, PCT Pub. No. WO92/01043, PCT Pub. Date Jan. 23, 1992

PCT Filed Jul. 10, 1991, Ser. No. 838,775

Claims priority, application Japan, Jul. 10, 1990, 2-182174

Int. Cl.<sup>6</sup> C12N 5/00, 15/00, 5/16, 15/06

U.S. Cl. 435—240.27

7 Claims

1. The hybrid cell HU/Ch 22-4 (FERM BP-3474).

5,411,882

#### CYTOKINE WHICH MEDIATES INFLAMMATION

Karel G. Odink, Rheinfelden, Switzerland; Lajos Tarcsay, Grenzach-Wyhlen, Germany; Josef Brügggen, Riehen, Switzerland; Walter Wiesendanger, Aesch, Switzerland; Nico Cerletti, Bottmingen, Switzerland; Clemens Sorg, Münster, Germany; Christiane DeWolf-Peters, Bekkevoort, and Jan Delabie, Marke, both of Belgium, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 546,344, Jun. 29, 1990, abandoned.

This application Dec. 20, 1991, Ser. No. 811,893

Claims priority, application United Kingdom, Jul. 5, 1989, 8915414

Int. Cl.<sup>6</sup> C12N 5/00, 1/20, 15/00; C07H 15/12

U.S. Cl. 435—240.2

12 Claims

1. A DNA molecule encoding the polypeptide MRP-160 which is the molecule represented by the nucleotide sequence set forth in FIG. 1 (A-J), a genomic DNA molecule encoding the amino acid sequence set forth in FIG. 1(A-J), or a fragment of said molecule selected from the group of epitopic fragments consisting of nucleotides 2765-4414 of FIG. 1(A-J), nucleotides 617-664 of FIG. 1(A-J), nucleotides 3698-3745 of FIG. 1(A-J), nucleotides 3857-3898 of FIG. 1(A-J), and nucleotides 4358-4414 of FIG. 1(A-J).

5,411,883

#### PROLIFERATED NEURON PROGENITOR CELL PRODUCT AND PROCESS

Barbara D. Boss, Alameda, and Dennis H. Spector, Oakland, both of Calif., assignors to Somatix Therapy Corporation, Alameda, Calif.

Continuation of Ser. No. 631,617, Dec. 21, 1990, abandoned, which is a continuation-in-part of Ser. No. 456,757, Dec. 26, 1989, abandoned. This application Aug. 12, 1992, Ser. No. 928,676

Int. Cl.<sup>6</sup> C12N 5/00

U.S. Cl. 435—240.2

16 Claims

1. A culture consisting essentially of mammalian ventral mesencephalon neuron progenitor cells or mammalian ventral mesencephalon neuron progenitor cells and their differentiated counterparts, said neuron progenitor cells being taken from a region of the brain that produces dopaminergic cells at a stage of development when the region of the brain has no dopamine-containing cells, said neuron progenitor cells in said culture having undergone at least one round of cell division after dissociation of tissue used to establish said culture, said progenitor cells in said culture being capable of seven to eight rounds of cell division after dissociation of said tissue.

5,411,884

#### MONOCLONAL ANTIBODY L53 WHICH RECOGNIZES A HUMAN TUMOR-ASSOCIATED ANTIGEN

Ingegerd Hellstrom; Karl E. Hellstrom, both of Seattle; Hans Marquardt, Mercer Island, and Janet Johnston, Seattle, all of Wash., assignors to Oncogen Limited Partnership

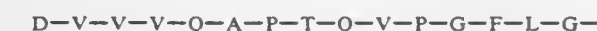
Continuation of Ser. No. 533,371, Jun. 5, 1990, abandoned. This application Feb. 18, 1993, Ser. No. 20,256

Int. Cl.<sup>6</sup> C12N 5/20, 15/02; C07K 15/28

U.S. Cl. 435—240.27

13 Claims

1. A monoclonal antibody, the antigen-binding region of which (a) binds to a cell surface glycoprotein antigen associated with human tumor cells having a molecular weight of 70,000 to about 75,000 daltons as determined by polyacrylamide gel electrophoresis, and having an amino terminal amino acid sequence as follows:



in which X represents an unidentified amino acid, and (b) competitively inhibits the immunospecific binding of the monoclonal antibody L53 produced by hybridoma ATCC No. HB10348 as deposited with the ATCC, to its target antigen wherein said monoclonal antibody is selected from the group consisting of a murine monoclonal antibody and a chimeric monoclonal antibody having a murine antigen-binding region and a human Fc region.

5,411,885

#### METHODS FOR TISSUE EMBEDDING AND TISSUE CULTURING

Gerard Marx, New York, N.Y., assignor to New York Blood Center, Inc., New York, N.Y.

Filed Dec. 17, 1993, Ser. No. 168,683

Int. Cl.<sup>6</sup> C12N 5/00; A61K 37/547, 37/553, 37/00

U.S. Cl. 435—240.2

9 Claims

1. A method for embedding tissue in vitro comprising the steps of:

- (a) preparing a solution of fibrinogen, wherein the amount of fibrinogen ranges from 2 to 100 mg/ml;
- (b) contacting a tissue with the solution of step (a);
- (c) adding to the solution of step (b) a Ca(II) compound in an amount ranging from 1 to 30 mM and a fibrinogen-activating enzyme in an amount ranging from 0.5 to 200 U/ml; and
- (d) allowing the solution contacting the tissue to stand until the solution forms a gel and embeds the tissue.

5,411,886

**XYLOSE ISOMERASE GENE OF *THERMUS AQUATICUS***  
Shigezo Uda, 1-24-3, Vezono-cho, Meito-ku, Nagoya-shi;  
Keoji Sakaguchi, Tokyo; Hideo Yamagata, and Koen Dekker,  
both of Nagoya, all of Japan, assignors to Nihon Shokuhin  
Kako Co., Ltd., Tokyo and Shigezo Uda, Aichi, both of  
Japan

Continuation of Ser. No. 783,150, Oct. 28, 1991, abandoned.

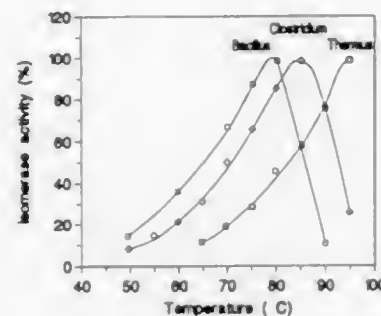
This application Aug. 27, 1993, Ser. No. 112,630

Claims priority, application Japan, Oct. 29, 1990, 2/291067;  
Mar. 7, 1991, 3/067967; Jun. 24, 1991, 3/178698

Int. Cl. C12N 1/19, 1/21, 15/61, 15/63

U.S. Cl. 435-252.3

5 Claims



□ Bacillus  
○ Clostridium  
△ Thermus

1. An isolated gene from *Thermus aquaticus* consisting of the nucleotide sequence set forth in SEQ ID NO: 1 or consisting of a DNA sequence encoding the xylose isomerase having the amino acid sequence set forth in SEQ ID NO:2.

5,411,887

**METHOD FOR THE PRODUCTION OF COLLAGEN:  
COLLAGEN PRODUCED THROUGH THE METHOD  
AND USE OF COLLAGEN**

Einar Sjölander, Hisings Kärna, Sweden, assignor to Collagen  
Casing Einar Sjölander AB, Sweden

PCT No. PCT/SE92/00192, § 371 Date Oct. 5, 1993, § 102(e)  
Date Oct. 5, 1993, PCT Pub. No. WO92/17503, PCT Pub.  
Date Oct. 15, 1992

PCT Filed Mar. 26, 1992, Ser. No. 133,083

Claims priority, application Sweden, Apr. 5, 1991, 9100999

Int. Cl. C07K 1/14, 14/435, 14/78; A61K 38/39

U.S. Cl. 435-273 14 Claims

1. A process for separating collagen from animal tissue comprising the steps of:

immersing said collagen containing tissue in a mixture of frozen and liquid water, said mixture having a pH which is maintained at about 5.5;

heating said collagen and water mixture to a temperature no higher than about 42°C while regulating the pH of said collagen and water mixture such that it does not exceed about 11;

adding to said heated collagen and water mixture an amount of at least one proteolytic enzyme which is sufficient to hydrolyze protein in said tissue, other than said collagen; hydrolyzing said protein;

adjusting the pH of the collagen and water mixture to about 5.5; and

separating said collagen from said mixture.

5,411,888

**IN VITRO TEST FOR DERMAL CORROSIVE  
PROPERTIES**

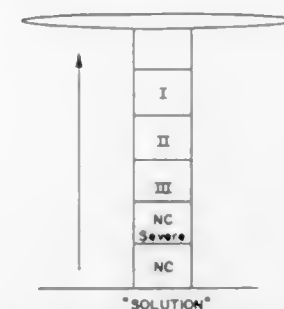
Virginia C. Gordon, Huntington Beach; Sohella Mirhashemi,  
Laguna Niguel, and Rosalind W. Wei, Costa Mesa, all of  
Calif., assignors to Invitro International, Irvine, Calif.

Continuation-in-part of Ser. No. 921,023, Jul. 27, 1992,  
abandoned. This application Jul. 27, 1993, Ser. No. 98,735

Int. Cl. G01N 13/00, 21/29

U.S. Cl. 436-5

6 Claims



1. A method for determining the degree of corrosive toxicity of a test substance to human skin or membrane which method comprises the steps of

(a) applying the test substance to a test stick, the stick having been prepared by applying a series of layers to an uncoated test stick said series comprising  
a first layer comprising a material which is weakly resistant to corrosive materials;

a second layer immediately under the first layer comprising a first dye;

a third layer underlying the second layer and comprising a more corrosive-resistant material than the first layer;

a fourth layer immediately under the third layer comprising a second dye;

a fifth layer underlying the fourth layer comprising the most corrosive resistant substance of the three corrosive-resistant layers;

a sixth layer, immediately under the fifth layer comprising a third dye; and wherein said first, third, and fifth layers are made from a proteinaceous material mimicking human skin or membrane;

(b) leaving the test substance in contact with the test stick for more than 1 second;

(c) observing the color of the test stick where the test substance was applied; and

(d) correlating the color of the test stick with the degree of corrosivity of the test substance.

5,411,889

**REGULATING WATER TREATMENT AGENT DOSAGE  
BASED ON OPERATIONAL SYSTEM STRESSES**

John E. Hoots, St. Charles, and Martin R. Godfrey, Elburn,  
both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Feb. 14, 1994, Ser. No. 194,679

Int. Cl. G01N 21/64

U.S. Cl. 436-6

16 Claims

1. A method of regulating the in-system concentration of a water treatment agent in an industrial fluid system comprising: adding an inert tracer to an industrial fluid system, the inert tracer being added in known proportion to a target specie also being added to said industrial fluid system, wherein the system consumption of the target specie is effected by the water treatment agent;

drawing a sample of fluid from said industrial fluid system; monitoring the target-specie by analysis of said sample to determine at least one characteristic that can be correlated to an in-system concentration of said target-specie;

monitoring said inert tracer by analysis of said sample to determine the in-system concentration of said inert tracer; determining the system consumption of the target specie from the measured in-system concentration of the target specie and the inert tracer; and  
regulating the in-system concentration of the water treatment agent in the fluid system based on the system consumption of the target specie.

5,411,890

**METHOD FOR MEASURING ATMOSPHERIC  
CORROSION**

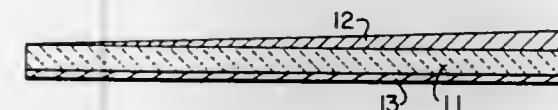
Ladislav Falat, College Park, Md., assignor to Westvaco Corporation, New York, N.Y.

Filed Jun. 23, 1994, Ser. No. 264,715

Int. Cl. G01N 17/00

U.S. Cl. 436-6

7 Claims



6. The method of determining the rate of corrosivity of a selected atmosphere comprising:

(a) preparing a corrosion test element having a layer of corrodable material applied to one surface of a transparent substrate having two opposed surfaces to form a reflective surface and a security coating applied to the opposite surface of said substrate, said layer of corrodable material having a thickness which varies along a length thereof and wherein the security coating is reflective to radiant energy in the visible region of the electromagnetic spectrum and transparent to radiant energy in adjacent parts of the electromagnetic spectrum;

(b) placing the test element in the atmosphere to be tested;

(c) observing the rate at which the reflective surface is reduced in size over time; and

(d) determining a corrosivity rate for the atmosphere in Angstroms per year.

5,411,891

**REAGENT COMPOSITIONS AND THEIR USE IN THE  
IDENTIFICATION AND CHARACTERIZATION OF  
RETICULOCYTES IN WHOLE BLOOD**

Sophie S. Fan, Millwood; Daniel Ben-David, Shrub Oak, both of N.Y.; Gregory M. Colella, Bloomfield, N.J.; Albert Cupo, Scarsdale, N.Y.; Gena Fischer, Harrington Park, N.J., and Leonard Ornstein, White Plains, N.Y., assignors to Miles Inc., Tarrytown and Mount Sinai School of Medicine of the City University of New York, New York, both of N.Y.

Division of Ser. No. 802,585, Dec. 5, 1991, Pat. No. 5,360,739.

This application Oct. 15, 1992, Ser. No. 961,582

Int. Cl. G01N 33/48

U.S. Cl. 436-63

11 Claims

1. A reagent composition for the characterization by flow cytometry of reticulocytes in a whole blood sample comprising reticulocytes and erythrocytes, said reagent composition comprising an effective amount of a red-excitable fluorescent, organic cationic dye compound for staining ribonucleic acid within said reticulocytes, an amount of a zwitterionic surfactant sufficient to effect isovolumetric sphering of said reticulocytes and erythrocytes without precipitating said dye; and a buffer solution for maintaining the pH of said composition at about 6 to about 9.

5,411,892

**METHOD AND APPARATUS FOR CARBOHYDRATE  
ANALYSIS**

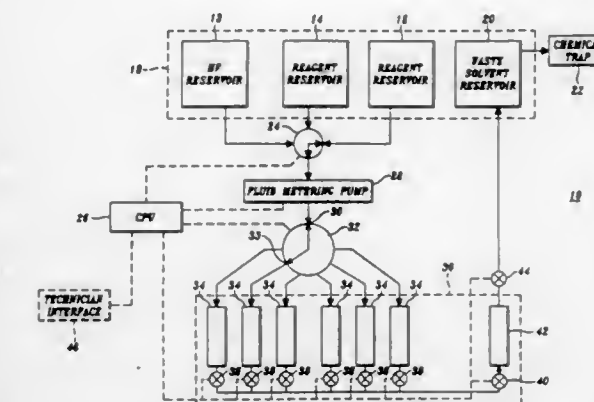
Brian A. Bergamaschi, Seattle, Wash., assignor to University of Washington, Seattle, Wash.

Filed Aug. 13, 1993, Ser. No. 106,060

Int. Cl. G01N 33/66

U.S. Cl. 436-94

25 Claims



1. A method for analyzing polymeric carbohydrates, comprising the steps of:

(a) solvolysing a polymeric carbohydrate in anhydrous hydrogen fluoride to yield a solution of at least partially depolymerized carbohydrate;

(b) terminating the solvolysis by reacting the solution of at least partially depolymerized carbohydrate in the hydrogen fluoride with a carboxylic acid anhydride to form acylated carbohydrates; and

(c) analyzing the qualitative or quantitative identity of the acylated carbohydrates as an indication of the type and structure of the carbohydrates present prior to solvolysis.

5,411,893

**DRY SLIDE FOR DIAGNOSTIC TESTS**

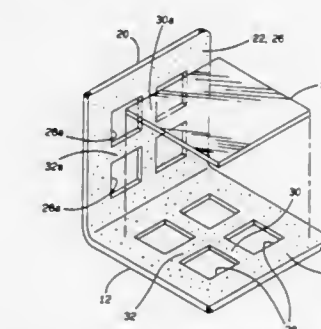
Ruth F. Eden; Jerry W. Smith, both of Ann Arbor; Amy T. Meszaros, Adrian, and Leon F. Strenkoski, Dexter, all of Mich., assignors to Difco Laboratories, Ann Arbor, Mich.

Filed Mar. 15, 1993, Ser. No. 31,660

Int. Cl. G01N 33/16, 33/48

U.S. Cl. 436-165

34 Claims



16. A method of making a test slide for performing diagnostic tests for detecting the presence of cells, their enzymes, metabolites and other cellular derivatives, said method comprising:

forming a support strip being dimensionally stable and having a top surface and a bottom surface,  
preparing a coating comprising a carrier and a diagnostic reagent being dry and stable, water soluble, and capable of rehydration,

bonding the coating by its own properties to the support strip,





5,411,900

# METHOD OF FABRICATING A MONOLITHIC INTEGRATED CIRCUIT WITH AT LEAST ONE CMOS FIELD-EFFECT TRANSISTOR AND ONE NPN BIPOLAR TRANSISTOR

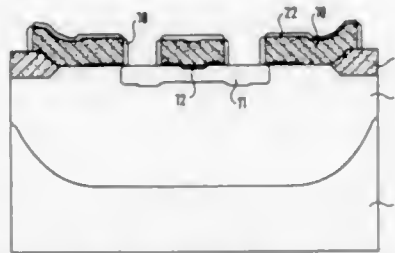
Juergen Nagel, Freiburg, Germany, assignor to Deutsche ITT Industries, GmbH, Freiburg, Germany  
Filed Mar. 4, 1994, Ser. No. 206,066

Claims priority, application Germany, Mar. 5, 1993, 43 06 932.0; Jan. 11, 1993, 43 19 437.0

Int. Cl.<sup>6</sup> H01L 21/265

U.S. Cl. 437—34

16 Claims



1. A method of fabricating a monolithic integrated circuit having at least one pair of CMOS field-effect transistors (FETs) and at least one planar bipolar transistor, said integrated circuit having a silicon substrate of a first conductivity type, said method comprising the steps of:

- introducing first and second wells of a second conductivity type onto a surface of said substrate, said first well forming a first well region for bipolar transistor, said second well forming a second well region for a first FET;
- covering said surface of said substrate with a first oxide layer of a first given thickness in areas where active transistor regions are to be formed, and covering said surface with a second oxide layer of a second given thickness greater than said first given thickness in areas where said active transistor regions are not to be formed;
- depositing a first polysilicon layer having a first predetermined thickness on said first and second oxide layers;
- forming a first opening in said first polysilicon layer above said first well region by removing said first polysilicon layer therewithin, thereby exposing said oxide layer within said first opening;
- implanting boron through said first oxide layer in said first opening to form a base region of said bipolar transistor in said first well;
- forming second, third and fourth openings in said first oxide layer, thereby exposing said first well region, wherein said second opening is located within said first opening in said first polysilicon layer, said third and fourth openings being disposed outside of said first opening and adjacent to said second oxide layer, said second opening defining an emitter region, said third opening defining a first collector region and said fourth opening defining a second collector region;

- depositing a second polysilicon layer of a second predetermined thickness greater than said first predetermined thickness, patterned and doped to form a first gate for said first FET, a second gate for a second FET in a second FET region, and to cover said bipolar transistor region, such that first and second transition areas of exposed said first oxide layer disposed between said base region and said first and second collector regions remain exposed, and such that overlapping regions are formed between respective of each said transition regions and said collector regions, said overlapping regions comprising said second polysilicon layer on said first polysilicon layer on said first oxide layer;
- implanting boron into said first and second well regions;
- removing said exposed first oxide layer in said transition areas;

forming oxide spacers between said overlapping regions and said base region;

implanting boron to form a plurality of base contact regions in said first well region and a source and drain region within said second well region;

selectively doping to said first conductivity type said emitter region, said collector regions, and said second FET region to form a source and drain of said second FET; and

producing a titanium-silicide layer on remaining exposed silicon and polysilicon.

5,411,901

# METHOD OF MAKING HIGH VOLTAGE TRANSISTOR

Wayne B. Grabowski, Mountain View, and Vladimir Rumennik, Los Altos, both of Calif., assignors to Power Integrations, Inc., Mountain View, Calif.

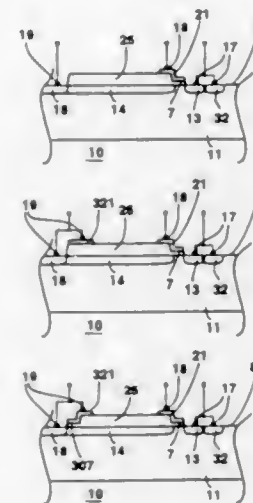
Division of Ser. No. 12,045, Feb. 1, 1993, Pat. No. 5,274,259.

This application Oct. 25, 1993, Ser. No. 140,938

Int. Cl.<sup>6</sup> H01L 21/265

U.S. Cl. 437—40

12 Claims



1. A method for constructing a semiconducting device comprising the steps of:

- (a) forming an extended drain region of a first conductivity type within a first region of a second conductivity type, the first region being contained within a substrate of the first conductivity type;
- (b) forming an insulating region over the extended drain region;
- (c) forming a gate region on a surface of the substrate, a first side of the gate region being adjacent to a first end of the extended drain region;
- (d) forming a drain region of the first conductivity type in contact with a second end of the extended drain region; and,
- (e) forming a source region on a second side of the gate region.

5,411,902

# PROCESS FOR IMPROVING GALLIUM ARSENIDE FIELD EFFECT TRANSISTOR PERFORMANCE USING AN ALUMINUM ARSENIDE OR AN ALUMINUM GALLIUM ARSENIDE BUFFER LAYER

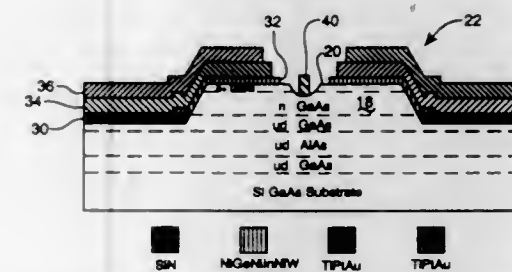
Hyong Y. Lee, Fairborn; Belinda Johnson, Dayton; Rocky Reston, Beavercreek, all of Ohio; Chris Ito, Colorado Springs, Colo.; Gerald Trombley, Centerville, and Charles Havasy, Beavercreek, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 6, 1994, Ser. No. 254,722

Int. Cl.<sup>6</sup> H01L 21/338

U.S. Cl. 437—40

4 Claims



1. A method of forming a gallium arsenide field effect transistor, comprising the steps of:

- forming a device by MBE on a semi-insulating GaAs substrate, comprising an undoped GaAs buffer layer about 1000 Å thick, an undoped AlAs barrier layer about 2500 Å thick, an undoped GaAs buffer layer about 1000 Å thick, an n type GaAs channel layer about 2000 Å thick, and an n+ type GaAs ohmic layer about 400 Å thick, the AlAs barrier layer being grown at a temperature about 90° C. above that of the GaAs layers to improve the quality of the AlAs layer and the subsequent channel layers;
- defining mesas on said device using a light field mesa mask, the mesas being isolated using a solution of HF:H<sub>2</sub>O<sub>2</sub>:H<sub>2</sub>O (1:1:8) as an etchant;
- then, depositing about 1000 Å of SiN by plasma enhanced chemical vapor deposition (PECVD), the SiN layer serving to isolate subsequent metal layers from the GaAs substrate;
- next, removing the SiN covering the mesa to facilitate the deposition of source, drain, and gate metals;
- patterning the ohmic source and drain metal using a lift-off technique which comprises Ni, Ge, Ni, In, Ni, W layers about 50, 25, 50, 50, 50, and 450 Å thick, respectively;
- depositing NiGeNi layers by electron-beam evaporation, the InNi layers being deposited by thermal evaporation, and the W layer being deposited by RF magnetron sputtering;
- rapid thermal annealing the ohmic contact in an 90/10% Ar/H<sub>2</sub> gas at 625° C. for 5 seconds, wherein these refractory ohmic contacts provide additional reliability at elevated temperatures;
- then, depositing Ti, Pt, Au, 300, 1000, and 3000 Å thick, respectively, as gate metal to create a Schottky barrier in the channel which is recessed in a prior step using a solution consisting of H<sub>3</sub>PO<sub>4</sub>:H<sub>2</sub>O<sub>2</sub>:H<sub>2</sub>O (1:2:100) as the etchant, wherein the gate metal also improves the overall conductivity.

5,411,903

# SELF-ALIGNED COMPLEMENTARY HFETS

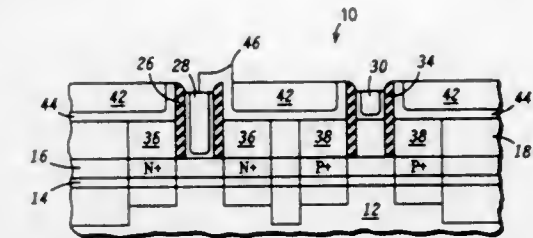
Schyi-yi Wu, Mesa; Jenn-Hwa Huang, Gilbert, both of Ariz., and Faivel Pintchovski, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 589,354, Sep. 28, 1990, abandoned. This application Jun. 1, 1993, Ser. No. 69,648

Int. Cl.<sup>6</sup> H01L 21/265

U.S. Cl. 437—41

8 Claims



1. A method of fabricating HFETs comprising the steps of: providing a semi-insulating substrate;
- forming a low bandgap III-V semiconductor layer on said substrate;
- forming a first dielectric layer of a first dielectric material on said III-V layer;
- forming first and second openings extending through said first dielectric layer and said III-V layer;
- forming dielectric spacers of a second dielectric material on the sidewalls of said first and second openings;
- forming gates in said first and second openings;
- removing said first dielectric layer;
- forming source and drain regions in said III-V layer and said substrate adjacent to each of said gates, the formation being self-aligned to said gates;
- forming isolation regions between devices; and
- forming ohmic contacts, all of a like material, to said source and drain regions, the formation being self-aligned to said gates.

5,411,904

# PROCESS FOR FABRICATING NONVOLATILE RANDOM ACCESS MEMORY HAVING A TUNNEL OXIDE FILM

Yoshimitsu Yamauchi, Yamatokoriyama; Kenichi Tanaka, Nara; Keizo Sakiyama, Kashihara, and Akitsu Ayukawa, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

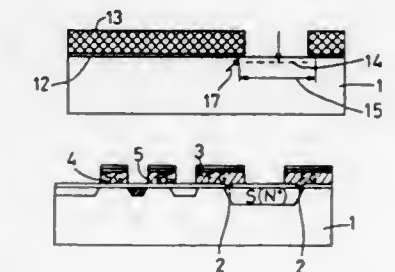
Division of Ser. No. 793,567, Nov. 18, 1991, abandoned. This application Apr. 25, 1994, Ser. No. 231,740

Claims priority, application Japan, Nov. 19, 1990, 2-313445; Nov. 30, 1990, 2-339759

Int. Cl.<sup>6</sup> H01L 21/266

U.S. Cl. 437—43

2 Claims



1. A process for fabricating a nonvolatile memory having a floating gate with a tunnel oxide film, said tunnel oxide film being formed by the steps of:

- (a) forming an ion implantation mask on a semiconductor substrate having a gate oxide film, said mask having an ion implantation window;



- (b) implanting an impurity ion in a surface layer of said substrate through said window and said gate oxide film;
- (c) etching away said gate oxide film from said substrate through said window to form an opened substrate exposed portion having a larger width than said window;
- (d) oxidizing said substrate exposed portion to form a selectively oxidized layer having an oxidized central portion corresponding to the ion-implanted region and a substantially unoxidized peripheral portion;
- (e) heat-treating said substrate to form an impurity-diffused region; and
- (f) oxidizing the unoxidized portion of said selectively oxidized layer after cleaning said unoxidized peripheral portion.

5,411,905

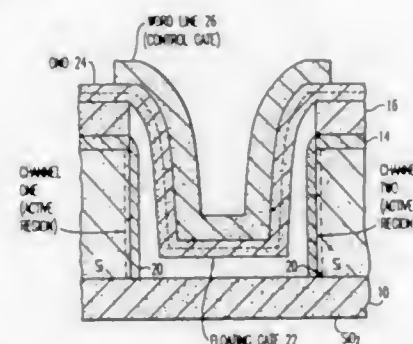
# METHOD OF MAKING TRENCH EEPROM STRUCTURE ON SOI WITH DUAL CHANNELS

Alexandre Acovic, Mohegan Lake, and Ben S. Wu, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 29, 1994, Ser. No. 236,752  
Int. Cl.<sup>6</sup> H01L 21/8247

U.S. Cl. 437—43

5 Claims



1. A fabrication method for a trench memory structure including memory cells having dual channels comprising the steps of:

- step 1, depositing a layer of silicon dioxide on silicon-on-insulator substrate consisting of a layer of silicon on a layer of insulation;
- step 2, depositing a layer of nitride on said layer of silicon dioxide deposited in step 1;
- step 3, removing selected portions and leaving remaining portions of said nitride and silicon dioxide layers on said silicon-on-insulator substrate;
- step 4, removing selected portions and leaving remaining portions of said silicon layer of said silicon-on-insulator substrate to form trenches having four vertical sides between said remaining portions of said silicon layer in the areas where said selected portions of said nitride and silicon dioxide layers were removed in step 3, said remaining portions of said silicon layer providing source and drain regions on either of two opposite sides of said trenches;
- step 5, growing oxide on the four vertical sides of said remaining portions of silicon layer to provide gate oxide regions;
- step 6, forming a doped polysilicon layer over said trenches to provide floating gate regions in said trenches;
- step 7, depositing a layer of insulating material over said doped polysilicon layer and a layer of polysilicon over said layer of insulating material to provide wordline driver regions.

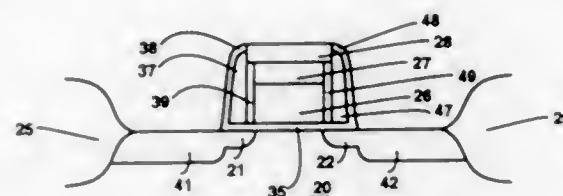
## METHOD OF FABRICATING AUXILIARY GATE LIGHTLY DOPED DRAIN (AGLDD) STRUCTURE WITH DIELECTRIC SIDEWALLS

Eric A. Johnson, San Jose; Ying T. Loh, Saratoga, and Chung S. Wang, Fremont, all of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.

Continuation of Ser. No. 786,193, Oct. 31, 1991, abandoned.  
This application Jul. 30, 1993, Ser. No. 100,638  
Int. Cl.<sup>6</sup> H01L 21/336

U.S. Cl. 437—44

12 Claims



1. A method for producing an auxiliary gate lightly doped drain structure, the method comprising the steps of:

- (a) placing on a substrate between two source/drain regions, a polysilicon gate region, the polysilicon gate region being placed on top of a dielectric layer, the polysilicon gate region forming part of a gate region;
- (b) placing on the polysilicon gate region, a metal-silicide gate region, the metal-silicide gate region forming part of the gate region;
- (c) performing a first implant of atoms into the substrate on two sides of the gate region;
- (d) forming sidewalls on the two sides of the gate region, first portions of the sidewalls immediately adjacent to the metal-silicide gate region acting as insulators and second portions of the sidewalls immediately adjacent to the polysilicon gate region acting as resistors;
- (e) forming auxiliary gate regions over the sidewalls formed in step (d), so that an auxiliary resistance from the gate region to the auxiliary gate regions is increased by decreasing a height of the polysilicon gate region and so that the auxiliary resistance from the gate region to the auxiliary gate regions is decreased by increasing a height of the polysilicon gate region, wherein the auxiliary gate regions consist of semiconducting material;
- (f) forming dielectric regions over the auxiliary gate regions formed in step (e); and
- (g) performing a second implant of atoms into the substrate on two sides of the dielectric regions formed in step (f); wherein in step (f) the dielectric regions are formed at a thickness sufficient to at least partially shield the auxiliary gate regions from the second implant of atoms performed in step (g).

5,411,907

# CAPPING FREE METAL SILICIDE INTEGRATED PROCESS

Chue-San Yoo, Taipei; Jyh-Min Tsaur, Miao Li; Chong-Shi Chen, Chang-Hua, and Pin-Nan Tseng, Taoyuan, all of Taiwan, Prov. of China, assignors to Taiwan Semiconductor Manufacturing Company, Hsinchu, Taiwan, Prov. of China

Filed Sep. 1, 1992, Ser. No. 937,735  
Int. Cl.<sup>6</sup> H01L 21/265

U.S. Cl. 437—44

19 Claims

1. The method for fabricating a lightly doped source/drain MOS FET integrated circuit device with a peeling-free metal silicide gate electrode comprising:

- forming a pattern of gate electrode structures upon a semiconductor substrate which structures each includes a gate oxide, a polysilicon layer, and metal silicide layer;

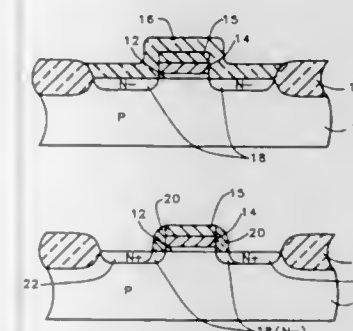
forming a pattern of lightly doped regions in said substrate by ion implantation using said structures as the mask;

blanket depositing a dielectric layer over the surfaces of the structure at a temperature of between about 650° to 750° C.;

driving in said pattern of lightly doped regions while maintaining said dielectric layer over said metal silicide layer by annealing at a temperature of more than about 920° C.;

etching the said blanket layer to form a dielectric spacer structure upon the sidewalls of each of said gate electrode structures and over the adjacent portions of said substrate, and to remove the said dielectric layer from the top surfaces of said metal silicide layer;

forming heavily doped regions in said substrate by ion implantation using the said gate electrode structures with



spacer structures as the mask to produce said lightly doped drain under said spacer structure of an MOS FET device and wherein the surface of said substrate being ion implanted is without using an ion protection covering layer;

forming a passivation layer over the said structures which passivation layer includes a layer of silicon oxide and a layer of a dielectric layer;

driving in said heavily doped regions by annealing at a temperature of more than about 900° C. while maintaining said passivation layer over said metal silicide; and

forming openings in said passivation layer and making electrical connecting structures thereover to electrically connect the said gate electrode structures and source/drain elements to form said integrated circuit device.

5,411,908

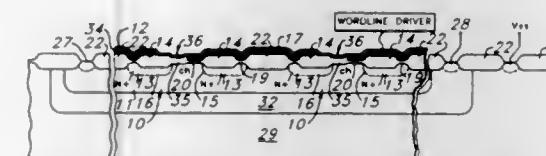
# FLASH EEPROM ARRAY WITH P-TANK INSULATED FROM SUBSTRATE BY DEEP N-TANK

Giovanni Santin, S. Rufina; Giovanni Naso, Frosinone, both of Italy; Sebastiano D'Arrigo, Cannes, France, and Michael C. Smayling, Missouri City, Tex., assignors to Texas Instrument Incorporated, Dallas, Tex.

Filed May 28, 1992, Ser. No. 890,577  
Int. Cl.<sup>6</sup> H01L 21/70

U.S. Cl. 437—52

8 Claims



1. A method for making a nonvolatile, floating-gate memory in a face of a semiconductor body of a first conductivity-type, comprising the steps of:

- forming a first diffusion region in said semiconductor body, said first diffusion region doped to have a second conductivity-type opposite said first conductivity-type;
- forming a second diffusion region in said first diffusion re-

gion and in said semiconductor body, said second diffusion region doped to have said first conductivity-type;

forming an array of floating-gate memory cells in and on said second diffusion region; and

forming wordline driver circuitry in and on said semiconductor body outside of said first diffusion region.

5,411,909

# METHOD OF FORMING A PLANAR THIN FILM TRANSISTOR

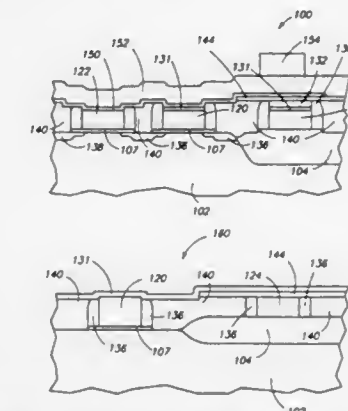
Monte Manning, Kuna, and Charles Dennison, Boise, both of Id., assignors to Micron Technology, Inc., Boise, Id.

Continuation-in-part of Ser. No. 21,274, Feb. 22, 1993. This application Jun. 23, 1993, Ser. No. 82,401

Int. Cl.<sup>6</sup> H01L 21/70, 27/00

U.S. Cl. 437—52

10 Claims



1. A method of forming a static random access memory cell on a semiconductor substrate, the method comprising:
- forming a field isolation region on a semiconductor substrate;
- forming first and second adjacent transistor gate conductors over the semiconductor substrate adjacent the field isolation region;
- forming a memory array word line over the field isolation region adjacent one of the transistor gate conductors;
- implanting the semiconductor substrate to create first and second driver transistors in the semiconductor substrate, the first and second driver transistors being gated by the first and second transistor gate conductors, respectively;
- applying an etch stop layer over the transistor gate conductors and the adjacent word line;
- providing an insulating filler over the semiconductor substrate adjacent the transistor gate conductors and the word line to an elevation at least as high as the top surfaces of the transistor gate conductors and the adjacent word line;
- leveling the insulating filler, the step of leveling being selective to the etch stop layer;
- removing the etch stop layer from over the transistor gate conductors;
- leaving the etch stop layer over the word line;
- forming a first planar semiconductor thin film over the first transistor gate conductor, over the adjacent insulating filler, and at least partially over the word line;
- doping the first planar semiconductor thin film to form source and drain regions of a first thin film load transistor which is gated from beneath by the first transistor gate conductor;
- the etch stop layer being positioned between the word line and the overlying first planar semiconductor thin film;
- the etch stop layer reducing capacitive coupling between the word line and the overlying first planar semiconductor thin film during operation of the static random access memory cell.

5,411,910

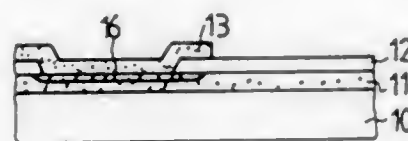
# METHOD FOR IMPROVING CHARACTERISTICS OF PARASITIC PN DIODES IN STATIC RANDOM ACCESS MEMORY CELL

Kwang S. Son, Seongnam, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Kyongkido, Rep. of Korea  
Filed Aug. 30, 1993, Ser. No. 114,203  
Claims priority, application Rep. of Korea, Sep. 3, 1992, 1992-16042

Int. Cl.<sup>6</sup> H01L 21/70, 27/00

U.S. Cl. 437—52

3 Claims



1. A method of improving characteristics of parasitic pn diodes formed in an SRAM, comprising the steps of: forming a gate polysilicon layer into which ion impurities are introduced, said gate polysilicon layer connecting a PMOS transistor to an NMOS transistor and metal wire; forming an insulating layer on said gate polysilicon layer; forming an opening portion in said insulating layer; implanting impurities having a conductivity type opposite to that of said gate polysilicon layer in said opening; forming a channel polysilicon layer of said PMOS transistor on said insulating layer including in said opening region; and annealing said gate polysilicon layer.

5,411,911

# PROCESS FOR PRODUCING DRAM SEMICONDUCTOR DEVICES

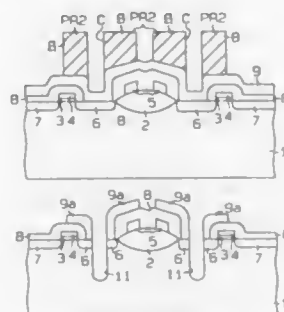
Norihiro Ikeda, Ogaki, and Kaoru Taketa, Gifu, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan  
Filed Oct. 25, 1993, Ser. No. 143,850

Claims priority, application Japan, Oct. 27, 1992, 4-312842; Oct. 4, 1993, 5-248095

Int. Cl.<sup>6</sup> H01L 21/70

U.S. Cl. 437—52

16 Claims



1. A process for producing a semiconductor device, comprising: a first step of forming a field oxide layer on a first conductivity type substrate to define an active region; a second step of forming gate electrodes, second conductivity type source regions and drain regions on said active region, and simultaneously forming word lines on said field oxide layer, followed by formation of an insulating layer on said substrate; a third step of forming contact holes through said insulating layer so as to partly expose the source regions; a fourth step of forming a polysilicon layer on the portions of the source regions exposed in the third step and on the entire surface of said insulating layer;

a fifth step of forming a mask pattern on said polysilicon layer; a sixth step of simultaneously forming a storage electrode pattern and trenches through said first conductivity type substrate at the source regions by etching said polysilicon layer using said mask pattern as an etching mask; a seventh step of doping the storage electrode pattern and the inner wall surfaces of said trenches with a second conductivity type impurity; an eighth step of forming a dielectric layer on said impurity-doped storage electrode pattern and doped inner wall surfaces of said trenches; and a ninth step of forming an opposite electrode on said dielectric layer.

5,411,912

# METHOD OF MAKING A SEMICONDUCTOR DEVICE COMPRISING LOWER AND UPPER SILICON LAYERS AS CAPACITOR ELECTRODES

Mitsuru Sakamoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

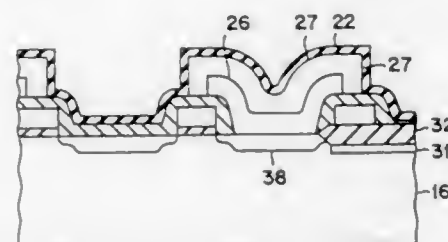
Division of Ser. No. 738,426, Jul. 31, 1991, Pat. No. 5,336,922. This application Mar. 8, 1994, Ser. No. 207,200

Claims priority, application Japan, Jul. 31, 1990, 2-203314; Oct. 26, 1990, 2-288906

Int. Cl.<sup>6</sup> H01L 21/70

U.S. Cl. 437—60

9 Claims



1. A method of manufacturing a semiconductor device comprising the steps of forming an insulator film on a substrate surface of a semiconductor substrate, selectively forming openings through said insulator film, patterning patterned electrodes on said insulator film with said patterned electrodes made to fill said openings, respectively, and forming charge storage capacitors by using said patterned electrodes, respectively, wherein said patterning step comprises the steps of patterning lower silicon layers on said insulator film with said lower silicon layers made to fill said openings, respectively, and with each of said lower silicon layers made to have layer side and top surfaces, and growing upper silicon layers by selectively growing polysilicon on the layer side and top surfaces of said lower silicon layers.

5,411,913

# SIMPLE PLANARIZED TRENCH ISOLATION AND FIELD OXIDE FORMATION USING POLY-SILICON

Rashid Bashir, Santa Clara; Francois Hebert, Sunnyvale, and Datong Chen, Fremont, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Apr. 29, 1994, Ser. No. 236,387

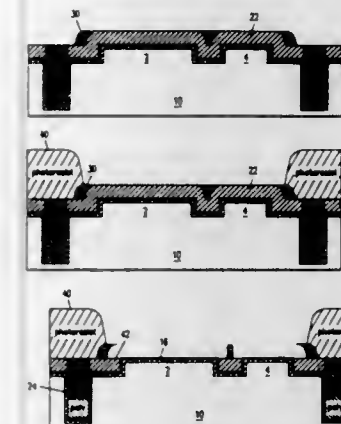
Int. Cl.<sup>6</sup> H01L 21/311, 21/76

U.S. Cl. 437—67

21 Claims

13. A method for electrically isolating individual active device regions of an integrated circuit fabricated in a semiconductor substrate, the method comprising: defining active and inactive regions on the substrate; etching the substrate in the inactive regions to form an etched portion of the substrate; depositing a layer of pad oxide on the resulting substrate; depositing a layer of nitride on the pad oxide layer;

depositing a first oxide layer over the substrate, wherein the first oxide layer covers the previously deposited pad oxide and nitride layers and forms a step as a result of the etching step; depositing a layer of poly-silicon over the substrate, wherein the poly-silicon covers the first oxide layer;



etching the poly-silicon layer to remove the poly-silicon from the inactive regions and to form a poly-silicon spacer on the sides of the step; and aligning a mask over the etched portions of the substrate and having an edge over the poly-silicon spacer such that a portion of the first oxide layer overlying the active regions is exposed.

5,411,914

# III-V BASED INTEGRATED CIRCUITS HAVING LOW TEMPERATURE GROWTH BUFFER OR PASSIVATION LAYERS

Chang-Lee Chen, Sudbury; Leonard J. Mahoney, East Walpole; Michael J. Manfra, Tewksbury; Frank W. Smith, Waltham, and Arthur R. Calawa, Wellesley, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

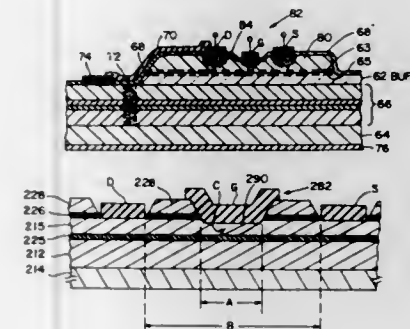
Continuation-in-part of Ser. No. 313,133, Feb. 17, 1989, Pat. No. 5,168,069, which is a continuation-in-part of Ser. No. 157,806, Feb. 19, 1988, Pat. No. 4,952,527. This application May 15, 1992, Ser. No. 884,651

The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.

Int. Cl.<sup>6</sup> H01L 21/203

U.S. Cl. 437—107

22 Claims



1. A method of making an intermediate layer for semiconductor devices comprising the steps of: a) forming said layer of group III-V material by lattice matched growth of Group III and Group V species on group III-V material at a growth temperature below about 450° C.; b) subjecting said layer to a heat treatment at a temperature above said growth temperature in an ambient containing the more volatile of said group III-V species to introduce

an excess of the more volatile of said specie into said layer; and c) minimizing out diffusion of said more volatile of said group III-V specie from said layer.

5,411,915

# METHOD OF MANUFACTURING A SINGLE CRYSTAL LAYERS

Hiroki Hamada; Shoji Honda; Masayuki Shono, and Takao Yamaguchi, all of Osaka, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

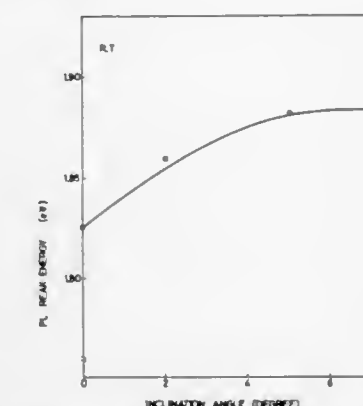
Division of Ser. No. 896,386, Jun. 10, 1992, Pat. No. 5,264,389, which is a division of Ser. No. 664,866, Apr. 11, 1991, Pat. No. 5,146,466, which is a continuation of Ser. No. 412,786, Sep. 26, 1989, Pat. No. 5,016,252. This application Oct. 8, 1993, Ser. No. 134,293

Claims priority, application Japan, Sep. 29, 1988, 63-245148; Mar. 20, 1989, 1-68784; Mar. 31, 1989, 1-83107

Int. Cl.<sup>6</sup> H01L 21/20

U.S. Cl. 437—129

9 Claims



1. A method of growing a crystal layer of a compound semiconductor, comprising the steps of: preparing a GaAs substrate having a surface inclined by at least about 5° from a {100} plane of said substrate in a <011> direction, and epitaxially growing a crystal layer of one selected from a group consisting of a GaInP system and an AlGaInP system on said surface to reduce the density of crystal defects of the grown crystal layer and provide a higher photoluminescence peak energy as compared with a crystal layer grown on a {100} plane of a GaAs substrate.

5,411,916

# METHOD FOR PATTERNING WIRINGS OF SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Masahiro Abe, Yokohama; Yasukazu Mase, Fujisawa, and Tomie Yamamoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 808,744, Dec. 17, 1991, abandoned, which is a division of Ser. No. 609,601, Nov. 6, 1990, Pat. No. 5,126,819. This application Mar. 18, 1993, Ser. No. 77,946

Claims priority, application Japan, Nov. 10, 1989, 1-293490

Int. Cl.<sup>6</sup> H01L 21/60

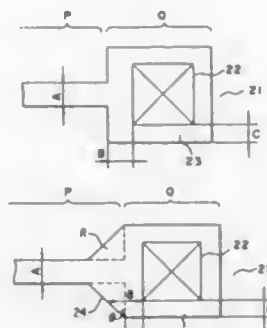
U.S. Cl. 437—189

20 Claims

1. A method for patterning wirings, the method comprising the steps of: forming a connection hole in a semiconductor substrate so as to be rectangular in shape when viewed from above the semiconductor substrate and to have a plurality of sides; forming on a surface of the semiconductor substrate a conductive layer thinner in a first portion along the sidewalls of said connection hole than in a second portion alongside said connection hole; and patterning the conductive layer to form first and second wiring sections, such that:



- (a) the first wiring section is rectangular in shape when viewed from above the semiconductor substrate and has first to fourth sides, each of which is parallel to one of the plurality of sides of the connection hole,
- (b) a first distance, between the first side of the first wiring section and one of the plurality of sides of the connection hole which is closest to the first side is greater than a second distance, between one of the second to fourth sides of the first wiring section and one of the plurality of sides



- of the connection hole which is closest to the respective one of the second to fourth sides, and
- (c) the second wiring section has an end portion connected to the first side of the first wiring section and has a width narrower than a length of the first side of the first wiring section,

the patterning providing that the first distance is greater than a minimum width by an amount assuring a desired yield in the presence of the expected distribution of patterning errors.

5,411,917

# **ELECTRICALLY PROGRAMMABLE ANTIFUSE INCORPORATING DIELECTRIC AND AMORPHOUS SILICON INTERLAYER**

Abdul R. Forouhi, San Jose; John L. McCollum, Saratoga, and Shih-Oh Chen, Fremont, all of Calif., assignors to Actel Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 604,779, Oct. 26, 1990, Pat. No. 5,181,096, which is a continuation-in-part of Ser. No. 508,306, Apr. 12, 1990, Pat. No. 5,070,384. This application Jan. 19, 1993, Ser. No. 4,912

Int. Cl.<sup>6</sup> H01L 21/44

U.S. Cl. 437-195

21 Claims



1. A method for forming an electrically programmable, low impedance antifuse element on a semiconductor substrate comprising the steps of:

forming an insulating layer over active circuit regions on said substrate,

forming a first electrode over a selected portion of said insulating layer,

forming a first dielectric layer immediately above said first electrode,

forming an antifuse layer over said first dielectric layer,

forming a second dielectric layer immediately over said antifuse layer,

forming a second electrode over a selected portion of said second dielectric layer.

5,411,918

# **PROCESSING MICROCHIPS**

Edward A. Keible, Palo Alto, Calif., and Nicholas J. G. Smith, Cricklade, England, assignors to Raychem Limited, United Kingdom

PCT No. PCT/GB91/01172, § 371 Date Mar. 18, 1993, § 102(e) Date Mar. 18, 1993, PCT Pub. No. WO92/02038, PCT Pub. Date Feb. 6, 1992

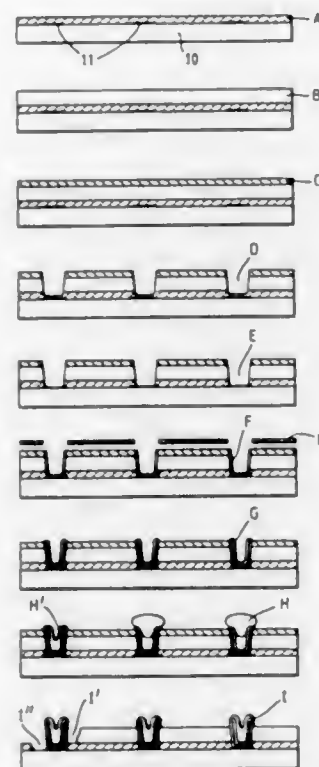
PCT Filed Jul. 16, 1991, Ser. No. 966,066

Claims priority, application United Kingdom, Jul. 18, 1990, 9015820

Int. Cl.<sup>6</sup> H01L 21/60

U.S. Cl. 437-209

21 Claims



1. A method of providing an integrated circuit semiconductor device with electrically conductive material projecting from the device bonding sites for bonding to a matching array of electrical contacts with which the device will be face-to-face in use, comprising:

(a) providing a said device having an electrically insulating layer at least 5 micrometers thick adhering to the surface of the device;

(b) perforating the insulating layer by U.V. laser ablation to provide at least one hole through the insulating layer communicating with a bonding site, the perforation being at least partly effected using an excimer laser;

(c) depositing electrically conductive material within the hole(s) to establish electrical connection to the bonding site(s); and

(d) excluding, or if necessary, removing, deposited conductive material from the main surface of the insulating layer, so as to provide the conductive material substantially only within the said hole(s);

wherein an indicator layer is provided at the interface of the said insulating layer and the device, said indicator layer comprising material which generates a detectable indication when directly acted upon by a first perforating operation, and the first perforating operation is moderated, or is replaced by a gentler second perforating operation, upon detection of the said indication.

5,411,919

# **SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME**

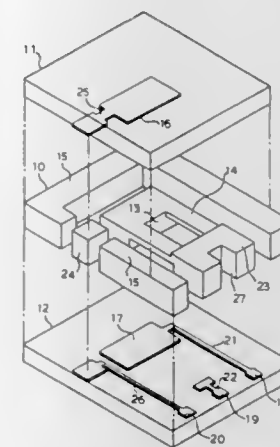
Hiroshi Inada, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 123,267, Sep. 20, 1993. This application Aug. 22, 1994, Ser. No. 293,300

Claims priority, application Japan, Nov. 17, 1992, 4-307156 Int. Cl.<sup>6</sup> H01L 21/60

U.S. Cl. 437-209

3 Claims



1. A method of manufacturing a semiconductor device which comprises first and second glass layers facing to each other, and a silicon layer positioned between said first and second glass layers in contact with the inner surfaces of said first and second glass layers, said first glass layer having an overhung portion protruded from an edge of said second glass layer, and said method comprising the steps of:

preparing first and second glass wafers and a silicon wafer, said silicon wafer being to form said silicon layer, said first and second glass wafers being to form said first and second glass layers, respectively, and said second glass wafer having an unnecessary portion which is to be cut off;

forming an anodic-bonding-inhibition-layer on the surface of said unnecessary portion of said second glass wafer;

overlapping said first and second glass wafers and said silicon wafer in such a manner that said silicon wafer is positioned between said first and second glass wafers and held in contact with said anodic-bonding-inhibition-layer;

electrostatically bonding said first and second glass wafers to said silicon wafer through an anodic bonding process after said overlapping step; and

cutting said second glass wafer along the configuration of said anodic-bonding-inhibition-layer after said electrostatically bonding step so as to separate said unnecessary portion of said second glass wafer together with said anodic-bonding-inhibition-layer from the rest of said second glass wafer and form said overhung portion of said first glass layer.

5,411,920

# **LEAD FRAME, SEMICONDUCTOR DEVICE, AND METHOD OF MANUFACTURING SAME**

Kazutaka Shibata, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

Division of Ser. No. 30,854, Mar. 12, 1993, Pat. No. 5,309,018. This application Apr. 12, 1994, Ser. No. 226,504

Claims priority, application Japan, Apr. 28, 1992, 4-110046 Int. Cl.<sup>6</sup> H01L 21/60

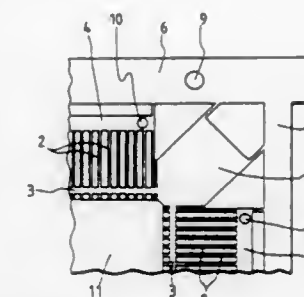
U.S. Cl. 437-217

1 Claim

1. A method of manufacturing a semiconductor device using a lead frame having a die pad and an array of surrounding leads arranged in parallel groups of selected width along sides of the die pad, the leads in each group being connected at their sides

by tie bars and at their ends by connecting bars which have positioning holes located within the width of each group of leads comprising the steps of:

- (a) bonding a semiconductor chip onto the die pad of the lead frame;
- (b) electrically connecting the semiconductor chip to the leads in the array surrounding the die pad;



- (c) sealingly covering the semiconductor chip and the electrically connected portions of the surrounding leads with a resin; and
- (d) cutting out the connecting tie bars using the positioning holes located within the width of each group of leads as a positioning reference.

5,411,921

# **SEMICONDUCTOR CHIP DIE BONDING USING A DOUBLE-SIDED ADHESIVE TAPE**

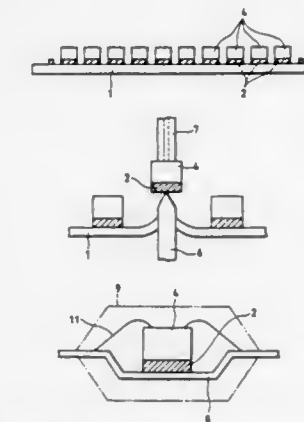
Atsuhito Negoro, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

Division of Ser. No. 13,754, Feb. 4, 1993. This application Mar. 28, 1994, Ser. No. 218,764

Claims priority, application Japan, Feb. 10, 1992, 4-023731 Int. Cl.<sup>6</sup> H01L 21/60

U.S. Cl. 437-217

5 Claims



1. A method of manufacturing a semiconductor device comprising the steps of:

providing a double-sided adhesive tape having first and second adhesive surfaces on opposite side S;

applying a semiconductor wafer to an expandable tape using the double-sided adhesive tape by adhering the semiconductor wafer to the first adhesive surface and adhering the expandable tape to the second adhesive surface;

dicing the semiconductor wafer into a plurality of semiconductor chips such that the double-sided adhesive tape is cut into tape sections together with the semiconductor wafer;

expanding the expandable tape to part the semiconductor chips from each other;

removing each of the plurality of semiconductor chips and

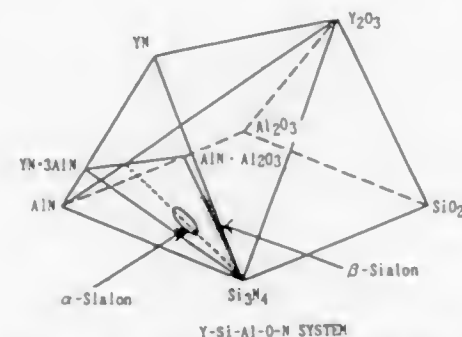
the double-sided adhesive tape section adhered thereto from the expandable tape; and bonding each of the plurality of semiconductor chips to a die pad of a lead frame by adhering the second adhesive surface of the double-sided adhesive tape section adhered to the semiconductor chip to the die pad.

**5,411,922**  
**NEUTRAL GRAY-GREEN LOW TRANSMITTANCE HEAT ABSORBING GLASS**  
James V. Jones, Toledo, Ohio, assignor to Ford Motor Company, Dearborn, Mich.  
Filed Dec. 27, 1993, Ser. No. 172,979  
Int. Cl.<sup>6</sup> C03C 3/087

U.S. Cl. 501—71 9 Claims  
1. A heat absorbing, neutral gray to green colored glass composition having a base glass composition comprising: 65 to 75% SiO<sub>2</sub>, 10 to 18% Na<sub>2</sub>O, 5 to 15% CaO, 3 to 5% MgO, 0 to 5% Al<sub>2</sub>O<sub>3</sub>, and 0 to 5% K<sub>2</sub>O and colorants consisting essentially of: 0.90 to 1.90 wt. % total iron oxide as Fe<sub>2</sub>O<sub>3</sub>; 0.002 to 0.025 wt. % cobalt oxide as Co; 0.0010 to 0.0060 wt. % selenium as Se; and 0.1 to 2.0% titanium oxide as TiO<sub>2</sub>, the glass at 4 mm. control thickness having light transmittance using illuminant A of 10.0% and 60.0%, ultra violet transmittance less than 25.0%, infra red transmittance is less than about 50.0%, dominant wavelength with illuminant C between 480 and 575.5 nanometers, and an excitation purity of less than 6.0%.

**5,411,923**  
**SILICON NITRIDE BASE SINTERED BODY**  
Junichiro Suzuki, Gifu, Japan, assignor to NGK Spark Plug Co., Ltd., Nagoya, Japan  
Continuation of Ser. No. 441,001, Nov. 22, 1989, abandoned.  
This application May 15, 1991, Ser. No. 701,640  
Claims priority, application Japan, Nov. 24, 1988, 63-297021  
Int. Cl.<sup>6</sup> C09B 35/58

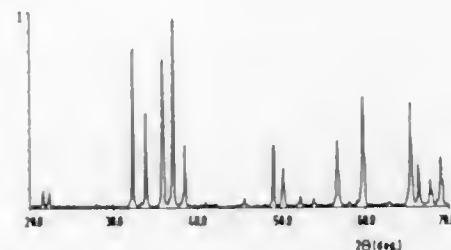
U.S. Cl. 501—97 22 Claims



1. A silicon nitride base sintered body comprising:  
a surface portion comprising  $\alpha$ -Sialon, or  $\alpha$ -Sialon and  $\beta$ -Sialon wherein  $\alpha$ -Sialon has a ratio of at least 0.6 relative to the sum of  $\alpha$ -Sialon and  $\beta$ -Sialon as measured by the X-ray peak intensity ratio method; and  
an inner portion comprising  $\beta$ -Sialon, or  $\beta$ -Sialon and  $\alpha$ -Sialon wherein  $\beta$ -Sialon has a ratio of at least 0.6 relative to the sum of  $\alpha$ -Sialon and  $\beta$ -Sialon.

**5,411,924**  
**CERAMIC BODY**  
Wilhelm A. Groen; Marcellinus J. Kraan, and Gijbertus De With, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Filed Feb. 15, 1994, Ser. No. 196,938  
Claims priority, application European Pat. Off., Feb. 18, 1993, 93200467

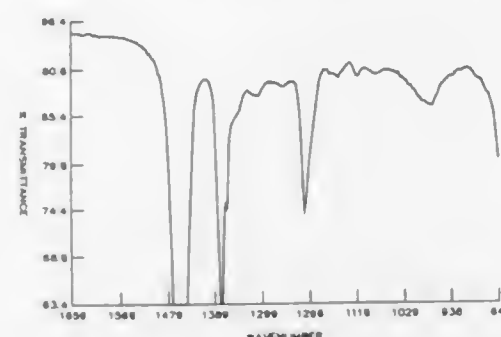
Int. Cl.<sup>6</sup> C04B 35/58 8 Claims  
U.S. Cl. 501—97



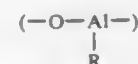
1. A ceramic body, comprising 20–30 at. % of magnesium, 20–30 at. % of silicon, 40–60 at. % of nitrogen and maximally 15 at. % of oxygen.

**5,411,925**  
**ORGANO-ALUMINOXY PRODUCT AND USE**  
Rolf L. Geerts; Scott E. Kufeld, both of Bartlesville, Okla., and Tara G. Hill, Fairfield, Ohio, assignors to Phillips Petroleum Company, Bartlesville, Okla.  
Filed Feb. 12, 1993, Ser. No. 17,207  
Int. Cl.<sup>6</sup> B01J 31/00

U.S. Cl. 502—117 28 Claims



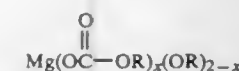
1. A process comprising contacting a solution of an organo aluminosilane having aluminosilane units of the formula



wherein R is hydrocarbyl with an organo boroxine to form a solid organo-aluminosilane product suitable for use as a cocatalyst for a metallocene for the polymerization of ethylene, characterized by the fact that the molar ratio of the boron in the organo boroxine to the aluminum in the aluminosilane units of the organo aluminosilane is in the range of about 1:20 to about 1:3.

**5,411,926**  
**OLEFIN POLYMERIZATION CATALYST**  
Stanley E. Wilson, Houston, and Richard A. Kemp, Stafford, both of Tex., assignors to Shell Oil Company, Houston, Tex.  
Continuation of Ser. No. 969,652, Oct. 30, 1992, abandoned.  
This application Feb. 8, 1994, Ser. No. 193,302  
Int. Cl.<sup>6</sup> B01J 31/00

U.S. Cl. 502—117 14 Claims  
1. An olefin polymerization procatalyst precursor used in producing a high activity catalyst obtained by contacting at an elevated temperature in the presence of an inert diluent:  
(a) a carbonated magnesium alkoxide of the general formula



wherein R is a hydrocarbyl group having up to 12 carbon atoms and x is a number from about 0.1 to about 2; and

(b) at least one halogenating compound selected from the group consisting of non-transition metal halogenated compounds which are aluminum trichloride and tin tetrachloride, and non-metallic halogenated compounds which are thionyl chloride, hydrogen chloride, oxalyl chloride, carbonyl chloride, boron trichloride, phosphorous oxychloride, and carbon tetrachloride.

**5,411,927**  
**PROCESS OF PREPARING COMPOSITE CATALYSTS FOR PRODUCTION OF SYNTHESIS GAS BY OXIDATIVE CONVERSION OF METHANE OR NATURAL GAS**

Vasant R. Choudhary; Vilas H. Rane, and Amarjeet M. R. Rajput, all of Maharashtra, India, assignors to Council of Scientific & Industrial Research, New Delhi, India  
Filed Aug. 14, 1992, Ser. No. 930,007  
Int. Cl.<sup>6</sup> B01J 37/14, 23/78, 23/10, 23/58

U.S. Cl. 502—302 5 Claims

1. A process for the preparation of composite catalysts comprising metal oxides, said catalysts used in the production of a gas comprising H<sub>2</sub> and CO by oxidative conversion of a gas comprising methane wherein said catalysts are represented by formula: T<sub>m</sub>N<sub>n</sub>R<sub>p</sub>O<sub>q</sub> wherein T is a transition element selected from Ni, Co, Ru, Rh, or a mixture of two or more thereof; m is T/R mole ratio, wherein m is from about 0.01 to about 100; N is an element selected from Mg, Ca, or a mixture thereof; n is N/R mole ratio, wherein n is from 0 to 100, R is a rare earth element selected from La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu or a mixture of two or more thereof; O is oxygen and p is number of oxygen atoms needed to fulfill the valence requirement of the elements in the composite catalyst,

wherein said process comprises:

(i) mixing thoroughly one or more finely ground transition metal compounds represented by formula: T<sub>a</sub>X<sub>a</sub> wherein T is a transition element selected from Ni, Co, Ru, Rh, or a mixture of two or more thereof, X is selected from NO<sub>3</sub>, CH<sub>3</sub>COO, OH, O, CO<sub>3</sub>, Cl or oxalate anions, and a is number of X required to fulfill the valence requirement of the transition element T, and one or more finely ground rare earth metal compound(s) represented by the formula: R<sub>b</sub>Y<sub>b</sub> wherein R is a rare earth element selected from La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu or a mixture of two or more thereof, Y is selected from selected from NO<sub>3</sub>, OH, O, CO<sub>3</sub>, CH<sub>3</sub>COO, Cl or oxalate anions, and b is number Y required to fulfill the valence requirement of the rare earth element and one or more finely ground non-transition metal compound(s) represented by formula: N<sub>c</sub>Y<sub>c</sub> wherein, N is selected from non-transition elements Mg, Ca, or a mixture thereof wherein the T/R

mole ratio is 0.01 to 100 and the N/R mole ratio is 0 to 100,  
(ii) heating the mixture to dryness at a temperature of about 80° to 250° C. in air;  
(iii) decomposing the dried mass containing catalyst precursors to their oxides at a temperature of about 400° to 1500° C. in presence of air, inert gas or under vacuum for about 0.1 to 50 hours;  
(iv) powdering the decomposed mass and forming catalyst pellets, extrudes and granules; and  
(v) calcining the catalyst at a temperature of about 500° to 1000° C. in presence of air, inert gas, CO<sub>2</sub> or a mixture thereof, or under vacuum for about 0.1 to 100 hours.

**5,411,928**  
**COMPOSITION FOR ABSORBING HYDROGEN**  
Leung K. Heung; George G. Wicks, both of Aiken, and Glenn L. Enz, N. Augusta, all of S.C., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed May 24, 1993, Ser. No. 70,740  
Int. Cl.<sup>6</sup> B01J 20/12

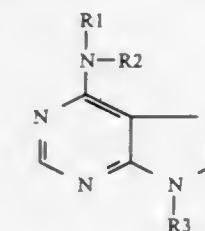
U.S. Cl. 502—407 20 Claims

1. A composition for absorbing hydrogen, said composition made by a process comprising the steps of:  
adding a hydrogen absorber to a sol;  
agitating said sol to disperse said hydrogen absorber throughout said sol;  
gelling said sol to form a gel with said hydrogen absorber dispersed throughout said gel; and  
solidifying said gel to form a porous glass matrix with said hydrogen absorber dispersed throughout.

**5,411,929**  
**THERMALLY-PROCESSABLE IMAGE RECORDING MATERIALS INCLUDING SUBSTITUTED PURINE COMPOUNDS**  
Maureen F. Ford, Cambridge; Donna J. Guarrera, Norwood; Mark R. Mischke, Arlington; Ramdas P. Pai, Roslindale, and John C. Warner, Norwood, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.  
Filed Jun. 30, 1994, Ser. No. 269,925  
Int. Cl.<sup>6</sup> B41M 5/30; C07D 311/00, 495/10; G03C 1/73

U.S. Cl. 503—210 13 Claims

1. A thermally-processable image recording material comprising a support carrying:  
a di- or triarylmethane thiolactone dye precursor;  
an organic silver salt;  
a binder; and  
a substituted purine compound represented by the formula:

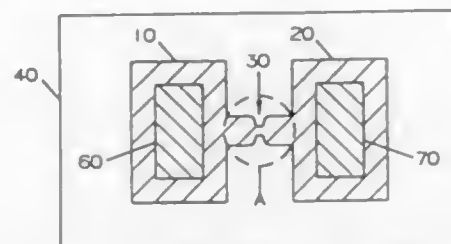


wherein R1, R2, and R3 are substituents which render said purine compound mobile within said image recording material, and provided at least one of R1, R2, and R3 is hydrogen.





- defining a bridge pattern of irradiated resist material atop the transition region;  
d) removing the irradiated resist material and exposing a bridge pattern of transition region material; and



- e) removing the exposed transition region material with an etchant and forming a bridge connecting said first and second regions, wherein said bridge has a length less than 100 nm.

5,411,938

## SEALED GLASS COATING OF HIGH TEMPERATURE CERAMIC SUPERCONDUCTORS

Weite Wu, Tainan, Taiwan, Prov. of China; Cha Y. Chu, Garnerville, N.Y.; Kenneth C. Goretti, Downers Grove, and Jules L. Routbort, Darien, both of Ill., assignors to University of Chicago, Chicago, Ill.

Filed Jul. 30, 1993, Ser. No. 100,606

Int. Cl.<sup>6</sup> B05D 3/02; H01L 39/24

U.S. Cl. 505—430

14 Claims

1. A method of manufacturing a coated, high temperature 123 YBaCuO superconductor, comprising the steps of: providing a 123 YBaCuO superconductor article; applying the suspension of said glass powders to form a dispersion of said glass powders on said high temperature 123 YBaCuO superconductor article; heating said dispersion of said glass powders causing melting and formation of a lead oxide based continuous glass coating on said high temperature 123 YBaCuO superconductor article; and cooling said melted lead oxide based continuous glass coating forming a solid glass coating on said superconductor article and formation of compressive stresses on said 123 YBaCuO superconductor article.

5,411,939

## EMULSIFIABLE SUSPENSION CONCENTRATE COMPOSITIONS OF IMIDAZOLINYL BENZOIC ACIDS, ESTERS AND SALTS THEREOF, AND DINITROANILINE HERBICIDES

Ivor P. Baker, Chandlers Ford, England, assignor to American Cyanamid Co., Wayne, N.J.

Filed Sep. 28, 1993, Ser. No. 128,512

Int. Cl.<sup>6</sup> A01N 33/08, 43/50

U.S. Cl. 504—139

12 Claims

1. A herbicidal emulsifiable suspension concentrate composition comprising about 5% to 20% by weight of an imidazolinyl benzoic acid, or ester or salt thereof, about 10% to 30% by weight of a dinitroaniline herbicide, about 0.5% to 10% by weight of a mixture of an alkylarylsulfonate and an alkylarylsulfonic acid, about 5% to 15% by weight of a nonionic surfactant or mixture of nonionic surfactants, about 1% to 10% by weight of a suspending agent, up to about 1% by weight of an antifoaming agent, and an aromatic solvent or mixture of aromatic solvents.

5,411,940

USE OF TGF- $\beta_3$  TO REDUCE THE FORMATION OF SCAR TISSUE IN RESPONSE TO CORNEAL TRAUMA

Jon C. Nixon, and Billie M. York, both of Fort Worth, Tex., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.

Filed Sep. 29, 1993, Ser. No. 128,460

Int. Cl.<sup>6</sup> A61K 37/02, 37/36

U.S. Cl. 514—12

7 Claims

1. A method of reducing the formation of scar tissue following trauma to the cornea, which comprises applying to the cornea at the site of the trauma a composition comprising: 0.001 to 10,000 ng/ml of TGF- $\beta_3$ ; and a pharmaceutically acceptable vehicle therefor.

5,411,941

## HETERODIMERIC OSTEOGENIC FACTOR

Lynn Grinna, Santa Monica; Georgia Theofan, Torrance, and Thomas F. Parsons, Arcadia, all of Calif., assignors to XOMA Corporation, Berkeley, Calif.

Division of Ser. No. 718,274, Jun. 20, 1991, Pat. No. 5,284,756, which is a continuation-in-part of Ser. No. 415,555, Oct. 4, 1989, Pat. No. 5,106,626, which is a continuation-in-part of Ser. No. 256,034, Oct. 11, 1988, abandoned. This application Nov. 8, 1993, Ser. No. 149,106

Int. Cl.<sup>6</sup> C07K 13/00

U.S. Cl. 514—12

6 Claims

1. An osteogenic protein preparation comprising a heterodimer of a first polypeptide subunit and a second polypeptide subunit the preparation produced according to the method of culturing in a suitable culture medium a cell line transformed with a first and a second nucleotide sequence, said first nucleotide sequence being selected from the group consisting of: the nucleotide sequence as shown in SEQ ID NO: 3; and a nucleotide sequence which encodes the same sequence of amino acids as encoded by the nucleotide sequence shown in SEQ ID NO: 3; and said second nucleotide sequence being selected from the group consisting of: the nucleotide sequence as shown in SEQ ID NO: 1; and a nucleotide sequence which encodes the same sequence of amino acids as encoded by the nucleotide sequence shown in SEQ ID NO: 1; to produce said heterodimer, and isolating said preparation from the culture medium.

5,411,942

## PEPTIDE DERIVATIVE, PHARMACEUTICAL PREPARATION CONTAINING IT AND METHOD FOR TREATMENT OF GLAUCOMA

Fred Widmer, Dee Why, Australia; Kailash K. Gauri, Lentföhrden, and Stig Aasmul-Olsen, Skodsborg, both of Denmark, assignors to Caribiotec Ltd. A/S, Copenhagen, Denmark

PCT No. PCT/DK90/00322, § 371 Date Jul. 20, 1992, § 102(e) Date Jul. 20, 1992, PCT Pub. No. WO91/09053, PCT Pub. Date Jun. 27, 1991

PCT Filed Dec. 7, 1990, Ser. No. 859,714

Claims priority, application Denmark, Dec. 7, 1989, 6158/89

Int. Cl.<sup>6</sup> A61K 37/00, 37/02; C07K 5/00, 7/00

U.S. Cl. 514—17

3 Claims

1. A linear or cyclic peptide, or salt thereof, having an amino acid sequence selected from the group consisting of Asn-Gly-Gly-Val-Cys(Acm)NH<sub>2</sub>, Asn-Leu-Gly-Val-Cys(Acm)NH<sub>2</sub>, and Asn-Ala-Gly-Val-Cys(Acm)NH<sub>2</sub>.

5,411,943

## HEPATOMA TREATMENT WITH SOMATOSTATIN ANALOGS

Arthur E. Bogden, Hopedale, Mass., assignor to Biomeasure, Inc., Milford, Mass.

Filed Feb. 25, 1992, Ser. No. 840,881

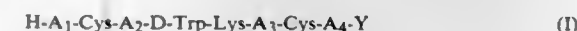
Int. Cl.<sup>6</sup> A61K 7/00

U.S. Cl. 514—16

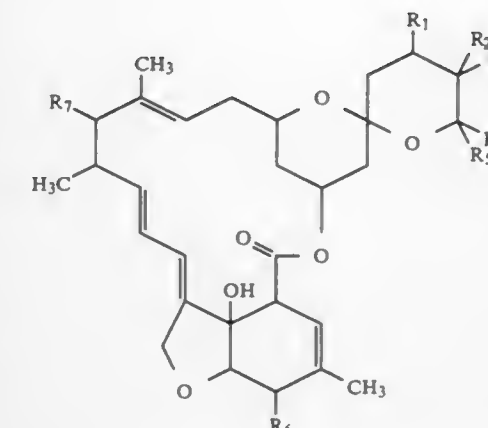
28 Claims

1. A method for treating hepatoma in a mammalian subject,

which method includes administering to said subject a composition comprising a therapeutically effective amount of an octapeptide of the following formula:



wherein, A<sub>1</sub> is D- $\beta$ -Nal or D-Phe; A<sub>2</sub> is Phe, pentafluoro-Phe, or p-substituted X-Phe where X is a halogen, NH<sub>2</sub>, NO<sub>2</sub>, OH, or C<sub>1-3</sub> alkyl; A<sub>3</sub> is Thr, Ser, Phe, Val,  $\alpha$ -aminobutyric acid, or Ile; A<sub>4</sub> is Thr,  $\beta$ -Nal, or Trp; and Y is NH<sub>2</sub> or OH; or a pharmaceutically acceptable salt or complex thereof.



5,411,944

## GLYPHOSATE-SULFURIC ACID ADDUCT HERBICIDES AND USE

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 887,288, May 22, 1992, abandoned, which is a division of Ser. No. 306,529, Feb. 3, 1989, Pat. No. 5,116,401, which is a continuation of Ser. No. 890,076, Jul. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 771,260, Aug. 30, 1985, abandoned, and a continuation-in-part of Ser. No. 673,358, Nov. 20, 1984, Pat. No. 4,664,717, and a continuation-in-part of Ser. No. 442,296, Nov. 17, 1982, abandoned, and a continuation-in-part of Ser. No. 444,667, Nov. 26, 1982, abandoned, and a continuation-in-part of Ser. No. 453,496, Dec. 27, 1982, Pat. No. 4,910,179, which is a continuation-in-part of Ser. No. 331,001, Dec. 15, 1991, Pat. No. 4,402,852, and a continuation-in-part of Ser. No. 330,904, Dec. 15, 1981, Pat. No. 4,404,116, and a continuation-in-part of Ser. No. 318,629, Nov. 5, 1981, Pat. No. 4,445,925, and a continuation-in-part of Ser. No. 318,368, Nov. 5, 1981, Pat. No. 4,447,253, and a continuation-in-part of Ser. No. 318,343, Nov. 5, 1981, Pat. No. 4,397,675. This application Dec. 21, 1993, Ser. No. 171,190

Int. Cl.<sup>6</sup> A01N 57/04, 59/02

U.S. Cl. 504—206

18 Claims

1. A compound consisting of glyphosate [N-(phosphonomethyl)glycine] and sulfuric acid in a 1:2 molar ratio of glyphosate-to-sulfuric acid.

5,411,945

## PULLULAN BINDER AND ITS USES

Yoshihide Ozaki; Tatsuo Nomura, and Toshio Miyake, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed May 7, 1993, Ser. No. 57,909

Claims priority, application Japan, Aug. 29, 1992, 4-272256

Int. Cl.<sup>6</sup> C08B 37/00; A61K 31/70

U.S. Cl. 514—23

21 Claims

1. A binder which comprises pullulan and saccharide(s) as a main ingredient wherein the weight ratio of said pullulan to saccharide(s) is in the range of 85:15 to 65:35, on a dry solid basis, and the total content of said pullulan and saccharide(s) is at least 90 w/w %, on a dry solid basis.

5,411,946

## AVERMECTIN DERIVATIVES

Ronald C. Newbold, Bound Brook, and Thomas L. Shih, Edison, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 24, 1993, Ser. No. 21,450

Int. Cl.<sup>6</sup> A61K 31/70; C07H 17/04

U.S. Cl. 514—30

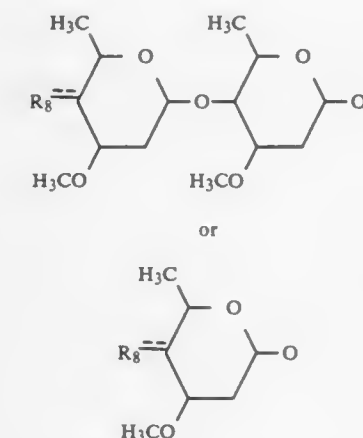
4 Claims

1. A compound having the following structural formula:

where

R<sub>1</sub> is selected from the group consisting of hydrogen, hydroxy, oxo, thiophenyl, thiophenyl substituted with halogen, thiopyridyl, thiothiazolyl, thioimidazolyl, thioacetyl, and their sulfoxide and sulfone oxidation products;

R<sub>2</sub> is selected from the group consisting of hydrogen, hydroxy, thiophenyl, thiophenyl substituted with halogen, cyano, thiopyridyl, thiothiazolyl, thioimidazolyl, thioacetyl, and their sulfoxide and sulfone oxidation products provided that when R<sub>2</sub> is hydrogen, R<sub>1</sub> is other than hydrogen, hydroxy or oxo;

R<sub>3</sub> is methyl;R<sub>4</sub> is H isopropyl or sec-butyl;R<sub>5</sub> is H;R<sub>6</sub> is OH, oxo, or NOH;R<sub>7</sub> is H, OH, fluoro, chloro, OCH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>,

where

R<sub>8</sub> is connected to the 4' or 4'' carbon atoms by a single bond and is hydroxy, lower alkanoyloxy, lower alkoxy, amino, N-lower alkyl-amino, N,N-diloweralkylamino, N-loweralkanolamino, N-lower alkyl-N-lower alkanoylamino, N-lower-alkyl silyloxy or phenoxylower-alkanoyloxy, or R<sub>8</sub> is attached to the 4' or 4'' carbon atoms by a double bond and is oxo, semicarbazano, N-lower-alkylsemicarbazano, N,N-diloweralkanolamino, lower-alkanoylhydrazono or loweralkylbenzoylhydrazono.

4. A method of controlling parasites in an animal host infested with parasites comprising administering to the animal an effective amount of a compound of claim 1.



5,411,947

# METHOD OF CONVERTING A DRUG TO AN ORALLY AVAILABLE FORM BY COVALENTLY BONDING A LIPID TO THE DRUG

Karl Y. Hostettler, Del Mar, and Raj Kumar, San Diego, both of Calif., assignors to Vestar, Inc., San Dimas, Calif.  
Continuation-in-part of Ser. No. 373,088, Jun. 28, 1989, Pat. No. 5,223,263, Ser. No. 440,898, Nov. 22, 1989, Pat. No. 5,194,654, and Ser. No. 932,231, Aug. 19, 1992, abandoned. This application Dec. 16, 1992, Ser. No. 991,166

Int. Cl.<sup>6</sup> A01N 43/04, 37/18; A61K 37/00, 31/43

U.S. Cl. 514—43

12 Claims

1. A method of converting a drug that is unavailable or poorly available in a mammal through the oral route of administration to an orally available form, comprising:

- covalently linking a species selected from the group consisting of 1-O-alkyl-sn-glycerol-3-phosphates, and 1-O-acyl-sn-glycerol-3-phosphates to a functional group of said drug either directly through the phosphate group of the lipid species or through a multifunctional linker molecule to form a lipid derivative of the drug;
- recovering the lipid derivative of the drug from the linking reaction mixture of step (a); and
- incorporating the lipid derivative of the drug into a therapeutic formulation suitable for oral administration.

5,411,948

# USE OF HOST CELL PHOSPHOLIPIDS FOR INHIBITING MICROBIAL COLONIZATION

Clifford A. Lingwood, Toronto, Canada; Howard C. Krivan, Derwood, Md., and Bo Nilsson, Lund, Sweden, assignors to HCS Research and Development, Toronto, Canada and MicroCarb, Inc., Gaithersburg, Md.  
Continuation of Ser. No. 632,372, Dec. 21, 1990, abandoned.  
This application Jan. 16, 1993, Ser. No. 78,474

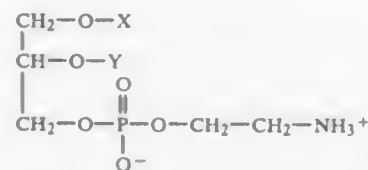
Int. Cl.<sup>6</sup> A61K 31/685

U.S. Cl. 514—78

12 Claims

1. A method for specifically inhibiting bacterial colonization in a biological preparation, comprising:

- contacting a biological preparation-suspected of containing bacteria selected from the group consisting of Streptococcus, Chlamydia, Clostridium, Staphylococcus, Borrelia, Haemophilus, Pseudomonas, Neisseria, Helicobacter, Shigella, Pasteurella, Coxiella, Mycobacterium, Salmonella, Fusobacterium, Bacteriodes, and Campylobacter, with an effective amount of phospholipid receptor having the formula:



wherein X is



or  $\text{—C=CH—R'}$ ;  
Y is



and

R' is an alkyl group and R is selected independently at each occurrence from alkyl, hydroxyalkyl or alkenyl groups of fatty acids for a time sufficient to allow said bacteria to

specifically bind to and with said phospholipid receptor, thereby preventing binding of said bacteria to a native receptor on a host cell.

5,411,949

# 23-OXA-DERIVATIVES IN THE VITAMIN D SERIES, PROCESS FOR THEIR PRODUCTION, PHARMACEUTICAL PREPARATIONS CONTAINING THESE DERIVATIVES AS WELL AS THEIR USE PHARMACEUTICAL AGENTS

Günter Neef; Andreas Steinmeyer; Gerald Kirsch; Katina Schwarz; Martin Haberey; Ruth Thieroff-Ekerdt, and Petra Rach, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

PCT No. PCT/EP92/00123, § 371 Date Jul. 19, 1993, § 102(e) Date Jul. 19, 1993, PCT Pub. No. WO92/12963, PCT Pub. Date Aug. 6, 1992

PCT Filed Jan. 20, 1992, Ser. No. 90,201

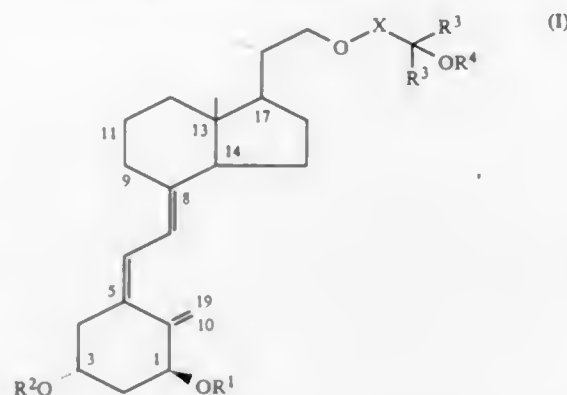
Claims priority, application Germany, Jan. 19, 1991, 41 01 953.9

Int. Cl.<sup>6</sup> C07C 401/00

5 Claims

U.S. Cl. 514—167

1. 23-Oxa-derivatives in the vitamin D series of formula I



in which

R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> independently of one another mean a hydrogen atom or an acyl group with 1 to 9 carbon atoms, each R<sup>3</sup> is a hydrogen atom or each R<sup>3</sup> is a linear or branched alkyl group with 1 to 4 carbon atoms and X means an alkylene radical  $\text{—(CH}_2\text{)}_n\text{—}$  wherein n is 1, 2 or 3 and if n=1, R<sup>3</sup> cannot be a methyl group.

5,411,950

# BENZO-FUSED OXAZOCINYL TERMINATED ALKYLAMINO ETHYNYL ALANINE AMINO DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION

Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill.

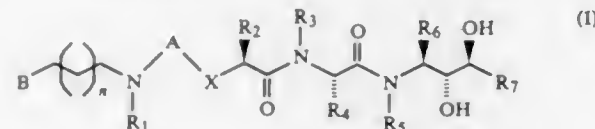
Division of Ser. No. 930,069, Aug. 14, 1992. This application Feb. 22, 1994, Ser. No. 198,424

Int. Cl.<sup>6</sup> A61K 31/395; C07D 267/22

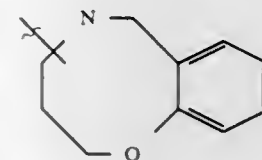
U.S. Cl. 514—183

14 Claims

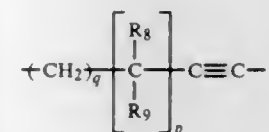
I. A compound of Formula I:



wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein R<sub>1</sub> is selected from hydrido and alkyl; wherein B is a benzo-fused oxazocinyl radical having the structure



wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein R<sub>2</sub> is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of R<sub>3</sub> and R<sub>5</sub> is independently selected from hydrido and alkyl; wherein R<sub>4</sub> is selected from



wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of R<sub>8</sub> and R<sub>9</sub> is a radical independently selected from hydrido, alkyl, alkenyl and phenyl; wherein R<sub>6</sub> is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein R<sub>7</sub> is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

5,411,951

# PROLONGED RELEASE OF BIOLOGICALLY ACTIVE SOMATOTROPIN

James W. Mitchell, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 568,284, Aug. 16, 1990, abandoned, which is a division of Ser. No. 414,503, Sep. 29, 1989, Pat. No. 5,013,713, which is a continuation of Ser. No. 787,873, Oct. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 657,713, Oct. 4, 1984, abandoned. This application Nov. 20, 1992, Ser. No. 979,367

Claims priority, application Spain, Oct. 2, 1985, 85/547,489; Canada, Oct. 3, 1985, 3721567

Int. Cl.<sup>6</sup> A61K 37/36

U.S. Cl. 514—12

21 Claims

2. A suspension composition having a low enough viscosity for administration by injection, in unit injection dosage form, comprising a substantially non-aqueous formulation of about 10% to about 50% by weight of a biologically active bovine somatotropin in a biocompatible oil, the oil being present in an amount sufficient to fully envelop substantially all of the bovine somatotropin in the composition and the bovine somatotropin being present in an amount less than an amount where the oil ceases to exist in a continuous phase, said composition being free of water and other components in amounts which accelerate the release of somatotropin from the composition into aqueous bodily fluids of an animal, said composition being effective for prolonged release of somatotropin into the circulatory system of an animal when administered as a unit dose by subcutaneous or intramuscular injection.

5,411,952

# OCULAR CYCLOSPORINE COMPOSITION

Renee Kaswan, Athens, Ga., assignor to University of Georgia Research Foundation, Inc., Atlanta, Ga.

Continuation of Ser. No. 187,823, Apr. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 092,466, Sep. 3, 1987, Pat. No. 4,839,342, and Ser. No. 117,218, Nov. 4, 1987, abandoned. This application Feb. 6, 1990, Ser. No. 474,683. The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.

Int. Cl.<sup>6</sup> A61K 37/02

U.S. Cl. 514—11

12 Claims

1. A topical ophthalmic composition comprising a pharmaceutically effective amount of cyclosporin in corn oil.

5,411,953

# OXAZOPINYL TERMINATED ALKYLAMINO ETHYNYL ALANINE AMINO DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION

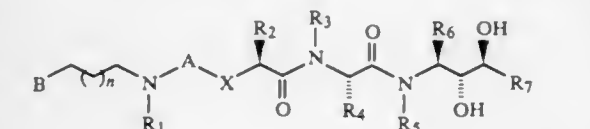
Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill.  
Division of Ser. No. 930,069, Aug. 14, 1992. This application Dec. 16, 1993, Ser. No. 168,561

Int. Cl.<sup>6</sup> A61K 31/535; C07D 267/10

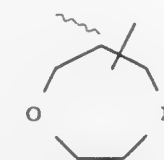
U.S. Cl. 514—211

14 Claims

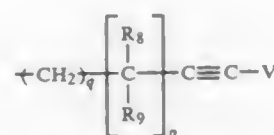
1. A compound of Formula I:



wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein R<sub>1</sub> is selected from hydrido and alkyl; wherein B is an oxazopiny radical having the structure



wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein R<sub>2</sub> is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of R<sub>3</sub> and R<sub>5</sub> is independently selected from hydrido and alkyl; wherein R<sub>4</sub> is selected from



wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of R<sub>8</sub> and R<sub>9</sub> is a radical independently selected from hydrido, alkyl, alkenyl and phenyl; wherein R<sub>6</sub> is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein R<sub>7</sub> is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

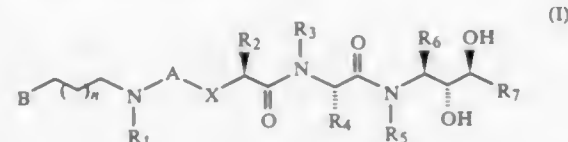
5,411,954

**BENZO-FUSED OXAZOPINYL-TERMINATED ALKYLAMINO ETHYNYL ALANINE AMINO DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION**  
Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill.  
Division of Ser. No. 930,069, Aug. 14, 1992. This application Feb. 22, 1994, Ser. No. 199,410  
Int. Cl.<sup>6</sup> C07D 267/14; A61K 31/55

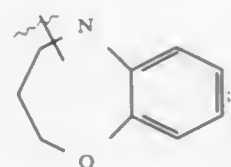
U.S. Cl. 514—211

14 Claims

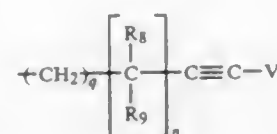
1. A compound of Formula I:



wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein R<sub>1</sub> is selected from hydrido and alkyl; wherein B is a benzo-fused oxazopinyll radical having the structure



wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein R<sub>2</sub> is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of R<sub>3</sub> and R<sub>5</sub> is independently selected from hydrido and alkyl; wherein R<sub>4</sub> is selected from



wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of R<sub>8</sub> and R<sub>9</sub> is a radical independently selected from alkyl, alkenyl and phenyl; wherein R<sub>6</sub> is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein R<sub>7</sub> is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

5,411,955

**THIADIAZINECARBOXAMIDE DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND PHARMACEUTICALS**

Rupert Strasser, Strasslach; Peter Zeller, and Rainer J. Klausner, both of Munich, all of Germany, assignors to Luitpold Pharma GmbH, Munich, Germany  
PCT No. PCT/DE92/01048, § 371 Date Sep. 16, 1993, § 102(e) Date Sep. 16, 1993, PCT Pub. No. WO93/12119, PCT Pub. Date Jun. 24, 1993

PCT Filed Dec. 11, 1992, Ser. No. 104,115

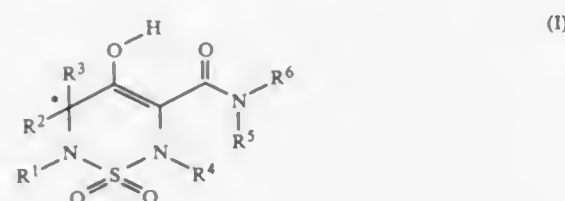
Claims priority, application Germany, Dec. 13, 1991, 41 41 218.4

Int. Cl.<sup>6</sup> A61K 31/54; C07D 513/04

U.S. Cl. 514—214

13 Claims

1. Compounds of the general formula I



wherein

R<sup>1</sup> is a lower alkyl group, an aryl group, a heteroaryl group or an aryl-lower-alkyl group,  
R<sup>2</sup> is a hydrogen atom, a lower alkyl group or an aryl group,  
R<sup>3</sup> is a hydrogen atom, a lower alkyl group, an aryl group, a heteroaryl group, an aryl-lower-alkyl group or a saturated, unbranched C<sub>1</sub>-C<sub>4</sub> alkyl group which is monosubstituted by a group selected from the group consisting of —OR<sup>7</sup>, —NR<sup>8</sup>R<sup>9</sup>, —CO—OR<sup>10</sup>, —SR<sup>11</sup>, —CO—NR<sup>12</sup>R<sup>13</sup> or —NH—C(NH<sub>2</sub>)(=NH),

or

wherein R<sup>1</sup> and R<sup>3</sup> together is an unbranched, saturated alkylene group having two, three, four or five carbon atoms and thus, together with the adjacent nitrogen atom and carbon atom of the thiadiazine ring system, is a ring having four, five, six or seven ring members,  
R<sup>4</sup> is a hydrogen atom, a lower alkyl group or an aryl-lower-alkyl group,  
R<sup>5</sup> is a hydrogen atom or a lower alkyl group,  
R<sup>6</sup> is a hydrogen atom, a lower alkyl group, an aryl group, a heteroaryl group or an aryl-lower-alkyl group,  
R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup>, and R<sup>13</sup> independently of one another is a hydrogen atom, a lower alkyl group, an aryl group or an aryl-lower-alkyl group, and salts thereof with the physiologically acceptable acids and bases, further wherein the aryl group is a phenyl group, a 1-naphthyl group or a 2-naphthyl group, each of which is optionally substituted by one, two or three identical or different substituents selected from the group of halogen atoms, hydroxyl groups, lower alkyl groups, lower alkoxy groups, carboxyl groups, lower alkyloxycarbonyl groups, nitro groups, sulfo groups, trifluoromethyl groups or hydrogen-atom- or lower-alkyl-group-substituted amino groups, and the heteroaryl group selected from furanyl groups, thienyl groups, pyrrolyl groups, pyrazolyl groups, imidazolyl groups, triazolyl groups, thiazolyl groups, oxazolyl groups, isothiazolyl groups, isoxazolyl groups, thiadiazolyl groups, pyridyl groups, pyrimidyl groups, pyrazinyl groups, triazinyl groups, benzofuranyl groups, benzothienyl groups, indolyl groups, benzoxazolyl groups, benzothiazolyl groups, benzimidazolyl groups, quinolinyl groups or isoquinolinyl groups, it being possible for the abovementioned groups to be linked to the basic structure of the compounds of the general formula I via any ring carbon atom and it being possible for the abovementioned rings to be optionally substituted by one or two identical or different substituents selected from the group of halogen atoms, hydroxyl groups, lower alkyl groups, lower alkoxy groups, carboxyl groups, lower alkyloxycarbonyl groups, nitro groups, sulfo groups, trifluoromethyl groups or hydrogen-atom or lower-alkyl-group-substituted amino groups, and the aryl-lower-alkyl group is a methyl group or an ethyl group which is substituted by an aryl group, and the lower alkyl group, or the "lower alkyl" in connection with lower alkoxy group or lower alkyloxycarbonyl group is an unbranched or branched saturated hydrocarbon group having up to six carbon atoms.

5,411,956

**LIPOLYTIC ENZYME INHIBITORS**

Toshiyuki Miyazaki; Hirofumi Motoi, both of Kawagoe; Toshiaki Kodama, Wako; Tatsu Maeda, Ohimachi; Takahiro Tsujita, Ehime, and Hiromichi Okuda, Matsuyama, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 631,321, Dec. 20, 1990, abandoned.

This application Sep. 24, 1992, Ser. No. 950,773

Claims priority, application Japan, Dec. 25, 1989, 1-332884; Mar. 27, 1990, 2-75600; Jul. 25, 1990, 2-194782

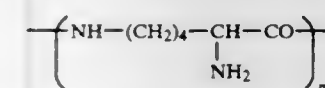
The portion of the term of this patent subsequent to Dec. 27, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61K 37/02, 37/64; C07K 7/06

U.S. Cl. 514—15

6 Claims

2. A composition which inhibits enzymatic hydrolysis of lipids in a mammal, comprising an amount of an ε-polylysine of the formula:



or a salt thereof, wherein n is a number of from 5 to 9, effective to inhibit enzymatic hydrolysis of lipids in said mammal, and a biologically acceptable carrier.

5,411,957

**3-AZABICYCLO[3.2.1]-NONANYL-TERMINATED NON-PIPTIDYL ALPHA-SUCCINAMIDOACYL AMINODIOLS AS ANTI-HYPERTENSIVE AGENTS**

Gunnar J. Hanson, Skokie, and John S. Baran, Winnetka, both of Ill., assignors to G.D. Searle & Co., Chicago, Ill.

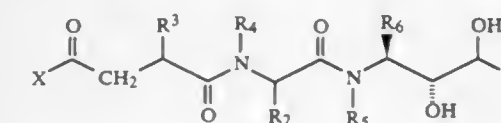
Division of Ser. No. 732,880, Jul. 19, 1991, which is a continuation of Ser. No. 103,623, Oct. 1, 1987, abandoned. This application Jan. 25, 1994, Ser. No. 186,348

Int. Cl.<sup>6</sup> A61K 31/55; C07D 233/14

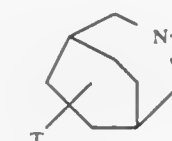
U.S. Cl. 514—216

10 Claims

1. A compound of the formula:



wherein X is



wherein T is selected from one or more groups selected from linear or branched lower alkyl, lower alkoxy, oxo, halo, haloloweralkyl, lower alkenyl, lower alkynyl and cyano; wherein R<sub>1</sub> is selected from linear or branched lower alkyl, haloloweralkyl, lower alkylcycloalkyl, lower alkylcycloalkenyl and lower alkoxyalkyl; wherein R<sub>2</sub> is selected from linear or branched lower alkyl and benzyl; wherein R<sub>3</sub> is selected from lower alkyl, lower alkylcarbonylaminoalkyl, benzyl, naphthylmethyl, phenyl, naphthyl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R<sub>4</sub> and R<sub>5</sub> is independently selected from H or lower alkyl; and wherein R<sub>6</sub> is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from lower alkyl, lower alkoxy, halo, haloloweralkyl, lower alkenyl, lower alkynyl and cyano.

5,411,958

**BENZOTHIOMORPHOLINYL-TERMINATED NON-PEPTIDYL α-SUCCINAMIDOACYL AMINODIOLS AS ANTI-HYPERTENSIVE AGENTS**

Gunnar J. Hanson, Skokie, and John S. Baran, Winnetka, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

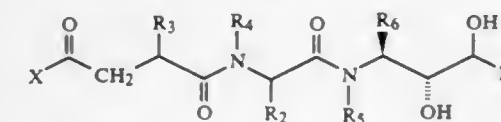
Division of Ser. No. 732,880, Jul. 19, 1991, which is a continuation of Ser. No. 103,623, Oct. 1, 1987, abandoned. This application Feb. 22, 1994, Ser. No. 198,423

Int. Cl.<sup>6</sup> A61K 31/54; C07D 279/16

U.S. Cl. 514—224.2

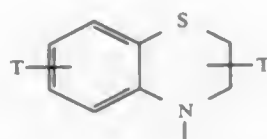
10 Claims

1. A compound of the formula:



wherein X is





wherein each T is independently selected from one or more groups selected from linear or branched lower alkyl, lower alkoxy, oxo, halo, haloloweralkyl, lower alkenyl, lower alkynyl and cyano; wherein R<sub>1</sub> is selected from linear or branched lower alkyl, haloloweralkyl, lower alkylcycloalkyl, lower alkylcycloalkenyl and lower alkoxy; wherein R<sub>2</sub> is selected from linear or branched lower alkyl and benzyl; wherein R<sub>3</sub> is selected from lower alkyl, lower alkylcarbonylaminoalkyl, benzyl, naphthylmethyl, phenyl, naphthyl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R<sub>4</sub> and R<sub>5</sub> is independently selected from H or lower alkyl; and wherein R<sub>6</sub> is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from lower alkyl, lower alkoxy, halo, haloloweralkyl, lower alkenyl, lower alkynyl and cyano.

5,411,959

# 1,4-THIOMORPHOLINO-TERMINATED ALKYLAMINO ETHYNYL ALANINE AMINO DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION

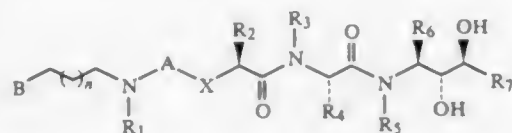
Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill. Division of Ser. No. 930,069, Aug. 14, 1992. This application Dec. 16, 1993, Ser. No. 168,750

Int. Cl.<sup>6</sup> A61K 31/54; C07D 279/12

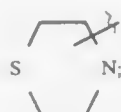
U.S. Cl. 514—227.5

14 Claims

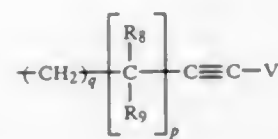
1. A compound of Formula I:



wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein R<sub>1</sub> is selected from hydrido and alkyl; wherein B is a 1,4-thiomorpholinyl radical having the structure



wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein R<sub>2</sub> is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of R<sub>3</sub> and R<sub>5</sub> is independently selected from hydrido and alkyl; wherein R<sub>4</sub> is selected from



wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of R<sub>8</sub> and R<sub>9</sub> is a radical independently selected from hydrido, alkyl, alkenyl and phenyl; wherein R<sub>6</sub> is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein R<sub>7</sub> is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

5,411,960

# SUBSTITUTED PYRROLOANTHRACENES AND -DIONES

Eckhard Schwenner, Wuppertal, Germany; Gaetan Ladouceur, Hamden, Conn.; Hans-Joachim Kabbe, Leverkusen, Germany, and Thomas M. Aune, Hamden, Conn., assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

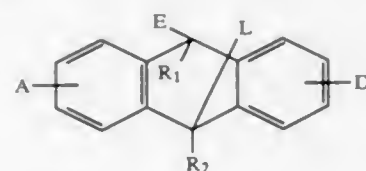
Filed Dec. 9, 1993, Ser. No. 164,495

Int. Cl.<sup>6</sup> C07D 265/28, 209/56; A61K 31/40

U.S. Cl. 514—230.5

5 Claims

1. A substituted pyrroloanthracene or -dione of the general formula (I)



in which

A and D are identical or different and represent hydrogen, hydroxyl, halogen, cyano, carboxyl, nitro, trifluoromethyl or trifluoromethoxy, or represent straight-chain or branched alkyl or alkoxy in each case having up to 8 carbon atoms,

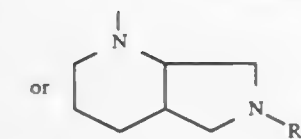
R<sup>1</sup> and R<sup>2</sup> are identical or different and represent hydrogen, halogen, cyano, formyl, phenyl or hydroxyl, or represent straight-chain or branched alkoxy having up to 8 carbon atoms, or represent straight-chain or branched alkyl or alkenyl in each case having up to 8 carbon atoms, each of which is optionally substituted up to 2 times by identical or different hydroxyl, nitro, phenyl or halogen, by straight-chain or branched alkoxy having up to 6 carbon atoms or by a group of the formula —NR<sup>3</sup>R<sup>4</sup>,

in which

R<sup>3</sup> and R<sup>4</sup> are identical or different and denote hydrogen, straight-chain or branched alkyl having up to 6 carbon atoms or phenyl,

E and L together form a heterocyclic radical of the formula

-continued



in which

a denotes a number 1 or 2,

R<sup>11</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup> and R<sup>16</sup> are identical or different and denote benzyl or aryl having 6 to 10 carbon atoms, each of which is optionally substituted up to 3 times by identical or different halogen, hydroxyl, nitro, cyano, trifluoromethyl or trifluoromethoxy or by straight-chain or branched alkyl or alkoxy in each case having up to 8 carbon atoms,

and its salts.

5,411,961

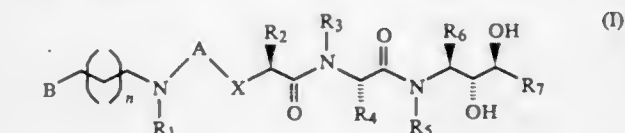
**BENZO-FUSED MORPHOLINYL TERMINATED ALKYLAMINO ETHYNYL ALANINE AMINO DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION**  
Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill. Division of Ser. No. 930,069, Aug. 14, 1992. This application Jan. 25, 1994, Ser. No. 186,353

Int. Cl.<sup>6</sup> C07D 265/36; A61K 31/535

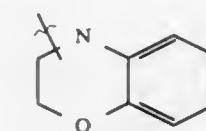
U.S. Cl. 514—230.5

14 Claims

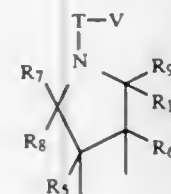
1. A compound of Formula I:



wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein R<sub>1</sub> is selected from hydrido and alkyl; wherein B is a benzo-fused morpholinyl radical having the structure



wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein R<sub>2</sub> is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of R<sub>3</sub> and R<sub>5</sub> is independently selected from hydrido and alkyl; wherein R<sub>4</sub> is selected from



in which

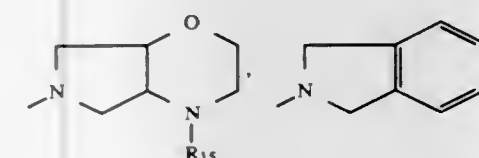
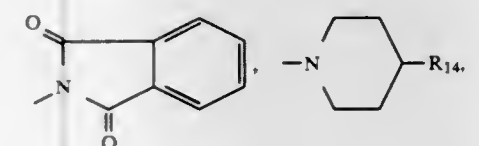
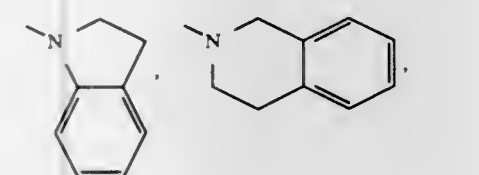
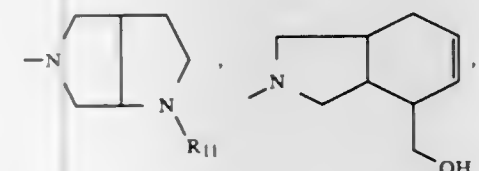
R<sup>5</sup> and R<sup>6</sup> are identical or different and denote hydrogen, halogen, phenyl or straight-chain or branched alkyl having up to 8 carbon atoms, which is optionally substituted by carboxyl or by straight-chain or branched alkoxy having up to 6 carbon atoms,

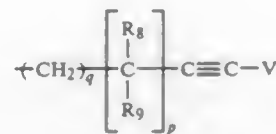
R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> are identical or different and denote hydrogen or straight-chain or branched alkyl having up to 6 carbon atoms, or

R<sup>7</sup> and R<sup>8</sup> and/or R<sup>9</sup> and R<sup>10</sup> in each case together form the radical of the formula =O,

T denotes straight-chain or branched alkyl having up to 4 carbon atoms,

V denotes a radical of the formula





wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of R<sub>8</sub> and R<sub>9</sub> is a radical independently selected from alkyl, alkenyl and phenyl; wherein R<sub>6</sub> is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein R<sub>7</sub> is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

5,411,962

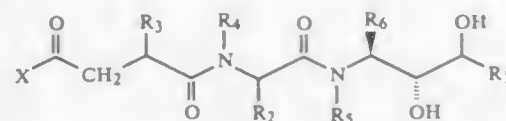
# **BENZOMORPHOLINYL-TERMINATED NON-PEPTIDYL α-SUCCINAMIDOACYL AMINODIOLS AS ANTI-HYPERTENSIVE AGENTS**

Gunnar J. Hanson, Skokie, and John S. Baran, Winnetka, both of Ill., assignors to G.D. Searle & Co., Chicago, Ill.  
Division of Ser. No. 732,880, Jul. 19, 1991, which is a continuation of Ser. No. 103,623, Oct. 1, 1987, abandoned. This application Feb. 22, 1994, Ser. No. 198,413  
Int. Cl.<sup>6</sup> A61K 31/535; C07D 265/36

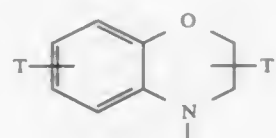
U.S. Cl. 514—230.5

10 Claims

1. A compound of the formula:



wherein X is



wherein each T is independently selected from one or more groups selected from linear or branched lower alkyl, lower alkoxy, oxo, halo, haloloweralkyl, lower alkenyl, lower alkenyl and cyano; wherein R<sub>1</sub> is selected from linear or branched lower alkyl, haloloweralkyl, lower alkylcycloalkyl, lower alkylcycloalkenyl and lower alkoxy; wherein R<sub>2</sub> is selected from linear or branched lower alkyl and benzyl; wherein R<sub>3</sub> is selected from lower alkyl, lower alkylcarbonylaminoalkyl, benzyl, naphthylmethyl, phenyl, naphthyl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R<sub>4</sub> and R<sub>5</sub> is independently selected from H or lower alkyl; and wherein R<sub>6</sub> is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from lower alkyl, lower alkoxy, halo, haloloweralkyl, lower alkenyl, lower alkyl and cyano.

5,411,963

# **QUINAZOLINE DERIVATIVES**

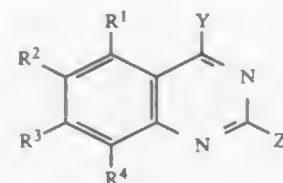
Barry A. Dreikorn, Lawrence; Glen P. Jourdan, Morristown, and Robert G. Suhr, Greenfield, all of Ind., assignors to DowElanco, Indianapolis, Ind.

Continuation of Ser. No. 324,056, Mar. 16, 1989, abandoned, which is a continuation-in-part of Ser. No. 150,102, Jan. 29, 1988, abandoned. This application Jul. 19, 1993, Ser. No. 93,975  
Int. Cl.<sup>6</sup> C07D 265/00; A61K 31/505, 31/62

U.S. Cl. 514—259

61 Claims

1. A compound of the formula (1)



wherein

R<sup>1</sup> to R<sup>4</sup> are independently H, halo, (C<sub>1</sub>-C<sub>4</sub>) alkyl, branched (C<sub>3</sub>-C<sub>4</sub>) alkyl, halo (C<sub>1</sub>-C<sub>4</sub>) alkyl, halo (C<sub>1</sub>-C<sub>4</sub>) alkoxy, (C<sub>1</sub>-C<sub>4</sub>) alkoxy, halo (C<sub>1</sub>-C<sub>4</sub>) alkylthio, OH, CN, NO<sub>2</sub>, or NH<sub>2</sub>, at least two of R<sup>1</sup> to R<sup>4</sup> being H;

Y is X-W-Ar,

X is O, or NR<sup>7</sup>, or CR<sup>8</sup>R<sup>9</sup>;Z is H, Cl, OCH<sub>3</sub>, CH<sub>3</sub>, or CCl<sub>3</sub>;R<sup>7</sup> is H, (C<sub>1</sub>-C<sub>4</sub>) alkyl, or acetyl;

R<sup>8</sup> and R<sup>9</sup> are independently H, (C<sub>1</sub>-C<sub>4</sub>) alkyl, (C<sub>1</sub>-C<sub>4</sub>) acyl, halo or OH, or R<sup>8</sup> and R<sup>9</sup> combine to form a saturated or unsaturated carbocyclic ring comprising three to seven carbon atoms;

W is an alkylene chain 2 to 8 carbon atoms long, that optionally includes a saturated or unsaturated carbocyclic ring comprising three to seven carbon atoms, and optionally is substituted with (C<sub>1</sub>-C<sub>3</sub>) alkyl, (C<sub>2</sub>-C<sub>4</sub>) alkenyl, phenyl, (C<sub>3</sub>-C<sub>8</sub>) cycloalkyl, halo, hydroxy, or acetyl; and

Ar is

imidazolyl,

indolyl,

thienyl, optionally substituted with CH<sub>3</sub> or Cl,

thiazolyl,

1,3-benzodioxolyl,

fluorenyl,

cyclopentyl,

1-methylcyclopentyl,

cyclohexyl (hexahydrophenyl),

cyclohexenyl (tetrahydrophenyl),

naphthyl,

substituted naphthyl,

dihydronaphthyl,

tetrahydronaphthyl,

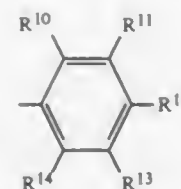
decahydronaphthyl,

pyridyl,

substituted pyridyl,

2,3-dihydroindolyl,

or a group of the formula (2):



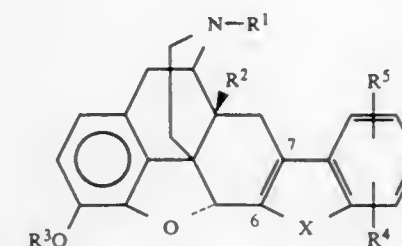
where

R<sup>10</sup> to R<sup>14</sup> are independently H, halo, I, (C<sub>1</sub>-C<sub>10</sub>) alkyl, branched (C<sub>3</sub>-C<sub>6</sub>) alkyl, halo (C<sub>1</sub>-C<sub>7</sub>) alkyl, (C<sub>1</sub>-C<sub>7</sub>) alkoxy, halo (C<sub>1</sub>-C<sub>7</sub>) alkoxy, phenoxy, substituted phenoxy, phenyl, substituted phenyl, phenylthio, substituted phe-

nylthio, NH<sub>2</sub>, NO<sub>2</sub>, OH, acetoxy, CN, SiR<sup>15</sup>R<sup>16</sup>R<sup>17</sup>, OSiR<sup>15</sup>R<sup>16</sup>R<sup>17</sup>, where R<sup>15</sup>, R<sup>16</sup>, and R<sup>17</sup> are independently C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> branched alkyl, phenyl, or substituted phenyl, at least two of R<sup>10</sup> to R<sup>14</sup> being H; or an acid addition salt of a compound of formula (1); provided that:

(a) if Y is NR<sup>7</sup>-W-Ar, then R<sup>4</sup> is F, or Ar is naphthyl or a group of formula (2) wherein at least one of R<sup>10</sup> to R<sup>14</sup> is phenyl, substituted phenyl, phenoxy, substituted phenoxy, phenylthio, substituted phenylthio, halo (C<sub>1</sub>-C<sub>4</sub>) alkyl, or halo (C<sub>1</sub>-C<sub>4</sub>) alkoxy; and

(b) the compound 4-(3-phenylpropyl)quinazoline is excluded.



wherein R<sup>1</sup> is (C<sub>1</sub>-C<sub>5</sub>)alkyl, C<sub>3</sub>-C<sub>6</sub>(cycloalkyl)alkyl, C<sub>5</sub>-C<sub>7</sub>(cycloalkenyl)alkyl, aryl, aralkyl, trans(C<sub>4</sub>-C<sub>5</sub>)alkenyl, allyl or furan-2-ylalkyl, R<sup>2</sup> is H, OH or O<sub>2</sub>C(C<sub>1</sub>-C<sub>5</sub>)alkyl; R<sup>3</sup> is H, (C<sub>1</sub>-C<sub>5</sub>)alkyl; or ((C<sub>1</sub>-C<sub>5</sub>)alkyl)CO; X is O, S or NY, wherein Y is H or (C<sub>1</sub>-C<sub>5</sub>)alkyl; and R<sup>4</sup> and R<sup>5</sup> are individually H, F, Cl, Br, NCS, NO<sub>2</sub>, NH<sub>2</sub>, (C<sub>1</sub>-C<sub>5</sub>)alkyl or (C<sub>1</sub>-C<sub>5</sub>)alkoxy, or together are benzo; and the pharmaceutically acceptable salts thereof; wherein said amount is effective to inhibit the use of cocaine by said human.

5,411,964

# **PHENYLALANINE-GLYCINE COMPOUNDS HAVING ANTI-TUMOR ACTIVITY, PROCESS FOR PREPARATION THEREOF, AND PHARMACEUTICAL COMPOSITION CONTAINING SAID COMPOUNDS**

Koichi Niimura; Takako Kawabe, both of Saitama; Takao Ando, and Kenichi Saito, both of Tokyo, all of Japan, assignors to Kureha Chemical Industry Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1993, Ser. No. 31,478

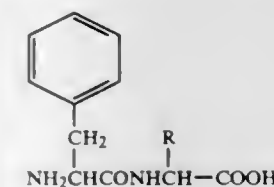
Claims priority, application Japan, Mar. 14, 1992, 4-089564

Int. Cl.<sup>6</sup> A61K 31/505, 31/215; C07D 239/12; C07C 229/28

U.S. Cl. 514—269

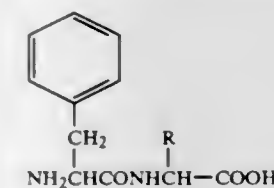
14 Claims

1. A phenylalanine-glycine compound of formula (I):



wherein R represents an antitumor substance, or a salt or an ester thereof.

14. A method of treating tumor in an animal, comprising administering to the animal a composition comprising a phenylalanine-glycine of the formula (I):



wherein R represents an antitumor substance, or a pharmaceutically acceptable salt or ester thereof.

5,411,965

# **USE OF DELTA OPIOID RECEPTOR ANTAGONISTS TO TREAT COCAINE ABUSE**

Larry D. Reid, Troy, N.Y.; Philip S. Portoghesi, St. Paul, Minn., and Frank Porreca, Tucson, Ariz., assignors to Arizona Board of Regents, Tucson, Ariz.

Filed Aug. 23, 1993, Ser. No. 110,396

Int. Cl.<sup>6</sup> A61K 31/44

U.S. Cl. 514—279

17 Claims

1. A therapeutic method for treating cocaine use by a human comprising administering to a human in need of such treatment an amount of a compound of the formula I:

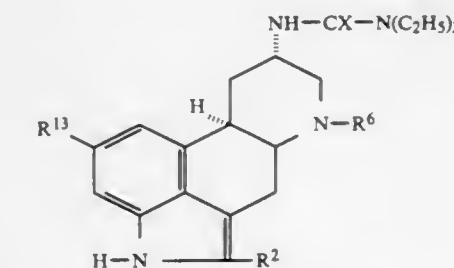
in which

R<sup>2</sup> is halogen, C<sub>1</sub>-6 alkyl or —S—C<sub>1</sub>-4 alkyl,R<sup>6</sup> is C<sub>1</sub>-6 alkyl, C<sub>3</sub>-6 alkenyl or C<sub>3</sub>-5 cycloalkyl-C<sub>1</sub>-2 alkyl;

X is oxygen or sulfur;

R<sup>13</sup> is —S—C<sub>1</sub>-4 alkyl, C<sub>1</sub>-6 alkyl, C<sub>2</sub>-6 alkenyl, 1,3-dithiolan-2-yl, —CO—R<sup>3</sup> or —CR<sup>4</sup>R<sup>5</sup>OH; andR<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are each independently hydrogen or C<sub>1</sub>-5 alkyl, or

a physiologically compatible acid addition salt thereof, with the proviso that said compound is not 3-(13-acetyl-2-bromo-6-methyl-8α-ergolinyl)-1,1-diethylurea.





5,411,967

## CARBAMATES OF RAPAMYCIN

Wenling Kao, Paoli, Pa.; Jerauld S. Skotnicki, Allentown, N.J.; Magid A. Abou-Gharbia, Glen Mills, and Yvette L. Palmer, Newtown, both of Pa., assignors to American Home Products Corporation, Madison, N.J.

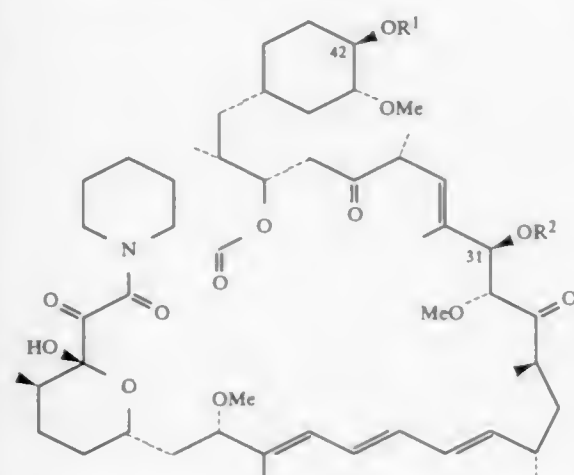
Continuation-in-part of Ser. No. 160,984, Dec. 1, 1993, abandoned, which is a division of Ser. No. 54,655, Apr. 23, 1993, Pat. No. 5,302,584, which is a continuation-in-part of Ser. No. 960,597, Oct. 13, 1992, abandoned. This application Apr. 8, 1994, Ser. No. 224,893

Int. Cl.<sup>6</sup> C07D 491/06; A61K 31/675, 31/395

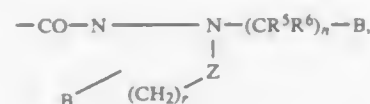
U.S. Cl. 514—291

36 Claims

1. A compound of the structure



wherein R<sup>1</sup> and R<sup>2</sup> are each, independently, hydrogen, —CONH—A—(CR<sup>5</sup>R<sup>6</sup>)<sub>n</sub>—B, —CONR<sup>11</sup>—A—(CR<sup>5</sup>R<sup>6</sup>)<sub>n</sub>—B,



R<sup>5</sup>, R<sup>6</sup>, and B are each, independently, hydrogen, alkyl of 1-6 carbon atoms, alkenyl of 2-7 carbon atoms, alkynyl of 2-7 carbon atoms, hydroxyalkyl of 1-6 carbon atoms, alkoxyalkyl of 2-12 carbon atoms, alkylthioalkyl of 2-12 carbon atoms, dialkylaminoalkyl of 2-12 carbon atoms, dialkylaminoalkyl of 3-12 carbon atoms, arylalkyl of 7-10 carbon atoms, cycloalkyl of 3-8 carbon atoms, —OR<sup>7</sup>, —SR<sup>7</sup>, halogen, —CN, —NO<sub>2</sub>, —CF<sub>3</sub>, —COR<sup>7</sup>, —CO<sub>2</sub>R<sup>7</sup>, —CONHR<sup>7</sup>, —SO<sub>2</sub>R<sup>7</sup>, —OSO<sub>2</sub>R<sup>7</sup>, —NR<sup>7</sup>R<sup>8</sup>, —NHCOR<sup>7</sup>, —NHSO<sub>2</sub>R<sup>7</sup>, —SO<sub>2</sub>NR<sup>7</sup>R<sup>8</sup>, or Ar;

R<sup>7</sup> and R<sup>8</sup> are each, independently, hydrogen, alkyl of 1-6 carbon atoms, arylalkyl of 7-10 carbon atoms, alkenyl of 2-7 carbon atoms, alkynyl of 2-7 carbon atoms, hydroxyalkyl of 1-6 carbon atoms, alkoxyalkyl of 2-12 carbon atoms, alkylthioalkyl of 2-12 carbon atoms, dialkylaminoalkyl of 2-12 carbon atoms, dialkylaminoalkyl of 3-12 carbon atoms, cycloalkyl of 3-8 carbon atoms, or Ar;

R<sup>11</sup> is alkyl of 1-6 carbon atoms, arylalkyl of 7-10 carbon atoms, alkenyl of 2-7 carbon atoms, alkynyl of 2-7 carbon atoms, hydroxyalkyl of 1-6 carbon atoms, alkoxyalkyl of 2-12 carbon atoms, alkylthioalkyl of 2-12 carbon atoms, dialkylaminoalkyl of 2-12 carbon atoms, dialkylaminoalkyl

of 3-12 carbon atoms, cycloalkyl of 3-8 carbon atoms, or

Ar;

A is —NR<sup>7</sup>—, —NHCO—, —N=C—, or —NHSO—;Z is —CH<sub>2</sub>— or

III

Ar is phenyl, naphthyl, pyridyl, quinolyl, isoquinolyl, quinoxalyl, thienyl, thionaphthyl, furyl, benzofuryl, benzodioxyl, benzoxazolyl, benzoisoxazolyl, 3-oxo-1,3, -dihydroisobenzofuran-5-yl, indolyl, thiazolyl, isoxazolyl, pyrimidinyl, pyrazinyl, pyridazinyl, 1,2,4-triazinyl, 1,3,5-triazinyl, phthalazinyl, mycophenolyl, imidazolyl, benzopyranyl, benzothiophenyl, benzimidazolyl, benzthiazolyl, benzodioxolyl, piperidinyl, morpholinyl, piperazinyl, tetrahydrofuran-2-yl, or pyrrolidinyl; wherein the Ar group may be optionally mono-, di-, or tri-substituted with a group selected from alkyl of 1-6 carbon atoms, arylalkyl of 7-10 carbon atoms, alkoxy of 1-6 carbon atoms, cyano, halo, hydroxy, nitro, carbalkoxy of 2-7 carbon atoms, trifluoromethyl, amino, dialkylamino of 1-6 carbon atoms per alkyl group, dialkylaminoalkyl of 3-12 carbon atoms, hydroxyalkyl of 1-6 carbon atoms, alkoxyalkyl of 2-12 carbon atoms, alkylthio of 1-6 carbon atoms, alkylcarbonyl of 2-7 carbon atoms, carbamyl, alkylcarbonyl of 2-7 carbon atoms, dialkylcarbonyl of 3-13 carbon atoms, aminosulfonyl, alkylaminosulfonyl of 1-6 carbon atoms, dialkylaminosulfonyl of 2-12 carbon atoms, arylaminosulfonyl, alkylsulfonyl of 1-6 carbon atoms, arylsulfonyl, —SO<sub>3</sub>H, and —CO<sub>2</sub>H;



is a nitrogen containing heterocyclic radical selected from the group consisting of piperidinyl, piperazinyl, morpholinyl, pyrrolidinyl, or imidazolyl, that may be optionally mono-, di-, or tri-substituted with a group selected from alkyl of 1-6 carbon atoms, arylalkyl of 7-10 carbon atoms, alkoxy of 1-6 carbon atoms, cyano, halo, hydroxy, nitro, carbalkoxy of 2-7 carbon atoms, trifluoromethyl, amino, dialkylamino of 1-6 carbon atoms per alkyl group, dialkylaminoalkyl of 3-12 carbon atoms, hydroxyalkyl of 1-6 carbon atoms, alkoxyalkyl of 2-12 carbon atoms, alkylthio of 1-6 carbon atoms, —SO<sub>3</sub>H, and —CO<sub>2</sub>H;

n=0-6;

r=1-4;

with the proviso that R<sup>1</sup> and R<sup>2</sup> are not both hydrogen and further provided that when n=0, B is not —NR<sup>7</sup>R<sup>8</sup>, —NHCOR<sup>7</sup>, —N=C—, or —NHSO<sub>2</sub>R<sup>7</sup>; or a pharmaceutically acceptable salt thereof.

5,411,968

## TREATMENT OF ANXIETY

Michael B Tyers, Welwyn, England, assignor to Glaxo Group Limited, London, England

Division of Ser. No. 827,511, Jan. 29, 1992, Pat. No. 5,204,356, which is a continuation of Ser. No. 530,301, May 19, 1990, abandoned, which is a division of Ser. No. 419,728, Oct. 11, 1989, Pat. No. 4,975,436, which is a division of Ser. No. 259,719, Oct. 19, 1988, Pat. No. 4,883,803, which is a continuation of Ser. No. 888,467, Jul. 23, 1986, abandoned. This application Jan. 14, 1993, Ser. No. 4,611

Claims priority, application United Kingdom, Jul. 24, 1985, 8518658

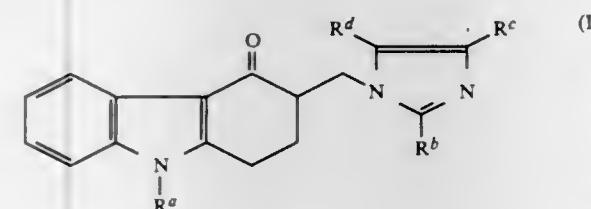
The portion of the term of this patent subsequent to Nov. 20, 2006, has been disclaimed.

Int. Cl.<sup>6</sup> A61K 31/46, 31/445

U.S. Cl. 514—304

9 Claims

1. A method of treatment of anxiety in a human or animal subject suffering from anxiety which comprises administering an effective amount of a compound which acts as an antagonist of 5-hydroxytryptamine (5-HT) at 5-HT "M" receptors, excluding tetrahydrocarbazolone derivatives of the general formula (I)



wherein R<sup>a</sup> represents a hydrogen atom or a C<sub>1-10</sub> alkyl, C<sub>3-7</sub> cycloalkyl, C<sub>3-7</sub> cycloalkyl-(C<sub>1-4</sub>)alkyl, C<sub>3-6</sub> alkenyl, C<sub>3-10</sub> alkynyl, phenyl or phenyl-(C<sub>1-3</sub>)alkyl group, and one of the groups represented by R<sup>b</sup>, R<sup>c</sup> and R<sup>d</sup> is a hydrogen atom or a C<sub>1-6</sub> alkyl, C<sub>3-7</sub> cycloalkyl, C<sub>2-6</sub> alkenyl or phenyl-(C<sub>1-3</sub>)alkyl group and each of the other two groups, which may be the same or different, represents a hydrogen atom or a C<sub>1-6</sub> alkyl group;

and physiologically acceptable salts and solvates thereof.

5,411,969

## ANTIHYPERLIPIDEMIC/ANTIOXIDANT DIHYDROQUINOLINES

Bradley C. Pearce, East Hampton, and John J. Wright, Guilford, both of Conn., assignors to Bristol-Myers Squibb Company, New York, N.Y.

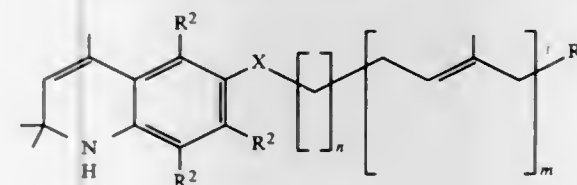
Filed Apr. 16, 1993, Ser. No. 48,696

Int. Cl.<sup>6</sup> A61K 31/47

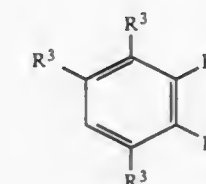
U.S. Cl. 514—311

6 Claims

1. A compound having the Formula



wherein

X is O, S or CH<sub>2</sub>R<sup>1</sup> is H or

R<sup>2</sup> and R<sup>3</sup> are independently H, C<sub>1-5</sub> alkyl, CF<sub>3</sub>, CN, halogen or OCH<sub>3</sub>,  
n is an integer of 1 to 3, and  
m is an integer of 1 to 3, or  
a pharmaceutically acceptable salt thereof.

5,411,970

## METHOD OF INHIBITING LENTIVIRUS

Richard A. Partis, Evanston; Francis J. Koszyk, Prospect Heights, and Richard A. Mueller, Glencoe, all of Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Division of Ser. No. 929,325, Aug. 13, 1992, Pat. No. 5,310,745, which is a continuation-in-part of Ser. No. 639,472, Jan. 10, 1991, abandoned, which is a continuation-in-part of Ser. No. 418,091, Oct. 12, 1989, Pat. No. 5,003,072, which is a continuation-in-part of Ser. No. 266,767, Nov. 3, 1988, abandoned. This application Dec. 21, 1993, Ser. No. 170,593

Int. Cl.<sup>6</sup> A61K 31/445

U.S. Cl. 514—315

3 Claims

1. The method of inhibiting lentivirus by orally administering to a mammalian host susceptible to said lentivirus a virally inhibitory effective amount of an O-acylated derivative of an N-alkyl-1,5-dideoxy-1,5-imino-D-glucitol in which the N-alkyl is an ω,ω,ω-trifluoroalkyl group having from three to eight carbon atoms and the O-acylated groups are butyryl.

5,411,971

## N-ALKYLENEPIPERIDINO COMPOUNDS, THEIR ENANTIOMERS AND PHARMACEUTICAL COMPOSITIONS

Xavier Edmonds-Alt, Combaillaux; Serge Martinez, Montpellier; Vincenzo Proietto, Saint Georges D'Orques, and Didier Van Broeck, Murviel les Montpellier, all of France, assignors to Elf Sanofi, Paris, France

Filed May 4, 1992, Ser. No. 877,734

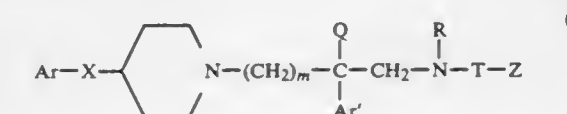
Claims priority, application France, May 3, 1991, 91 05486

Int. Cl.<sup>6</sup> A61K 31/445; C07D 413/12, 401/12, 211/58

U.S. Cl. 514—318

18 Claims

1. A compound having the formula:



in which:

m is equal to 2 or 3;

Ar represents a phenyl, unsubstituted or substituted one or more times with a halogen atom, with a C<sub>1-3</sub> alkyl, with a trifluoromethyl, with an alkoxy in which the alkyl is a C<sub>1-3</sub> group, with a hydroxyl or with a methylenedioxy; a thienyl, pyridyl or imidazolyl group which is or is not substituted with a C<sub>1-3</sub> alkyl;

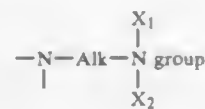
Ar' represents a phenyl group, unsubstituted or mono- or di-substituted with a halogen atom, with a C<sub>1-3</sub> alkyl, with a trifluoromethyl, with an alkoxy in which the alkyl is a C<sub>1-3</sub> group, with a hydroxyl or with a methylenedioxy; a thienyl group; an imidazolyl group or a benzothienyl group, each of which is unsubstituted or substituted with a halogen; a naphthyl group unsubstituted or substituted with a halogen; a biphenyl group; an indolyl unsub-

stituted or substituted on the nitrogen with a benzyl group;  
X represents an oxygen atom, a sulphur atom, a sulphone or a sulfoxide, an

—NH group, an

—N—CO—Alk group or an —N—Alk group

in which Alk is a C<sub>1</sub>–C<sub>3</sub> alkyl group; an

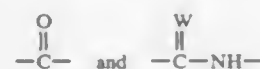


in which Alk represents a C<sub>1</sub>–C<sub>3</sub> alkylene and X<sub>1</sub> and X<sub>2</sub> represent, independently, hydrogen, a C<sub>1</sub>–C<sub>3</sub> alkyl or form, together with the nitrogen atom to which they are bonded, a pyrrolidine, piperidine or morpholine heterocycle;

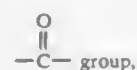
Q represents hydrogen, a C<sub>1</sub>–C<sub>4</sub> alkyl group or an aminoalkyl group of formula —(CH<sub>2</sub>)<sub>q</sub>—Am', where q is 2 or 3 and Am' is a piperidino, 4-benzylpiperidino or di(C<sub>1</sub>–C<sub>4</sub>)alkylamino group;

R represents hydrogen, a methyl group or a group (CH<sub>2</sub>)<sub>n</sub>—L, where n is an integer from 2 to 6 and L is hydrogen or an amino group;

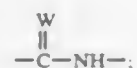
T represents a group selected from



W being an oxygen or sulphur atom, and  
Z represents either M or OM when T represents the



or M when T represents the group



M represents hydrogen or a linear or branched C<sub>1</sub>–C<sub>6</sub> alkyl; an α-hydroxybenzyl, an α-alkylbenzyl or a phenyl-alkyl in which the alkyl contains 1 to 3 carbon atoms, in which the phenyl portion is unsubstituted, mono- or poly-substituted on the aromatic ring with a halogen, a hydroxyl, an alkoxy of 1 to 4 carbon atoms, an alkyl of 1 to 4 carbon atoms; a pyridylalkyl in which the alkyl group contains 1 to 3 carbon atoms; a naphthylalkyl in which the alkyl group contains 1 to 3 carbon atoms; a pyridylthioalkyl in which the alkyl group contains 1 to 3 carbon atoms; a styryl; a 1-methyl-2-imidazolylthioalkyl in which the alkyl group contains 1 to 3 carbon atoms; a 1-oxophenyl-3-indan-2-yl; an aromatic or heteroaromatic radical selected from the group consisting of a phenyl which is unsubstituted, mono- or polysubstituted by a halogen, a C<sub>1</sub>–C<sub>4</sub> alkyl, a C<sub>1</sub>–C<sub>4</sub> alkoxy or a hydroxyl; a naphthyl group which is unsubstituted, mono- or polysubstituted by a halogen, a C<sub>1</sub>–C<sub>4</sub> alkyl or a hydroxyl; a pyridyl, thienyl, an indolyl and a benzothienyl, said pyridyl, thienyl, indolyl and benzothienyl groups being unsubstituted, mono- or polysubstituted by a C<sub>1</sub>–C<sub>3</sub> alkyl or hydroxyl;

or a salt thereof with an inorganic or organic acid or a quaternary ammonium salt thereof.

5,411,972

#### ARYLAMIDE DERIVATIVES FOR TREATING HYPERLIPEMIA

Teruo Komoto, Chiba; Hiroyuki Hirota; Susumu Sato, both of Shizuoka; Mari Ohtsuka, Narashino; Hidehiko Koya, Narita; Hiroyuki Mizuno, Tomisato, and Tadayuki Kuraishi, Narashino, all of Japan, assignors to SS Pharmaceutical Co., Ltd., Tokyo, Japan

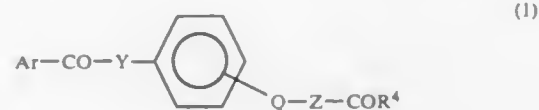
Filed Nov. 29, 1993, Ser. No. 158,398

Claims priority, application Japan, Dec. 8, 1992, 4-328164; Jun. 7, 1993, 5-136119

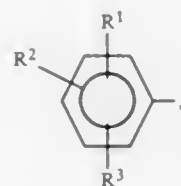
Int. Cl.<sup>6</sup> A61K 31/445; C07D 211/40, 211/74, 295/10

U.S. Cl. 514—330 7 Claims

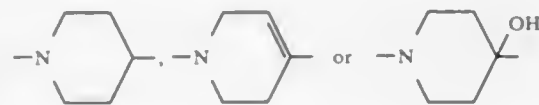
1. An arylamide derivative represented by the formula (1) or a salt thereof:



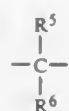
wherein Ar represents a group



in which R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are the same or different from each other and each independently represents a hydrogen atom, a halogen atom, a hydroxyl group, an alkyl group which may be substituted by a halogen atom, an alkoxy group, an alkenyl group, an acylamino group or a carboxyalkoxy group, a naphthyl group, a pyridinyl group, a furyl group, a thienyl group, a quinolyl group or an indolyl group; Y represents a group



and Q represents —O—, Z represents a C<sub>1</sub> to C<sub>3</sub> alkylene group or a group



in which R<sup>5</sup> and R<sup>6</sup> each independently represents an alkyl group; R<sup>4</sup> represents a hydroxyl group, an alkoxy group or a group —NH(CH<sub>2</sub>)<sub>m</sub>COOH, in which m is a number of 1 to 3.

5,411,973

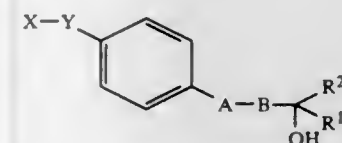
#### THERAPEUTIC ALCOHOLS

Keith Russell, Newark; James R. Empfield, Bear; Cyrus J. Ohnmacht, Wilmington, all of Del., and Keith H. Gibson, Prestbury, England, assignors to Zeneca Limited, England  
Filed May 18, 1993, Ser. No. 63,373

Claims priority, application United Kingdom, May 18, 1992, 9210577; Jan. 25, 1993, 9301438

Int. Cl.<sup>6</sup> C07C 49/835, 317/22; C07D 213/50; A61K 31/10  
U.S. Cl. 514—347 7 Claims

1. A method for the treatment of urinary incontinence, comprising administering to a mammal in need of such treatment an effective amount of a compound of formula I:



wherein:

X is selected from

(a) phenyl which may bear 0–2 substituents selected from fluoro, chloro, and hydroxy,

(b) 2-pyridyl, 3-pyridyl, 4-pyridyl, and 2-pyrimidinyl;

Y is selected from sulfonyl or carbonyl;

A–B is selected from OCH<sub>2</sub>, SCH<sub>2</sub>, NHCH<sub>2</sub>, trans-vinylene, and ethynylene;

R<sup>1</sup> and R<sup>2</sup> are independently selected from the group consisting of methyl, monofluoromethyl, difluoromethyl, trifluoromethyl, ethyl and pentafluoroethyl, provided that at least one of R<sup>1</sup> and R<sup>2</sup> is fluorine-bearing; or a pharmaceutically acceptable in vivo hydrolyzable ester or a pharmaceutically acceptable salt thereof.

5,411,974

#### HETEROCYCLIC COMPOUNDS

Masaaki Toda, Osaka; Shuichi Ohnouchi, Kyoto, and Hiroyuki Ohno, Shiga, all of Japan, assignors to ONO Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 8,365, Jan. 22, 1993, which is a division of Ser. No. 700,299, May 15, 1991, Pat. No. 5,212,191, which is a division of Ser. No. 333,227, Apr. 5, 1989, Pat. No. 5,053,414.

This application Jun. 27, 1994, Ser. No. 265,734

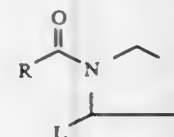
Claims priority, application Japan, Apr. 8, 1988, 63-85288

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.<sup>6</sup> C07D 277/04; A01K 31/425

U.S. Cl. 514—365

1. A thiazoline derivative of the formula:

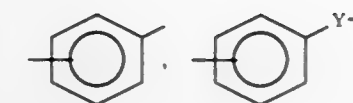


wherein R represents the general formula:



wherein

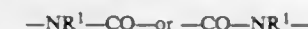
A represents a linkage which contains no atom, an alkylene group of from 1 to 6 carbon atoms(s), an alkenylene group of from 2 to 6 carbon atoms, a group of the formula:



wherein Y represents an alkylene group of from 1 to 4 carbon atom(s) or an alkenylene group of from 2 to 4 carbon atoms, a saturated hydrocarbon ring of from 4 to 7 carbon atoms or a heterocyclic mono ring containing 3 to 7 ring members including 1 or 2 hetero atom(s) selected from N, O and S atoms which may be partially or fully saturated or aromatic,

B represents a linkage which contains no atom or an alkylene group of from 1 to 6 carbon atom(s),

D represents a linkage which contains no atom, an oxygen atom, a carbonyl group or a group of the formula:



wherein R<sup>1</sup> represents a hydrogen atom, an alkyl group of from 1 to 6 carbon atom(s), a phenyl group or a benzyl group,

E represents a linkage which contains no atom, an alkylene group of from 1 to 8 carbon atom(s) or an alkylene group of from 1 to 8 carbon atom(s) substituted or by a phenyl or benzyl group,

G represents a mono-, bi- or tri-carbocyclic ring(s) containing not more than 15 carbon atoms which may be partially or fully saturated or aromatic, or a mono-, bi- or tri-heterocyclic ring(s) containing not more than 15 ring members including carbon and 1 or 2 hetero atoms selected from N, O and S atoms which may be partially or fully saturated or aromatic wherein said carbocyclic or heterocyclic ring(s) represented by G is unsubstituted or substituted by 1–3 of an alkyl group of from 1 to 6 carbon atoms(s), an alkoxy group of from 1 to 6 carbon atom(s), a halogen atom, a trifluoromethyl group or a nitro group,

L represents a —CO—<sup>4</sup> group wherein R<sup>4</sup> represents an alkyl group of from 1 to 6 carbon atom(s), a phenyl group, an alkyl group of from 1 to 6 carbon atom(s), substituted by a phenyl group or a trifluoromethyl group, with the proviso that compounds wherein both of A and B are a linkage which contains no atom are excluded, or a non-toxic salt or hydrate thereof.

5,411,975

#### THIAZOLIDINYL TERMINATED ALKYLAMINO ETHYNYL ALANINE AMINO DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION

Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 930,069, Aug. 14, 1992. This application

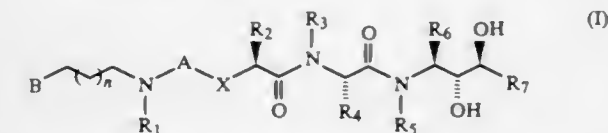
Jan. 25, 1994, Ser. No. 186,211

Int. Cl.<sup>6</sup> A61K 31/425; C07D 277/04

U.S. Cl. 514—365

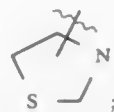
14 Claims

1. A compound of Formula I:

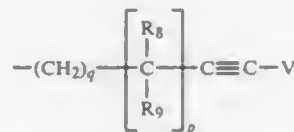


wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein R<sub>1</sub> is selected from hydrido and alkyl; wherein B is a thiazolidinyl radical having the structure





wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein R<sub>2</sub> is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of R<sub>3</sub> and R<sub>5</sub> is independently selected from hydrido and alkyl; wherein R<sub>4</sub> is selected from



wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of R<sub>8</sub> and R<sub>9</sub> is a radical independently selected from hydrido, alkyl, alkenyl and phenyl; wherein R<sub>6</sub> is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein R<sub>7</sub> is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

5,411,976

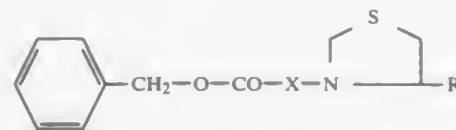
# NEW THIAZOLIDINE DERIVATIVES, PROCESS FOR PREPARING SAME AND ANTI-AMNESTIC COMPOSITION CONTAINING SAME

Kunio Kado, and Toshizo Shiga, both of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Nonsha, Tokyo, Japan  
Continuation of Ser. No. 492,333, Mar. 12, 1990, abandoned, which is a continuation of Ser. No. 288,245, Dec. 22, 1988, abandoned. This application Dec. 19, 1991, Ser. No. 810,447  
Claims priority, application Japan, Dec. 25, 1987, 62-327181  
Int. Cl.<sup>6</sup> C07D 417/06; A61K 31/425

U.S. Cl. 514—365

5 Claims

1. A thiazolidine derivative of the general formula:



wherein X stands for a proline or thioproline residue and R stands for —CH<sub>2</sub>OH or —CHO.

## 5,411,977 SUBSTITUTED 2,5-DIARYL-4-ISOTHIAZOLIN-3-ONES AS ANTIINFLAMMATORY AND ANTITHROMBOTIC AGENTS

Joseph J. Petraitis, Glenmoore, Pa., and Susan R. Sherk, Newark, Del., assignors to The Dupont Merck Pharmaceutical Company, Wilmington, Del.

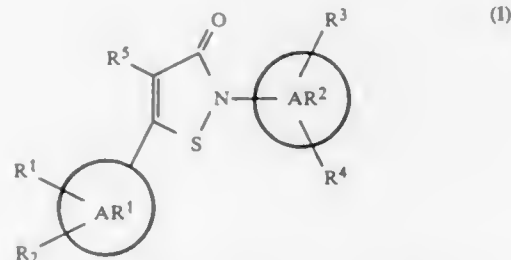
Filed Mar. 31, 1993, Ser. No. 40,771

Int. Cl.<sup>6</sup> A61K 31/425; C07D 275/02, 275/03

U.S. Cl. 514—372

4 Claims

1. A method of treating inflammation in a patient in need of such treatment said method comprising administering to the patient an anti-inflammatory effective amount of a compound of the Formula (I) wherein:



Ar<sup>1</sup> and Ar<sup>2</sup> are each independently a C<sub>5</sub> to C<sub>10</sub> saturated or unsaturated carbocyclic ring;

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> each independently are: H, straight or branched alkyl chain of 1 to 6 carbon atoms, substituted with 0-3 R<sup>8</sup>, alkenyl of 2-4 carbon atoms, alkynyl of 2 to 4 carbon atoms, F, Cl, Br, I, OH, OR<sup>6</sup>, CO<sub>2</sub>H, OCOR<sup>6</sup>, OCO<sub>2</sub>R<sup>6</sup>, OCON(R<sup>6</sup>)<sub>2</sub>, NO<sub>2</sub>, NR<sup>6</sup>R<sup>7</sup>, NHR<sup>7</sup>, NR<sup>6</sup>C(=O)R<sup>6</sup>, CF<sub>3</sub>, NR<sup>6</sup>C(=O)OR<sup>6</sup>, N(C(=S)R<sup>6</sup>)<sub>2</sub>, NR<sup>6</sup>C(+O)N(R<sup>6</sup>)<sub>2</sub>, NR<sup>6</sup>SOR<sup>6</sup>, N(SO<sub>2</sub>R<sup>6</sup>)<sub>2</sub>, N(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, SR<sup>6</sup>, S(O)R<sup>6</sup>, SO<sub>2</sub>R<sup>7</sup>, SO<sub>3</sub>H, SO<sub>2</sub>N(R<sup>6</sup>)<sub>2</sub>, SO<sub>2</sub>NR<sup>6</sup>R<sup>7</sup>, COR<sup>6</sup>, CO<sub>2</sub>R<sup>6</sup>, CON(R<sup>6</sup>)<sub>2</sub> C(=S)NHR<sup>6</sup>, C(=S)N(R<sup>6</sup>)<sub>2</sub>, CONR<sup>6</sup>OR<sup>6</sup>, CN, CONH<sub>2</sub>, CONHR<sup>6</sup>, R<sup>6</sup>CO<sub>2</sub>R<sup>7</sup>, tetrazolyl, or hydroxamic acid;

R<sup>5</sup> is H, Br, OR<sup>6</sup>, SR<sup>6</sup>, COR<sup>6</sup>, CO(R<sup>1</sup>-R<sup>4</sup> substituted Ar<sup>1</sup>), R<sup>6</sup>, CO<sub>2</sub>R<sup>6</sup>, CO<sub>2</sub>H, CONH<sub>2</sub>, CONHR<sup>6</sup>, CON(R<sup>6</sup>)<sub>2</sub>, CONH(R<sup>1</sup>-R<sup>4</sup> substituted Ar<sup>1</sup>), CON(R<sup>1</sup>-R<sup>4</sup> substituted Ar<sup>1</sup>)<sub>2</sub>, CN or R<sup>1</sup>-R<sup>4</sup> substituted Ar<sup>1</sup>;

R<sup>6</sup> is straight or branched alkyl chain of 1 to 4 carbon atoms, alkenyl of 3-4 carbon atoms or alkynyl of 3-4 carbon atoms, and;

R<sup>7</sup> is H, straight or branched alkyl chain of 1 to 4 carbon atoms, alkenyl of 2-4 carbon atoms, or COR<sup>6</sup>; and,

R<sup>8</sup> is: H, straight or branched alkyl chain of 1 to 6 carbons substituted with 0-3 R<sup>6</sup>alkenyl of 2-4 carbon atoms, alkynyl of 2-4 carbon atoms, halo, OH, OR<sup>6</sup>, CO<sub>2</sub>H, OCOR<sup>6</sup>, OCO<sub>2</sub>R<sup>6</sup>, OCON(R<sup>6</sup>)<sub>2</sub>, NO<sub>2</sub>, NR<sup>6</sup>R<sup>7</sup>, NHR<sup>7</sup>, NR<sup>6</sup>C(=O)R<sup>6</sup>, NR<sup>6</sup>C(=O)OR<sup>6</sup>, N(C(=S)R<sup>6</sup>)<sub>2</sub>, NR<sup>6</sup>C(=O)N(R<sup>6</sup>)<sub>2</sub>, NR<sup>6</sup>SOR<sup>6</sup>, N(SO<sub>2</sub>R<sup>6</sup>)<sub>2</sub>, SR<sup>6</sup>, S(O)R<sup>6</sup>, SO<sub>2</sub>R<sup>7</sup>, SO<sub>3</sub>H, SO<sub>2</sub>N(R<sup>6</sup>)<sub>2</sub>, SO<sub>2</sub>NR<sup>6</sup>R<sup>7</sup>, COR<sup>6</sup>, CO<sub>2</sub>R<sup>6</sup>, CON(R<sup>6</sup>)<sub>2</sub>, C(=S)NHR<sup>6</sup>, C(=S)N(R<sup>6</sup>)<sub>2</sub>, CONR<sup>6</sup>OR<sup>6</sup>, CN, CONH<sub>2</sub>, CONHR<sup>6</sup>, R<sup>6</sup>CO<sub>2</sub>, tetrazolyl, and hydroxamic acid; with the proviso that R<sup>1</sup>-R<sup>5</sup> may not simultaneously be H when Ar<sup>1</sup> and Ar<sup>2</sup> are each phenyl; or a pharmaceutically acceptable salt thereof.

## 5,411,978 BENZISOTHIAZOLINONE-1-DIOXIDE DERIVATIVES AS ELASTASE INHIBITORS

Robert Ladislav, Santeny; Elemer Moczar, Gif Sur Yvette; William Georges Hornebeck, Versailles, and Christiane M. Kerneur, Vitry Sur Seine, all of France, assignors to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.

Division of Ser. No. 666,093, Mar. 7, 1991, Pat. No. 5,338,747.

This application Apr. 19, 1994, Ser. No. 230,048

Claims priority, application France, Mar. 8, 1990, 90 02951

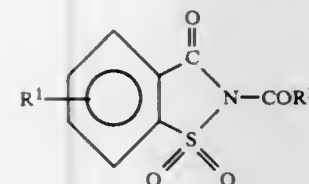
Int. Cl.<sup>6</sup> C07D 275/06; A61K 31/41

U.S. Cl. 514—373

8 Claims

1. A composition comprising:

(i) an elastase inhibitor which is at least one benzisothiazolinone-1-dioxide derivative having the formula:



where

R<sup>1</sup> is a hydrogen atom,

R<sup>2</sup> is a monovalent C<sub>11</sub>-C<sub>19</sub> alkyl or alkenyl group; and

(ii) a pharmaceutically or cosmetically acceptable carrier.

5,411,979

## OXAZOLINE DERIVATIVE, ITS PRODUCTION AND ITS USE

Taro Hirose; Hiroshi Kisida; Shigeru Saito, all of Takarazuka, and Hiroaki Fujimoto, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan  
Filed Jan. 27, 1993, Ser. No. 10,015

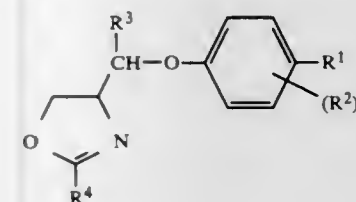
Claims priority, application Japan, Jan. 28, 1992, 4-012967

Int. Cl.<sup>6</sup> A01N 43/76

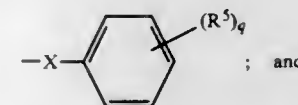
U.S. Cl. 514—374

18 Claims

1. An oxazoline derivative having the formula:

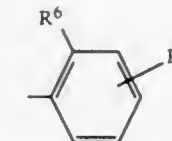


wherein R<sup>1</sup> is a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>16</sub> alkyl group, a C<sub>1</sub>-C<sub>16</sub> haloalkyl group, an alkoxyalkyl group having 2 to 16 carbon atoms, a C<sub>1</sub>-C<sub>16</sub> alkoxy group, a C<sub>1</sub>-C<sub>16</sub> haloalkoxy group, a C<sub>1</sub>-C<sub>16</sub> alkylthio group, a C<sub>1</sub>-C<sub>16</sub> haloalkylthio group, a C<sub>1</sub>-C<sub>10</sub> cycloalkyl group, a C<sub>3</sub>-C<sub>10</sub> halocycloalkyl group, an alkylcycloalkyl group having 4 to 10 carbon atoms, a C<sub>5</sub>-C<sub>10</sub> cycloalkoxy group, a C<sub>5</sub>-C<sub>10</sub> halocycloalkoxy group, an alkylcycloalkoxy group having 5 to 10 carbon atoms or a group of the formula:



(wherein R<sub>5</sub> is, the same or different, a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>8</sub> alkyl group, a C<sub>1</sub>-C<sub>8</sub> haloalkyl group, an alkoxyalkyl group having 2 to 8 carbon atoms, a C<sub>1</sub>-C<sub>8</sub> alkoxy group, a C<sub>1</sub>-C<sub>8</sub> haloalkoxy group, a C<sub>1</sub>-C<sub>8</sub> alkylthio group or a C<sub>1</sub>-C<sub>8</sub> haloalkylthio group; X is a single bond, an

oxygen atom, a sulfur atom, a methylene group or a methyleneoxy group (—CH<sub>2</sub>O—, —OCH<sub>2</sub>—); q is an integer of 1 to 5; R<sup>2</sup> is a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>3</sub> alkyl group, a C<sub>1</sub>-C<sub>3</sub> alkoxy group or a C<sub>1</sub>-C<sub>3</sub> alkylthio group; p is an integer of 1 to 4; R<sub>5</sub> is a hydrogen atom or a methyl group; R<sup>4</sup> is a group of the formula:



(wherein R<sup>6</sup> and R<sup>7</sup> may be the same or different, and each of which is a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>3</sub> alkyl group, a C<sub>1</sub>-C<sub>3</sub> haloalkyl group, a C<sub>1</sub>-C<sub>3</sub> alkoxy group or a C<sub>1</sub>-C<sub>3</sub> haloalkoxy group).

5,411,980

## SUBSTITUTED TRIAZOLINONES, TRIAZOLINETHIONES, AND TRIAZOLINIMINES AS ANGIOTENSIN II ANTAGONISTS

Wallace T. Ashton, Clark; Linda L. Chang, Wayne; Malcolm MacCoss, Freehold; Prasun K. Chakravarty, Edison; William J. Greenlee, Teaneck; Arthur A. Patchett, Westfield, and Kelly Flanagan, Edison, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

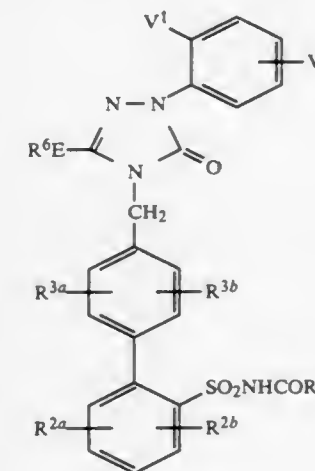
Continuation-in-part of Ser. No. 899,868, Dec. 17, 1992, abandoned, and Ser. No. 812,891, Dec. 20, 1991, abandoned, which is a continuation-in-part of Ser. No. 725,720, Jul. 3, 1991, abandoned, which is a continuation-in-part of Ser. No. 504,507, Apr. 4, 1990, abandoned, which is a continuation-in-part of Ser. No. 386,328, Jul. 28, 1989, abandoned. This application Dec. 21, 1992, Ser. No. 994,228

Int. Cl.<sup>6</sup> A61K 31/41; C07D 249/12

U.S. Cl. 514—384

9 Claims

1. A compound having the formula (I):



or a pharmaceutically acceptable salt thereof, wherein:

R<sup>2a</sup> is:

(a) hydrogen, or  
(b) —Cl, —Br, —I, or —F;

R<sup>2b</sup> is:

(a) hydrogen,  
(b) —Cl, —Br, —I, or —F, or  
(c) C<sub>1</sub>-C<sub>4</sub>-alkyl;

R<sup>3a</sup> is

(a) —H, or  
(b) —Cl, —Br, —I, or —F;

R<sup>3b</sup> is —H, —Cl, —Br, —I, —F, or C<sub>1</sub>-C<sub>4</sub>-alkyl;

E is a single bond;

R<sup>6</sup> is C<sub>1</sub>-C<sub>6</sub>-alkyl is unsubstituted or substituted with one or more substituents selected from the group consisting of: C<sub>3</sub>-C<sub>7</sub>-cycloalkyl and CF<sub>3</sub>;

R<sup>9</sup> is H, C<sub>1</sub>-C<sub>3</sub>-alkyl, aryl or —CH<sub>2</sub>-aryl;

aryl is phenyl, biphenyl, or naphthyl, unsubstituted or substituted with one, two or three substituents selected from the group consisting of: —Cl, —Br, —I, —F, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, NO<sub>2</sub>, CF<sub>3</sub>, C<sub>1</sub>-C<sub>6</sub>-alkyl-S(O)<sub>p</sub>, —CF<sub>3</sub>SO<sub>2</sub>—, —OH, —NR<sup>9</sup>R<sup>10</sup>, CO<sub>2</sub>H, —CO<sub>2</sub>-C<sub>1</sub>-C<sub>4</sub>-alkyl, —CONR<sup>9</sup>R<sup>10</sup>, —CN, —NHCOR<sup>9</sup>, OCF<sub>3</sub>, phenyl-C<sub>1</sub>-C<sub>2</sub>-alkyl, phenyl-S(O)<sub>p</sub>, and phenyl-C<sub>1</sub>-C<sub>2</sub>-alkyl-S(O)<sub>p</sub>;

R<sup>10</sup> is H, or C<sub>1</sub>-C<sub>4</sub>-alkyl;

R<sup>21</sup> is H or R<sup>22</sup>;

R<sup>22</sup> is

(a) C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>2</sub>-C<sub>6</sub>-alkynyl each of which is unsubstituted or substituted with one or more substituents selected from the group consisting of: aryl, wherein aryl is as defined under R<sup>9</sup> above, C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, Cl, Br, I, F, —OH, —O—C<sub>1</sub>-C<sub>4</sub>-alkyl,

(b) C<sub>3</sub>-C<sub>7</sub>-cycloalkyl unsubstituted or substituted with one or more substituents selected from the group consisting of: C<sub>1</sub>-C<sub>4</sub>-alkyl, phenyl, Cl, Br, F, and I, or

(c) aryl, wherein aryl is as defined under R<sup>9</sup> above;

R<sup>23</sup> is

(a) phenyl, unsubstituted or substituted with one or two substituents selected from the group consisting of: Cl, Br, F, I, CH<sub>3</sub> and CF<sub>3</sub>, at least one of which occupies an ortho position;

(b) branched C<sub>3</sub>-C<sub>7</sub>-alkyl;

(c) C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, unsubstituted or substituted at the 1- or 2-position with one to three substituents selected from the group consisting of: C<sub>1</sub>-C<sub>4</sub>-alkyl, Cl, Br, F, or I;

(i) norbornan-2-yl, adamantan-1-yl or noradamantan-3-yl; V<sub>1</sub> is H, CH<sub>3</sub>, CF<sub>3</sub> or halogen, with the proviso that V<sub>1</sub> is CF<sub>3</sub>, when V<sub>2</sub> is H; and

V<sub>2</sub> is:

(a) H,

(b) —NO<sub>2</sub>,

(c) —NR<sup>10</sup>R<sup>21</sup>,

(d) —CONR<sup>21</sup>R<sup>22</sup>,

(e) —COR<sup>22</sup>,

(f) —NR<sup>21</sup>COR<sup>22</sup>,

(g) —NR<sup>21</sup>CO<sub>2</sub>R<sup>22</sup>,

(h) —NR<sup>21</sup>CONR<sup>23</sup>R<sup>22</sup>, or

(i) —S(O)<sub>p</sub>R<sup>22</sup>, wherein p is 0 to 2.

5,411,981

# PHENYLIMIDAZOLIDINES HAVING ANTIANDROGENIC ACTIVITY

Martine Gaillard-Kelly; Francois Goubet, both of Paris; Daniel Philibert, La Verenne Saint Hilaire, and Jean-Georges Teutsch, Pantin, all of France, assignors to Roussel Uclaf, France

Continuation-in-part of Ser. No. 819,910, Jan. 9, 1992, abandoned. This application May 18, 1993, Ser. No. 64,257

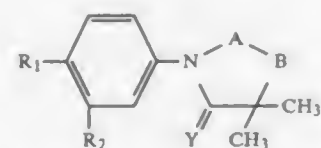
Claims priority, application France, Jan. 9, 1991, 91 00185; Jul. 8, 1992, 92 08431

Int. Cl.<sup>6</sup> C07D 233/72; A61K 31/415

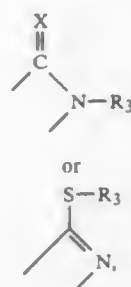
U.S. Cl. 514—386

20 Claims

1. A compound selected from the group consisting of a compound of the formula



wherein R<sub>1</sub> is selected from the group consisting of —CN, —NO<sub>2</sub> and halogen, R<sub>2</sub> is —CF<sub>3</sub> or halogen, —A—B is



X is —O— or —S—, R<sub>3</sub> is selected from the group consisting of a) hydrogen, b) alkyl, alkenyl and alkynyl of up to 12 carbon atoms, c) phenyl and phenylalkyl unsubstituted or substituted with at least one member of the group consisting of —OH, halogen, —OCH<sub>3</sub>, —CN and haloalkyl, d) acyl of an organic carboxylic acid of up to 7 carbon atoms, e) free or saltified carboxy, carboxy esterified with alkyl and amidified carboxy, f) amino and mono and dialkylamino of 1 to 4 carbon atoms and g) —S—phenyl unsubstituted or substituted with at least one member of the group consisting of —CF<sub>3</sub> and alkyl, alkenyl, alkoxy, alkenyloxy, alkynyl and alkynyloxy of up to 12 carbon atoms with the sulfur unoxidized or oxidized to sulfone or sulfoxide, the alkyl, alkenyl and alkynyl being uninterrupted or interrupted with oxygen, sulfur or nitrogen and Y is —O—, —S— or —NH— with the provisos that when X is oxygen, R<sub>3</sub> is hydrogen and Y is —O— or —NH—, then R<sub>1</sub> is NO<sub>2</sub> or —CN and when X is sulfur and Y is —O— then at least one of the following conditions is satisfied, R<sub>1</sub> is —CN and R<sub>2</sub> is —CF<sub>3</sub> and their non-toxic, pharmaceutically acceptable acid addition salts.

5,411,982

# CYCLOALKYLENE AZOLES, AND THEIR USE AS AROMATASE INHIBITORS

Rolf Bohlmann; Peter Strehlke; David Henderson; Martin Schneider, and Yukishige Nishino, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Division of Ser. No. 889,331, May 28, 1992, Pat. No. 5,280,035, which is a continuation of Ser. No. 563,114, Aug. 3, 1990, Pat. No. 5,135,937. This application Nov. 16, 1993, Ser. No. 153,326

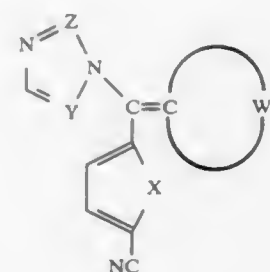
Claims priority, application Germany, Aug. 3, 1989, 39 26 365.7

Int. Cl.<sup>6</sup> A61K 31/415; C07D 409/08, 405/08, 233/58

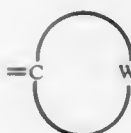
U.S. Cl. 514—397

18 Claims

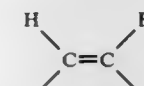
1. A cycloalkylene azole of formula I



I wherein



is a cycloalkylidene group of from 4-20 carbon atoms or a polycycloalkylidene group of from 7-20 carbon atoms unsubstituted or substituted with at least one straight-chain or branched alkyl group of 1-6 carbon atoms; X is the grouping



an oxygen or sulfur atom; and Y and Z are



or a pharmaceutically compatible salt of a cycloalkylene azole of Formula I with acid.

5,411,983  
CERTAIN

# HYDROXY-PHOSPHINYL-OXY-PHENYLMETHYL-IMIDAZOLIUM HYDROXIDE INNER SALTS AS PAF ANTAGONISTS

Allan Wissner, Ardsley, N.Y.; Robert E. Schaub, Upper Saddle River, N.J., and Phaik-Eng Sum, New City, N.Y., assignors to American Cyanamid Company, Wayne, N.J.

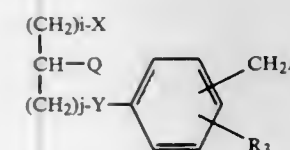
Division of Ser. No. 763,714, Sep. 23, 1991, Pat. No. 5,234,918, which is a continuation of Ser. No. 763,716, Sep. 23, 1991, Pat. No. 5,215,975, which is a continuation of Ser. No. 316,721, Mar. 3, 1989, abandoned, which is a continuation-in-part of Ser. No. 177,299, Apr. 4, 1988, abandoned. This application Jul. 28, 1993, Ser. No. 99,037

Int. Cl.<sup>6</sup> A61K 31/415; C07F 9/6506

U.S. Cl. 514—398

17 Claims

1. A compound of R or S enantiomers or racemic mixtures of compounds of the formula;



Formula I

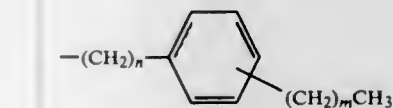
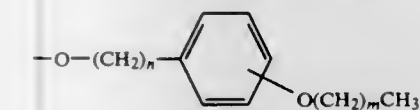
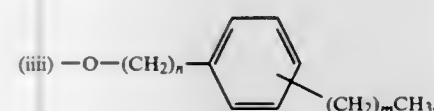
wherein:

(A) X is

(i) C<sub>1</sub>-C<sub>14</sub> alkyl;

(ii) C<sub>1</sub>-C<sub>24</sub> alkoxy;

(iii) C<sub>1</sub>-C<sub>24</sub> carboamoyloxy;



wherein n is an integer from 1 to 25 and m is an integer from 0 to 24 and the sum of n and m is less than or equal to 25;

(v) phenyl;

(vi) mono- or polysubstituted phenyl substituted with C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>1</sub>-C<sub>20</sub> alkoxy, halogen, trifluoromethyl, phenyl, substituted phenyl or benzyloxy;

(vii) phenoxy;

(viii) mono- or polysubstituted phenoxy substituted with C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>1</sub>-C<sub>20</sub> alkoxy, halogen, trifluoromethyl, phenyl, substituted phenyl or benzyloxy;

(ix) naphthaloxy;

(x) mono- or polysubstituted naphthaloxy substituted with C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>1</sub>-C<sub>20</sub> alkoxy or halogen;

(xi) —O—(CH<sub>2</sub>)<sub>r</sub>—O—((CH<sub>2</sub>)<sub>p</sub>O)—(CH<sub>2</sub>)<sub>t</sub>—W wherein W is methyl or phenyl optionally substituted with C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy or phenyl, r, p, t and a are integers such that the expression r+(p+1)t+a is also an integer and has a value of 3 to 20; r is greater than or equal to 2; p is greater than or equal to 2; t is greater than or equal to zero; and a is greater than or equal to zero;

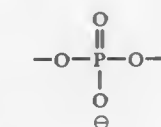
(B) i is an integer from 1 to 3 and j is an integer from 1 to 6;

(C) Q is —OR<sub>2</sub>,



wherein R<sub>2</sub> is hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>1</sub>-C<sub>6</sub> alkenyl;

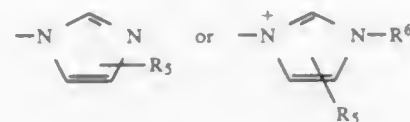
(D) Y is a divalent radical



(E) the moiety R<sub>3</sub> represents one or more C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>5</sub> alkoxy or halogen substituents of the aromatic ring;

(F) the moiety —CH<sub>2</sub>A may be in the ortho, meta or para position wherein A is





5,411,984

## WATER SOLUBLE ANALOGS AND PRODRUGS OF TAXOL

David G. I. Kingston, Blacksburg, Va., and Jingyu Liang, Nanjing, China, assignors to Virginia Tech Intellectual Properties, Inc., Blacksburg, Va.

Filed Oct. 16, 1992, Ser. No. 963,337

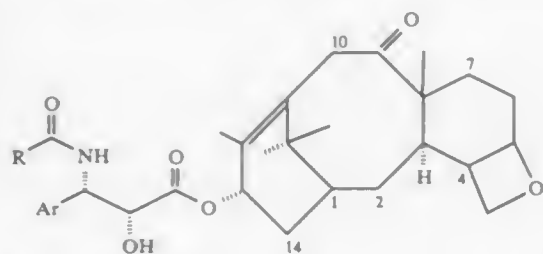
Int. Cl.<sup>6</sup> A61K 31/335; C07D 305/14

U.S. Cl. 514-449

47 Claims

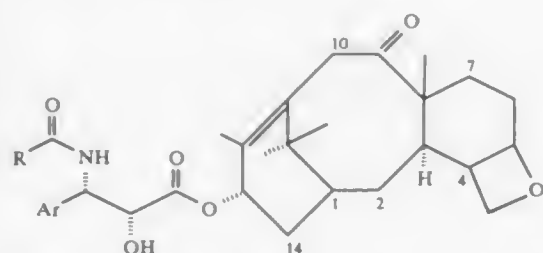
1. Taxol congeners having the taxane tetracyclic nucleus and C-13 side-chain of Formula I wherein R is selected from the group consisting of aryl, alkoxy, alkyl, and alkenyl, and the C-1, C-2 and C-4 positions have the same substituents as in taxol and wherein the C-7 position has a substituent selected from the group consisting of hydroxy, triethylsilyloxy, and ester and the C-10 position has a substituent selected from the group consisting of hydroxy and ester; and

having a C-2'-O-aryl substituent wherein said aryl substituent has at least two substituents independently selected from the group consisting of alkyl, aryl, ester, sulfonate, carboxylate, and ammonio cation and wherein the Formula I is as follows:



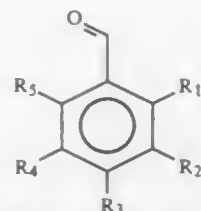
29. Taxol congeners having the taxane tetracyclic nucleus and C-13 side-chain of Formula I, wherein R is selected from the group consisting of aryl, alkoxy, alkyl, and alkenyl, and the C-1, C-2 and C-4 positions have the same substituents as in taxol and wherein the C-7 position has a substituent selected from the group consisting of hydroxy, triethylsilyloxy, and ester and the C-10 position has a substituent selected from the group consisting of hydroxy and ester; and

having a C-2'-O-aryl substituent, wherein the aryl substituent has at least one substituent selected from the group consisting of alkyl, aryl, ester and sulfonate and wherein the Formula I is as follows:

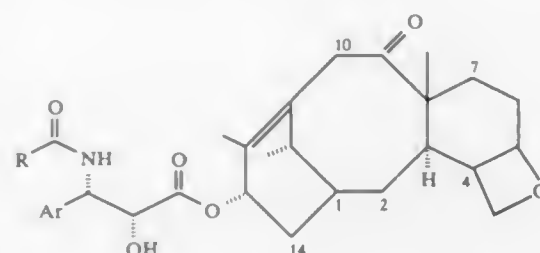


39. Taxol congeners having the taxane tetracyclic nucleus and C-13 side-chain of Formula I, wherein R is selected from the group consisting of aryl, alkoxy, alkyl, and alkenyl, and the C-1, C-2 and C-4 positions have the same substituents as in taxol and wherein the C-7 position has a substituent selected from the group consisting of hydroxy, triethylsilyloxy, and

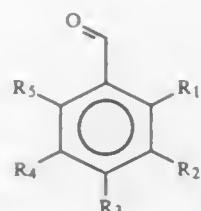
ester and the C-10 position has a substituent selected from the group consisting of hydroxy and ester; and having an O-benzoyl substituent at the C-2' position, wherein the benzoyl substituent has the general formula:



wherein R<sub>3</sub> is selected from the group consisting of COO-X<sup>+</sup>, SO<sub>3</sub>-X<sup>-</sup>, alkyl containing a substituent selected from the group consisting of SO<sub>3</sub>-X<sup>+</sup>, COO-X<sup>+</sup>, and ammonio cation; and aryl containing a substituent selected from the group consisting of SO<sub>3</sub>-X<sup>+</sup>, COO-X<sup>+</sup>, and ammonio cation; wherein X<sup>+</sup> is selected from the group consisting of the alkali metal cations and the ammonio cations; and wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>4</sub>, and R<sub>5</sub> are independently selected from the group consisting of H, alkyl, aryl, ester, sulfonate, carbonate, and ammonio cation and wherein the Formula I is as follows:



46. Taxol congeners having the taxane tetracyclic nucleus and C-13 side-chain of Formula I, wherein R is selected from the group consisting of aryl, alkoxy, alkyl, and alkenyl, and the C-1, C-2 and C-4 positions have the same substituents as in taxol and wherein the C-7 position has a substituent selected from the group consisting of hydroxy, triethylsilyloxy, and ester and the C-10 position has a substituent selected from the group consisting of hydroxy and ester; and having an O-benzoyl substituent at the C-2' position wherein the benzoyl substituent has the general formula:



wherein R<sub>3</sub> is selected from the group consisting of COO-X<sup>+</sup>, SO<sub>3</sub>-X<sup>-</sup>, alkyl containing a substituent selected from the group consisting of SO<sub>3</sub>-X<sup>+</sup>, COO-X<sup>+</sup>, and ammonio cation; and aryl containing a substituent selected from the group consisting of SO<sub>3</sub>-X<sup>+</sup>, COO-X<sup>+</sup>, and ammonio cation; wherein X<sup>+</sup> is H<sup>+</sup>; and wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>4</sub>, and R<sub>5</sub> are independently selected from the group consisting of H, alkyl, aryl, ester, sulfonate, carbonate, and ammonio cation and further wherein said taxol congeners are intermediates that can be converted via cation exchange to congeners having increased water solubility relative to taxol and wherein the Formula I is as follows:

5,411,987

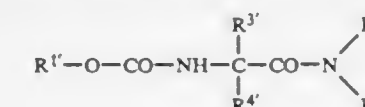
FUNGICIDAL SUBSTITUTED AMINO ACID AMIDES  
Detlef Wollweber, Wuppertal; Thomas Seltz, Monheim, and Wilhelm Brandes, Leichlingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany  
Division of Ser. No. 514,919, Apr. 25, 1990, Pat. No. 5,210,084.  
This application Feb. 25, 1993, Ser. No. 23,241  
Claims priority, application Germany, May 13, 1989, 39 15 755.5

Int. Cl.<sup>6</sup> A01N 37/46; C07C 271/44

U.S. Cl. 514-529

4 Claims

1. A substituted amino amide derivative of the formula



in which

R<sup>1</sup> represents straight-chain or branched alkyl having 1 to 6 carbon atoms, straight-chain or branched alkenyl or alkynyl having 2 to 6 carbon atoms, straight-chain or branched halogenoalkyl having 1 to 6 carbon atoms and 1 to 9 identical or different halogen atoms, straight-chain or branched halogenoalkenyl or halogenoalkynyl having 2 to 6 carbon atoms and 1 to 9 identical or different halogen atoms or unsubstituted or substituted cycloalkyl or cycloalkenyl having 3 to 7 carbon atoms,

R<sup>3</sup> represents hydrogen, and

R<sup>4</sup> represents i-propyl, i-butyl, s-butyl or 3-pentyl, or

R<sup>3</sup> and R<sup>4</sup>, together with the carbon atom to which they are bonded, form a cycloalkyl ring having 3 to 7 carbon atoms,

R<sup>5</sup> represents hydrogen or alkyl having 1 to 6 carbon atoms, and

R<sup>6</sup> represents alkenyl or alkynyl having in each case 2 to 6 carbon atoms, or represents cyanoalkyl having 1 to 4 carbon atoms in the alkyl part, phenylalkyl having 1 to 4 carbon atoms in the phenyl part, which is substituted in the phenyl part by one to three identical or different substituents, or phenyl which is substituted by one to three identical or different substituents, the substituents in each case being selected from the group consisting of halogen; alkyl, alkoxy and alkylthio having in each case 1 to 4 carbon atoms; halogenoalkyl, halogenoalkoxy and halogenoalkylthio having in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms; hydroxyl; cyano; nitro; amino; alkylamino and dialkylamino having in each case 1 to 4 carbon atoms and carboxyl; or represents cycloalkyl having 3 to 7 carbon atoms which is unsubstituted or substituted by identical or different substituents, the substituents being alkyl and alkoxy and having in each case 1 to 4 carbon atoms.

5,411,985

GAMMA-PYRONE-3-ACETIC ACID AS AN INHIBITOR OF INTERLEUKIN-1 $\beta$  INVENTORY ENZYME

Gerald F. Bills, Cranford; Otto D. Hensens, Red Bank; Jerrold M. Liesch, Princeton Junction; Russel B. Lingham, Watchung; Jon D. Polishook, Scotch Plains; Michael J. Salvatore, South Plainfield, and Susan L. Raghoobar, Fords, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

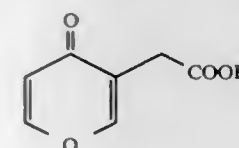
Filed May 17, 1993, Ser. No. 62,881

Int. Cl.<sup>6</sup> A61K 31/35

U.S. Cl. 514-460

4 Claims

1. A pharmaceutical composition for inhibiting ICE comprising a pharmaceutically acceptable carrier and a non-toxic therapeutically effective amount of compound of formula I which is gamma-pyrone-3-acetic acid



or a pharmaceutically acceptable salt thereof wherein said effective amount is 5 mg to 500 mg of formula I.

5,411,986

## CHEMOPROTECTIVE ISOTHIOCYANATES

Cheon-Gyu Cho; Gary H. Posner; Paul Talalay, and Yuesheng Zhang, all of Baltimore, Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Mar. 12, 1993, Ser. No. 30,610

Int. Cl.<sup>6</sup> C07C 331/04

U.S. Cl. 514-514

14 Claims

1. A pharmaceutical composition comprising an active ingredient which is sulforaphane ((-)-1-isothiocyanato-(4R)-(methylsulfinyl)butane) (CAS 4478-93-7) or an analogue thereof, said analogue being selected from the group consisting of: 6-isothiocyanato-2-hexanone (GHP 1105); exo-2-acetyl-6-isothiocyanatonorbornane (GHP 1066); exo-2-isothiocyanato-6-methylsulfonylnorbornane (GHP 1068); 6-isothiocyanato-2-hexanol (GHP 1106); 1-isothiocyanato-4-dimethylphosphonylbutane (GHP 1078); exo-2-(1'-hydroxyethyl)-5-isothiocyanatonorbornane (GHP 1075); exo-2-acetyl-5-isothiocyanatonorbornane (GHP 1067); 1-isothiocyanato-5-methylsulfonylpentane (GHP 1003); and cis- or trans-3-(methylsulfonyl)cyclohexylmethylisothiocyanate (GHP 1079 or 1080).

5,411,988

## COMPOSITIONS AND METHODS FOR INHIBITING INFLAMMATION AND ADHESION FORMATION

Barry I. Bockow, 16122-8th Ave. S.W., Ste. D3, Seattle, Wash. 98166, and Marc D. Erlitz, 12034 NE. 130th La. #101, Kirkland, Wash. 98034

Filed Oct. 27, 1993, Ser. No. 144,054

Int. Cl.<sup>6</sup> A61K 31/20, 31/61, 31/07

U.S. Cl. 514-560

24 Claims

1. A method for inhibiting tissue adhesion in a body cavity of a warm-blooded animal, comprising administering to the body cavity an effective amount of a composition comprising an omega fatty acid, a nonionic surfactant, a cyclooxygenase inhibitor, and a pharmaceutically acceptable carrier or diluent.

5,411,989

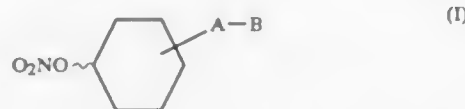
## NITRIC ACID ESTERS OF CYCLOHEXANOL DERIVATIVES

Helmut Michel, Mannheim, and Wolfgang Bartsch, Viernheim, both of Germany, assignors to Boehringer Mannheim, GmbH, Mannheim, Germany

Division of Ser. No. 920,365, Aug. 17, 1992, abandoned. This application Dec. 17, 1993, Ser. No. 168,163  
Claims priority, application Germany, Feb. 16, 1990, 40 04 841.1

Int. Cl.<sup>6</sup> A61K 31/16; C07C 309/26, 233/08, 233/23  
U.S. Cl. 514—616 15 Claims

1. Cyclohexanol nitrates of the formula I



wherein A is a valency bond or a C<sub>1</sub>–C<sub>6</sub> alkylene chain; and wherein B is the group —NR<sup>1</sup>—CO—Z, —NR<sup>1</sup>—SO<sub>2</sub>—Z, or —CO—NR<sup>2</sup>—Z,  
wherein R<sup>1</sup> is hydrogen or a C<sub>1</sub>–C<sub>6</sub> alkyl group; R<sup>2</sup> is hydrogen, hydroxyl, hydroxy —C<sub>1</sub>–C<sub>6</sub> alkyl, C<sub>1</sub>–C<sub>6</sub> alkoxy, C<sub>1</sub>–C<sub>6</sub> alkyl, C<sub>2</sub>–C<sub>6</sub> alkenyl, or C<sub>2</sub>–C<sub>6</sub> alkynyl; Z is hydrogen, an unsubstituted or substituted C<sub>1</sub>–C<sub>6</sub> alkyl, C<sub>2</sub>–C<sub>6</sub> alkenyl, or C<sub>2</sub>–C<sub>6</sub> alkynyl group wherein the substituents are at least one of hydroxyl, C<sub>1</sub>–C<sub>6</sub> alkylcarboxyloxy, C<sub>1</sub>–C<sub>6</sub> alkoxy, halogen, cyano, carboxyl, C<sub>1</sub>–C<sub>6</sub> alkoxycarbonyl, —CO—NR<sup>3</sup>R<sup>4</sup>, mercapto, C<sub>1</sub>–C<sub>6</sub> alkylmercapto or C<sub>1</sub>–C<sub>6</sub> alkylcarbonylmercapto, or Z is a C<sub>3</sub>–C<sub>6</sub> cycloalkyl group, and for the case that B is an NR<sup>1</sup>—CO—Z group, Z can also be C<sub>1</sub>–C<sub>6</sub> alkoxy; and R<sup>3</sup> and R<sup>4</sup> can be the same or different, and, in each case independently of one another, signify hydrogen or a C<sub>1</sub>–C<sub>6</sub> alkyl group, as well as their optically active forms and physiologically compatible salts.

5,411,990

## INDUSTRIAL MICROBICIDE AND A METHOD FOR KILLING MICROBES FOR INDUSTRIAL USE

Katsuji Tsuji, Kyoto, and Hidenori Hirashima, Osaka, both of Japan, assignors to Yoshitomi Pharmaceutical Industries Ltd. and Katayama Chemical Inc., both of Osaka, Japan

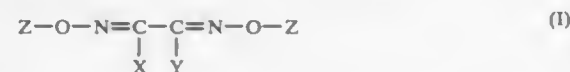
Filed May 17, 1993, Ser. No. 62,661

Claims priority, application Japan, May 18, 1992, 4-125105; May 22, 1992, 4-130929; Apr. 28, 1993, 5-103140

Int. Cl.<sup>6</sup> A01N 33/24, 47/40, 43/78, 37/34

U.S. Cl. 514—640 9 Claims

1. An industrial microbicide which comprises:  
at least one haloglyoxime derivative of the formula (I):



wherein X is a halogen atom; Y is a hydrogen atom, a halogen atom or a lower alkyl group having 1 to 4 carbon atoms; and Z is a hydrogen atom or an optionally halogenated lower alkanoyl group having 1 to 5 carbon atoms; and  
at least one known industrial microbicide ingredient which is

- an organonitrogen-sulfur compound selected from the group consisting of methylenebisithiocyanate, 5-chloro-2-methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazolin-3-one, and 4,5-dichloro-2-n-octyl-isothiazolin-3-one,
- an organohalogen compound selected from the group consisting of 2-bromo-2-nitropropane-1,3-diol, 2-bromo-2-nitro-1-ethanol, 2,2-dibromo-2-nitro-1-ethanol, 2-bromo-2-nitro-1,3-diacetoxypentane, 2,2-dibromo-3-nitro-propionamide, β-bromo-β-nitrostyrene, 5-bromo-5-nitro-1,3-dioxane, 1,2-bis(bromoacetoxymethyl)ethane, 1,2-bis(bromoacetoxymethyl)propane,

1,4-bis(bromoacetoxymethyl)-2-butene and 1,2,3-tris(bromoacetoxymethyl)propane,

- an organonitrogen compound selected from the group consisting of α-chlorobenzaldoxime, 5-chloro-2,4,6-trifluoroisophthalonitrile and 5-chloro-2,4-difluoro-6-methoxyisophthalonitrile or
- an organosulfur compound selected from the group consisting of 4,5-dichloro-1,2-dithiol-3-one, bis(trichloromethyl)sulfone and bis(tribromomethyl)sulfone, and optionally a carrier or diluent provided that the combination of monohaloglyoxime (Y and Z are hydrogen atoms) and the known industrial microbicide ingredient is excluded.

5,411,991

## METHOD OF REDUCING HAIR GROWTH EMPLOYING SULFHYDRYL ACTIVE COMPOUNDS

Douglas Shander, 16112 Howard Landing Dr., Gaithersburg, Md. 20878; Gurpreet S. Ahluwalia, 8632 Stable View Ct., Gaithersburg, Md. 20879, and Diana M-D. Grosso, 4513 W. Brook Ln., Kensington, Md. 20895

Filed Dec. 22, 1992, Ser. No. 995,037

Int. Cl.<sup>6</sup> A61K 31/13, 31/60, 31/22, 31/195

U.S. Cl. 514—665 31 Claims

- A process of reducing the rate of mammalian hair growth, comprising:  
selecting an area of mammalian skin from which a reduced rate of hair growth is desired; and  
applying a non-depilatory composition including a hair growth reducing effective amount of a sulfhydryl active compound to said area of mammalian skin, said sulfhydryl active compound penetrating into the hair follicles in said area of mammalian skin to interfere with the formation of new hair causing a reduction in the rate of hair growth from said area of mammalian skin.

5,411,992

## LICE REPELLANT COMPOSITION

Meir Eini, Ness Ziona, and Dov Tamarkin, Jerusalem, both of Israel, assignors to Cilco Ltd., Ness Ziona, Israel

Continuation of Ser. No. 902,415, Jun. 19, 1992, Pat. No.

5,227,163, which is a continuation of Ser. No. 642,806, Jan. 18, 1991, abandoned. This application Apr. 29, 1993, Ser. No. 55,986

The portion of the term of this patent subsequent to Jul. 13, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> A01N 31/08, 65/00

U.S. Cl. 514—731 15 Claims

- A method to repel lice, comprising applying to a human or an animal susceptible to lice infestation an effective amount to repel but not kill lice of a terpene or a mixture of terpenoids in an acceptable carrier for topical application to a human or an animal, wherein the terpene is selected from the group consisting of a terpene-ol other than linalool, terpene ester, essential oil containing at least 40% terpene-ol or terpene-ester, cytral, nerol, ionone, dihydrocarvone, and pullegone, wherein the composition does not contain any non-terpenoid insecticides or repellants.

5,411,993

## ANTI-INFLAMMATORY, STABLE AQUEOUS PREPARATION COMPRISING AZULENE SODIUM SULFONATE AND POLYHYDRIC ALCOHOL

Tokihiko Yamamoto, Nagoya; Tomoyuki Yamaoka, Kasugai; Yoshiaki Yoshida, Toyohashi; Kazuo Shin, Kodaira; Hiromitsu Aonuma, Yokohama, and Tutomu Tanaka, Tokyo, all of Japan, assignors to Nihon Tengen Kenkyusho Co. Ltd. and Meiji Milk Prod. Co., Ltd., both of Japan

Filed Jul. 12, 1993, Ser. No. 89,581

Claims priority, application Japan, Jul. 13, 1992, 4-185443

Int. Cl.<sup>6</sup> A61K 31/015, 9/10

U.S. Cl. 514—766 8 Claims

- An aqueous solution preparation for topical application to treat inflammation of the oral cavity or throat which comprises 0.02 to 0.06 w/v % of azulene sodium sulfonate as an active ingredient and 20 w/v % or more of a polyhydric alcohol selected from the group consisting of glycerin, sorbitol and xylitol.

5,411,994

## GRAFT COPOLYMERS OF POLYOLEFINS AND A METHOD OF PRODUCING SAME

Paolo Gaili, Wilmington; Anthony J. DeNicola, Jr., Newark, both of Del., and Jeanine A. Smith, West Chester, Pa., assignors to Himont Incorporated, Wilmington, Del.

Continuation of Ser. No. 604,553, Oct. 26, 1990, abandoned, which is a continuation-in-part of Ser. No. 454,228, Dec. 21, 1989, abandoned. This application Nov. 6, 1992, Ser. No. 973,193

Int. Cl.<sup>6</sup> C08J 9/36; C08F 255/02, 255/04, 255/08

U.S. Cl. 521—50.5 20 Claims



- A grafted copolymer material comprising a particulate olefin polymer material having a uniform distribution of graft polymerized vinyl monomer throughout the particulate formed by the free radical-initiated graft polymerization in a substantially non-oxidizing environment of 5 to 80 percent by weight of at least one vinyl monomer at the free radical sites on an as-polymerized particulate olefin polymer material which as-polymerized particulate material has (a) a pore volume fraction of at least about 0.07 wherein more than 40% of the pores have a diameter larger than 1 micron; (b) a surface area of at least 0.1 m<sup>2</sup>/g; and (c) a weight average diameter in the range of about 0.4 to 7 mm, and wherein the vinyl monomer is (i) neat or (ii) in combination with a diluent or a solvent compound, which compound is selected from the group consisting of ketones, alcohols, aromatic hydrocarbons and cycloaliphatic hydrocarbons, and which, if present, is inert with respect to the as-polymerized particulate olefin polymer material.

5,411,995

## FREE RADICALLY CURABLE FORMULATIONS EMPLOYING DITHIOLATE CATALYSTS

Darchun B. Yang, West Hartford, Conn., assignor to Loctite Corporation, Newington, Conn.

Division of Ser. No. 556,019, Jul. 20, 1990, Pat. No. 5,217,760.

This application Apr. 8, 1993, Ser. No. 44,826

Int. Cl.<sup>6</sup> C08F 2/50

U.S. Cl. 522—27 20 Claims

- A photoinitiator for initiating curing of free radically

polymerizable ethylenically unsaturated compounds, the photoinitiator consisting essentially of:

- a dithiolate component selected from the group consisting of transition metal xanthate salts and mixtures thereof; and
- a coinitiator selected from the group consisting of:  
halogenated organic compounds,  
tertiary amines selected from the group consisting of trialkyl amines, one or more of the alkyl groups of which being optionally substituted by a hydroxy group; triphenylamine; N,N-dialkylaniline and dialkylanilines substituted in one or more of the ortho, meta, or para positions by the following groups: methyl, ethyl, isopropyl, t-butyl, n-pentyl, n-hexyl, phenyl, 3,4-tetramethylene, trifluoromethyl, hydroxy, ethoxy, methylthio, ethylthio, acetylthio, isopropylthio, fluoro, chloro, bromo and iodo; N-alkyl substituted cyclic amines; and polymers having tertiary amino groups, and mixtures thereof.

5,411,996

## ONE-PART UV-CURABLE EPOXY SILICONE COMPOSITIONS CONTAINING A FLUORINATED ALCOHOL

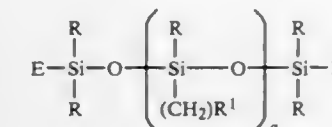
Richard P. Eckberg, Saratoga Springs, and Michael J. O'Brien, Clifton Park, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Jun. 25, 1992, Ser. No. 904,347

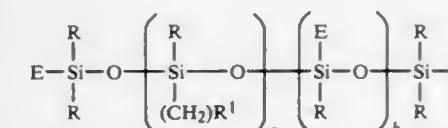
Int. Cl.<sup>6</sup> C08F 2/50; C08G 77/38, 77/46, 59/14

U.S. Cl. 522—31 18 Claims

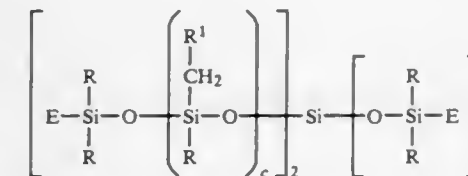
- A one part UV curable composition selected from a group consisting of (i) a mixture of (A), (C) and (D), and II a mixture of (A), (B), (C) and (D);  
wherein (A) is an epoxy-functional silicone selected from the group consisting of  
(I) linear epoxy-functional silicones having the general formula



(II) linear epoxy-functional silicones having the general formula

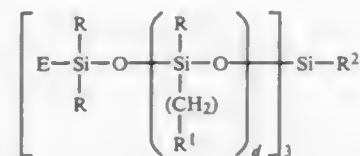


(III) resinous epoxy-functional silicones having the general formula



and  
(iv) resinous epoxy-functional silicones having the general formula





wherein E represents an epoxy-functional organic group of from about 2 to about 20 carbon atoms, R represents an alkyl radical having from 1 to about 10 carbon atoms, R<sup>1</sup> represents a hydrogen atom or an alkyl or perfluoroalkyl radical having from about 1 to about 8 carbon atoms, R<sup>2</sup> represents an alkyl radical having from 1 to about 10 carbon atoms, "a" represents a number from 0 to about 400, "b" represents a number from 1 to about 100, "c" represents a number from 0 to about 100, and "d" represents a number from 0 to about 100; wherein (B) is an epoxy-functional silicone polyether copolymer having the general formula:



where

M<sup>E</sup> is ER<sub>2</sub>SiOt<sub>1</sub>, E=an alkylepoxy group,

D is R<sub>2</sub>SiO

D' is R<sub>2</sub>SiOR', R' = —CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>—

PEO is polyethylene oxide

x is up to about 400

y ranges from about 1 to about 50 and (B) has a viscosity ranging from about 10 to about 10000 ctsk at 25° C.;

wherein (C) is an aliphatic fluoro-containing alcohol having from 1 to about 10 carbon atoms

wherein (D) is a sulfonium catalyst having the general formula:



where radicals represented by R<sup>3</sup> can be the same or different organic radicals from 1 to 30 carbon atoms, including aromatic carbocyclic radicals of from 6 to 20 carbon atoms which can be substituted with from 1 to 4 monovalent radicals selected from C<sub>(1-18)</sub> alkoxy, C<sub>(1-8)</sub> alkyl, nitro, chloro, bromo, cyano, carboxy and, mercapto and also including aromatic heterocyclic radicals including, e.g., pyridyl, thiophenyl and pyranil, and MX<sub>n</sub><sup>-</sup> is a non-basic, non-nucleophilic anion, such as BF<sub>4</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, AsF<sub>6</sub><sup>-</sup>, SbF<sub>6</sub><sup>-</sup>, SbCl<sub>6</sub><sup>-</sup>, HSO<sub>4</sub><sup>-</sup>, ClO<sub>4</sub><sup>-</sup>, and the like.

5,411,997

#### MUD MATERIAL USED FOR IRON TAP HOLE IN BLAST FURNACE

Kengo Ohara; Hiraio Omori, both of Akashi; Osamu Michihiko, Kakogawa; Makoto Suga, Kakogawa; Kouji Shimomura, Kakogawa; Toshitake Okada, Kakogawa, and Yuji Ochiai, Kakogawa, all of Japan, assignors to Shinagawa Rosai Kabushiki Kaisha, Akashi, Japan

PCT No. PCT/JP92/00264, § 371 Date Nov. 5, 1992, § 102(e) Date Nov. 5, 1992, PCT Pub. No. WO92/15537, PCT Pub. Date Sep. 17, 1992

PCT Filed Mar. 5, 1992, Ser. No. 945,643

Claims priority, application Japan, Mar. 7, 1991, 3-41865

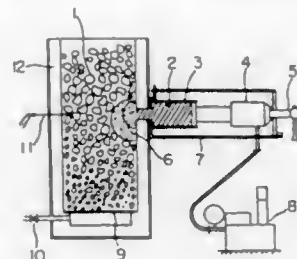
Int. Cl.<sup>6</sup> B22C 1/22

U.S. Cl. 523—145

12 Claims

1. A mud material used for an iron tap hole in a blast furnace containing a refractory aggregate used for conventional mud material and a binder, wherein said binder is a solution consisting of a novolak phenolic resin including novolak phenolic resin having a number-average molecular weight ranging from

300 to 600 and a solvent, and having a resin content in the liquid ranging from 50 to 70 wt. %, and wherein said solution



is added in an amount of from 8 to 20 wt. % based on the refractory aggregate.

5,411,998

#### CURING ANAEROBIC COMPOSITIONS THROUGH THICK BOND LINES

Clara B. McArdle, and Joseph Burke, both of Dublin, Ireland, assignors to Loctite Limited, Dublin, Ireland

Filed Jul. 19, 1993, Ser. No. 93,414

Claims priority, application Ireland, Jul. 24, 1992, 922418

Int. Cl.<sup>6</sup> C09J 4/02, 5/02; C08F 4/00

U.S. Cl. 523—176

23 Claims

1. A process for sealing or adhering two surfaces having gaps of more than 100 micrometers between the surfaces which comprises:

(A) applying to at least one of said surfaces an anaerobic compositions comprising:

(i) a room temperature polymerizable (meth)acrylic ester monomer,

(ii) a peroxy free radical initiator, and

(iii) an amount effective as an accelerator of a combination of saccharin and at least one onium salt (other than an iodide), said onium salt being present in an amount of at least about 0.25% by weight of the composition; and

(B) placing said surfaces in an abutting relationship until the composition has cured through the gaps.

5,411,999

#### EPOXY-POLYESTER, POLYCARBONATE, METAL PHOSPHATE AND RUBBERY MODIFIER

Robert R. Gallucci, Mt. Vernon, Ind., assignor to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 139,390, Oct. 19, 1993, Pat. No. 5,354,791.

This application Aug. 22, 1994, Ser. No. 294,280

Int. Cl.<sup>6</sup> C08K 7/14; C08L 67/02, 69/00

U.S. Cl. 523—436

18 Claims

1. A polyester-polycarbonate composition comprising

(a) polyester having epoxy functionality,

(b) polycarbonate,

(c) a high impact rubbery modifier, and

(d) a catalyst quencher selected from the group consisting of Group IB metal phosphate salts, Group IIB metal phosphate salts, and salts of the formula



wherein M is a metal, x is a number ranging from 1 to 12, and y is a number ranging from 1 to 12, n is a number in the range of 1 to 10, z is a number in the range of 1 to 5, and the sum of xz+y is equal to n+2.

5,412,000

#### PLASTIC PRIMER COATING OF EVA, CHLORINATED POLYOLEFIN AND EPOXY RESIN

Udo Hellmann, Remscheid; Werner Stephan, Wuppertal, and Fritz Sadowski, Pulheim, all of Germany, assignors to Herberts Gesellschaft mit beschränkter Haftung, Germany

Continuation of Ser. No. 102,538, Aug. 4, 1993, abandoned, which is a continuation of Ser. No. 917,795, Jul. 20, 1992,

abandoned, which is a continuation of Ser. No. 667,241, Mar. 8, 1991, abandoned, which is a continuation of Ser. No. 297,304,

Jan. 13, 1989, abandoned. This application Mar. 17, 1994, Ser. No. 216,071

Claims priority, application Germany, Jan. 15, 1988, 38 00 938.2

Int. Cl.<sup>6</sup> C08K 5/01; C08L 23/08, 23/28, 63/02

U.S. Cl. 523—437

5 Claims

1. A sprayable plastic primer coating composition for priming a polyolefin plastic surface of a structural vehicle part consisting essentially of:

a) from about 1 to 5% by weight of one or more ethylene/vinyl acetate copolymers which have a vinyl acetate content of from about 27 to 42 weight percent,

b) from about 0.5 to 5% by weight of one or more chlorinated polyolefins having a chlorine content of from about 10 to 25 weight percent,

c) from about 0.01 to 5% by weight of one or more epoxy resins prepared by reaction of aromatic polyols with epichlorohydrin,

d) from about 85 to 98.49% by weight of one or more organic solvents containing at least one solvent selected from the group consisting of xylene, toluene and mixtures thereof.

5,412,001

#### METHOD TO REACTOR-FILL POLYOLEFINS BY FORMATION OF A DUAL CATALYST SYSTEM CAUSING COMPATIBILIZATION OF THE FILLER WITH THE MAXTRIX POLYMER

Richard W. Fries, Joliet, Ill., assignor to Quantum Chemical Corporation, Cincinnati, Ohio

Filed Aug. 30, 1993, Ser. No. 114,034

Int. Cl.<sup>6</sup> C08L 9/02, 9/04

U.S. Cl. 523—344

31 Claims



1. A method to reactor-fill polyolefins useful for preparing a reactor-filled polyolefin composite having a relatively uniform distribution of filler particles blended therein comprising the steps of:

(a) adding a catalytic amount of a transition metal halide to a filler material to initiate the formation of atactic polyolefin on the surface and in the pores of said filler material, said filler material being present in the composite in proportions to act as a filler;

(b) contacting the product of step (a) in no specific order with a high activity polymerization catalyst, a cocatalyst, and, if necessary a cocatalyst modifier wherein said high activity polymerization catalyst comprises:

(i) a pretreated inorganic or organic support material;

(ii) an organomagnesium compound;

(iii) at least one transition metal containing compound effective in alpha-olefin polymerization reactions; and as appropriate;

(iv) an alcohol or modifying compound, and

(c) adding an alpha-olefin under olefin polymerization reac-

tion conditions to the reaction product of step (b) to cause formation of said reactor-filled composite.

5,412,002

#### COMPOSITION OF GLYCIDYLATED PHENOL/VINYLCYCLOHEXENE OR VINYL NORBORNENE RESIN

Masami Enomoto; Susumu Kubota; Hitoshi Yuasa; Fumiaki Oshimi, and Yutaka Otsuki, all of Yokohama, Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1992, Ser. No. 988,225

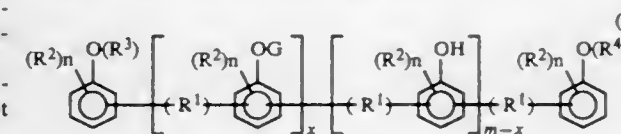
Claims priority, application Japan, Dec. 11, 1991, 3-327830

Int. Cl.<sup>6</sup> C08K 3/36; C08L 63/00; C08G 59/04

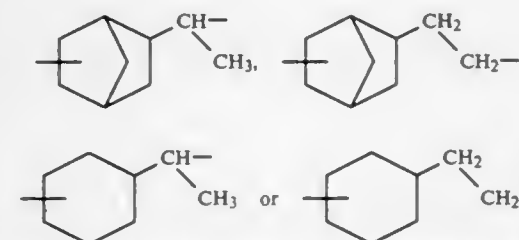
U.S. Cl. 523—466

12 Claims

1. An epoxy resin composition for encapsulation containing an epoxy resin represented by the formula (I), a phenol resin, a curing accelerator and an inorganic filler:



wherein R<sup>1</sup> stands for



where G stands for a glycidyl group, R<sup>2</sup> stands for an alkyl group having 1 to 4 carbon atoms, R<sup>3</sup> and R<sup>4</sup> stand for the same or different groups and each denote a hydrogen atom or a glycidyl group, m and x each denote an integer of 0 to 10, n denotes an integer of 0 to 2, provided that m ≥ x and, if m = 0, then x = 0, in which case at least one of R<sup>3</sup> and R<sup>4</sup> denotes a glycidyl group on the condition that when m ≥ 1 and m > x, R<sup>1</sup> may each stand for different groups.

5,412,003

#### UNSATURATED POLYESTER RESIN COMPOSITIONS, MOLDING MATERIALS, AND MOLDED PRODUCTS

Koichi Akiyama; Hiromu Miyashita, both of Kanagawa; Sanji Aoki, Nara; Ken Hattai, Aichi; Takashi Ino, Aichi, and Yasuhiro Mishima, Aichi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka and Toyota Jidosha Kabushiki Kaisha, Aichi, both of Japan

Filed Jan. 22, 1993, Ser. No. 7,774

Claims priority, application Japan, Jan. 24, 1992, 4-11309

Int. Cl.<sup>6</sup> C08K 3/00

U.S. Cl. 523—513

13 Claims

1. A resin composition containing (a) 20–40 weight parts of an unsaturated polyester, (b) 30–70 weight parts of styrene, (c) and 5–30 weight parts of a thermoplastic resin, wherein said thermoplastic resin is (i) styrene-butadiene block copolymer, (ii) polyvinyl acetate, (iii) a saturated polyester with a molecular weight of 300 to 100,000, or (iv) a urethane derivative of such a saturated polyester with a molecular weight of 2,000 to 100,000; and wherein said molecular weight is determined by gel permeation chromatography, such that the three components (a) to (c) make up a total of 100 parts by weight, (d) and also containing 0.1–5.0 weight parts of a polymerization initiator, wherein said polymerization initiator is at least one organic peroxide selected from the group consisting of tertiary butyl peroxybenzoate, tertiary butyl peroxyoctoate, 2,5-dimethyl-

2,5-di(benzoyl peroxy)hexane, tertiary amyl peroxyoctoate, tertiary butyl isopropyl carbonate, 1,1-bis(t-butyl peroxy)-3,3,5-trimethyl cyclohexane, 1,1-bis(t-butyl peroxy)cyclohexane, 1,1-bis(t-amyl peroxy)-3,3,5-trimethyl cyclohexane and 1,1-bis(t-amyl peroxy)cyclohexane, and (e) 5-100 weight parts of hollow glass microspheres with a true density of 0.5-1.3 g/cm<sup>3</sup> and an elution alkalinity reduced to less than 0.05 meq/g by using at least one of the methods selected from the group consisting of washing normal hollow glass microspheres in a solution of an acid and using a coupling agent to carry out a surface treatment.

5,412,004

# SILICONE POLYMER, PASTE-LIKE SILICONE COMPOSITION, AND W/O-TYPE COSMETIC COMPOSITION COMPRISING THE SAME

Kiyomi Tachibana, Tokyo; Koji Sakuta, and Kenichi Isobe, both of Annaka, all of Japan, assignors to Kose Corporation and Shin-Etsu Chemical Co., Ltd., both of Tokyo, Japan  
Division of Ser. No. 934,317, Aug. 25, 1992, abandoned. This application Feb. 25, 1994, Ser. No. 202,086

Claims priority, application Japan, Nov. 21, 1991, 3-332641; Jul. 16, 1992, 3-189610; Jul. 16, 1992, 3-189611  
Int. Cl.<sup>6</sup> C08L 5/00

U.S. Cl. 524-27

20 Claims

1. A water-in-oil cosmetic composition comprising:  
(a) an oil phase component which comprises (i) a pasty silicone composition which can disperse water and (ii) silicic acid anhydride or hydrophobic silica, or both; and  
(b) at least one water phase component comprising water and water soluble components;  
wherein the pasty like silicone composition is prepared by kneading 100 parts by weight of a silicone polymer and 5 to 1,000 parts by weight of a silicone oil under a sufficient shearing force to produce a smooth and homogeneous outward appearance, and  
wherein the silicone polymer is prepared by the addition polymerization of the following components (I) and (II):  
(I) an organohydrogenpolysiloxane represented by the following formula (1),



wherein

R<sup>1</sup> represents a substituted or unsubstituted alkyl, aryl, or aralkyl group having 1 to 18 carbon atoms, or a halogenated hydrocarbon group;  
R<sup>2</sup> represents a group,



wherein

R<sup>3</sup> is a hydrogen, a saturated aliphatic hydrocarbon group having 1 to 10 carbon atoms, or a group —(CO)—R<sup>5</sup>, wherein R<sup>5</sup> is a saturated aliphatic hydrocarbon group having 1 to 5 carbon atoms,  
d is an integer of 2 to 200, and  
e is an integer of 0 to 200,  
provided that d+e is 3 to 200, and n is 2 to 6;  
a is a value satisfying inequality 1.0 ≤ a ≤ 2.5;  
b is a value satisfying inequality 0.001 ≤ b ≤ 1.0; and  
c is a value satisfying inequality 0.001 ≤ c ≤ 1.0;  
or an organohydrogenpolysiloxane represented by the following formula (2),



wherein

R<sup>1</sup> is the same as defined in formula (1),  
f is a value satisfying inequality 1.0 ≤ f ≤ 3.0,  
g is a value satisfying inequality 0.001 ≤ g ≤ 1.5;  
or a mixture of said organohydrogenpolysiloxanes of formulas (1) and (2), and

(II) a polyoxyalkylene represented by the following formula (A),



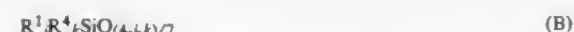
wherein

h is an integer of 2 to 200,

i is an integer of 0 to 200, provided that h+i is 3 to 200, and

m is 2 to 6,

or an organopolysiloxane represented by the following formula (B),



wherein

R<sup>1</sup> is the same as defined in formula (1),R<sup>4</sup> is a monovalent hydrocarbon group having an aliphatic unsaturated bond at the terminal thereof and containing 2 to 10 carbon atoms,

j is a value satisfying inequality 1.0 ≤ j ≤ 3.0, and

k is a value satisfying inequality 0.001 ≤ k ≤ 1.5,

or a mixture of the polyoxyalkylene of formula (A) and the organopolysiloxane of formula (B),

wherein at least one organohydrogenpolysiloxane of formula (1) or at least one polyoxyalkylene of formula (A) is contained as an essential component of the addition polymerization.

5,412,005

# BIODEGRADABLE POLYMERIC COMPOSITIONS BASED ON STARCH AND THERMOPLASTIC POLYMERS

Catia Bastioli; Vittorio Bellotti, both of Novara; Alessandro Montino, Pavia; Gianfranco D. Tredici, Varese; Roberto Lombi, and Roberto Ponti, both of Novara, all of Italy, assignors to Novamont S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 875,453, Apr. 29, 1992, abandoned, Ser. No. 839,322, Feb. 20, 1992, abandoned, and Ser. No. 744,300, Aug. 13, 1991, Pat. No. 5,286,770. This application Apr. 30, 1992, Ser. No. 876,474

Claims priority, application Italy, May 3, 1991, TO91A0327; European Pat. Off., Aug. 1, 1991, 91112942; Italy, Mar. 10, 1992, TO92A0199; Mar. 27, 1992, TO92A0282

Int. Cl.<sup>6</sup> C08L 3/00; C08K 5/06

U.S. Cl. 524-47

27 Claims

1. A polymeric composition obtainable from a melt comprising a starch component, a plasticizer and a synthetic thermoplastic polymer component, wherein the synthetic component comprises at least one polymer or mixture of polymers selected from the group consisting of:

(a) homopolymers of aliphatic hydroxyacids having from 2 to 24 carbon atoms, the corresponding lactones or lactides;

(b) copolymers of a first monomer selected from the group consisting of aliphatic hydroxyacids having from 2 to 24 carbon atoms, the corresponding lactones or lactides with a second monomer selected from the group consisting of aliphatic hydroxyacids having from 2 to 24 carbon atoms other than that constituting the first monomer, corresponding lactones or lactides, aromatic hydroxyacids, aliphatic or aromatic isocyanates,

(c) block or graft copolymers between the homopolymers and copolymers (a) or (b) with one or more of the following components:

(i) cellulose or modified cellulose;

(ii) amylose, amylopectin, natural or modified starches;

(iii) polymers deriving from reaction of diols, polyester prepolymers or polymers having diol terminal groups with:  
aromatic or aliphatic bifunctional isocyanates,  
aromatic or aliphatic bifunctional epoxydes,  
aliphatic dicarboxylic acids,

bicarboxylic cycloaliphatic acids,  
aromatic acids or anhydrides,

(iv) polyurethanes, polyamide-urethanes from diisocyanates and aminoalcohols, polyamides, polyesteramides from dicarboxylic acids and aminoalcohols, polyester-urea from aminoacids and diesters of glycols,

(v) polyhydroxylated polymers selected from the group consisting of polyvinylalcohol, ethylenevinylalcohol copolymers, totally or partially hydrolyzed, and polysaccharides up to dextrans,

(vi) polyvinylpyrrolidone, polyvinylpyrrolidonevinylacetate copolymers, polyethyloxazolines;

(vii) ionomeric polymers selected from polyacrylates and polymetacrylates;

(d) polyesters obtained from monomers or comonomers as defined above at (a) and (b) upgraded with chain extenders selected from the group consisting of isocyanates, epoxides, phenylesters and aliphatic carbonates;

(e) polyesters obtained from monomers and comonomers defined at (a) and (b) above partially crosslinked by means of polyfunctional acids selected from the group consisting of trimellitic acid, pyromellitic acid, polyisocyanates and polyepoxides, said starch component and said synthetic polymer component being present in a ratio of from 1:9 to 9:1.

5,412,006

# ELECTRORHEOLOGICAL CELS AND A METHOD FOR THE PREPARATION THEREOF

Mark D. Fisher; Mark H. Eckstein, and Randall G. Schmidt, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 14, 1994, Ser. No. 212,663

Int. Cl.<sup>6</sup> C08L 3/00

U.S. Cl. 524-47

21 Claims

1. An electrorheological gel composition comprising:

(A) a curable silicone polymer having its formula selected from the group consisting of

(i) (RO)<sub>3</sub>SiO(RXSiO)<sub>m</sub>(R<sub>2</sub>SiO)<sub>n</sub>Si(OR)<sub>3</sub>;(ii) (RO)<sub>3</sub>SiO(RXSiO)<sub>m</sub>(R<sub>2</sub>SiO)<sub>n</sub>Si(X)<sub>3</sub>;(iii) (X)<sub>3</sub>SiO(RXSiO)<sub>m</sub>(R<sub>2</sub>SiO)<sub>n</sub>Si(X)<sub>3</sub>; and

(iv) mixtures thereof;

wherein R is a monovalent hydrocarbon radical having from 1 to 20 carbon atoms, X is independently selected from the group consisting of R, acyloxy groups, hydroxy groups, alkoxy groups, oxime groups, and olefinic hydrocarbon radicals having from 2 to 20 carbon atoms, m has an average value of from 0 to 100, and n has an average value of from 100 to 2,000;

(B) electrorheologically active solid particles; and

(C) a metal catalyst;

wherein said gel prior to the application of an electric field has a storage modulus of between 500 and 500,000 pascals when measured at a frequency of 10 hertz at 25° C., a peak strain amplitude such that the gel resides in the linear region of viscoelasticity, and has a dynamic mechanical loss tangent of at least 0.5.

5,412,007

# STABLE PETROLEUM RESIN-WATER EMULSION

Randall R. Hendrix, Spring; Bruce E. Wilburn, Houston, and Aldan P. Cooney, Conroe, all of Tex., assignors to Pennzoil Products Company, The Woodlands, Tex.

Filed Feb. 4, 1994, Ser. No. 191,505

Int. Cl.<sup>6</sup> C09K 3/22; C08L 97/02, 57/02; C08K 5/05

U.S. Cl. 524-72

11 Claims

1. A dust suppressing composition for application to road or soil surfaces comprising:

(a) 10 to 35 parts by weight of an anionic ammonium, alkali metal or alkaline earth metal lignosulfonate surfactant,  
(b) 0.5 to 10 parts by weight of at least one non-ionic polyethoxylated alkylphenol or polyethoxylated alcohol surfactant,

(c) 10 to 70 parts by weight of a petroleum resin, having a

flash point in the range of approximately 600° F. to 680° F., a viscosity in the range of approximately 2400 to 3000 SUS at 210° F., and a pour point in the range of 80° F. to 120° F., and  
(d) 1 to 99 parts by weight of water.

5,412,008

# STABILIZED METHYLMETHACRYLATE POLYMERS

Peter Michaelis, Freiburg, Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 22,795, Feb. 23, 1993, abandoned, which is a continuation of Ser. No. 856,235, Mar. 25, 1992, abandoned. This application Oct. 22, 1993, Ser. No. 143,240  
Claims priority, application Switzerland, Mar. 27, 1991, 938/91

Int. Cl.<sup>6</sup> C08K 5/3492

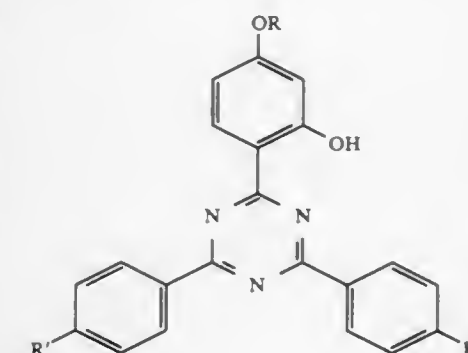
U.S. Cl. 524-100

10 Claims

1. A polymer composition which is stabilised against degradation caused by the action of light, oxygen and heat, said composition comprising

a) a methylmethacrylate homopolymer or copolymer which contains from 80 to 100% of methylmethacrylate in polymerised form, and

b) an effective stabilising amount of a hydroxyphenyltriazine of formula I



wherein

R is hydrogen, C<sub>1</sub>-C<sub>18</sub>alkyl, halogen- or C<sub>1</sub>-C<sub>12</sub>alkoxy-substituted C<sub>2</sub>-C<sub>6</sub>alkyl, or benzyl, and  
R' is hydrogen or methyl.

5,412,009

# FLAME RETARDANT COMPOUNDS COMPRISING FULLY BROMINATED DIANHYDRIDES

Michael J. Schneider, Near Chester, and James Gainer, Worsley, both of United Kingdom, assignors to FMC Corporation (UK) Limited, Manchester, United Kingdom

Filed Dec. 7, 1992, Ser. No. 988,069

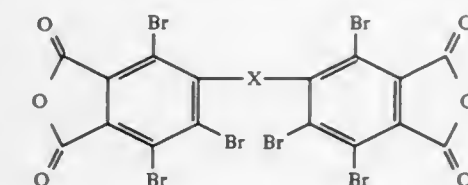
Claims priority, application United Kingdom, Dec. 24, 1991, 9127587

Int. Cl.<sup>6</sup> C08K 5/15

U.S. Cl. 524-109

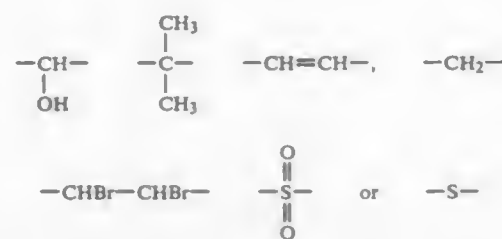
12 Claims

1. A compound characterized by the general formula I



in which X represents a direct bond or a





group.

**5,412,010**  
**MONOMER SUPPRESSION ADDITIVE CONTAINING**  
**ETHYLENICALLY UNSATURATED MONOMER,**  
**CERESIN WAX, DRYING OIL AND EPOXIDIZED**  
**DRYING OIL**

Terry W. Cowley, and Mary L. N. White, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 121,399, Dec. 14, 1993, Pat. No. 5,340,856, which is a division of Ser. No. 996,545, Dec. 24, 1992, Pat. No. 5,286,554, which is a division of Ser. No. 797,640, Nov. 25, 1991, Pat. No. 5,206,077. This application May 19, 1994, Ser. No. 245,772

Int. Cl.<sup>6</sup> C08K 5/00

U.S. Cl. 524—109 6 Claims

1. A vaporizable ethylenically unsaturated vinyl monomer suppressant/secondary adhesion promoter additive composition comprising (i) from about 20 to about 40 percent by weight of at least one polymerizable, vaporizable, ethylenically unsaturated monomer, (ii) from about 10 to about 25 percent by weight of ceresin wax, (iii) from about 10% to about 30% by weight of drying oil, and (iv) from about 20 to about 40 percent by weight of epoxidized drying oil; wherein the total of components (i), (ii), (iii) and (iv) is 100%.

**5,412,011**  
**COMPOSITION AND PROCESS FOR COATING METALS**  
 Brenda S. Morris, Philadelphia; Jiangbo Ouyang, Bensalem, and David W. Reichgott, Richboro, all of Pa., assignors to Betz Laboratories, Inc., Treviso, Pa.

Filed Oct. 15, 1993, Ser. No. 137,644

Int. Cl.<sup>6</sup> C08L 33/26, 33/02; C08K 3/34, 5/54

U.S. Cl. 524—261 18 Claims

1. An aqueous solution for coating a metal surface comprising an anionic acrylamide acrylic acid copolymer, a water soluble inorganic silicate and an organofunctional silane.

**5,412,012**  
**FLAME RETARDANT INSULATION COMPOSITIONS**  
**HAVING IMPROVED STRIPPABILITY**  
 Steven W. Horwath, West Chester, and James W. Biggs, Lebanon, both of Ohio, assignors to Quantum Chemical Corporation, Cincinnati, Ohio

Filed Jan. 24, 1994, Ser. No. 185,573

The portion of the term of this patent subsequent to Jul. 6, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C08K 5/54

U.S. Cl. 524—265 16 Claims

1. An improved crosslinkable flame retardant insulation composition comprising:

- a polymer selected from the group consisting of copolymers of ethylene and vinyl esters of C<sub>2-6</sub> aliphatic carboxylic acids, copolymers of ethylene and C<sub>1-6</sub> alkyl acrylates, copolymers of ethylene and C<sub>1-6</sub> alkyl methacrylates, or mixtures thereof;
- 80 to 400 phr hydrated inorganic filler;
- 0.5 to 5 phr alkoxysilane;
- 1 to 8 phr chemical crosslinking agent;
- 1 to 8 phr of a stabilizer package consisting of (i) tetrakis[

methylene(3,5-di-tert-butyl-4-hydroxyhydrocin-namate)]methane, (ii) pentaerythritol tetrakis(betalaurylthiopropionate) and (iii) thioldiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinamate).

**5,412,013**  
**POLYAMIDE RESIN COMPOSITION**  
 Noriyoshi Watanabe, Kiyoshi Morishige, and Hajime Inoue, all of Hiratsuka, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Jul. 20, 1993, Ser. No. 93,874

Claims priority, application Japan, Jul. 20, 1992, 4-192088

Int. Cl.<sup>6</sup> C08K 3/00

U.S. Cl. 524—413 10 Claims

- A polyamide resin composition comprising (A) a resin component of a polyamide (a) containing a xylylenediamine component in an amount of 60% by weight or more based on total diamine components and an  $\alpha,\omega$ -straight chain aliphatic dibasic acid component in an amount of 70% by weight or more based on total amount of dibasic acid components, or a combination of the polyamide (a) and polyamide 66,
- polyamide 12 in an amount of 1 to 15 parts by weight per 100 parts by weight of the resin component (A),
- a copper (I) oxide or a copper (II) oxide compound in an amount of 0.01 to 5 parts by weight, in terms of copper, per 100 parts by weight of the resin component (A),
- carbon black in an amount of 1 to 15 parts by weight per 100 parts by weight of the resin component (A), and
- an alkali metal halide of such an amount that the number of halogen atoms of the alkali metal halide is 0.3 to 4 per one copper atom of the above copper compound.

**5,412,014**  
**FIRE RETARDANT RESIN COMPOSITIONS**  
 David J. Romenesko, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 906,165, Jun. 29, 1992. This application Oct. 26, 1993, Ser. No. 142,757

Int. Cl.<sup>6</sup> C08K 3/32

U.S. Cl. 524—416 24 Claims

- A method for imparting fire retardancy to an organic resin (A), said resin being selected from the group consisting of organic thermoplastic resins and organic thermoset resins, said method comprising thoroughly dispersing in said organic resin (B) a silicone polymer powder and,
- a phosphorus-based fire retardant to form a modified resin composition, said silicone polymer powder (B) having an average particle size of 1 to 1000 microns and consisting essentially of
- 100 parts by weight of a polydiorganosiloxane polymer, and
- from 10 to 150 parts by weight of a silica filler.

**5,412,015**  
**SEALING COMPOSITIONS CONTAINING POLYMERS**  
**OF ETHYLENICALLY UNSATURATED MONOMERS**  
 Oswin Sommer, Burghausen, Germany; Michel Dubois, F-Soisy Sous Montmorency, France; Norman Dorsch, and Alois Strasser, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Sep. 27, 1993, Ser. No. 126,592

Claims priority, application Germany, Oct. 1, 1992, 42 33 077.7

Int. Cl.<sup>6</sup> C08K 3/26

U.S. Cl. 524—425 6 Claims

- A sealing composition comprising a dispersion of
- 40 to 80% by weight of a polymer obtained from ethylenically unsaturated monomers,
- 0.1 to 5% by weight of a branched organopolysiloxane

containing at least one aminoalkyl group, based on the total weight of the sealing composition,

- 1 to 20% by weight of a dispersing agent,
- 30 to 70% by weight of a filler and
- water.

**5,412,016**  
**PROCESS FOR MAKING POLYMERIC**  
**INORGANIC-ORGANIC COMPOSITIONS**  
 Kenneth G. Sharp, Landenberg, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 952,128, Sep. 28, 1992, abandoned. This application Sep. 14, 1993, Ser. No. 119,523  
 Int. Cl.<sup>6</sup> C08J 3/24, 3/21; C08K 3/18, 3/34

U.S. Cl. 524—430 8 Claims

1. A process for making an inorganic-organic interpenetrating network composition consisting essentially of an intimate combination of an inorganic gel component and an organic polymer component, said process comprising the following sequential steps:

- intimately mixing together the following components A) through C) under such conditions that a homogenous liquid solution is initially formed:
  - at least one inorganic gel precursor selected from the group of compounds consisting of tetraalkoxyasilanes Si(OR)<sup>4</sup>, tetraalkyl titanates Ti(OR)<sup>4</sup>, tetraalkyl zirconates Zr(OR)<sup>4</sup>, chelated tetraalkyl titanates Ti(OR)<sup>4</sup>X<sup>d</sup>, and chelated tetraalkyl zirconates Zr(OR)<sup>4</sup>X<sup>d</sup>, wherein each one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, and R<sup>5</sup> independently is a C<sub>1</sub>-C<sub>6</sub> alkyl;
  - X is a chelating ligand;
  - a is titanium and zirconium coordination number, being in each case an integer having a value of 4-6;
  - d is a number, either 2 or 3, corresponding to the chelating ability of the ligand X, d being 2 for a bidentate ligand and 3 for a tridentate ligand;
  - p is either 1 or 2, except that for d=3, p always is 1; and n=a-d-p;
  - at least one organic polymer selected from the group consisting of modified cellulose derivatives, starch, polyamides, polyesters, polymethacrylates, polyacrylates, polyvinyl alcohol, copolymers of vinyl alcohol with ethylenically unsaturated monomers, polyvinyl acetate, poly(alkylene oxides), vinyl chloride homopolymers, vinyl chloride copolymers, terpolymers of ethylene with carbon monoxide along with an acrylic ester, terpolymers of ethylene with carbon monoxide along with vinyl monomer, polysiloxanes, polyfluoroalkylenes, poly(fluoroalkyl vinyl ethers), homopolymers of halodioxoles, copolymers of halodioxoles, homopolymers of substituted halodioxoles, copolymers of substituted halodioxoles, and poly(vinylpyrrolidone); and
  - an organic carboxylic acid having a pK<sub>a</sub> value of at most 4.0, which organic acid may contain up to about 40 mole % water, and being selected from the group consisting of
  - acids miscible with components A) and
  - acids miscible with liquids in which components A) are soluble,
- said acid being present in an amount of at least 2 moles per mole of all components A) present:
- the total amount of water present in the reaction medium being less than that of component C) and, further, such that the mole ratio of water to all components A) present is 0 to 20;
- maintaining the above solution, with agitation as needed, at a temperature of about 0°-100° C. until gelation of the inorganic component occurs; and
  - recovering the resulting inorganic-organic interpenetrating network composition.

**5,412,017**  
**FLAMEPROOFED THEROPLASTIC MOLDING**  
**MATERIALS BASED ON POLYAMIDES**  
 Brigitte Gareiss, Ludwigshafen; Petra Baierweck, Boehl-Iggelheim; Christoph Plachetta, Limburgerhof, and Karlheinz Ullmerich, Lambsheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Mar. 18, 1994, Ser. No. 214,421

Claims priority, application Germany, Apr. 20, 1993, 43 12 752.5

U.S. Cl. 524—436 7 Claims

- A process for preparing a flameproofed thermoplastic molding material which comprises the steps of mixing
  - from 20 to 70% by weight of a magnesium hydroxide and
  - from 0 to 70% by weight of conventional additives and processing assistants
- into a melt of
- from 10 to 80% by weight of a polyamide prepolymer having a viscosity number of from 40 to 100 ml/g and then carrying out solid-phase postcondensation.

**5,412,018**  
**SILICONE RUBBER REINFORCED WITH REINFORCED**  
**PRECIPITATED SILICA**  
 Thomas G. Krivak, Akron, Ohio; Timothy A. Okel, Trafford, Pa., and Melvin P. Wagner, Wadsworth, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 541,679, Jun. 21, 1990, Pat. No. 5,094,829. This application Aug. 8, 1991, Ser. No. 741,921

Int. Cl.<sup>6</sup> C08J 5/10; C08K 3/34; C08L 83/04

U.S. Cl. 524—492 10 Claims

- An elastomeric composition comprising:
  - a crosslinked poly(diorganosiloxane), and
  - reinforced amorphous precipitated silica having, on a coating-free and impregnant-free basis, a surface area of from about 220 to about 340 square meters per gram, a pore diameter at the maximum of the volume pore size distribution function of from about 9 to about 20 nanometers, and a total intruded volume of from about 2.6 to about 4.4 cubic centimeters per gram;
- said silica being distributed substantially uniformly throughout said crosslinked poly(diorganosiloxane).

**5,412,019**  
**POLYMER-MODIFIED PARTICULATE TITANIUM**  
**DIOXIDE**  
 Brian J. Roulstone, Burnham, and Julian A. Waters, Goring-on-Thames, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 995,010, Dec. 22, 1992, abandoned. This application Jan. 31, 1994, Ser. No. 189,279

Claims priority, application United Kingdom, Dec. 23, 1991, 9127293

Int. Cl.<sup>6</sup> C08K 3/22

U.S. Cl. 524—497 21 Claims

- A polymer-modified or copolymer-modified particulate titanium dioxide (TiO<sub>2</sub>) comprising particles of organic polymer attached to particles containing titanium dioxide which titanium dioxide particles have a number average particle size (Dt) of from 100 to 400 nm (nanometer) and which polymer particles have a number average particle size, Dp wherein
- the polymer particles are pre-formed prior to their attachment to the titanium dioxide particles and have a Dp such that when
- Dp > Dt, their Dp is

$$\leq \left( \frac{1-f}{f} \right)^{\frac{1}{3}} \cdot \frac{Dt}{31}$$

where

$$f = \frac{V_t}{V_t + V_p}$$

$V_t$  = the volume of the  $\text{TiO}_2$  particles and  $V_p$  = the volume of the polymer particles or

- (ii)  $D_p \leq D_t$ , the number ratio of polymer particles to titanium dioxide particles exceeds whichever is the greater of

$$\frac{3.64}{20} \left( \frac{D_t}{D_p} + 1 \right)^2 : 1 \text{ or } 3:1$$

- b) the polymer particles are pre-formed either by
- a free radical initiated aqueous emulsion or dispersion polymerization performed in the presence of a water-soluble compound which bonds chemically to the polymer as the polymer is being formed, or
  - a polymerization which is followed by the chemical bonding of a water-soluble compound to the polymer and
- c) the water-soluble compound is a polymeric material having a weight average molecular weight of at least 1500 and which is chemically bondable to the polymer and which contains at least one moiety adsorbable onto the titanium dioxide particles.

5,412,020

# PROPYLENE POLYMER COMPOSITIONS

Akihiko Yamamoto, Yurimasa Zenitani, and Masayoshi Yamaguchi, all of Kuga, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jul. 28, 1994, Ser. No. 281,610

Claims priority, application Japan, Jul. 28, 1993, 5-186409; Jul. 28, 1993, 5-186410; Jul. 28, 1993, 5-186411

Int. Cl.<sup>6</sup> C08L 53/00

U.S. Cl. 524—505 5 Claims

1. A propylene polymer composition comprising:
- a propylene polymer in an amount of 10 to 90% by weight, and
  - a propylene block copolymer in an amount of 90 to 10% by weight;
- said propylene polymer [A] having the following characteristic properties:

- a boiling heptane-insoluble component is contained in said polymer in an amount of not less than 96% by weight;
- a pentad isotacticity [ $M_5$ ] of the boiling heptane-insoluble component obtained from the following formula (1) using a  $^{13}\text{C}$ -NMR spectrum is in the range of 0.970 to 0.995:

$$[M_5] = \frac{[P_{mmmm}]}{[P_w]}$$

wherein

[P<sub>mmmm</sub>] is absorption intensity of methyl groups on third propylene units in five propylene unit sequences where the five units are bonded isotactically to each other, and

[P<sub>w</sub>] is absorption intensity of all methyl groups in propylene units;

- a pentad tacticity [ $M_5$ ] of the boiling heptane-insoluble component obtained from the following formula (2) using a  $^{13}\text{C}$ -NMR spectrum is in the range of 0.0020 to 0.0050:

$$[M_5] = \frac{[P_{mmmm}] + [P_{mmmr}] + [P_{mmrr}] + [P_{mrrr}] + [P_{rrrr}]}{[P_w]} \quad (2)$$

wherein

[P<sub>mmmm</sub>] is absorption intensity of methyl groups on third propylene units in five propylene unit sequences represented by  $\text{JJJJJ}$  in which J and J are each a propylene unit,

[P<sub>mmmr</sub>] is absorption intensity of methyl groups on third propylene units in five propylene unit sequences represented by  $\text{JJJJJ}$  in which J and J are each a propylene unit,

[P<sub>mmrr</sub>] is absorption intensity of methyl groups on third propylene unit in five propylene unit sequences represented by  $\text{JJJJJ}$  in which J and J are each a propylene unit,

[P<sub>mrrr</sub>] is absorption intensity of methyl groups on third propylene units in five propylene unit sequences represented by  $\text{JJJJJ}$  in which J and J are each a propylene unit,

[P<sub>rrrr</sub>] is absorption intensity of methyl groups on third propylene units in five propylene unit sequences represented by  $\text{JJJJJ}$  in which J and J are each a propylene unit, and

[P<sub>w</sub>] is absorption intensity of all methyl groups in propylene units; and

- a melt flow rate (MFR) of said polymer, as measured in accordance with ASTM D-1238 at 230° C. under a load of 2.16 kg, is in the range of 5 to 50 g/10 min; said propylene block copolymer [B] having the following characteristic properties:

- a melt flow rate (MFR) of said copolymer, as measured in accordance with ASTM D-1238 at 230° C. under a load of 2.16 kg, is in the range of 10 to 50 g/10 min,
- a 23° C. n-decane-soluble component is contained in said copolymer in an amount of 5 to 13% by weight, and
- constituent units derived from ethylene are contained in the 23° C. n-decane-soluble component in an amount of 30 to 50% by mol.

5,412,021

# WATER-BASE ERASABLE INK COMPOSITION FOR USE IN MARKING PENS

Mikihiko Nakanishi, Osaka, Japan, assignor to Sakura Color Products Corporation, Osaka, Japan

Filed Aug. 19, 1993, Ser. No. 109,705

Claims priority, application Japan, Aug. 24, 1992, 4-223850; Jan. 17, 1993, 5-146318; Aug. 9, 1993, 5-197206

Int. Cl.<sup>6</sup> C08K 5/06; C09D 11/10

U.S. Cl. 524—523 11 Claims

1. A water-base erasable ink composition for use in marking pens which comprises:

- a solvent consisting essentially of water and not more than 15% by weight of a lower aliphatic alcohol;
- a colorant dispersed or dissolved in the water in an amount of 0.5–20% by weight;
- a water soluble polyvinyl acetal resin as a film-forming agent in an amount of 0.1–15% by weight;
- an aqueous emulsion of an aliphatic carboxylic acid ester which is liquid and nonvolatile or only slightly volatile at room temperature as a separating agent in a dry amount of 1–20% by weight, the amount of said alcohol, if present, being insufficient to break said emulsion;

and

- at least one of a polyoxyethylene polyoxypropylene block copolymer in an amount of 0.1–5% by weight and a lanoline derivative in an amount of 0.01–5% by weight, as a writing separation assistant.

5,412,022

# LYO GEL, ITS PRODUCTION AND ITS USE FOR SEALING

Johannes Andres, Hilden; Juergen Wichelhaus, Wuppertal, and Reimar Heucher, Cologne, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Germany

PCT No. PCT/EP91/02294, § 371 Date Jun. 14, 1993, § 102(e) Date Jun. 14, 1993, PCT Pub. No. WO92/10537, PCT Pub. Date Jun. 25, 1992

PCT Filed Dec. 3, 1991, Ser. No. 75,551

Claims priority, application Germany, Dec. 14, 1990, 40 39 899.4

Int. Cl.<sup>6</sup> C08L 43/02

U.S. Cl. 524—535 19 Claims

1. A composition useful as a lyo gel sealant comprising:
- a gelling agent of (i) an organic, synthetic polymer having carboxylic acid groups and (ii) a metal compound having a metal selected from the group consisting metals of the second periodic group, the third periodic group, the fourth periodic group, the fifth periodic group and the transition metals in an amount effective to crosslink said organic, synthetic polymer, said organic, synthetic polymer having carboxylic acid groups such that said organic, synthetic polymer is crosslinkable through said metal compound, and
  - an inert organic liquid having a volatility of less than 0.5% by weight, as determined after 2 hours at 105° C. in accordance with ASTM D 972, as a swelling agent for said gelling agent.

5,412,023

# AQUEOUS DISPERSIONS OF CROSS-LINKED POLYMER MICROPARTICLES

Hans-Dieter Hille, Bergisch-Gladbach, and Matthias Massone, Köln, both of Germany, assignors to Bollig & Kemper KG, Köln, Germany

PCT No. PCT/EP90/02096, § 371 Date Jul. 10, 1992, § 102(e) Date Jul. 10, 1992, PCT Pub. No. WO91/08269, PCT Pub. Date Jun. 13, 1991

PCT Filed Dec. 4, 1990, Ser. No. 910,080

Claims priority, application Germany, Dec. 6, 1989, 39 40 316.5

Int. Cl.<sup>6</sup> C08L 51/00, 61/00

U.S. Cl. 524—539 13 Claims

1. An aqueous coating dispersion of cross-linked polymer microparticles, said polymer microparticles being prepared at an elevated temperature in an aqueous medium from two components, (A) and (B), the ratio by weight of component (A) to component (B) being between 30:70 and 95:5, wherein

A. component (A) is a polymer, optionally dissolved in an organic solvent, said polymer bearing at least two hydroxyl groups and comprising a number of ionic groups sufficient for the formation of a stable aqueous dispersion, said polymer comprising a polyesterpolyol having an acid value between 20 and 50, said polyesterpolyol being prepared from one or more polyol(s) selected from the group consisting of: ethylene glycol, 1,2- and 1,3-propanediol, 1,3- and 1,4-butanediol, the isomeric pentanediols, hexanediols or octanediols (e.g., 2-ethyl-1,3-hexanediol), trimethylolpropane, neopentyl glycol, glycerol, bis(hydroxymethyl) cyclohexane, erythritol, mesoerythritol, arabitol, adonitol, xylitol, mannitol, sorbitol, dulcitol, hexanetriol, and (poly-)pentaerythritol, by reaction with one or more polycarboxylic acid or anhydrides thereof—so far as said anhydrides exist—having from 2–18 carbon atoms, wherein said polycarboxylic acids and/or anhydrides may be employed individually or in admixtures thereof; and component (B) is an aminoplast resin consisting of molecules

containing at least two reactive groups consisting of hydroxyl and/or amino an/or ether groups; the aqueous dispersion of cross-linked microparticles being stable.

5,412,024

# THERMOPLASTIC RESIN COMPOSITION

Akihiko Okada, Ichihara, and Shuji Machida, Sodegaura, both of Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Apr. 9, 1992, Ser. No. 865,457

Claims priority, application Japan, Apr. 9, 1991, 3-076008

Int. Cl.<sup>6</sup> C08L 25/06

U.S. Cl. 524—577 16 Claims

1. A thermoplastic resin composition which comprises 100 parts by weight of (A) a terminally-modified styrenic polymer having syndiotactic configuration, and having bonded as terminal modification solely to the terminal ends of the styrenic polymer having syndiotactic configuration a compound having both a polar group and a carbon-carbon double bond or a carbon-carbon triple bond and 1 to 350 parts by weight of (B) an inorganic filler.

5,412,025

# METHOD TO REACTOR-FILL POLYOLEFINS BY EMPLOYING A STICKY PREPOLYMER AS A BLENDING AND COMPATIBILIZING AGENT

Richard W. Fries, Joliet, Ill., assignor to Quantum Chemical Corporation, Cincinnati, Ohio

Filed Aug. 30, 1993, Ser. No. 114,031

Int. Cl.<sup>6</sup> C08K 5/05, 3/22, 3/34, 3/04

U.S. Cl. 524—765 35 Claims

1. A method to reactor-fill polyolefins useful for preparing a polyolefin composite having a uniform distribution of filler particles blended therein comprising the steps of:

- adding a sufficient amount of an alpha-olefin to a filler such that a sticky prepolymer can be formed in-situ;
- prepolymerizing the mixture of step (a) by contacting the mixture in random order of no specific sequence with a high activity polymerization catalyst, a cocatalyst, and, if necessary a cocatalyst modifier wherein said contacting causes the formation of a sticky prepolymer on the surface and in the pores of the filler; and
- adding an alpha-olefin under olefin polymerization conditions to the reaction product of step (b) to cause formation of said reactor-filled composite.

5,412,026

# HIGH TEMPERATURE AQUEOUS POLYMERIZATION PROCESS

Norman L. Holy, Penns Park; Newman M. Bortnick, Oreland; Graham Swift, Blue Bell, and Kathleen A. Hughes, Blue Bell, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 823,733, Jan. 22, 1992, Pat. No. 5,268,437. This application Sep. 16, 1993, Ser. No. 121,472

Int. Cl.<sup>6</sup> C08F 283/06

U.S. Cl. 525—54.31 9 Claims

1. An aqueous process for polymerizing carboxylic acid monomers consisting essentially of:

- forming a reaction mixture by feeding into a reactor containing water at a temperature in the range of from about 130° to about 240° C. under elevated pressure
- one monomer or aqueous solution thereof selected from the group consisting of C<sub>3</sub>–C<sub>6</sub> monoethylenically unsaturated monocarboxylic acids, and the alkali metal and ammonium salts thereof, C<sub>4</sub>–C<sub>6</sub> monoethylenically unsaturated dicarboxylic acids, and the alkali metal and ammonium salts thereof, and anhydrides of C<sub>4</sub>–C<sub>6</sub> monoethylenically unsaturated cis-dicarboxylic acids, and
- initiator, or an aqueous solution thereof, in an effective



amount for initiating free-radical polymerization of said monomers,

(iii) one or more monoethylenically unsaturated carboxyl-free monomers, or aqueous solutions thereof, at a level of from 0 to 20 percent by weight based on the monomer (i),

such that water always makes up at least 35 percent by weight of the reaction mixture and wherein the reaction mixture contains from about 10 to about 50 percent by weight of a reactive substrate based on the reaction mixture wherein the reactive substrate is selected from the group consisting of polyhydric alcohols, poly(ethylene glycol), poly(propylene glycol) and polycaprolactone; and

(b) maintaining the reaction mixture in said temperature range to form a polymer product having Mn below 10,000.

5,412,027

# PREPARATION OF HOMOGENEOUS POLYMERS USING SUPERCRITICAL FLUID SOLUTIONS

Annetta D. Shine, Newark, Del.; Steven D. Smith, and Isao Noda, both of Fairfield, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio and The Univ. of Delaware, Newark, Del.

Continuation of Ser. No. 675,764, Mar. 27, 1991, abandoned.

This application Nov. 19, 1993, Ser. No. 155,041

Int. Cl.<sup>6</sup> C08G 63/48; C08L 51/08

U.S. Cl. 525—63

8 Claims

1. A process for preparing a homogeneous blend of otherwise thermodynamically immiscible polymers, including at least one block or graft copolymer, comprising rapidly expanding a heated single-phase solution of said polymers in a supercritical fluid solvent across a small diameter nozzle, whereby said supercritical fluid solvent is removed and the solid polymer blend is precipitated, at a temperature of no more than 30° C. above the glass transition temperature of the polymer blend, whereby the non-equilibrium homogeneous morphology of the blend is maintained.

5,412,028

# THERMOPLASTIC RESIN COMPOSITION

Jong K. Yeo; Suk K. Chang; Eun H. Koo, and Min H. Lee, all of Daejeon-si, Rep. of Korea, assignors to Lucky, Ltd., Seoul, Rep. of Korea

Continuation of Ser. No. 61,534, May 14, 1993, abandoned, which is a continuation of Ser. No. 650,195, Feb. 4, 1991, abandoned, which is a continuation-in-part of Ser. No. 335,376, Apr. 10, 1989, abandoned. This application Oct. 28, 1993, Ser. No. 142,103

Claims priority, application Rep. of Korea, Apr. 13, 1988, 88-4193

Int. Cl.<sup>6</sup> C08L 67/02, 69/00, 51/04, 51/06

U.S. Cl. 525—65

6 Claims

1. A thermoplastic resin composition consisting essentially of

- (1) 40 to 95 parts by weight of polybutylene terephthalate;
- (2) 5 to 55 parts by weight of a core-shell copolymer which is comprised of from 20 to 90% by weight of one or more rubber components selected from the group consisting of acrylic rubbers and diene rubbers having 80 to 10% by weight of one or more unsaturated compounds grafted thereon;
- (3) 0.1 to 5 parts by weight of a multifunctional novolak epoxy resin having three or more oxirane groups;
- (4) 0.001 to 3.0 parts by weight of a Lewis catalyst; and
- (5) 1 to 90 parts by weight of a bisphenol A polycarbonate resin.

5,412,029

# PROTECTIVE MATERIAL CAPABLE OF APPLICATION IN MOLTEN FORM

Rainer Elm, Marl; Helmut Kehr, Schermbeck; Adolf Kühnle, Marl, and Matthias Schleinzner, Dorsten, all of Germany, assignors to Hueis Aktiengesellschaft, Marl, Germany

Continuation of Ser. No. 743,894, Aug. 12, 1991, abandoned.

This application Oct. 19, 1993, Ser. No. 138,000

Claims priority, application Germany, Aug. 24, 1990, 40 26 719.9

Int. Cl.<sup>6</sup> C08L 51/06

U.S. Cl. 525—71

8 Claims

1. A composition which protects metallic, primed or lacquered surfaces, comprising:

(I) not less than 70% by weight of at least one poly- $\alpha$ -olefin having a degree of crystallinity of not more than 25% as determined by X-ray diffraction, comprising the following monomers:

(a) 3 to 75% by weight of at least one  $\alpha$ -olefin having 4 to 10 carbon atoms,

(b) 25 to 94% by weight of propene, and

(c) 3 to 20% by weight of ethene; and

(II) from 2 to 30% by weight of polypropylene,

wherein at least one of the components (I) and (II) comprises a functionalized polymer produced by free-radical grafting at least one of components (I) and (II) with 0.1 to 10% by weight of one or more functional comonomers selected from the group consisting of maleic anhydride, fumaric acid, acrylic acid, methacrylic acid, itaconic acid, aconitic acid, salts thereof, maleic anhydride, itaconic anhydride, methyl (meth)acrylate, ethyl (meth)acrylate, butyl (meth)acrylate, hydroxyethyl (meth)acrylate, hydroxybutyl (meth)acrylate, acrylamide, maleimide, itaconimide, vinyltrimethoxysilane, 3-methacryloxypropyltrimethoxysilane, and adducts of maleic anhydrides with ammonia, ethylamine, ethanolamine, aniline, dibutylamine, methanol, ethanol, n-butanol, ethanediol, 1,4-butanediol, neopentyl glycol, glycerol, pentaerythritol or 1,4-cyclohexanedimethanol, based on the weight of the component to be functionalized.

5,412,030

# POLYPROPYLENE OR ETHYLENE COPOLYMER MISCIBLE WITH ETHYLENE COPOLYMER

Frank S. Bates, St. Louis Park; Jeffrey H. Rosedale; Mark F. Schulz, both of Minneapolis, all of Minn., and Kristoffer Almdal, Roskilde, Denmark, assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Mar. 23, 1993, Ser. No. 36,013

Int. Cl.<sup>6</sup> C08L 23/08, 23/12, 23/14, 23/16

U.S. Cl. 525—98

3 Claims

1. A polyolefin blend having a melt-miscible polyolefin blend phase, the polyolefin blend comprising:

(a) from about 60 to about 99.8 weight percent, based on the blend weight, of a primary polyolefin selected from polypropylene or ethylene/alpha-olefin copolymer having a segment length (SL-1) within a range of absolute value of from about 5.0 to about 8.8 Angstroms; and

(b) from about 0.2 to about 40 weight percent, based on the blend weight, of at least one modifying polyolefin comprising a block/segment copolymer comprising:

(i) from about 40 to about 99 weight %, based on the block/segment copolymer weight, of a block derived from ethylene and one or more monomer units selected from propylene, 1-butene, butadiene, 1-pentene, 1-hexene, 1-octene, isoprene, 2-methyl-1-butene, 3-methyl-1-butene, 4-methyl-1-pentene, or mixtures thereof, and

(ii) from about 1 to about 60 weight %, based on the block/segment copolymer weight, of at least one segment comprising a polar polymer having a weight average molecular weight of at least 1,000 daltons, the polar polymer segment derived from monomer units selected

from styrene, substituted styrene, vinyl pyridine, N-vinyl pyrrolidone, a C<sub>1</sub>-C<sub>4</sub> alkyl acrylic ester, a C<sub>1</sub>-C<sub>8</sub> alkyl methacrylic ester, phenyl methacrylate, benzyl methacrylate, acrylonitrile, methacrylonitrile, or mixtures thereof;

wherein the block further comprises a terminal functional fragment derived from a reactive terminal molecule selected from carbon dioxide, ethylene oxide, propylene oxide, succinic anhydride, maleic anhydride, glutaric anhydride, epichlorohydrin, caprolactone, or allyl halide, and has a segment length (SL-B) of from about 90% to about 110% of the SL-1, and wherein an absolute value of the SL-1 and the SL-B is determined from a chosen common segment volume of  $1.08 \times 10^{-22}$  cubic centimeters, and further wherein the block/segment copolymer has a weight average molecular weight of at least 20,000 daltons.

5,412,031

# MULTI-ARM BLOCK COPOLYMERS, AND PRESSURE SENSITIVE ADHESIVE AND TAPE EMPLOYING A MULTI-ARM ELASTOMERIC BLOCK COPOLYMER

Jingjing Ma, and Mark K. Nestegard, both of Woodbury, Minn., assignors to Minnesota Mining & Manufacturing Company, St. Paul, Minn.

Filed May 25, 1993, Ser. No. 66,860

Int. Cl.<sup>6</sup> C08F 293/00, 297/00

U.S. Cl. 525—98

5 Claims

1. A multi-arm block copolymer having the structure (A-B)<sub>m</sub>Y(C-D)<sub>n</sub>, wherein A, B, C and D are polymer segments; Y is a residue of a multifunctional coupling agent; m and n are the number of arms where both m and n are greater than 0, and the sum of m plus n is at least 3; A comprises a random copolymer segment of a monoalkenylarene and a conjugated diene; B and C may be the same or different and individually comprise either a homopolymer segment of a conjugated diene or a polymer segment of two or more conjugated dienes; D comprises either a homopolymer segment of a monoalkenylarene or a copolymer segment of a monoalkenylarene and a conjugated diene wherein the T<sub>g</sub> of D is greater than the T<sub>g</sub> of A; and the weight percent of monoalkenylarene in the block copolymer is 40% or less.

5,412,032

HIGH MOLECULAR WEIGHT LOW COUPLED LINEAR STYRENE-ISOPRENE-STYRENE BLOCK COPOLYMER COMPOSITION AND ADHESIVES MADE THEREFROM

David R. Hansen, Houston, Tex., and Steven H. Dillingham, Birmingham, Wash., assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 22, 1994, Ser. No. 199,401

Int. Cl.<sup>6</sup> C08L 9/06, 53/02

U.S. Cl. 525—98

4 Claims

1. A linear styrene-isoprene-styrene block copolymer composition comprised of linear polymeric blocks, said block polymer composition characterized in that it has a coupling efficiency from 20 to 40%, a polystyrene content of from 18 to 24% by weight, a polystyrene block peak molecular weight as determined by gel permeation chromatography of from 25,000 to 35,000, and an overall peak molecular weight as determined by gel permeation chromatography of from above 280,000 to 520,000.

5,412,033

Patent Not Issued For This Number

5,412,034

# CURABLE ELASTOMERIC BLENDS

David L. Tabb, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 26, 1993, Ser. No. 143,262

Int. Cl.<sup>6</sup> C08J 3/24; C08L 27/22, 33/04, 31/04

U.S. Cl. 525—194

9 Claims

1. A curable elastomeric blend consisting essentially of:

(a) at least about 5%, by weight of components (a) and (b), of at least one elastomeric fluoropolymer having at least about 45 weight % fluorine;

(b) at least about 5%, by weight of components (a) and (b), of at least one elastomeric copolymer comprising

(1) ethylene and

(2) at least one polar comonomer selected from the group consisting of alkyl acrylates, alkyl methacrylates and vinyl esters wherein the polar comonomer comprises 55-80% by weight of the copolymer (b); and

(c) at least one curing agent, capable of crosslinking (a) and (b) independently, in an amount effective for crosslinking both (a) and (b);

wherein at least one of (a) and (b) contains about from 0.01 to 10.0% by weight of at least one cure site monomer and the elastomers in said blend consists of components (a) and (b).

5,412,035

# PRESSURE-SENSITIVE ADHESIVES

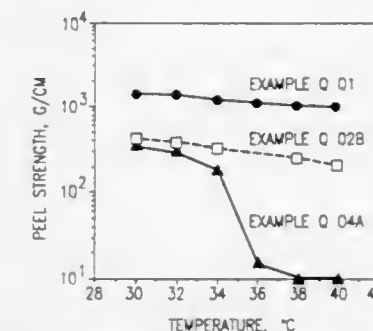
Edward E. Schmitt, Palo Alto; Raymond Clarke, Los Altos; Andrew W. Larson, Palo Alto; Steven P. Bitler, Menlo Park; Ross S. Tsugita, Mountain View, and Donald A. Schultz, San Mateo, all of Calif., assignors to Landec Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 829,494, Feb. 7, 1992, abandoned, which is a continuation-in-part of Ser. No. 654,723, Feb. 12, 1991, abandoned. This application Aug. 12, 1992, Ser. No. 928,800

Int. Cl.<sup>6</sup> C08L 53/00; B32B 7/12; A61F 13/02

U.S. Cl. 525—93

98 Claims



1. A pressure-sensitive adhesive (PSA) composition which comprises

(1) at least 50% by weight of a polymeric pressure-sensitive adhesive component, and

(2) a crystalline polymeric additive having a weight average molecular weight of less than 25,000 and a first order transition point T<sub>g</sub> in the composition greater than 23° C.; said composition, when tested for peel strength under selected test conditions as a PSA composite consisting of a selected backing and a layer of the PSA composition of selected thickness,

(i) at a selected temperature T<sub>1</sub> which is less than T<sub>g</sub> and is from 20° C. to 60° C., having a PSA peel strength P<sub>1</sub>, and

(ii) at a selected temperature T<sub>2</sub> which is higher than T<sub>g</sub> and is not greater than 100° C., having a PSA peel strength P<sub>2</sub>;

a comparative composition which is the same as said composition except that it does not contain the additive, when tested for peel strength under the same test conditions, as a comparative PSA composite consisting of the same backing and a layer of the comparative PSA composition of the same thickness,

(i) at T<sub>1</sub>, having a PSA peel strength P<sub>1</sub><sup>c</sup> or undergoing non-adhesive failure, and

(ii) at T<sub>2</sub>, having a PSA peel strength P<sub>2</sub><sup>c</sup> or undergoing non-adhesive failure;

and at least one of the following conditions being fulfilled

(a) P<sub>1</sub>-P<sub>2</sub> is at least 25 g/cm,

(b) 100(P<sub>1</sub>-P<sub>2</sub>)/P<sub>1</sub> is at least 25,

(c) the comparative PSA composite undergoes non-adhesive failure at T<sub>1</sub> or T<sub>2</sub>, and

(d)  $(P_1 - P_2)/P_1$  is greater than  $(P_1' - P_2')/P_1'$ .

5,412,036

**MALEIMIDE-MODIFIED HIGH HEAT ABS RESINS**  
Thomas D. Traugott, Sanford, and Shari L. Workentine, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 27, 1993, Ser. No. 127,726  
Int. Cl.<sup>6</sup> C08F 279/02

U.S. Cl. 525—282

9 Claims

1. A process for preparing a rubber-modified monovinylidene aromatic copolymer composition, said process comprising the steps of:

A. dissolving a rubber in a monomer mixture comprising a monovinylidene aromatic monomer, an ethylenically unsaturated nitrile monomer and, optionally, an N-substituted maleimide monomer to form an original monomer charge, said rubber being a homopolymer of a conjugated diene monomer or a copolymer of a conjugated diene monomer with up to about 40 weight percent of a monoethylenically unsaturated monomer;

B. partially polymerizing the resulting solution of said rubber in said monomer mixture;

C. adding an N-substituted maleimide monomer to the partially polymerized solution of said rubber in said monomer mixture when at least 20 weight percent of said monomer mixture has been converted from monomer to polymer;

D. continuing to polymerize the partially polymerized reaction mixture of step (C) to the desired degree of polymerization; and

E. removing any unreacted monomers from the product of step D at elevated temperature and reduced pressure and under conditions such that the swelling index of the resulting rubber modified polymer product is from about 15 to about 25; said process being conducted such that at least about 30 percent of the total N-substituted maleimide monomer employed is added to the polymerization process at a point wherein from 20 to 60 percent of the original monomer charge has been converted from monomer to polymer and wherein the difference between the N-substituted maleimide monomer content as between the matrix phase and the grafted and occluded rigid copolymer portion of the rubber phase within the resulting rubber-modified polymer product is 9 weight percentage points or less.

5,412,037

**SUPERABSORBENT ACRYLIC POWDERS**

Shu R. Rehre, Vincennes; Christian Collette, Paris, and André Kowalik, Gouvilleux, all of France, assignors to Elf Atochem S.A., Puteaux, France

Division of Ser. No. 104,761, Aug. 12, 1993, This application  
Aug. 19, 1994, Ser. No. 293,031

Claims priority, application France, Aug. 12, 1993, 92 09960  
Int. Cl.<sup>6</sup> C08F 265/02

U.S. Cl. 525—301

5 Claims



1. Particulates of a superabsorbent partially neutralized acrylic polymer, having a mean particle size ranging from 100 to 500  $\mu\text{m}$ , essentially monodisperse and essentially devoid of fines having a particle size of less than 100  $\mu\text{m}$ , and having a nonuniformly surfaced spheroidal particle morphology.

5,412,038  
**PROCESS UTILIZING ALKENYLCARBOXYLATE  
CROSSLINKERS**

Rex E. Murray, Charleston, W. Va.; Robert F. Eaton, Belle Mead; Thomas A. Upshaw, Somerset, both of N.J.; James W. Taylor, Kingsport, Tenn.; David R. Bassett, Cary, N.C., and David M. Lincoln, Charleston, W. Va., assignors to Union Carbide Chemicals & Plastics Technology Corporation, Danbury, Conn.

Filed Jun. 28, 1993, Ser. No. 83,659

Int. Cl.<sup>6</sup> C08F 265/04, 291/08; C08L 33/06

U.S. Cl. 525—303

7 Claims

1. A process for crosslinking a polymer containing hydroxyl groups which process comprises:

(a) forming a mixture of said polymer and crosslinking amount of a poly(alpha, beta-alkenylcarboxylate) that is free of isocyanato groups and groups that cause liberation of formaldehyde during the cure of the polymer containing hydroxyl groups, and

(b) maintaining the mixture in the presence of a low molecular weight solvent and catalyst, at elevated temperature conditions under which the polymer cures by reaction of the hydroxyl groups of the polymer with the poly(alpha, beta-alkenylcarboxylate), to produce a crosslinked polymer and an aldehyde or ketone by product derived from the alkenyl groups of the poly(alpha, beta-alkenylcarboxylate).

5,412,039

**ACRYLIC COPOLYMER CORE WITH CATALYST  
GRAFTED WITH MACROMONOMERS**

Robert J. Barsotti, Franklinville, N.J.; Charles T. Berge, and Christopher Scopazzi, both of Wilmington, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Jul. 8, 1994, Ser. No. 272,342

Int. Cl.<sup>6</sup> C08F 265/02; C08L 33/14

U.S. Cl. 525—309

5 Claims

1. A catalytic composition comprising a catalyst reacted with the acid functionality of a core of a branched acrylic copolymer which is insoluble in a non-polar organic solvent and formed from the polymerization of an ethylenically unsaturated monomer with at least about 5% by weight of acid functionality, and grafted to the core, one end of a acrylic stabilizer in the form of a macromonomer, said acrylic stabilizer being soluble in an organic solvent.

5,412,040

**HYDROGENATED BLOCK COPOLYMERS  
CONTAINING EPOXY GROUPS AND THEIR  
PREPARATION**

Sergio Custro, and Gian T. Viola, both of Ravenna, Italy, assignors to Enichem Elastomeri S.R.L., Milan, Italy

Filed Feb. 5, 1992, Ser. No. 831,444

Claims priority, application Italy, Feb. 6, 1991, M191A0306  
Int. Cl.<sup>6</sup> C08F 8/08

U.S. Cl. 525—332.9

6 Claims

1. Linear or branched block copolymers, deriving from the block copolymerization of vinylaromatic and diene monomers, wherein the diene blocks have been partially hydrogenated and subsequently fully epoxylated, defined with the formula:



where

A is a polyvinylaromatic block, E-B-EPOX is an ethylene-butene copolymeric block containing epoxy units of the type 1,4 cis and 1,4 trans, distributed along the polymeric chain, n is an integer between 1 and 20 and X is a coupling radical having functionality n, said copolymers having an average weight molecular weight ranging from 30,000 and 400,000, a content of polyvinylaromatic blocks of between 10 and 50% by weight, a content of EPOX units

of between 1% and 20% of the initial unsaturations present in the polymer before its partial hydrogenation.

5,412,041

**METHOD FOR FORMING**

**(METH)ACROLEIN-CONTAINING POLYMERS**

Patricia M. Lesko, Ottsville, Pa., and Ronald Fairhurst, Whitley Bay, United Kingdom, assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jul. 11, 1994, Ser. No. 273,259

Int. Cl.<sup>6</sup> C08F 8/12

U.S. Cl. 525—340

3 Claims

1. A method for forming emulsion copolymers of (meth)acrolein comprising the steps of:

(a) emulsion polymerizing a copolymer from about 0.1% to about 25%, by weight, based on the total weight of the copolymer, of an acetal derivative of (meth)acrolein with from about 75% to about 99.9% by weight, based on the total weight of the copolymer, of at least one  $\alpha,\beta$ -ethylenically unsaturated comonomer; and

(2) adjusting the pH of said copolymer to less than about 5 to hydrolyze said acetal derivative of (meth)acrolein to (meth)acrolein.

5,412,042

**CROSSLINKED ELASTOMERIC ACETAL POLYMERS**

George L. Collins, Maplewood; William M. Pleban, Stanhope, and Milton J. Hayes, Jr., Irvington, all of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Jul. 25, 1991, Ser. No. 735,974

Int. Cl.<sup>6</sup> C08L 59/02

U.S. Cl. 525—403

6 Claims

1. A crosslinked acetal polymer consisting essentially of monomer units derived from:

(a) 1,3-dioxolane;  
(b) 1,3-dioxepane; and  
(c) one or more polyfunctional crosslinking compounds, said crosslinking compounds having at least two reactive functional groups, each of said reactive functional groups being subject to cationic polymerization; said crosslinked elastomeric acetal polymer being non-crystalline at room temperature.

5,412,043

**COMPOSITE MATERIALS OF INTERPENETRATING  
INORGANIC AND ORGANIC POLYMER NETWORKS**

Bruce M. Novak, Orinda, and Mark W. Ellsworth, Berkeley, both of Calif., assignors to The Regents of the University of California, Oakland, Calif.

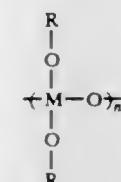
Division of Ser. No. 674,849, Mar. 25, 1991, Pat. No. 5,254,638,  
This application Aug. 24, 1993, Ser. No. 110,850

Int. Cl.<sup>6</sup> C08F 283/12

U.S. Cl. 525—479

3 Claims

1. A polymer with the structure



wherein M is Si or Ti, O is oxygen, n is the number of repeating units, and wherein at least some of the R groups are alkoxide moieties derived from alcohols and including polymerizable ethylenically unsaturated carbon-carbon bonds, said polymer being further polymerizable to form an inorganic-organic composite material having a solid interwoven network of an inorganic polymer matrix within interpenetrating polymerized alcohols.

5,412,044

**NITRO GROUP TERMINATED MESOGENIC EPOXY  
RESIN ADDUCTS**

Robert E. Hefner, Jr., and Jimmy D. Earls, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 154,805, Nov. 18, 1993, Pat. No. 5,344,898, which is a division of Ser. No. 982,804, Nov. 30, 1992, Pat. No. 5,298,575. This application May 12, 1994, Ser. No. 241,883

Int. Cl.<sup>6</sup> C08G 59/00; C07C 205/19

U.S. Cl. 525—523

17 Claims

1. An adduct containing terminating nitro or nitroso groups and one or more rodlike mesogenic moieties per molecule which adduct results from the reaction of

(A) one or more compounds containing an average of more than one vicinal epoxide group per molecule and

(B) one or more compounds containing one or more nitro or nitroso groups and one hydrogen atom per molecule which is reactive with an epoxide group thereby forming an adduct essentially free of epoxy groups and containing nitro groups;

with the proviso that said at least one or more rodlike mesogenic moieties per molecule are present in either component (A) or (B) or in both components (A) and (B), wherein components (A) and (B) are employed in amounts which provide a ratio of equivalents of hydrogen reactive with an epoxide group, excluding secondary hydroxyl groups formed by epoxide ring opening reaction to form the adduct, per equivalent of epoxide reacted of from about 1:1 to about 100:1.

5,412,045

**PREPARATION OF HIGH CIS-1,4-POLYBUTADIENE  
WITH REDUCED GEL**

Akhtar Osman, and Thomas F. Knauf, both of Sarnia, Canada, assignors to Polysar Rubber Corporation, Sarnia, Canada

Filed Sep. 16, 1994, Ser. No. 308,013

Int. Cl.<sup>6</sup> C08F 4/14, 4/70, 136/06

U.S. Cl. 526—133

11 Claims

1. A process for the production of a high molecular weight rubbery polybutadiene with reduced microgel content having more than 96 percent of the butadiene units present in the cis-1,4-configuration which process comprises the steps of:

(A) polymerizing 1,3-butadiene in a polymerization medium comprising an inert hydrocarbon at a temperature of from about 0° C. to about 120° C. in the presence of a catalyst system dissolved in said polymerization medium, said catalyst system comprising (1) a nickel salt of a carboxylic acid,

(2) a mixture of triethyl aluminum and an organoaluminum compound having the formula  $R_3Al$ , said mixture having an average composition  $Et_3-xR_xAl$  wherein Et is an ethyl group, R is an alkyl group having from 8 to 12 carbon atoms and x is a numeral of from about 0.1 to about 2.9 and (3) a boron trifluoride etherate wherein the molar ratio of said nickel salt to said mixture of triethyl aluminum and an organoaluminum compound is from about 1:1 to about 1:20 and the molar ratio of said boron trifluoride etherate to said mixture of triethyl aluminum and an organoaluminum compound is from about 1:0.25 to about 1:2,

(B) continuing the polymerization thus initiated to the monomer conversion desired and

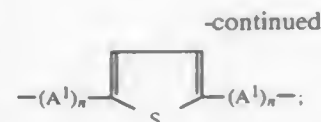
(C) thereafter deactivating the polymerization and recovering the polybutadiene.











each A¹ is independently a —CO—, —O—CO—, —CO—O—, —CO—S—, —S—CO—, —CO—NR²— or —NR²—CO— group; each R is independently hydrogen or a hydrocarbyl or hydrocarbyloxy group having from one to about 10 carbon atoms, a halogen atom, a nitro group, a nitrile group or a —CO—R² group; each R² is independently hydrogen or a hydrocarbyl group having from one to about 6 carbon atoms; each R⁴ is independently hydrogen or a hydrocarbyl group having from one to about 3 carbon atoms; n has a value of zero or 1; and n' has a value of 1 or 2;

(C) optionally, at least one epoxy resin curing agent which is different from component (B);

(D) optionally, at least one curing catalyst; and wherein components (B) and (C) combined are present in quantities sufficient to cure component (A).

5,412,058

### NOVOLAKS OF THE PHENOL-DENSE ALDEHYDE TYPE

Thierry Dreyfus, Villiers sur Coudun, and Noël Le Bourd, Compiègne, both of France, assignors to CECA S.A., France  
PCT No. PCT/FR90/00049, § 371 Date Sep. 14, 1990, § 102(e)  
Date Sep. 14, 1990, PCT Pub. No. WO90/08790, PCT Pub.  
Date Aug. 9, 1990

PCT Filed Jan. 23, 1990, Ser. No. 576,465

Claims priority, application France, Jan. 25, 1989, 89 00876  
Int. Cl.⁶ C08G 8/04

U.S. Cl. 528—129

1 Claim

1. The process for the preparation of novolak resins in which the aldehydes: phenols ratio is between 0.9 and 1.2 and in which at least 50% of the aldehyde compounds originate from aliphatic aldehydes with a number of carbon atoms equal to or greater than 6, which consists in reacting the phenol reagents and the aldehyde reagents in the presence of acid catalysts and in eliminating the water of reaction as soon as it is formed.

5,412,059

### POLYBENZIMIDAZOLES VIA AROMATIC NUCLEOPHILIC DISPLACEMENT

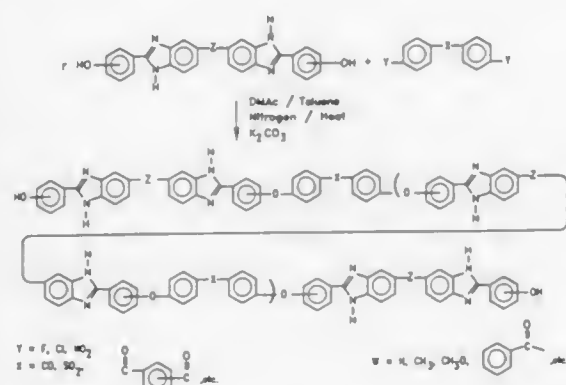
John W. Connell; Paul M. Hergenrother, and Joseph G. Smith, Jr., all of Yorktown, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 5, 1993, Ser. No. 45,335

Int. Cl.⁶ C08G 63/00, 8/02, 73/18

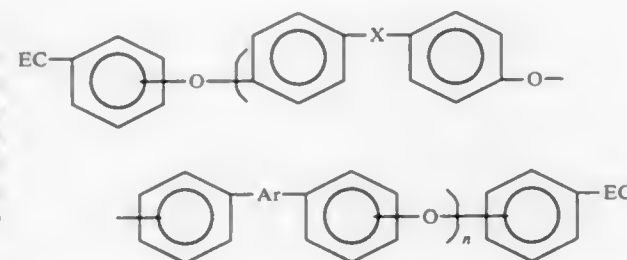
U.S. Cl. 528—183

11 Claims

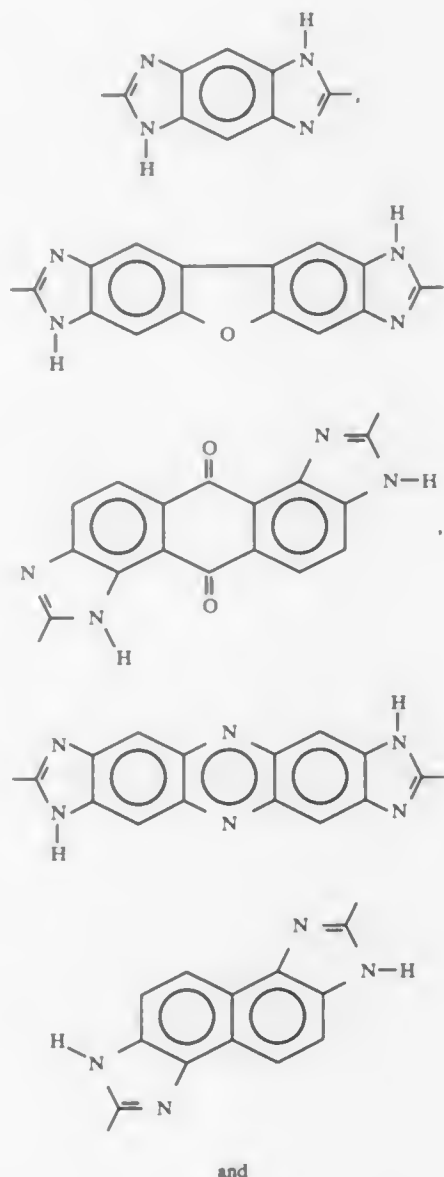


1. A molecular weight controlled and endcapped poly(ben-

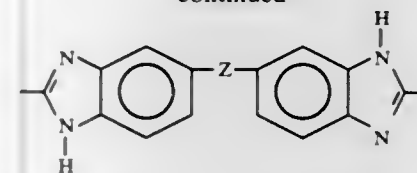
zimidazole) consisting of repeat units having the general structural formula



wherein the catenation of oxygen is selected from the group consisting of meta-meta, para-para, and para-meta; wherein Ar is a radical selected from the group consisting of



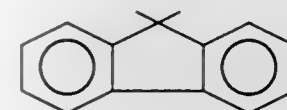
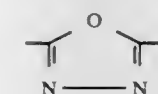
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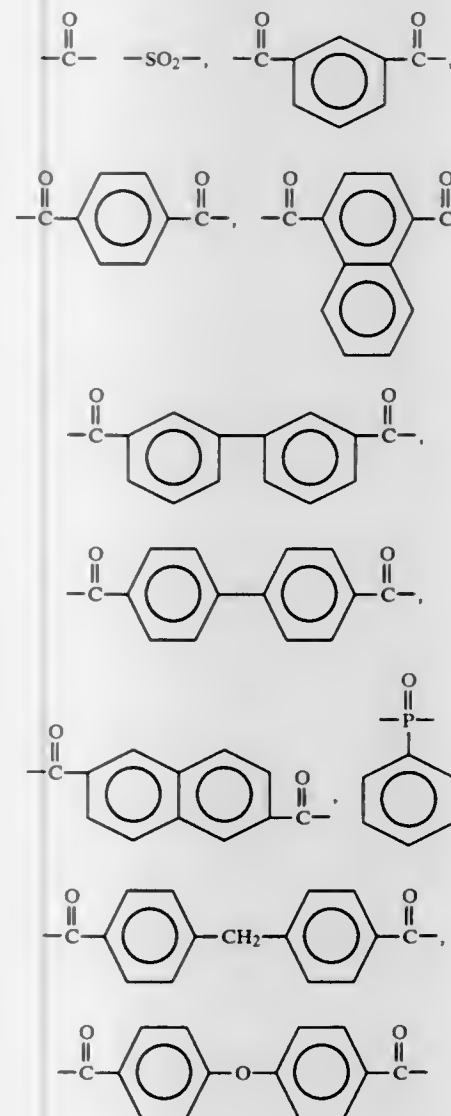
wherein Z is a bond or Z is a radical selected from the group consisting of

CH₂, O, S, O=C, SO₂,

and

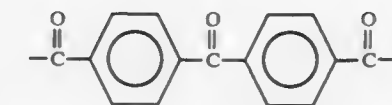


wherein X is a radical selected from the group consisting of

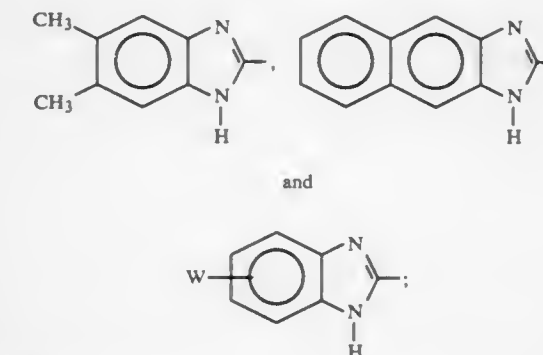


-continued

and



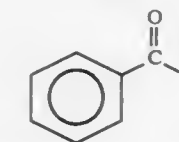
wherein EC is a radical selected from the group consisting of:



wherein W is a radical selected from the group consisting of

H, CH₃, CH₃O,

and



wherein n is an integer between 4 and 1000.

5,412,060

PROCESS FOR THE PRODUCTION OF POLYCARBONATE OF CONSTANT VISCOSITY  
Claus Wulff, Krefeld; Uwe Hucks, Alpen; Rolf Bachmann, Bergisch Gladbach; Günther Weymans, Leverkusen; Jürgen Kadelka, Krefeld, and Wolfgang Herrig, Bergisch Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 59,478, May 7, 1993, abandoned, which is a continuation-in-part of Ser. No. 931,743, Aug. 18, 1992, abandoned. This application Jan. 31, 1994, Ser. No. 189,382

Claims priority, application Germany, Aug. 20, 1991, 41 27 512.8

Int. Cl.⁶ C08G 64/00

U.S. Cl. 528—196

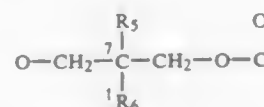
9 Claims

1. A process for the production of polycarbonates by the two-phase interfacial method in at least two reaction steps, in which a phosgene-containing organic phase and a bisphenol-containing water phase with or without alkali hydroxide or chain terminator are mixed in a first step to form a first input stream and in a second step polycarbonate producing catalyst with or without chain terminator is added as a second input stream, said first input stream and said second input stream being controlled by the value of the relative viscosity Of the polycarbonate, wherein the relative viscosity of the resulting polycarbonate is measured at the end of the reaction, a viscosity number (VZ\*) defined as V-number=100×(relative viscosity — 1) is calculated from the measured concentration and

**U.S. Cl. 528—370** **20 Claims**  
1. A medical device comprising:  
a polymeric fiber; and



a bioresorbable copolymer in contact with said polymeric fiber, said bioresorbable copolymer comprising as a major component one or more recurring monomeric units of the formula:



wherein:

R<sub>5</sub> and R<sub>6</sub> are the same or different and are hydrogen or alkyl having from 1 to about 7 carbon atoms; said polymeric fiber having a different chemical composition than said bioresorbable copolymer.

5,412,069

## TWO-PART POLYSULFIDE MOLDING COMPOSITION AND PROCESS

Robert A. LeCompte, Lebanon, and Scott S. Moningerhoff, Milford, both of N.J., assignors to Rutgers, The State University of New Jersey, New Brunswick, N.J.

Filed Jul. 30, 1993, Ser. No. 100,083  
Int. Cl.<sup>6</sup> C08G 75/04

U.S. Cl. 528—374

12 Claims

1. A stable, curable two-part polysulfide molding composition which has manganese dioxide as the curing agent, said two parts defined as follows:

Part A: (polysulfide part)

100 parts by weight of low viscosity liquid polysulfide having a small amount of crosslinking;  
optionally an effective amount of a plasticizer or combination of plasticizers which are compatible with the liquid polysulfide component, providing desired low viscosity, being compatible with curing of the composition and being compatible with obtaining desired Shore A hardness, tear strength and low viscosity in the admixture of Parts A and B;  
optionally an amount of a retarding agent to slow cure rate of the composition as desired;  
optionally about 0.25 to 2 parts of elemental sulfur per 100 parts of liquid polysulfide; and  
optionally an effective amount of carbon or other pigment to pigment the composition;

Part B: (curing agent part)

100 parts by weight of activated manganese dioxide;  
an amount of a medium to suspend the manganese dioxide in which the catalyst is compatible and stable;  
an amount of a wetting agent which promotes stability of the manganese dioxide catalyst and reduces the thixotropic character of Part B and which is compatible with the curing of the composition;  
an amount of an accelerator having the activity shown by presence of tetramethylthiuram disulfide;  
optionally an amount of an inhibitor for the manganese dioxide to provide reduced cure rate as provided by dimer acid;  
optionally an amount of an amine accelerator for the manganese dioxide to provide enhanced cure rate as desired;  
said Part B catalyst showing a high stability of curing activity after 7–14 days in the accelerated stability test whereby a gel time of less than 90 minutes is provided;  
said Part B medium providing the stability as provided by chlorinated paraffin having a chloro content of about 50 percent;  
said composition made by adding a sufficient amount of part B with thorough mixing to Part A to provide a working time of about 10 to about 30 minutes, a gel time of about 30 to about 90 minutes and a cure time of about 1 to about 24 hours without use of agents to inhibit or accelerate the curing rate;  
said composition providing upon curing a molded structure

having good tear strength and a Shore A hardness of 5 to 401

said viscosity determined at 78° F. as by using a Brookfield viscometer, Model HBT, No. 6 spindle, at 20 RPM.

5,412,070

## POLYKETONE COPOLYMERS OF HIGH BULK DENSITY AND NON-REACTIVITY

Paul K. Hanna, East Windsor, N.J., and Teresa M. Cheron, Yonkers, N.Y., assignors to Akzo Nobel N.V., Arnhem, Netherlands

Division of Ser. No. 898,627, Jun. 15, 1992, abandoned. This application Jul. 22, 1993, Ser. No. 96,798  
Int. Cl.<sup>6</sup> C08G 67/02

U.S. Cl. 528—392

6 Claims

1. A copolymer of carbon monoxide and an olefin having a bulk density of above about 0.60 g/ml which is substantially free of reactive groups selected from the group consisting of vinyl, ester, alkoxy or acid end groups and which essentially contains alkyl end groups.

5,412,071

## CATALYST COMPOSITION AND PROCESS FOR THE PREPARATION OF POLYMERS

Arleen M. Bradford, and Andre Buys, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 7, 1994, Ser. No. 319,903  
Int. Cl.<sup>6</sup> C08G 67/02; B01J 31/02, 31/12

U.S. Cl. 528—392

19 Claims

1. A catalyst composition comprising  
a) a metal of Group VIII of the Periodic Table, and  
b) an anion which is weakly or non-coordinating with the Group VIII metal and which includes an oxidant moiety in its molecular structure.

15. A process for the preparation of copolymers which comprises copolymerizing carbon monoxide with one or more ethylenically unsaturated compounds in the presence of a catalyst composition comprising:

a) a metal of Group VIII of the Periodic Table, and  
b) an anion which is weakly or non-coordinating with the Group VIII metal and which includes an oxidant moiety in its molecular structure.

5,412,072

## WATER SOLUBLE HIGH MOLECULAR WEIGHT POLYMERIZED DRUG PREPARATION

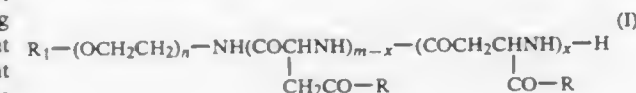
Yasuhisa Sakurai, Tokyo; Teruo Okano; Kazunori Kataoka, both of Chiba; Noriko Yamada, Tokyo; Shohei Inoue, Tokyo, and Masayuki Yokoyama, Tokyo, all of Japan, assignors to Research Development Corp. of Japan, Tokyo, Japan  
Filed Mar. 21, 1990, Ser. No. 496,741

Claims priority, application Japan, May 11, 1989, 1-116082  
Int. Cl.<sup>6</sup> C07K 9/00

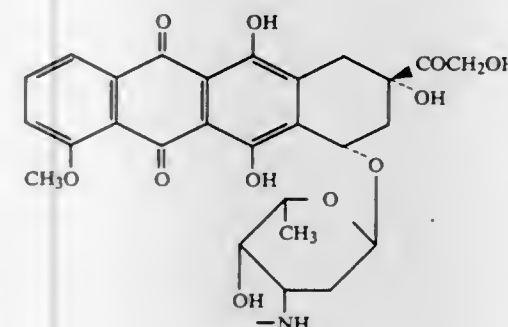
U.S. Cl. 530—322

1 Claim

1. A compound of formula I:



wherein R represents OH; or

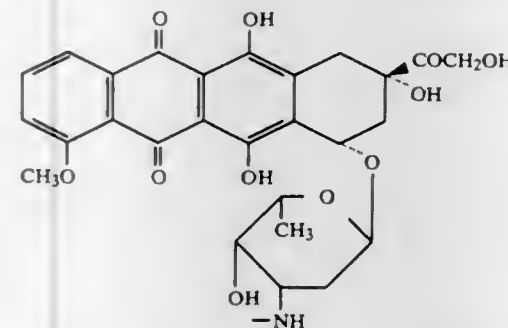


R<sub>1</sub> represents—CH<sub>3</sub> or —CH<sub>2</sub>CH<sub>3</sub>

n represents an integer from 90 to 400,

m represents an integer from 1 to 300,

x represents an integer from 0 to 300; and in which at least one R represents,



said compound forming a micelle when in an aqueous solution.

5,412,073

## POLYPEPTIDES AND DNA CODING THEREFOR

Ahmed N. Kalsbeker, Cardiff, Wales, assignor to 3i Research Exploitation Limited, London, England

PCT No. PCT/GB90/02003, § 371 Date Jun. 16, 1992, § 102(e)  
Date Jun. 16, 1992, PCT Pub. No. WO91/09947, PCT Pub. Date Jul. 11, 1991

PCT Filed Dec. 21, 1990, Ser. No. 859,480

Claims priority, application United Kingdom, Dec. 22, 1989, 8929110

Int. Cl.<sup>6</sup> C07K 13/00; A61K 37/64

U.S. Cl. 530—350

2 Claims

1. A protein having the amino sequence shown in SEQ ID NO: 2.

5,412,074

## SILICONE MODIFIED PROTEINS

Roger T. Jones, Cuddington, and Mark A. Humphreys, Warrington, both of United Kingdom, assignors to Croda International PLC., United Kingdom

Filed Nov. 2, 1992, Ser. No. 971,023

Claims priority, application United Kingdom, Nov. 1, 1991, 9123251

Int. Cl.<sup>6</sup> A61K 47/48

U.S. Cl. 530—353

17 Claims

1. A silicone modified protein comprising:  
an organofunctional silicone chain having a first end and a second end;

a first organic moiety on said first end of said chain and a second organic moiety on said second end of said chain; and

a first protein having a free amino group covalently linked to said silicone chain via said first organic moiety and a second protein having a free amino group covalently

linked to said silicone chain via said second organic moiety.

5,412,075

## CONTROL OF METHIONINE CONTENT IN PHOTOGRAPHIC GRADE GELATIN

Donald P. Wrathall, Topsfield, Mass.; John E. Keevert, Jr.; Gregg C. Hider, both of Rochester, N.Y., and John S. Brand, Pittsford, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 849,483, Mar. 11, 1992, abandoned.

This application Apr. 13, 1994, Ser. No. 227,171

Int. Cl.<sup>6</sup> C07K 4/12; G03C 1/047

U.S. Cl. 530—355

5 Claims

1. A process for preparing photographic grade gelatin from bone stock in which the variability of the methionine content of said gelatin is regulated to within a total range of 4 μmoles of methionine per gram of gelatin, said process comprising the steps of:

acidulating the bone stock,  
liming the acidulated bone stock,  
washing the limed bone stock, and  
extracting gelatin from the washed bone stock; said process including exposure of said gelatin to an oxidant during at least one of said processing steps;  
and said process being characterized in that the variability of the methionine content of said gelatin is regulated to within said total range of 4 μmoles of methionine per gram of gelatin by controlling the extent to which said gelatin is exposed to said oxidant during said at least one processing step to a range of oxidant which provides said range of methionine content.

5,412,076

## CROSSLINKABLE COLLAGEN DERIVATIVES, PROCESS FOR THEIR PRODUCTION AND THEIR APPLICATION TO THE PREPARATION OF BIOMATERIALS

Christian Gagnieu, Chassieu, France, assignor to Flamel Technologies, Venissieux Cedex, France

Filed Jun. 17, 1993, Ser. No. 77,605

Claims priority, application France, Jun. 18, 1992, 92 07692  
Int. Cl.<sup>6</sup> A61K 37/12, 9/70; C07K 13/00; A61L 15/32

U.S. Cl. 530—356

16 Claims

1. A crosslinkable modified collagen which is soluble in water and/or in aprotic polar organic solvents and which comprises free or unsubstituted thiol groups carried by residues of cysteine, at least some of said residues being fixed to the collagen via spacer compounds.

5,412,077

## EFFECTIVE ANTIBODY TITERS AGAINST RESPIRATORY VIRUSES

George R. Siber, Brookline, and Jeanne Leszczynski, Jamaica Plains, both of Mass., assignors to Massachusetts Health Research Institute, Inc., Boston, Mass.

Continuation of Ser. No. 688,435, Apr. 22, 1991, abandoned.

This application Aug. 4, 1993, Ser. No. 102,106

Int. Cl.<sup>6</sup> A61K 39/42, 39/395; C12Q 1/70; C01N 33/569  
U.S. Cl. 530—389.4

5 Claims

1. A process for preparing an immunoglobulin containing effective antibody titers for the treatment or prophylaxis of an infection caused by respiratory syncytial virus, comprising:  
recovering from plasma an immunoglobulin containing effective antibody titers for the treatment or prophylaxis of an infection caused by respiratory syncytial virus, said plasma having been selected by:  
contacting a sample of plasma containing antibodies against respiratory syncytial virus with respiratory syncytial virus;  
contacting the mixture of sample and respiratory syncytial virus with a population of cells;  
incubating the mixture for a prescribed period of time to

allow non-neutralized respiratory syncytial virus remaining in the mixture to replicate in cells; determining the amount of respiratory syncytial virus antigen in cells by an immunoassay; and selecting a plasma whose sample which, at a preselected minimum antibody titer, prevents vital replication within said cells.

5,412,078

# REACTIVE PYRIDONE-CONTAINING DYESTUFFS, THEIR PREPARATION AND THEIR USE

Thomas Elzenhöfer, Cologne; Wolfgang Harms, Odenthal, and Karl-Josef Herd, Odenthal-Holz, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 26, 1993, Ser. No. 9,493

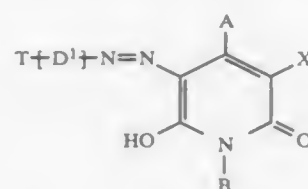
Claims priority, application Germany, Feb. 6, 1992, 42 03 280.6

Int. Cl.<sup>6</sup> C09B 62/08, 62/507; D06P 1/38

U.S. Cl. 534-635

4 Claims

1. A reactive dyestuff which, as the free acid, corresponds to the formula

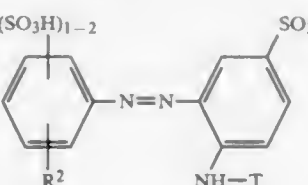
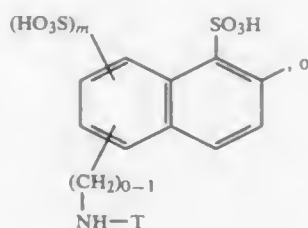
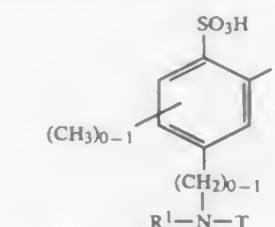


wherein

A is H or C<sub>1</sub>-C<sub>4</sub>-alkyl;

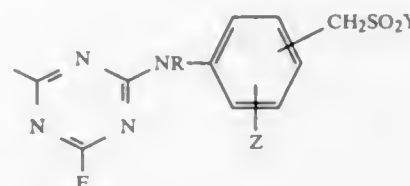
B is H, optionally substituted C<sub>1</sub>-C<sub>6</sub> alkyl wherein the substituents are selected from the group consisting of OH, SO<sub>3</sub>H, OSO<sub>3</sub>H, NH<sub>2</sub>, CO<sub>2</sub>H, NH(C<sub>1</sub>-C<sub>4</sub>-alkyl) and C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>3</sub>-C<sub>6</sub> cycloaliphatic radical, or optionally substituted phenyl wherein the substituents are selected from the group consisting of SO<sub>3</sub>H, CO<sub>2</sub>H, CH<sub>3</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, NH<sub>2</sub> and NH(C<sub>1</sub>-C<sub>4</sub>-alkyl);

X is H, Cl, Br, CH<sub>3</sub>, CH<sub>2</sub>SO<sub>3</sub>H, CH(CH<sub>3</sub>)-SO<sub>3</sub>H, CONH<sub>2</sub>, or COCH<sub>3</sub>;

D<sup>1</sup> is a radical of the formulaR<sup>2</sup> is H, CH<sub>3</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, CH<sub>2</sub>SO<sub>2</sub>W, SO<sub>3</sub>W;

where

W is CH=CH<sub>2</sub>, CH<sub>2</sub>CH<sub>2</sub>OSO<sub>3</sub>H or CH<sub>2</sub>CH<sub>2</sub>Cl;  
m is 0 or 1 and T is



where

R is H, CH<sub>3</sub>, CH<sub>2</sub>H<sub>5</sub>, C<sub>3</sub>H<sub>7</sub>, CH<sub>2</sub>CH<sub>2</sub>OH, CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H, CH<sub>2</sub>CO<sub>2</sub>H or CH<sub>2</sub>CH<sub>2</sub>CN;

Z is H, CH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub> or OC<sub>3</sub>H<sub>7</sub> and

Y is CH=CH<sub>2</sub>, CH<sub>2</sub>CH<sub>2</sub>OSO<sub>3</sub>H or CH<sub>2</sub>CH<sub>2</sub>Cl.

5,412,079

# LIQUID CRYSTAL MONOMER COMPOUND AND POLYMER OBTAINED THEREFROM

Junji Furukawa, Kawasaki; Hiroshi Okamoto, Owariasahi; Yoshio Onouchi, Seto; Takushi Andoh, Fujieda, and Satoshi Urano, Tsuzuki, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Mar. 25, 1994, Ser. No. 217,670

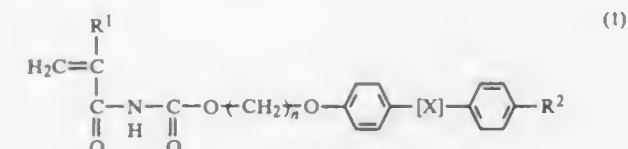
Claims priority, application Japan, Mar. 26, 1993, 5-067938

Int. Cl.<sup>6</sup> C07C 261/00; C09B 29/00

U.S. Cl. 534-732

9 Claims

1. A liquid crystal monomer compound represented by formula (1):



wherein n is an integer of from 2 to 18, X is direct bond, —(C=O)—O—, —(C=O)—NH— or —N=N—, R<sup>1</sup> is hydrogen or a lower alkyl group, and R<sup>2</sup> is hydrogen, a cyano group or a methoxy group.

5,412,080

# ENTEROBACTIN COMPOUNDS

Yoshito Kishi, Belmont, and Bruno Tse, Cambridge, both of Mass., assignors to President and Fellow of Harvard College, Cambridge, Mass.

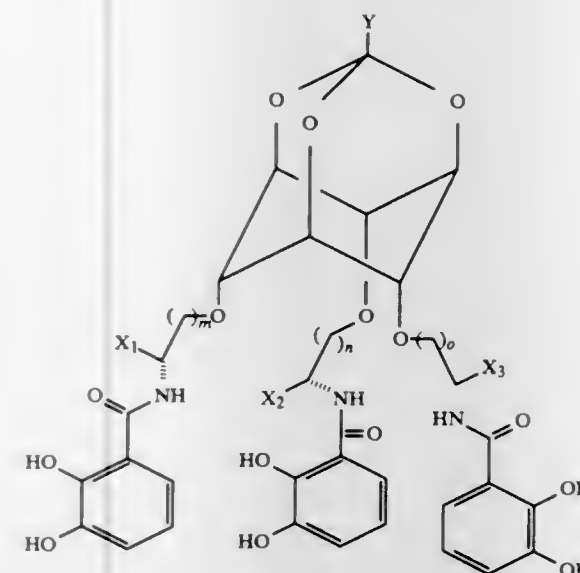
Filed Aug. 25, 1993, Ser. No. 111,622

Int. Cl.<sup>6</sup> C07H 15/00, 17/00, 17/02

U.S. Cl. 536-4.1

16 Claims

1. A compound of the following formula:

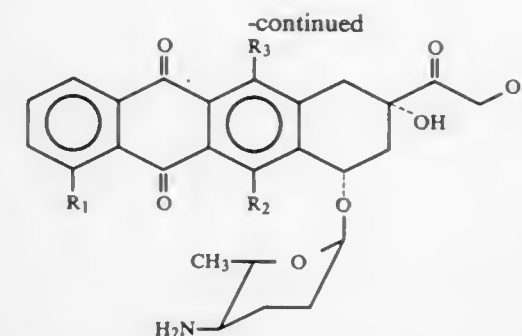


wherein

each X<sub>1</sub>, X<sub>2</sub> and X<sub>3</sub>, independently, is H, C<sub>1</sub>-20 alkyl, phenyl, naphthyl, C<sub>7</sub>-20 aralkyl, or C<sub>7</sub>-20 alkaryl;

Y is H, C<sub>1</sub>-20 alkyl, phenyl, naphthyl; C<sub>7</sub>-20 aralkyl, C<sub>7</sub>-20 alkaryl; —(C<sub>6</sub>H<sub>4</sub>)<sub>p</sub>—CH<sub>2</sub>OH, —(C<sub>6</sub>H<sub>4</sub>)<sub>p</sub>—COOH or its salt, —(C<sub>6</sub>H<sub>4</sub>)<sub>p</sub>—NR<sub>1</sub>R<sub>2</sub> or its salt, or —(C<sub>6</sub>H<sub>4</sub>)<sub>p</sub>—N<sup>+</sup>R<sub>1</sub>R<sub>2</sub> R<sub>3</sub>; in which p is 1-20 and each R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, independently, is H or C<sub>1</sub>-5 alkyl; and

m, n and o, independently, is 1-6; or the enantiomer thereof.



wherein R<sub>1</sub> is selected from the group consisting of hydrogen, fluorine, hydroxy and amino; R<sub>2</sub> and R<sub>3</sub> both represent hydroxy or one of R<sub>2</sub> and R<sub>3</sub> is hydrogen, nitro or amino and the other of R<sub>2</sub> and R<sub>3</sub> is hydroxy; or a pharmaceutically acceptable acid addition salt thereof.

5,412,082

# CONVERSION OF AMINES TO HYDROXYLAMINES

Mark D. Wittman, Hamden; Samuel J. Danishefsky, and Randall L. Halcomb, both of New Haven, all of Conn., assignors to Yale University, New Haven, Conn.

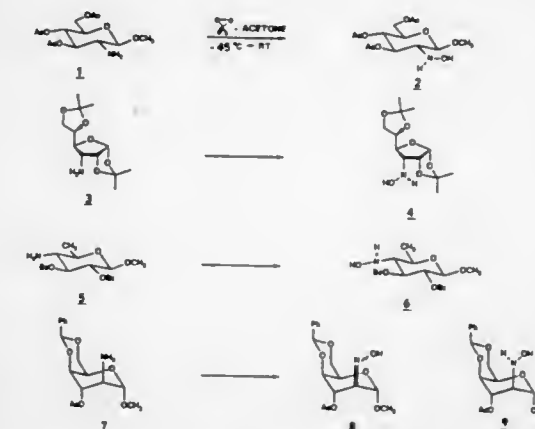
Continuation of Ser. No. 498,106, Mar. 23, 1990, abandoned.

This application Aug. 31, 1993, Ser. No. 114,601

Int. Cl.<sup>6</sup> C07H 19/02; C07C 239/00

U.S. Cl. 536-17.2

13 Claims



5,412,081

# NEW 4'-EPI-4'-AMINO ANTHRACYCLINES

Francesco Angelucci, Alberto Bargiotti, both of Milan; Daniela Faiardi, Pavia; Stefania Stefanelli, and Antonino Suarato, both of Milan, all of Italy, assignors to Farmitalia Carlo Erba S.R.L., Milan, Italy

Continuation-in-part of Ser. No. 730,933, Jul. 29, 1991,

abandoned. This application Jan. 6, 1993, Ser. No. 1,229

Claims priority, application United Kingdom, Feb. 7, 1989, 8902709; WIPO, Feb. 2, 1990, PCT/EP90/00183

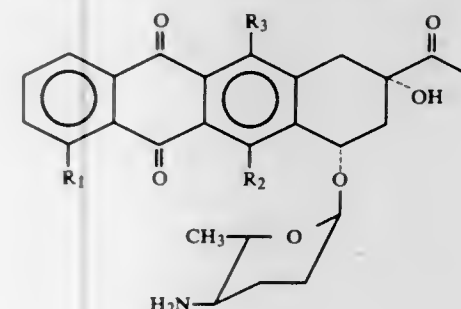
The portion of the term of this patent subsequent to Jan. 22, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> C07H 15/24

U.S. Cl. 536-6.4

5 Claims

1. An anthracycline glycoside of formula 1 or 2:



1. A process for forming an aliphatic non-axial hydroxylamine from a corresponding aliphatic non-axial primary amine that comprises admixing an excess of an aliphatic non-axial primary amine with a dialkyl dioxirane having a total of two to about six carbon atoms in the dialkyl groups in a non-reactive solvent at a temperature in the range of about zero to -50 degrees C. to form a reaction mixture, and maintaining said reaction mixture at said temperature for a time period sufficient for a corresponding hydroxylamine to be formed; and recovering the formed corresponding aliphatic non-axial hydroxylamine.

5,412,083

# CARBOHYDRATE HETEROBIFUNCTIONAL CROSS-LINKING REAGENT

Roger W. Giese, Quincy, Mass.; Kailin Guan, Lawrenceville, N.J., and Douglas J. Cecchini, Jamaica Plain, Mass., assignors to Northeastern University, Boston, Mass.

Filed Apr. 16, 1992, Ser. No. 871,221

Int. Cl.<sup>6</sup> C07H 5/04, 5/06; C08B 37/08

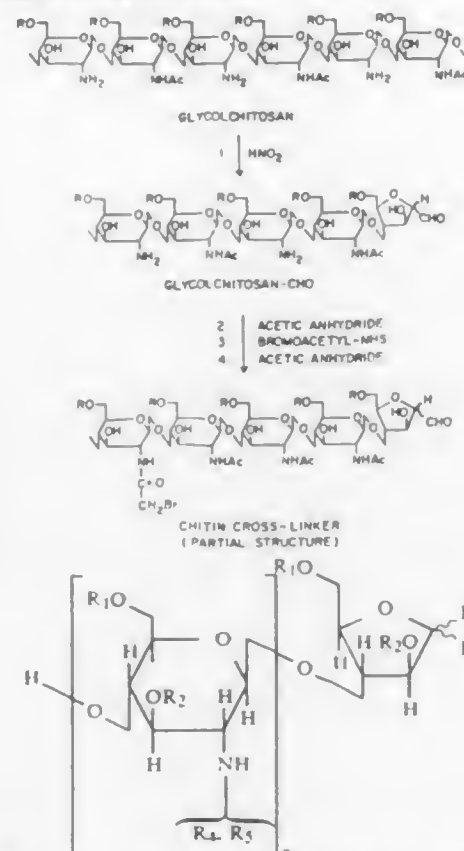
U.S. Cl. 536-20

17 Claims

1. A carbohydrate cross-linking reagent comprising a sequence of substituted glucosamine units in β-1,4 linkage, said



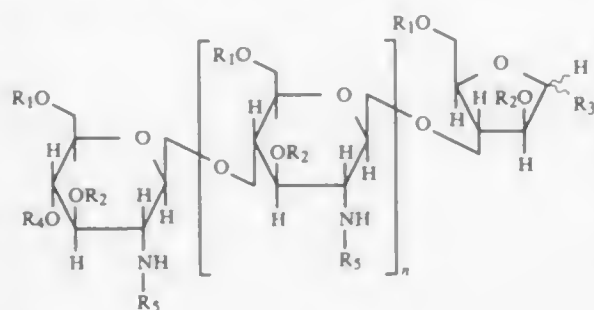
sequence having at the reducing end a tetrahydrofuran unit, said reagent having the formula



wherein

$R_1, R_2$  is H,  $(CH_2CH_2O)_mH$ ,  $(CH_2CH[CH_3]O)_mH$ ,  $CH_2CO_2H$ , or  $CH_2CH_2CN$ , wherein  $m$  is an integer in the range of 1-10;  
 $n$  is greater than or equal to 2;  
 $R_3$  and  $R_4$  are acylating, alkylating, electrophilic or nucleophilic reactive substituents which are different from each other but mutually compatible neither  $R_3$  nor  $R_4$  is an acyl group, and at least one  $R_4$  is present; and  
 $R_5$  is an acyl group.

2. A carbohydrate cross-linking reagent comprising a sequence of substituted glucosamine units in  $\beta$ -1,4 linkage, said sequence having at the reducing end a tetrahydrofuran unit, said reagent having the formula



wherein

$R_1, R_2$  is H,  $(CH_2CH_2O)_mH$ ,  $(CH_2CH[CH_3]O)_mH$ ,  $CH_2CO_2H$ , or  $CH_2CH_2CN$ , wherein  $m$  is an integer in the range of 1-10;  
 $n$  is greater than or equal to 1;  
 $R_3$  and  $R_4$  are acylating, alkylating, electrophilic or nucleophilic reactive substituents which are different from each other but mutually compatible neither  $R_3$  nor  $R_4$  is an acyl group; and  
 $R_5$  is an acyl group.

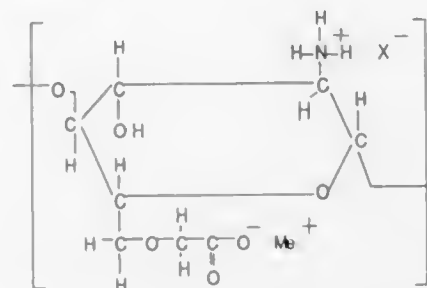
# 5,412,084 N,O-CARBOXYMETHYLCHITOSONIUM CARBOXYLATE SALTS

Clive M. Elson; Dennis T. Curran, both of Halifax, and Susan E. Henderson, Wellington, all of Canada, assignors to Nova Chem Limited, Halifax, Canada

Continuation of Ser. No. 772,405, Oct. 9, 1991, abandoned. This application Jan. 26, 1993, Ser. No. 9,083  
Int. Cl.<sup>6</sup> C08B 37/08; C07H 5/04, 5/06

U.S. Cl. 536—20

23 Claims



9. A process for the preparation of N,O-carboxymethylchitosonium carboxylate salts from N,O-carboxymethyl chitosans having from 20% to 25% of the nitrogen atoms in their polymer chains with carboxymethyl substituents thereon, which comprises:

- (1) suspending the carboxymethyl chitosan in particulate form in an organic diluent-water mixture which does not dissolve nor render the suspended particles adherent, glutinous, gummy, or sticky,
- (2) lowering the pH of the suspension below 7 by adding 0.20 to 0.80 moles of carboxylic acid per mole of carboxymethyl chitosan monomer units in the suspension, said carboxylic acid being dissolved in water, organic solvent for the acid, or a mixture thereof while adjusting the proportion of water in the suspension to maintain the suspended particles separate and discrete and the carboxylic acid in solution,
- (3) stirring the heterogeneous suspension for substantially one hour at room temperature,
- (4) separating the solid particles from the suspension,
- (5) washing the solid particles with anhydrous alcohol to remove residual water, unreacted carboxylic acid, and diluent, and
- (6) recovering and drying the resulting N,O-carboxymethylchitosonium carboxylate salt.

5,412,085  
POLLEN-SPECIFIC PROMOTER FROM MAIZE  
Rebecca L. Allen, and David M. Lonsdale, both of Norwich, United Kingdom, assignors to Pioneer Hi-Bred International Inc., Des Moines, Iowa

Continuation of Ser. No. 911,532, Jul. 9, 1992, abandoned. This application Nov. 9, 1993, Ser. No. 149,695  
Int. Cl.<sup>6</sup> C07H 17/00; C12N 15/00

U.S. Cl. 536—24.1

10 Claims

1. An isolated and purified DNA molecule consisting essentially of a nucleotide sequence which is selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7 and SEQ ID NO: 8.

3. A pollen-specific chimeric gene comprising:
  - (a) the DNA molecule as in either claim 1 (SEQ ID NO: 2-8) or claim 2 (SEQ ID NO: 5); and
  - (b) an exogenous gene,
wherein said DNA molecule regulates the expression of said exogenous gene in a pollen-specific manner.

5,412,086  
DNA PROBE FOR LACTOBACILLUS HELVETICUS  
Herbert Hottinger, Blonay; Beat Mollet, Mollie-Margot, and Nathalie Pilloud, Tour-de-Peilz, all of Switzerland, assignors to Nestec S.A., Vevey, Switzerland

Continuation of Ser. No. 494,138, Mar. 14, 1990, abandoned. This application May 28, 1992, Ser. No. 892,403  
Claims priority, application European Pat. Off., Feb. 10, 1990, 90102650

Int. Cl.<sup>6</sup> C07H 21/04; C12Q 1/68; C12N 15/00

U.S. Cl. 536—24.32

8 Claims



1. An isolated sLHI DNA fragment.

5,412,087  
SPATIALLY-ADDRESSABLE IMMOBILIZATION OF OLIGONUCLEOTIDES AND OTHER BIOLOGICAL POLYMERS ON SURFACES

Glenn H. McGall, Mountain View; Stephen P. A. Fodor, Palo Alto, and Edward L. Sheldon, Menlo Park, all of Calif., assignors to Affymax Technologies N.V., Curacao, Netherlands Antilles

Filed Apr. 24, 1992, Ser. No. 874,849

Int. Cl.<sup>6</sup> C07H 17/00; C12N 11/06

U.S. Cl. 536—24.3

7 Claims

1. A method for forming predefined regions on a surface of a solid support, the method comprising the steps of:

- a) covalently coupling thiolpropionate having a photochemically removable protecting group, the protecting group selected from the group consisting of nitroveratryl, 1-pyrenylmethyl, 6-nitroveratryloxycarbonyl, dimethyl-dimethoxybenzyloxycarbonyl, nitrobenzyloxycarbonyl, 5-bromo-7-nitroindolyl, O-hydroxy-alpha-methyl-cinnamoyl, methyl, 6-nitroveratryloxycarbonyl, methyl-6-nitropiperonyloxycarbonyl, and 2-oxymethylene anthraquinone, to functional groups on a surface of a solid support; and
- b) illuminating the surface with a light source of a wavelength of between 280 and 420 nm shone through a mask, thereby selectively irradiating the predefined regions of the surface to remove said photochemically removable protecting group from the thiolpropionate in the predefined regions.

5,412,088  
6-O-SUBSTITUTED GUANOSINE DERIVATIVES  
Roger A. Jones, Glenside, Pa.; Reza Fathip, Newark, and Barbara L. Gaffney, Neshanic, both of N.J., assignors to Rutgers, The State University, New Brunswick, N.J.

Continuation of Ser. No. 439,616, Nov. 20, 1989, abandoned.

This application Apr. 3, 1992, Ser. No. 863,653

Int. Cl.<sup>6</sup> C07H 19/167, 19/173, 19/20, 21/04

U.S. Cl. 536—27.81

32 Claims

1. The compound 2-N-trifluoroacetamido-6-(4-nitrophenox-yl)-9-(2-deoxy-beta-D-erythro-pentofuranosyl)purine.

5,412,089  
2'-DEOXY-2'-METHYLIDENECYTIDINE DIHYDRATE, METHODS FOR ITS PRODUCTION AND COMPOSITIONS

Shinji Sakata; Takanori Miyashita, and Kazuhiko Kondo, all of Choshi, Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka and Yamasa Corporation, Chiba, both of Japan

Division of Ser. No. 656,824, Feb. 19, 1991, Pat. No. 5,183,882. This application Oct. 9, 1992, Ser. No. 959,267

Claims priority, application Japan, Feb. 19, 1990, 2-37695

Int. Cl.<sup>6</sup> C07H 19/06

U.S. Cl. 536—28.5

1 Claim

1. A crystallization 2'-deoxy-2'-methylenecytidine dihydrate having a melting point of about 107°-110° C. and exhibiting the following X-ray diffraction data:

Spacing d (Å)	Relative Intensities
2.90	40
3.08	47
3.29	54
3.71	100
3.89	35
4.08	91
5.73	31
7.51	66
7.79	56

5,412,090  
HYDROUS CELLULOSE PULP FOR NON PAPER PRODUCTS

Bernard Bendiner, 8815 W. Golf Rd., Suite 12D, Niles, Ill. 60714

Filed Feb. 2, 1994, Ser. No. 190,301

Int. Cl.<sup>6</sup> A61K 7/06, 7/16, 7/50

U.S. Cl. 536—56

14 Claims

1. A process for improving mouthwash, glass cleaner, toothpaste, shampoo, soap, detergent and lotions or creams comprising the steps of:

- (a) producing a decomposition resistant hydrous cellulose pulp, the individual fibers of which are coated with a thin wax film;
- (b) adding the decomposition resistant hydrous cellulose pulp to the product while the product is in liquid form;
- (c) blending the resulting mixture such that the fibers of the decomposition resistance hydrous cellulose pulp are dispersed and suspended in the product where they function as scrubbing and massaging agents to enhance the cleaning and conditioning function of the product.

5,412,091  
16-METHYL-Δ1,4-PREGNADIENE-3,20-DIONE  
Jean Boivin, Forges les Bains; Christine Chauvet, Paris, and Samir Zard, Gif sur Yvette, all of France, assignors to Roussel Uclaf, France

Division of Ser. No. 903,886, Jun. 25, 1992, Pat. No. 5,248,773.

This application Jul. 1, 1993, Ser. No. 86,240

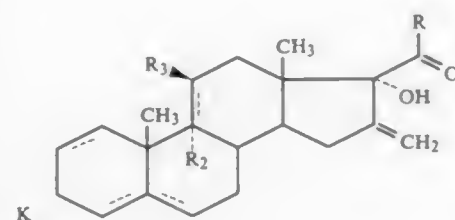
Claims priority, application France, Jun. 25, 1991, 91 07784

Int. Cl.<sup>6</sup> C07J 5/00, 31/00, 33/00, 43/00

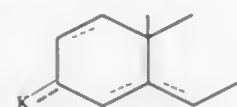
U.S. Cl. 540—108

10 Claims

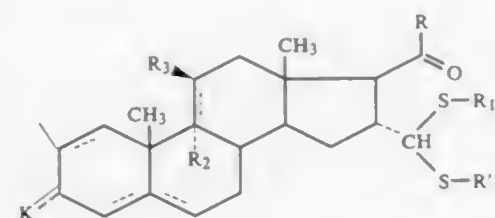
1. A process for the preparation of a compound of the formula



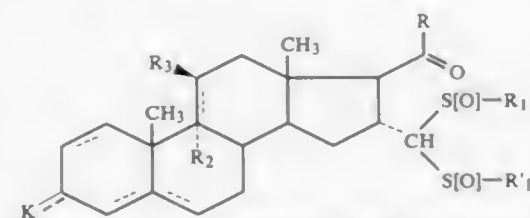
in which



is either a 3-keto-Δ<sup>4</sup>-system or 3-keto-Δ<sup>1,4</sup>-system or a 3-OR<sub>4</sub>-Δ<sup>5</sup>-system in which R<sub>4</sub> is hydrogen or a protector group of hydroxy, R is methyl, —CH<sub>2</sub>OH or —CH<sub>2</sub>OR', in which R' is a protector group of hydroxy, R<sub>2</sub> and R<sub>3</sub> are hydrogen or R<sub>2</sub> is fluorine and R<sub>3</sub> is formyloxy or acetyloxy and the dotted lines in position 9(11) indicate the optional presence of a second bond comprising reacting a compound of the formula



in which K, R, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and the dotted lines are defined as above and R<sub>1</sub> and R<sub>1</sub>' are individually selected from the group consisting of methyl, a branched alkyl of 5 to 8 carbon atoms not possessing hydrogen in the β position, aryl of up to 10 carbon atoms, heteroaryl of up to 10 carbon atoms and at least one heteroatom selected from the group consisting of nitrogen, sulfur and oxygen and benzyl, n and m are individually the numbers of 0 or 1 with at least two equivalents of an oxidizing agent to obtain a compound of the formula



and subjecting the latter to the action of a thiophilic agent to obtain the expected compound of formula A.

5,412,092

## N-SUBSTITUTED 2-AZETIDINONES

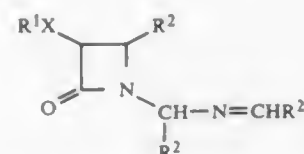
Allan W. Rey, Quebec, Canada; Purushotham Vemishetti, E. Syracuse, N.Y., and Roberto Droghini, Quebec, Canada, assignors to Bristol-Myers Squibb Company, New York, N.Y. Continuation-in-part of Ser. No. 52,434, Apr. 23, 1993, abandoned. This application Dec. 13, 1993, Ser. No. 165,610

Int. Cl.<sup>6</sup> C07D 205/085, 205/08, 405/04, 409/04  
U.S. Cl. 540—200

8 Claims

1. A cis compound having the formula:

A



wherein R<sup>1</sup> is selected from the group consisting of: alkyl, halo-substituted alkyl, aryl, cycloalkyl, and arylalkyl; X is selected from O, N, S, C(O)O and a direct bond; and R<sup>2</sup> is selected from the group consisting of aryl, aryl bearing from 1 to 3 of the same or different substituents selected from C<sub>1-3</sub> alkyl, C<sub>1-3</sub> alkoxy, hydroxy, trifluoromethyl and halogen, and heteroaryl.

5,412,093

3-HETEROCYCLIC THIOMETHYL CEPHALOSPORINS  
Frederic H. Jung, Rillay la Montagne, and Annie A. Olivier, Reims, both of France, assignors to ICI Pharma, Cergy Cedex, France

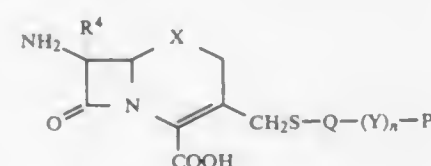
Division of Ser. No. 740,420, Aug. 5, 1991, Pat. No. 5,262,410, which is a division of Ser. No. 133,482, Dec. 15, 1987, Pat. No. 5,057,511. This application Aug. 25, 1993, Ser. No. 111,402  
Claims priority, application European Pat. Off., Dec. 23, 1986, 86402917

Int. Cl.<sup>6</sup> C07D 501/18

U.S. Cl. 540—221

4 Claims

1. A compound of the formula (XVI):



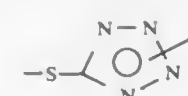
(XVI)

wherein:

X is sulphur or sulphinyl;

R<sup>4</sup> is hydrogen, methoxy or formamido;

wherein —S—Q— is of the formula (VIII):



(VIII)

which optionally may bear a positive charge, and which optionally may be substituted on an available nitrogen atom by carboxy, sulphonyl, C<sub>1-4</sub> alkoxy-carbonyl or C<sub>1-4</sub> alkyl (which alkyl group may itself optionally be substituted by carboxy, sulphonyl or C<sub>1-4</sub> alkoxy-carbonyl);

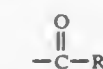
P represents:

(i) a benzene ring (optionally fused to a further benzene ring (so forming a naphthyl group) or to a 5 or 6 membered heterocyclic aromatic group containing 1, 2 or 3 heteroatoms selected from nitrogen, oxygen and sulphur) said benzene ring (or in the case of naphthyl either benzene ring) substituted by groups R<sup>1</sup> and R<sup>2</sup> which are ortho with respect to one another wherein R<sup>1</sup> is hydroxy or an in vivo hydrolysable ester thereof and R<sup>2</sup> is hydroxy, an in vivo hydrolysable ester thereof, carboxy, sulphonyl, hydroxymethyl, methanesulphonamido or ureido;

(ii) a group of the formula (II):

R<sub>3</sub> is —CO<sub>2</sub>H, —COO(C<sub>1-4</sub> alkyl), —NO<sub>2</sub> or,

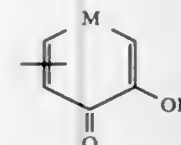
(II)



wherein R<sub>4</sub> is C<sub>1-4</sub> alkyl.

or,

(iii) a group of the formula (III):



wherein M is oxygen or a group NR<sup>3</sup>;

wherein R<sup>3</sup> is hydrogen or C<sub>1-4</sub> alkyl;

ring P (or, in the case wherein ring P is a benzene ring and is fused to another benzene ring, either benzene ring) is optionally further substituted by C<sub>1-4</sub> alkyl, halo, hydroxy, hydroxy C<sub>1-4</sub> alkyl, cyano trifluoromethyl, nitro, amino, C<sub>1-4</sub> alkylamino, di-C<sub>1-4</sub> alkylamino, amino C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkanoyl, C<sub>1-4</sub> alkoxy, C<sub>1-4</sub> alkylthio, C<sub>1-4</sub> alkanoyloxy, carbamoyl, C<sub>1-4</sub> alkylcarbamoyl, di-C<sub>1-4</sub> alkyl carbamoyl, carboxy, carboxy C<sub>1-4</sub> alkyl, sulphonyl, sulphonyl C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkanesulphonamido, C<sub>1-4</sub> alkoxy-carbonyl, C<sub>1-4</sub> alkanoylamino, nitroso, thioureido, amidino, ammonium, mono-, di- or tri-C<sub>1-4</sub> alkylammonium pyridinium, or a 5-membered heterocyclic ring containing 1 to 4 heteroatoms selected from oxygen, nitrogen and sulphur which is optionally substituted by 1, 2 or 3 C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy groups, n=0 or 1 such that when n=1 Y represents a covalent bond between Q and P or a (1-4C)alkylene group optionally substituted by carboxy or sulphonyl or Y represents a group —(CH<sub>2</sub>)<sub>m</sub>—Y'— wherein m=1 or 2 and Y' is —O.CO— or —NH.CO—; and when n=0 Q and P both represent monocyclic rings which are fused on an available carbon-carbon or carbon-nitrogen bond.

5,412,094

## BICYCLIC BETA-LACTAM/PARABEN COMPLEXES

Jane G. Amos, Mooreville; Joseph M. Indelicato; Carol E. Pasini, both of Greenwood, and Susan M. Rentzel, Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

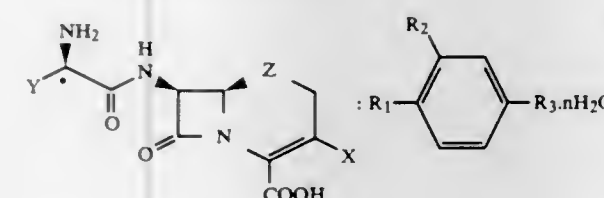
Filed Jun. 28, 1993, Ser. No. 84,651

Int. Cl.<sup>6</sup> C07D 498/053

U.S. Cl. 540—301

1 Claim

1. A complex of the formula



(V)

wherein

X is chloro, hydrogen, vinyl, or —CH<sub>3</sub>;

Z is O;

n is 0 to 5;

Y is phenyl or 1,4-cyclohexadien-1-yl;

R<sub>1</sub> and R<sub>2</sub> are hydrogen or hydroxy, with the proviso that R<sub>1</sub> and R<sub>2</sub> are not both hydrogen and

5,412,095

## TERAZOSIN MONOHYDROCHLORIDE AND PROCESSES AND INTERMEDIATE FOR ITS PRODUCTION

James A. Morley, Gurnee; John F. Bauer, Lake Bluff; Ramesh F. Patel, Chicago; Rodger E. Henry, Waukegan, and Stephen G. Spanton, Grayslake, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 178,184, Jan. 6, 1994, Pat. No. 5,362,730, which is a continuation-in-part of Ser. No. 90,721, Jul. 13, 1993, Pat. No. 5,294,615, which is a continuation-in-part of Ser. No. 54,917, Apr. 29, 1993, abandoned. This application

May 20, 1994, Ser. No. 246,526

The portion of the term of this patent subsequent to Mar. 15, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A61K 31/505; C07D 239/84

U.S. Cl. 544—291

2 Claims

1. The compound having the name 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-(tetrahydro-2-furoyl)piperazine monohydrochloride methanolate characterized by peaks in the powder x-ray diffraction pattern at values of two theta of 5.09°±0.2°; 9.63°±0.2°; 11.64°±0.2°; 15.32°±0.2°; 16.63°±0.2°; 21.25°±0.2°; 22.24°±0.2°; 22.28°±0.2°; 26.62°±0.2°; and 28.93°±0.2°.

2. The non-solvated crystalline polymorph of 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-(tetrahydro-2-furoyl)piperazine monohydrochloride characterized by peaks in the powder x-ray diffraction pattern at values of two theta of 7.29°±0.2°; 11.81°±0.2°; 14.59°±0.2°; 19.43°±0.2°; 20.40°±0.2°; 21.61°±0.2°; 22.36°±0.2°; 23.69°±0.2°; 24.34°±0.2°; 24.80°±0.2°; 25.75°±0.2°; 27.29°±0.2°; 29.96°±0.2°; and 31.20°±0.2°.

5,412,096

## HYDROCHLORIDE SALTS OF HETEROCYCLIC SPIRO COMPOUNDS

Shin-ichi Tsukamoto; Hitoshi Nagaoka, both of Tokyo; Shinji Usuda, Ibaragi; Masatomi Harada, and Toshinari Tamura, both of Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Division of Ser. No. 143,537, Oct. 26, 1993, abandoned, which is a continuation of Ser. No. 15,276, Feb. 8, 1993, abandoned, which is a continuation of Ser. No. 847,843, Mar. 9, 1992,

abandoned, which is a continuation of Ser. No. 732,742, Jul. 18, 1991, abandoned, which is a continuation of Ser. No. 595,307, Oct. 10, 1990, abandoned, which is a continuation-in-part of Ser. No. 470,173, Jan. 25, 1990, abandoned, which is a division of Ser. No. 254,375, Oct. 5, 1988, Pat. No. 4,940,795. This application

May 24, 1994, Ser. No. 230,625

Claims priority, application Japan, Oct. 5, 1987, 62-252104;

Dec. 11, 1987, 62-286297; May 4, 1988, 63-84327

The portion of the term of this patent subsequent to Jul. 10, 2007, has been disclaimed.

Int. Cl.<sup>6</sup> C07D 405/02

U.S. Cl. 546—16

5 Claims

1. A compound selected from the group consisting of the hydrochloride salt of (—)-2,8-Dimethyl-3-methylene-1-oxa-8-azaspiro[4,5]-decane, the hydrochloride salt of (+)-2,8-Dimethyl-3-methylene-1-oxa-8-azaspiro[4,5]-decane, the hydrochloride salt of (+)-2-ethyl-8-methyl-1-oxa-8-azaspiro[4,5]-decane-3-one and the hydrochloride salt of (—)-2-Ethyl-8-methyl-1-oxa-8-azaspiro[4,5]-decane-3-one.



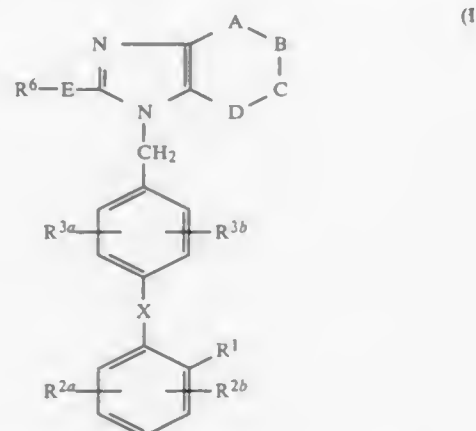
5,412,097  
HETEROCYCLIC COMPOUNDS BEARING ACIDIC  
FUNCTIONAL GROUPS AS ANGIOTENSIN II  
ANTAGONISTS

Prasun K. Chakravarty, Edison; William J. Greenlee, Teaneck; Dooseop Kim, Scotch Plains; Nathan B. Mantlo; Arthur A. Patchett, both of Westfield, and Ralph A. Rivero, Tinton Falls, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

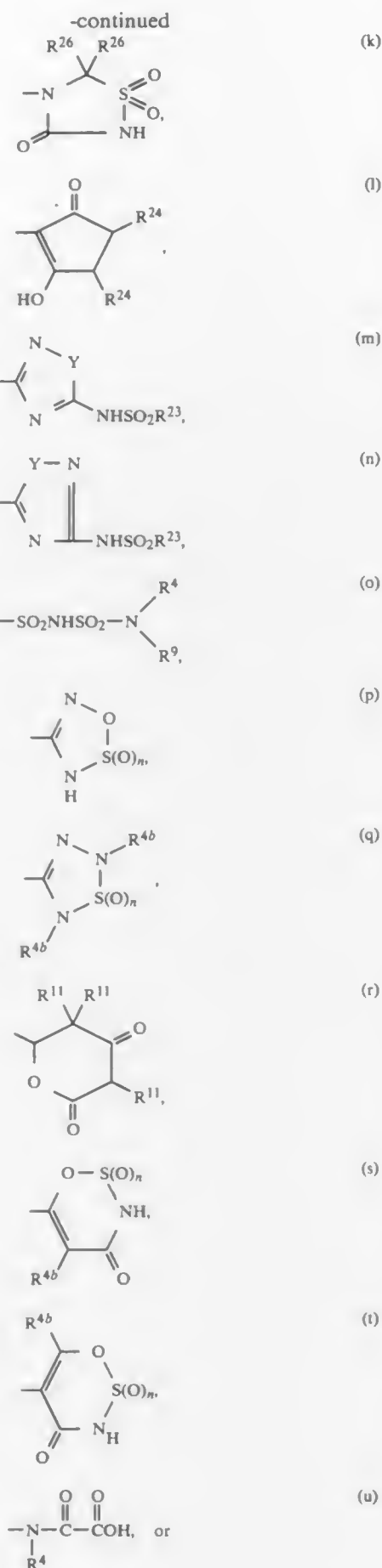
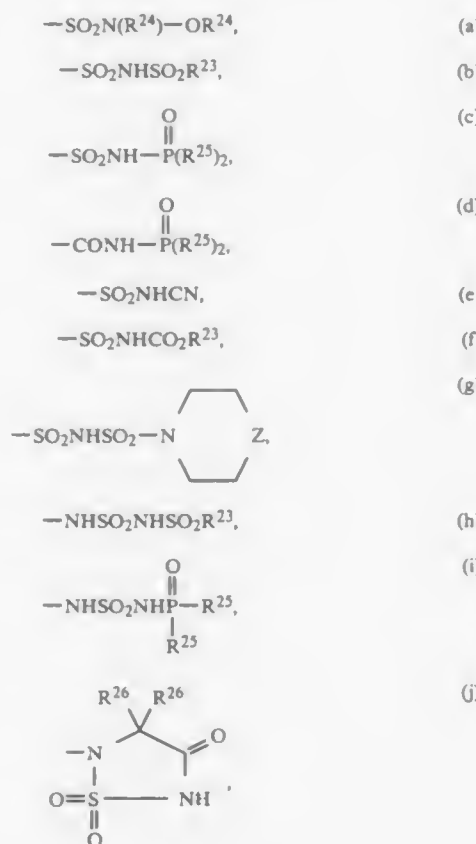
Continuation-in-part of Ser. No. 832,781, Feb. 14, 1992, abandoned, which is a continuation-in-part of Ser. No. 666,534, Mar. 8, 1991, abandoned. This application Sep. 2, 1992, Ser. No. 940,267

Int. Cl.<sup>6</sup> C07D 471/04, 473/00; A61K 31/52, 31/435  
U.S. Cl. 546—118 15 Claims

1. A compound of structural formula:



or a pharmaceutically acceptable salt thereof wherein:  
R<sup>1</sup> is:



—continued  
—NHSO<sub>2</sub>R<sup>23</sup>;

wherein Y is O or S;

R<sup>2a</sup> and R<sup>2b</sup> are independently H, Cl, Br, I, F, —NO<sub>2</sub>, —NH<sub>2</sub>, C<sub>1</sub>–C<sub>4</sub>-alkylamino, di(C<sub>1</sub>–C<sub>4</sub>-alkyl)-amino, —SO<sub>2</sub>NHR<sup>9</sup>, CF<sub>3</sub>, C<sub>1</sub>–C<sub>6</sub>-alkyl, or C<sub>1</sub>–C<sub>6</sub>-alkoxy, C<sub>1</sub>–C<sub>6</sub>-polyfluoroalkoxy, CH<sub>2</sub>–C<sub>1</sub>–C<sub>6</sub>-alkoxy, CH<sub>2</sub>–S–C<sub>1</sub>–C<sub>6</sub>-alkyl, CH<sub>2</sub>NR<sup>9</sup>R<sup>9</sup>, (CH<sub>2</sub>)<sub>n</sub>-aryl, wherein aryl is as defined under R<sup>3b</sup>, aryl, wherein aryl is as defined under R<sup>3b</sup>, C<sub>1</sub>–C<sub>6</sub>-polyfluoroalkyl, O(CH<sub>2</sub>)<sub>n</sub>-aryl, wherein aryl is as defined under R<sup>3b</sup>, O(CH<sub>2</sub>)<sub>n</sub>-C<sub>1</sub>–C<sub>6</sub>-alkoxy, O-aryl, —NR<sup>4</sup>R<sup>4b</sup>, C<sub>1</sub>–C<sub>6</sub>-thioalkoxy, S(O)<sub>n</sub>—(CH<sub>2</sub>)<sub>n</sub>-aryl, wherein aryl is as defined under R<sup>3b</sup>, CH<sub>2</sub>N(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>O, C<sub>1</sub>–C<sub>6</sub>-alkyl, unsubstituted or substituted with: C<sub>1</sub>–C<sub>3</sub>-alkyl;

s is: 0–2;

l is: 1–3;

R<sup>3a</sup> is:

- (a) H,  
(b) Cl, Br, I, or F,  
(c) C<sub>1</sub>–C<sub>6</sub>-alkyl,  
(d) C<sub>1</sub>–C<sub>6</sub>-alkoxy, or  
(e) C<sub>1</sub>–C<sub>6</sub>-alkoxyalkyl;

R<sup>3b</sup> is:

- (a) H,  
(b) Cl, Br, I, or F,  
(c) NO<sub>2</sub>,  
(d) C<sub>1</sub>–C<sub>6</sub>-alkyl,  
(e) C<sub>1</sub>–C<sub>5</sub>-alkyl-CO<sub>2</sub>—,  
(f) C<sub>1</sub>–C<sub>6</sub>-cycloalkyl,  
(g) C<sub>1</sub>–C<sub>6</sub>-alkoxy,  
(h) —NHSO<sub>2</sub>R<sup>4</sup>,  
(i) hydroxy C<sub>1</sub>–C<sub>4</sub>-alkyl,  
(j) aryl-C<sub>1</sub>–C<sub>4</sub>-alkyl, wherein aryl is as defined under R<sup>3b</sup>,  
(k) C<sub>1</sub>–C<sub>4</sub>-alkylthio,  
(l) C<sub>1</sub>–C<sub>4</sub>-alkyl sulfinyl,  
(m) C<sub>1</sub>–C<sub>4</sub>-alkyl sulfonyl,  
(n) NH<sub>2</sub>,  
(o) C<sub>1</sub>–C<sub>4</sub>-alkylamino,  
(p) C<sub>1</sub>–C<sub>4</sub>-dialkylamino,  
(q) fluoro C<sub>1</sub>–C<sub>4</sub>-alkyl,  
(r) —SO<sub>2</sub>—NHR<sup>9</sup>,  
(s) aryl, wherein aryl is as defined under R<sup>3b</sup>, or  
(t) furyl;

wherein aryl is phenyl or naphthyl or substituted phenyl or naphthyl with one or two substituents selected from the group consisting of Cl, Br, I, F, C<sub>1</sub>–C<sub>4</sub>-alkyl, C<sub>1</sub>–C<sub>4</sub>-alkoxy, NO<sub>2</sub>, CF<sub>3</sub>, C<sub>1</sub>–C<sub>4</sub>-alkylthio, OH, NH<sub>2</sub>, NH(C<sub>1</sub>–C<sub>4</sub>-alkyl), N(C<sub>1</sub>–C<sub>4</sub>-alkyl)<sub>2</sub>, CO<sub>2</sub>H, and CO<sub>2</sub>—C<sub>1</sub>–C<sub>4</sub>-alkyl;

R<sup>4</sup> is:

- (a) H,  
(b) aryl, wherein aryl is as defined above, or  
(c) C<sub>1</sub>–C<sub>6</sub>-alkyl, unsubstituted or substituted with: aryl, wherein aryl is as defined above, furyl, thienyl, pyridyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, and F;

R<sup>4a</sup> is:

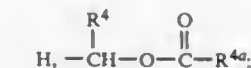
- (a) aryl, wherein aryl is as defined above, or  
(b) C<sub>1</sub>–C<sub>6</sub>-alkyl, substituted or unsubstituted with: aryl, wherein aryl is as defined above, furyl, thienyl, pyridyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, and F;

R<sup>4b</sup> is: H, C<sub>1</sub>–C<sub>6</sub>-alkyl, aryl, wherein aryl is as defined above, —CH<sub>2</sub>-aryl, —CO—C<sub>1</sub>–C<sub>6</sub>-alkyl, —CO—C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, —CO-aryl, wherein aryl is as defined above, —CO<sub>2</sub>—C<sub>1</sub>–C<sub>6</sub>-alkyl, —CO<sub>2</sub>—C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, —CO<sub>2</sub>-aryl, wherein aryl is as defined above, —CONR<sup>4</sup>—C<sub>1</sub>–C<sub>6</sub>-alkyl, —SO<sub>2</sub>-aryl, wherein aryl is as defined above, —SO<sub>2</sub>—C<sub>1</sub>–C<sub>6</sub>-alkyl, —CO-heteroaryl, wherein heteroaryl is as defined below, —SO<sub>2</sub>NR<sup>4</sup>—C<sub>1</sub>–C<sub>6</sub>-alkyl, or —SO<sub>2</sub>NR<sup>4</sup>-aryl, wherein aryl is as defined above;

wherein heteroaryl is an unsubstituted, monosubstituted or disubstituted five- or six-membered aromatic ring which contains 1 to 3 heteroatoms selected from the group consisting of O, N or S and wherein the substituents are members selected

from the group consisting of —OH, —SH, —C<sub>1</sub>–C<sub>4</sub>-alkyl, —C<sub>1</sub>–C<sub>4</sub>-alkoxy, Cl, Br, F, I, —NO<sub>2</sub>, —CO<sub>2</sub>H, —CO<sub>2</sub>—C<sub>1</sub>–C<sub>4</sub>-alkyl, —NH<sub>2</sub>, —NH(C<sub>1</sub>–C<sub>4</sub>-alkyl) and —N(C<sub>1</sub>–C<sub>4</sub>-alkyl)<sub>2</sub>;

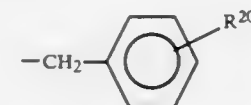
R<sup>5</sup> is:



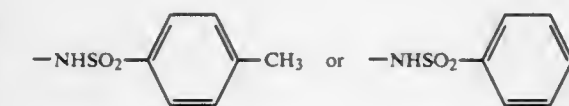
E is: a single bond, —NR<sup>13</sup>(CH<sub>2</sub>)<sub>s</sub>—, —S(O)<sub>n</sub>—, (CH<sub>2</sub>)<sub>s</sub>—, wherein n is 0 to 2 and s is 0 to 5, —CH(OH)—, —O—, or —CO—;

R<sup>6</sup> is:

- (a) C<sub>1</sub>–C<sub>9</sub>-alkyl, C<sub>2</sub>–C<sub>6</sub>-alkenyl or C<sub>2</sub>–C<sub>6</sub>-alkynyl, or substituted C<sub>1</sub>–C<sub>9</sub>-alkyl, C<sub>2</sub>–C<sub>6</sub>-alkenyl or C<sub>2</sub>–C<sub>6</sub>-alkynyl with a substituent selected from the group consisting of aryl as defined above, C<sub>3</sub>–C<sub>7</sub>-cycloalkyl, Cl, Br, I, F, —OH, —NH<sub>2</sub>, —NH(C<sub>1</sub>–C<sub>4</sub>-alkyl), —CF<sub>2</sub>CF<sub>3</sub>, —N(C<sub>1</sub>–C<sub>4</sub>-alkyl)<sub>2</sub>, —NH—SO<sub>2</sub>R<sup>4</sup>, —COOR<sup>4</sup>, —CF<sub>3</sub>, —CF<sub>2</sub>CH<sub>3</sub>, —SO<sub>2</sub>NHR<sup>9</sup>; or  
(b) perfluoro-C<sub>1</sub>–C<sub>4</sub>-alkyl, or  
(c) C<sub>3</sub>–C<sub>7</sub>-cycloalkyl or mono- or disubstituted C<sub>3</sub>–C<sub>7</sub>-cycloalkyl with a C<sub>1</sub>–C<sub>4</sub>-alkyl or —CF<sub>3</sub> substituent;  
R<sup>9</sup> is: H, C<sub>1</sub>–C<sub>5</sub>-alkyl, aryl, or —CH<sub>2</sub>-aryl, wherein aryl is as defined above;  
R<sup>10</sup> is: H, C<sub>1</sub>–C<sub>4</sub>-alkyl;  
R<sup>11</sup> is: H, C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>2</sub>–C<sub>4</sub>-alkenyl, C<sub>1</sub>–C<sub>4</sub>-alkoxy-C<sub>1</sub>–C<sub>4</sub>-alkyl, or



- R<sup>13</sup> is: H, —CO(C<sub>1</sub>–C<sub>4</sub>-alkyl), C<sub>1</sub>–C<sub>6</sub>-alkyl, allyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, phenyl or benzyl;  
R<sup>14</sup> is: H, C<sub>1</sub>–C<sub>8</sub>-alkyl, C<sub>1</sub>–C<sub>8</sub>-perfluoroalkyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, phenyl or benzyl;  
R<sup>15</sup> is: H or C<sub>1</sub>–C<sub>6</sub>-alkyl;  
R<sup>16</sup> is: H, C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>3</sub>–C<sub>6</sub>-cycloalkyl, phenyl or benzyl;  
R<sup>17</sup> is: —NR<sup>9</sup>R<sup>10</sup>, —OR<sup>10</sup>, —NHCONH<sub>2</sub>, —NHC(S)NH<sub>2</sub>,



R<sup>18</sup> and R<sup>19</sup> are independently: C<sub>1</sub>–C<sub>4</sub>-alkyl or taken together are —(CH<sub>2</sub>)<sub>q</sub>— where q is 2 or 3;  
R<sup>20</sup> is: H, —NO<sub>2</sub>, —NH<sub>2</sub>, —OH or —OCH<sub>3</sub>;

R<sup>23</sup> is:

- (a) aryl, wherein aryl is as defined above,  
(b) heteroaryl, wherein heteroaryl is as defined above,  
(c) C<sub>3</sub>–C<sub>4</sub>-cycloalkyl,  
(d) C<sub>1</sub>–C<sub>6</sub>-alkyl unsubstituted or substituted with a substituent that is a member selected from the group consisting of: aryl, wherein aryl is as defined above, heteroaryl, wherein heteroaryl is as defined above, —OH, —SH, —C<sub>1</sub>–C<sub>4</sub>-alkyl, —C<sub>3</sub>–C<sub>7</sub>-cycloalkyl, —O(C<sub>1</sub>–C<sub>6</sub>-alkyl), —S(O)<sub>n</sub>(C<sub>1</sub>–C<sub>6</sub>-alkyl), —CF<sub>3</sub>, Cl, Br, F, I, —NO<sub>2</sub>, —CO<sub>2</sub>H, —CO<sub>2</sub>—C<sub>1</sub>–C<sub>4</sub>-alkyl, —NH<sub>2</sub>, —NH(C<sub>1</sub>–C<sub>4</sub>-alkyl), —NHCOR<sup>4a</sup>, —N(C<sub>1</sub>–C<sub>4</sub>-alkyl)<sub>2</sub>, —PO(OH)(C<sub>1</sub>–C<sub>4</sub>-alkyl), —PO(OH)(aryl), wherein aryl is as defined above, or —PO(OH)(O—C<sub>1</sub>–C<sub>4</sub>-alkyl); where n is 0 to 2, or  
(e) polyfluoro-C<sub>1</sub>–C<sub>6</sub>-alkyl, except when R<sup>1</sup> is —NH—SO<sub>2</sub>R<sup>23</sup>;

R<sup>24</sup> is:

- (a) H,  
(b) aryl, wherein aryl is as defined above, or

- (c) C<sub>1</sub>-C<sub>6</sub>-alkyl, unsubstituted or substituted with aryl, wherein aryl is as defined above, F, Cl, Br, —OH, —NH<sub>2</sub>, —NH(C<sub>1</sub>-C<sub>4</sub>-alkyl), —N(C<sub>1</sub>-C<sub>4</sub>-alkyl)<sub>2</sub>, CF<sub>3</sub>, O—C<sub>1</sub>-C<sub>4</sub>-alkyl, or O(CH<sub>2</sub>)<sub>n+1</sub>—O—C<sub>1</sub>-C<sub>4</sub>-alkyl, or (d) C<sub>3</sub>-C<sub>7</sub>-cycloalkyl;

R<sup>25</sup> is:

- (a) aryl unsubstituted or substituted as defined above, (b) C<sub>1</sub>-C<sub>6</sub>-alkyl unsubstituted or substituted with aryl, wherein aryl is as defined above, F, Cl, Br, —OH, —NH<sub>2</sub>, —NH(C<sub>1</sub>-C<sub>4</sub>-alkyl), —N(C<sub>1</sub>-C<sub>4</sub>-alkyl)<sub>2</sub>, CF<sub>3</sub>, —COOR<sup>4</sup>, or CN, (c) —CH(R<sup>4</sup>)—O—CO—R<sup>4a</sup>, or (d) —OH, —O—C<sub>1</sub>-C<sub>6</sub>-alkyl, wherein alkyl is as defined in (b);

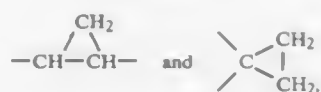
R<sup>26</sup> is:

- (a) H, (b) C<sub>1</sub>-C<sub>6</sub>-alkyl, unsubstituted or substituted with aryl, wherein aryl is as defined above, F, Cl, Br, —OH, —NH<sub>2</sub>, —NH(C<sub>1</sub>-C<sub>4</sub>-alkyl), —N(C<sub>1</sub>-C<sub>4</sub>-alkyl)<sub>2</sub>, CF<sub>3</sub>, —COOR<sup>4</sup>, or CN; (c) F, Cl, Br, or (d) —O—C<sub>1</sub>-C<sub>4</sub>-alkyl, wherein alkyl is defined as in (b);

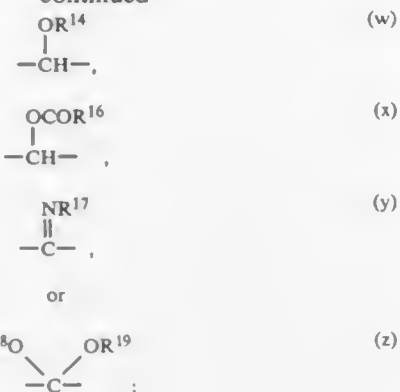
X is

a carbon-carbon single bond,

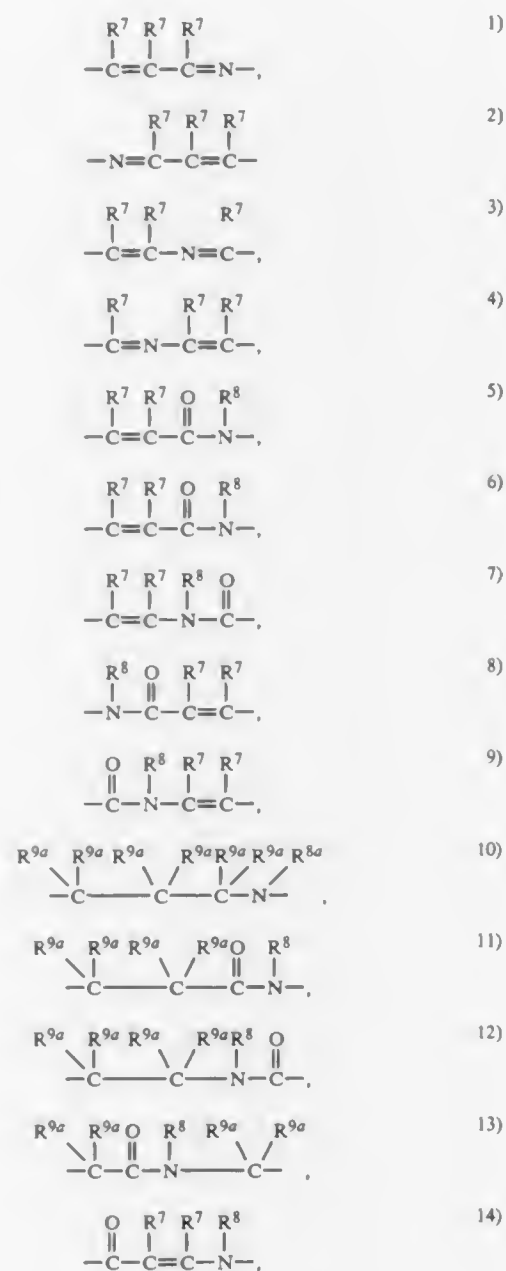
- (a) —CO—, (b) —O—, (c) —S—, (d) —N—, (e) —CON—, (f) —NCO—, (g) —OCH<sub>2</sub>—, (h) —CH<sub>2</sub>O—, (i) —SCH<sub>2</sub>—, (j) —CH<sub>2</sub>S—, (k) —NHC(R<sup>9</sup>)(R<sup>10</sup>)—, (l) —NR<sup>9</sup>SO<sub>2</sub>—, (m) —SO<sub>2</sub>NR<sup>9</sup>—, (n) —C(R<sup>9</sup>)(R<sup>10</sup>)NH—, (o) —CH=CH—, (p) —CF=CF—, (q) —CH=CF—, (r) —CF=CH—, (s) —CH<sub>2</sub>CH<sub>2</sub>—, (t) —CF<sub>2</sub>CF<sub>2</sub>—,



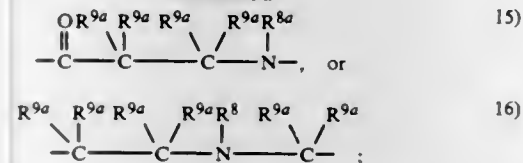
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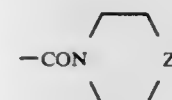
Z is CH<sub>2</sub>, O, NR<sup>13</sup> or S;  
—A—B—C—D— represents:



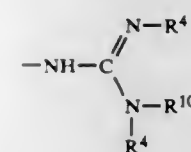
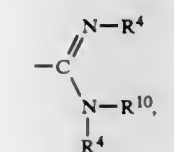
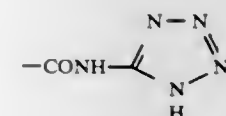
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R<sup>7</sup> groups can be the same or different and represent:

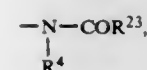
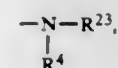
- a) hydrogen, b) C<sub>1</sub>-C<sub>6</sub> alkyl, or C<sub>2</sub>-C<sub>6</sub> alkenyl, or C<sub>2</sub>-C<sub>6</sub> alkynyl each of which is unsubstituted or substituted with: i) —OH, ii) C<sub>1</sub>-C<sub>4</sub>-alkoxy, iii) —CO<sub>2</sub>R<sup>4</sup> or —CO<sub>2</sub>R<sup>5</sup>, iv) —OCOR<sup>4</sup>, v)



- vi) —CON(R<sup>4</sup>)<sub>2</sub>, R<sup>4</sup> O, vii) —N—CR<sup>23</sup>, viii) —N(R<sup>4</sup>)R<sup>23</sup>, ix) aryl, wherein aryl is as defined above, x) —S(O)<sub>n</sub>R<sup>23</sup>, xi) tetrazol-5-yl, xii) —CONHSO<sub>2</sub>R<sup>23</sup>, xiii) —SO<sub>2</sub>NHR<sup>23</sup>, xiv) —SO<sub>2</sub>NHCOR<sup>23</sup>, xv)

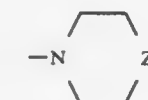


- xviii) —PO(OR<sup>4</sup>)<sub>2</sub>, xix) —PO(OR<sup>4</sup>)R<sup>9</sup>, c) fluoro, chloro, bromo or iodo, d) perfluoro-C<sub>1</sub>-C<sub>4</sub>-alkyl, e) —OH, f) —NH<sub>2</sub>,

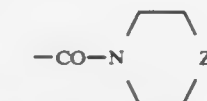


- i) —OR<sup>23</sup>, j) —CO<sub>2</sub>R<sup>4</sup> or —CO<sub>2</sub>R<sup>23</sup>, k) —CON(R<sup>4</sup>)R<sup>23</sup>,

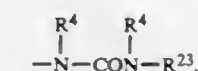
- l) —NH—C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, m) C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, n) aryl, wherein aryl is as defined above, o) heteroaryl which is a five- or six-membered saturated or unsaturated ring containing up to three heteroatoms selected from the group consisting of O, N or S wherein S may in the form of sulfoxide or sulfone and which may be substituted with one or two substituents which are members selected from the group consisting of Cl, Br, F, I, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-S(O)<sub>n</sub>—, CF<sub>3</sub>, NO<sub>2</sub>, OH, CO<sub>2</sub>H, CO<sub>2</sub>—C<sub>1</sub>-C<sub>4</sub>-alkyl, NH<sub>2</sub>, NH(C<sub>1</sub>-C<sub>4</sub>-alkyl), or —N(R<sup>4</sup>)<sub>2</sub>; p) —CN,



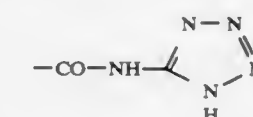
- r) —SO<sub>2</sub>N(R<sup>4</sup>)<sub>2</sub>, s) tetrazol-5-yl, t) —CONHSO<sub>2</sub>R<sup>23</sup>, u) —PO(OR<sup>4</sup>)<sub>2</sub>, v) —SO<sub>2</sub>NHR<sup>23</sup>, w) —SO<sub>2</sub>NHCOR<sup>23</sup>, x) —S(O)<sub>n</sub>—R<sup>23</sup>,



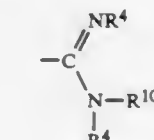
- z) —PO(OR<sup>4</sup>)R<sup>9</sup> or —PO(OR<sup>5</sup>)R<sup>9</sup>, aa) —SO<sub>2</sub>NHCON(R<sup>23</sup>)<sub>2</sub>, bb) —NHSO<sub>2</sub>NHR<sup>23</sup>, cc) —NHSO<sub>2</sub>NHCOR<sup>23</sup>, dd) —NHCONHSO<sub>2</sub>R<sup>23</sup>, ee) —N(R<sup>4</sup>)CO<sub>2</sub>R<sup>23</sup>,



gg) —CO-aryl, wherein aryl is as defined above,

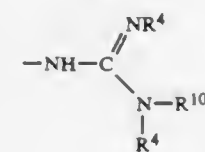


- ii) —CO—C<sub>1</sub>-C<sub>4</sub>-alkyl, jj) —SO<sub>2</sub>NH—CN, kk) —NHSO<sub>2</sub>R<sup>23</sup>,



g)

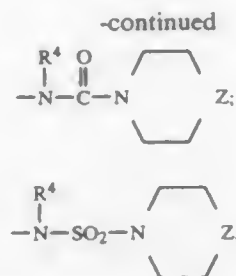
h)



ll)

mm)





$\text{R}^8$  groups can be the same or different and represent:

- hydrogen,
- $\text{C}_1$ - $\text{C}_6$ -alkyl or  $\text{C}_2$ - $\text{C}_6$  alkenyl either unsubstituted or substituted with hydroxy,  $\text{C}_1$ - $\text{C}_4$ -alkoxy,  $-\text{N}(\text{R}^4)_2$ ,  $-\text{CO}_2\text{R}^4$ , or  $\text{C}_3$ - $\text{C}_5$ -cycloalkyl, or
- $\text{C}_3$ - $\text{C}_5$ -cycloalkyl;

$\text{R}^{8a}$  is:  $\text{R}^8$  or  $\text{C}_1$ - $\text{C}_4$ -acyl;

$\text{R}^{9a}$  groups can be the same or different and represent:

- hydrogen, or
- $\text{C}_1$ - $\text{C}_6$ -alkyl either unsubstituted or substituted with

- hydroxy,
- $-\text{CO}_2\text{R}^4$ ,
- $-\text{CONHR}^4$ , or
- $-\text{CON}(\text{R}^4)_2$ .

5,412,098

# QUINOLONE DERIVATIVE OR SALT THEREOF AND ANTIBACTERIAL CONTAINING THE SAME

Kuramoto Yasuhiro; Noda Shuichi; Shinobu Maruyama; Shunso Hatono; Haruyo Mochizuki, and Akira Yazaki, all of Hiroshima, Japan, assignors to Wakunaga Sanyaku Kabushiki Kaisha and Fujisawa Pharmaceutical Co., Ltd., both of Osaka, Japan

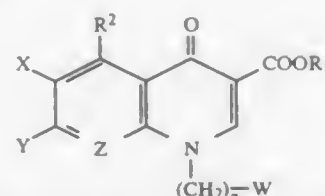
PCT No. PCT/JP92/01712, § 371 Date Aug. 19, 1993, § 102(e) Date Aug. 19, 1993, PCT Pub. No. WO93/13091, PCT Pub. Date Aug. 7, 1993

PCT Filed Dec. 25, 1992, Ser. No. 104,137

Claims priority, application Japan, Dec. 27, 1991, 3-346577 Int. Cl.<sup>6</sup> C07D 471/04, 471/02; A61K 31/435, 31/41

U.S. Cl. 546-156 4 Claims

1. A quinolone derivative represented by the formula (1), or a salt thereof:



wherein  $\text{R}^1$  represents a hydrogen atom, or a carboxyl protective group,  $\text{R}^2$  represents a hydrogen atom, halogen atom or a lower alkyl group, X represents a hydrogen atom or a halogen atom, Y represents a halogen atom, a cyclic amino group having one or more nitrogen atoms as part of the ring and which group may have a substituent, a cyclo-lower alkenyl group which may have a substituent, or a group  $\text{R}^3$ - $(\text{CH}_2)_m$ -A- (wherein  $\text{R}^3$  represents a hydrogen atom or an amino group which may have a substituent, A represents an oxygen atom or a sulfur atom and m represents a number of 0 to 3), Z represents a nitrogen atom or a group C- $\text{R}^4$  (wherein  $\text{R}^4$  represents a hydrogen atom or a halogen atom), W represents a five-membered heterocyclic group which may have a substituent and which has 3 or more hetero-atoms, among which at least 2 hetero-atoms are nitrogen atoms, and n represents a number of 0 to 2.

5,412,099

# INTERMEDIATE BENZOTHAZOLYL- AND BENZOXAZOLYL-ALDEHYDE COMPOUNDS

Siegfried Goldmann, Wuppertal; Horst Böshagen; Jürgen Stolltefuss, both of Haan; Alexander Straub; Rainer Gross, both of Wuppertal; Joachim Hütter, Leverkusen; Siegfert Heibisch, and Martin Bechem, both of Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany Division of Ser. No. 961,289, Oct. 15, 1992, Pat. No. 5,254,962, which is a division of Ser. No. 677,731, Mar. 29, 1991, Pat. No. 5,200,420. This application Aug. 6, 1993, Ser. No. 103,871 Claims priority, application Germany, Apr. 6, 1990, 40 11 106.7

Int. Cl.<sup>6</sup> C07D 413/04, 417/04, 263/57, 277/66

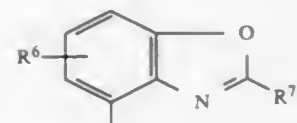
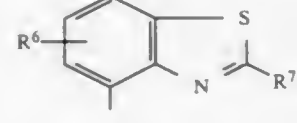
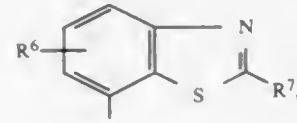
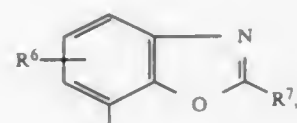
U.S. Cl. 548-180 5 Claims

1. An aldehyde of the formula



in which

$\text{R}^3$  represents a radical of the formula



in which

$\text{R}^6$  denotes hydrogen, fluorine, chlorine or straight-chain or branched alkyl or alkoxy in each case having up to 2 carbon atoms,

$\text{R}^7$  denotes phenyl which is optionally substituted by fluorine, chlorine, nitro, cyano, trifluoromethyl or by straight-chain or branched acyl having up to 4 carbon atoms, or -denotes pyridyl or thienyl.

5,412,100

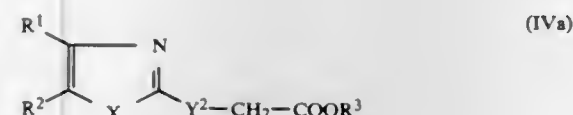
# FUNGICIDAL SUBSTITUTED ACRYLIC ESTERS

Alexander Klausener, Stolberg; Gerd Kleefeld, Duesseldorf; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Gerd Hänssler, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany Division of Ser. No. 788,007, Nov. 5, 1991, Pat. No. 5,254,693, which is a division of Ser. No. 478,119, Feb. 2, 1990, Pat. No. 5,114,959. This application Jul. 1, 1993, Ser. No. 86,601 Claims priority, application Germany, Feb. 20, 1989, 39 05 119.6

Int. Cl.<sup>6</sup> C07D 277/42, 263/48

U.S. Cl. 548-187 11 Claims

1. A substituted acetic ester of the formula



in which

$\text{Y}^2$  represents oxygen or sulphur, or represents an N-alkyl radical which is straight-chain or branched and has 1 to 6 carbon atoms,

$\text{R}^1$  represents hydrogen, or represents straight-chain or branched alkyl having 1 to 8 carbon atoms, or represents straight-chain or branched alkenyl having 2 to 8 carbon atoms, or represents aralkyl having 1 to 6 carbon atoms in the straight-chain or branched alkyl moiety, aralkenyl having 2 to 6 carbon atoms in the straight-chain or branched alkenyl moiety or aryl having 6 to 10 carbon atoms in the respective aryl moiety, each of which is optionally monosubstituted to polysubstituted in the aryl moiety by identical or different substituents selected from the group consisting of halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy or alkylthio, each of which has 1 to 4 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy or halogenoalkylthio, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in each case straight-chain or branched alkoxyalkyl or alkoxyiminoalkyl, each of which has 1 to 8 carbon atoms in the individual alkyl moieties, cycloalkyl having 3 to 7 carbon atoms, double-linked alkanediyl having 3 to 5 carbon atoms, or aryl, aralkyl, aryloxy or aralkyloxy, each of which has 6 to 10 carbon atoms in the aryl moiety and if appropriate 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety and each of which is optionally monosubstituted to polysubstituted in the aryl moiety by identical or different substituents from the group consisting of halogen, alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 to 4 carbon atoms and if appropriate 1 to 9 identical or different halogen atoms, or heteroarylalkyl or heteroaryl, each of which has 2 to 9 carbon atoms and 1 to 4 identical or different hetero atoms in the heteroaryl moiety and if appropriate 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety and each of which is optionally monosubstituted to polysubstituted in the heteroaryl moiety by identical or different substituents from the group consisting of halogen, alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 to 4 carbon atoms and if appropriate 1 to 9 identical or different halogen atoms;

$\text{R}^1$  furthermore represents a heteroaryl radical which has 2 to 9 carbon atoms and 1 to 4 identical or different hetero atoms and which is optionally monosubstituted to polysubstituted by identical or different substituents, possible substituents being the abovementioned aryl substituents,

$\text{R}^2$  represents fluorine, chlorine, bromine, iodine, cyano, nitro or formyl, or represents straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, or represents in each case straight-chain or branched alkoxyalkyl or alkylthioalkyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, or represents in each case straight-chain or branched hydroximinoalkyl, alkoxyiminoalkyl, N-alkyliminoalkyl or N, N-dialkylhydrazonoalkyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, or represents in each case straight-chain or branched alkoxy or alkylthio, each of which has 1 to 4 carbon atoms, or represents in each case straight-chain or branched halogenoalkoxy or halogenoalkylthio, each of which has 1 to 4 carbon atoms and each of which has 1 to 9 identical or different halogen atoms, or represents in each case straight-chain or branched alkanoyl or N,N-

dialkylcarbamoyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, or represents heterocyclylcarbonyl, the heterocyclyl radical being a saturated five- to seven-membered N-linked heterocyclic ring which can optionally contain a further hetero atom and which can optionally be monosubstituted to tetrasubstituted by methyl and/or ethyl;

$\text{R}^2$  furthermore represents N-aryliminoalkyl, aryloxy or arylthio, each of which is optionally monosubstituted to polysubstituted in the aryl moiety by identical or different substituents, each of which has 6 to 10 carbon atoms, the straight-chain or branched alkyl moiety having 1 to 4 carbon atoms and possible aryl substituents in each case being: halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy or alkylthio, each of which has 1 to 4 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy or halogenoalkylthio, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in each case straight-chain or branched alkoxyalkyl or alkoxyiminoalkyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, or phenyl which is optionally monosubstituted to polysubstituted by identical or different substituents from the group consisting of halogen and/or straight-chain or branched alkyl having 1 to 4 carbon atoms, and

$\text{R}^3$  represents straight-chain or branched alkyl having 1 to 6 carbon atoms, or represents aralkyl which has 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety and which is optionally monosubstituted to polysubstituted in the aryl moiety by identical or different substituents, possible aryl substituents being those mentioned in the case of  $\text{R}^1$ .

X represents oxygen or sulphur, and

$\text{Y}^2$  represents oxygen or sulphur or represents a radical



where

$\text{R}^6$  represents straight-chain or branched alkyl having 1 to 6 carbon atoms.

5,412,101

# SULPHOROUS DERIVATIVES OF IMIDAZOLE, AND THEIR USE AS MEDICAMENTS AND THE PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Jean C. Caille, Paris; Alain Corbier, Le Buisson; Michel Fortin, Paris; Gilles Hamon, Le Raincy; Simone Jouquey, Paris, and Jean Vevret, Pantin, all of France, assignors to Roussel-Uclaf, France

PCT No. PCT/FR91/00543, § 371 Date Jul. 24, 1992, § 102(e) Date Jul. 24, 1992

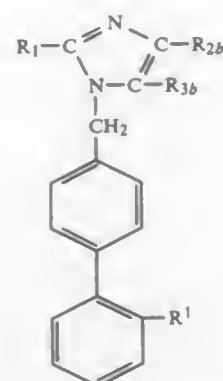
PCT Filed Jul. 4, 1991, Ser. No. 838,289

Claims priority, application France, Jul. 5, 1990, 90 08538; Apr. 19, 1991, 91 04882

Int. Cl.<sup>6</sup> C07D 403/10, 257/04; A61K 31/415, 31/41

U.S. Cl. 548-253 4 Claims

1. A compound selected from the group consisting of a compound of the formula



wherein  $R_1$  is alkyl of 1 to 13 carbon atoms,  $R_{2b}$  is  $-S(O)_n$ -phenyl, the alkyl and phenyl being optionally substituted with a member of the group consisting of  $-OH$ , alkyl, halogen haloalkoxy, haloalkyl, alkylthio, alkoxy, alkenyl and alkynyl of up to 6 carbon atoms, phenyloxy, phenylalkoxy, carbamoyl, acyl and acyloxy of an  $C_1$ - $C_6$ -hydrocarbyl organic carboxylic acid, free, salified or  $C_1$ - $C_4$  alkyl esterified carboxy, tetrazolyl,  $-CN$ ,  $-NO_2$  and mono and dialkylamino of 1 to 6 alkyl carbon atoms and phenyl optionally substituted with at least one member of the group consisting of  $-OH$ , alkyl and alkoxy of 1 to 4 carbon atoms, halogen,  $-CF_3$ , free, salified or  $C_1$ - $C_4$  alkyl esterified carboxy and tetrazolyl,  $n$  is 0, 1 or 2,  $R_{3b}$  is  $-COOH$  or  $-CH_2OH$ ,  $R^1$  is selected from the group consisting of  $-COOH$  or tetrazolyl, and their non-toxic, pharmaceutically acceptable salts with acids and bases.

5,412,102

# PROCESSES FOR PREPARING 1-BUTYL-2-[2'-(2H-TETRAZOL-5-YL) BIPHENYL-4-YLMETHYL]-1H-INDOLE-3-CARBOXYLIC ACID

Robin D. Clark, Palo Alto; Lawrence E. Fisher, Mountain View; Lee A. Flippin, Woodside; Michael G. Martin, San Francisco, and Stephen R. Stabler, Mountain View, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed May 27, 1994, Ser. No. 250,397

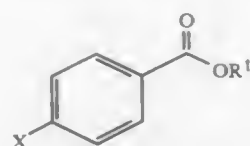
Int. Cl.<sup>6</sup> C07D 257/04

U.S. Cl. 548—253

13 Claims

1. A process for the preparation of 1-butyl-2-[2'-(2H-tetrazol-5-yl)-biphenyl-4-ylmethyl]-1H-indole-3-carboxylic acid which process comprises:

- (A)
- (i) treating protected 5-phenyl-2H-tetrazole with an organometallic base to give ortho-metalated protected 5-phenyl-2H-tetrazole,
- (ii) optionally treating the ortho-metalated protected 5-phenyl-2H-tetrazole with a metal halide to give ortho-transmetalated protected 5-phenyl-2H-tetrazole,
- (iii) reacting the ortho-metalated or ortho-transmetalated protected 5-phenyl-2H-tetrazole, optionally in the presence of phosphinated nickel or palladium catalyst, with a compound of Formula II:



in which X is halo and  $R^1$  is  $(C_1-4)$ alkyl, to give protected 2'-(2H-tetrazol-5-yl)biphenyl-4-carboxylic acid  $(C_1-4)$ alkyl ester,  
(iv) reducing the protected 2'-(2H-tetrazol-5-yl)biphenyl-

- 4-carboxylic acid  $(C_1-4)$ alkyl ester to give protected 2'-(2H-tetrazol-5-yl)biphenyl-4-methanol, and
- (v) halogenating the protected 2'-(2H-tetrazol-5-yl)biphenyl-4-methanol to give protected 4-halomethyl-2'-(2H-tetrazol-5-yl)biphenyl;
- (B) reacting the protected 4-halomethyl-2'-(2H-tetrazol-5-yl)biphenyl, optionally in the presence of phosphinated nickel or palladium catalyst, with 2-metalated or 2-transmetalated 1-but-1-yl-1H-indole-3-carboxylic acid to give protected 1-butyl-2-[2'-(2H-tetrazol-5-yl)biphenyl-4-ylmethyl]-1H-indole-3-carboxylic acid; and
- (C) deprotecting.

5,412,103

# PROCESS FOR PREPARING

(1R,5S,6S)-2-[(6,7-DIHYDRO-5H-PYRAZOLO [1,2-A][1,2,4]TRIAZOLIUM-6-YL)THIO-6-[(R)-1-HYDROXYETHYL]-1-METHYL-CARBAPENEM-3-CARBOXYLATE AND STARTING MATERIALS THEREOF  
Satoshi Tamai, Kawasaki; Takao Abe, Tokorozawa, and Yunosuke Nagase, Tokyo, all of Japan, assignors to Lederle (Japan), Ltd., Tokyo, Japan

Continuation of Ser. No. 902,727, Jun. 23, 1992, Pat. No. 5,241,703, which is a division of Ser. No. 633,540, Feb. 28, 1990.

This application May 11, 1993, Ser. No. 59,850

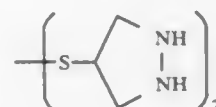
Claims priority, application Japan, Oct. 12, 1990, 2-272426; Oct. 12, 1990, 2-272427; Oct. 12, 1990, 2-272428

Int. Cl.<sup>6</sup> C07D 403/12

U.S. Cl. 548—365.1

1 Claim

1. A pyrazolidine-4-yl-disulfide represented by the following formula



(VI)

or salt thereof.

5,412,104

ESTER AND ALKOXY SUBSTITUTED BENZOPYRANS  
Adriano Afonso, West Caldwell; Jay Weinstein, Upper Montclair, and Margaret J. Gentles, Bloomfield, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

PCT No. PCT/US91/06252, § 371 Date Mar. 1, 1993, § 102(e) Date Mar. 1, 1993, PCT Pub. No. WO92/04327, PCT Pub. Date Mar. 19, 1992

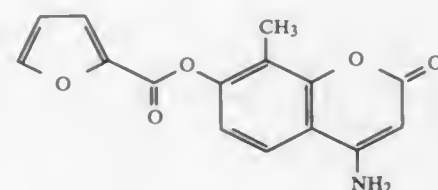
Continuation-in-part of Ser. No. 579,420, Sep. 7, 1990, abandoned, and a continuation-in-part of Ser. No. 579,749, Sep. 7, 1990, abandoned, and a continuation-in-part of Ser. No. 664,272, Mar. 4, 1991, abandoned. This PCT application Sep. 6, 1991, Ser. No. 30,186

Int. Cl.<sup>6</sup> A61K 31/47

U.S. Cl. 548—525

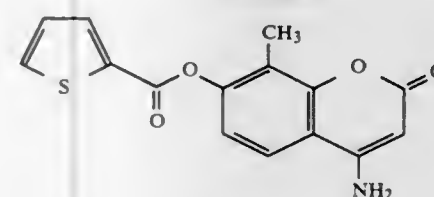
3 Claims

1. A compound selected from the group consisting of



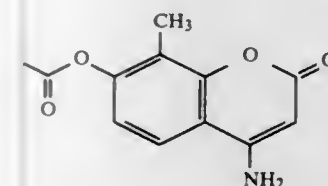
(65)

-continued

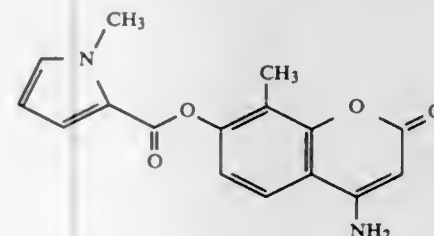


- (66) to 20 carbon atoms or hydrogen, A and B are alkyl groups, aromatic groups, alkenyl groups, or represent an aliphatic group forming a ring wherein A is bonded to B, m and p are integers no less than 1, n is a natural number which can be 0, X is a hydrogen or halogen atom, and Y is a hydrogen atom, halogen atom or thiophene.

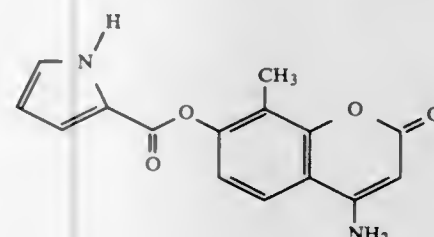
(68)



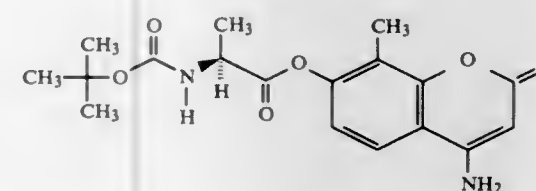
(69)



(70)



and



or a pharmaceutically acceptable salt thereof.

5,412,105

# THIOPHENE-SILOLE COPOLYMER AND ITS METHOD OF MANUFACTURE

Yoshihiko Ito; Kohei Tamao; Shigehiro Yamaguchi, all of Kyoto, and Yoshiki Nakagawa, Nishinomiya, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

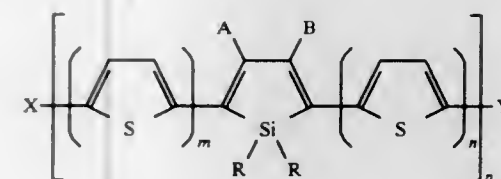
Filed Mar. 16, 1993, Ser. No. 31,980

Claims priority, application Japan, Jun. 29, 1992, 4-196609 Int. Cl.<sup>6</sup> C07D 333/50, 409/00; C07F 7/08; C08G 77/22

U.S. Cl. 549—4

6 Claims

1. A thiophene-silole copolymer represented by the formula (I) below;



wherein, R is a monofunctional hydrocarbon group having 1

5,412,106

# PROCESS FOR PRODUCTION OF 2-THIOPHENE ALDEHYDES

Kazuyoshi Yamashita, Hyogo; Kenji Saito, Hirakata, and Shinzo Seko, Toyonaka, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka and Sumitomo Seika Chemicals Co., Hyogo, both of Japan

Filed Oct. 19, 1993, Ser. No. 137,790

Claims priority, application Japan, Oct. 29, 1992, 4-291193

Int. Cl.<sup>6</sup> C07P 333/24

U.S. Cl. 549—70

3 Claims

1. A process for the production of a 2-thiophene aldehyde, comprising formylating thiophene or a thiophene derivative having a lower alkyl group or a halogen atom at a position selected from the 2- and 3- positions of the thiophene ring with a formamide and phosgene.

5,412,107

# PHENYLSULFONYLCHLORIDE INTERMEDIATES USEFUL FOR THE PREPARATION OF HERBICIDALLY ACTIVE SULFONYLUREAS

Willy Meyer, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 14,947, Feb. 8, 1993, Pat. No. 5,286,709, which is a division of Ser. No. 823,515, Jan. 21, 1992, Pat. No. 5,209,771. This application Nov. 19, 1993, Ser. No. 154,768

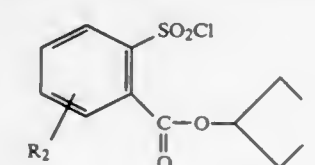
Claims priority, application Switzerland, Jan. 25, 1991, 220/91

Int. Cl.<sup>6</sup> C07D 331/04, 305/08, 305/10

U.S. Cl. 549—88

5 Claims

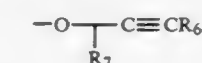
1. A phenylsulfonyl chloride of the formula VIII



(VIII)

in which X is oxygen, sulfur or  $SO_2$ ;

$R_2$  is hydrogen, fluorine, chlorine, bromine, iodine,  $(X)_nR_3$ ,  $NO_2$ ,  $NR_4R_5$ ,  $-C\equiv CR_6$ ,



(I) or cyano;

n is the number 0 or 1;

$R_3$  is  $C_1$ - $C_4$ alkyl or  $C_1$ - $C_4$ alkyl which is substituted by 1-4 halogen atoms,  $C_1$ - $C_3$ alkoxy or  $C_1$ - $C_3$ alkylthio; or  $C_2$ - $C_4$ alkenyl or  $C_2$ - $C_4$ alkenyl which is substituted by 1-4 halogen atoms;

$R_4$  is hydrogen,  $CH_3O$ ,  $CH_3CH_2O$  or  $C_1$ - $C_3$ alkyl;

$R_5$  is hydrogen or  $C_1$ - $C_3$ alkyl; and

$R_6$  is hydrogen, methyl or ethyl.

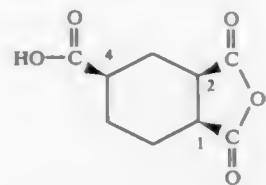


5,412,108  
METHOD FOR PREPARING  
1,2,4-CYCLOHEXANETRICARBOXYLIC ACID AND  
ANHYDRIDE

Allison M. Fisher, Aurora, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jan. 5, 1994, Ser. No. 177,661  
Int. Cl.<sup>6</sup> C07D 407/00; C07C 61/09

U.S. Cl. 549—245 4 Claims  
1. The anhydride of cis, cis, cis-1,2,4-cyclohexanetricarboxylic acid having the structure



5,412,109  
PROCESS FOR PREPARING OPTICALLY ACTIVE  
4-METHYL-2-OXETANONE

Hidemasa Takaya, Shiga; Tetsuo Ohta, Kyoto; Hidenori Kumobayashi, Kanagawa; Yoshiki Okeda, Kanagawa, and Yoshiharu Gonda, Kanagawa, all of Japan, assignors to Takasago International Corporation, Tokyo, Japan  
Continuation-in-part of Ser. No. 92,446, Jul. 14, 1993, Pat. No. 5,306,834. This application Nov. 30, 1993, Ser. No. 159,262  
Claims priority, application Japan, Jul. 16, 1992, 4-210683; Jun. 30, 1993, 5-18349

Int. Cl.<sup>6</sup> C07D 305/06

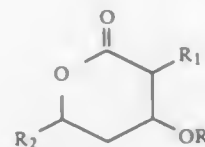
U.S. Cl. 549—263 6 Claims  
1. A process for preparing optically active 4-methyl-2-oxetanone which comprises asymmetrically hydrogenating 4-methylene-2-oxetanone in the presence of a ruthenium-optically active phosphine complex and as a solvent alcohol alone or a mixed solvent of aprotic solvent and alcohol.

5,412,110  
ENZYMATIC PROCESS TO SEPARATE RACEMIC  
MIXTURES OF DELTA VALEROLACTONES

Peter Pöchlauer, Linz, and Marion Wagner, Katsdorf, both of Austria, assignors to Chemie Linz Gesellschaft m.b.H., Linz, Austria  
Filed Aug. 28, 1992, Ser. No. 936,782  
Claims priority, application Austria, Jul. 6, 1992, 1374/92

Int. Cl.<sup>6</sup> C07D 304/30, 305/12

U.S. Cl. 549—291 11 Claims  
1. Process to separate racemic mixtures of a compound of the formula



in which R denotes hydrogen or an acyl group, and R1 and R2 denote independently of each other hydrogen, a straight chained or branched alkyl group having 4 to 20 C atoms, which can be interrupted by an oxygen atom in a position other than the alpha or beta position or denote an unsubstituted aralkyl group or an aralkyl group substituted by groups inert under the reaction conditions, provided that R1 and R2 do not simultaneously denote hydrogen, wherein the racemic mixture of a compound of formula I is introduced in a diluent and in the presence of a lipase having the ability to catalyze stereospecifically acylation and/or deacylation of beta-hydroxy-delta-valerolactones of formula I and, in the case where R in formula

I denotes hydrogen in the additional presence of an esterifying agent, is left to react, whereby a reaction mixture is produced which contains an enantiomerically pure beta-hydroxy-delta-valerolactone and an enantiomerically pure beta-acyloxy-delta-valerolactone, which is then separated.

5,412,111  
METHOD OF PREPARING  
(3R,4R)-3-HYDROXY-4-HYDROXYMETHYL-4-BUTANO-  
LIDE

Katsuya Matsumoto; Takashi Ebata; Koshi Koseki; Koji Okano; Hiroshi Kawakami, and Hajime Matsubita, all of Yokohama, Japan, assignors to Japan Tobacco Incorporated, Tokyo, Japan

Filed Jul. 23, 1993, Ser. No. 95,182  
Claims priority, application Japan, Jul. 23, 1992, 4-197008  
Int. Cl.<sup>6</sup> C07D 307/33

U.S. Cl. 549—313 12 Claims  
1. A method of preparing (3R,4R)-3-hydroxy-4-hydroxymethyl-4-butanolide represented by the following formula (1):

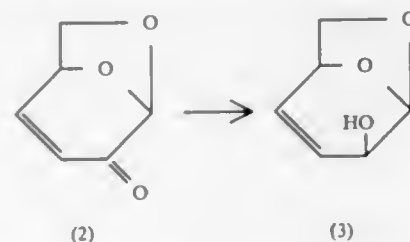


using levoglucosenone represented by the following formula (2) as a starting material:



which comprises:

(a) preparing a chemical compound represented by formula (3) having a hydroxyl group of a β-configuration by reducing a carbonyl group of the 2-position of said compound represented by formula (2) with a metallic hydride reducing agent as shown in the formula reaction:



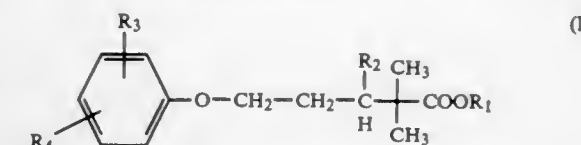
(b) preparing a chemical compound represented by formula (4) by reacting said compound represented by formula (3) with iodine and a chemical compound containing an acyloxy ion, followed by hydrolysis as shown in the following reaction:

5,412,112  
DERIVATIVES AND PREPARATION OF  
2,2-DIMETHYL-5-SUBSTITUTED  
PHENOXY-PENTANOIC ACIDS

Hui-Po Wang; On Lee, both of Taipei, and Chin-Tsai Fan, Tainan, all of Taiwan, Prov. of China, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China

Filed Jun. 14, 1994, Ser. No. 259,537  
Int. Cl.<sup>6</sup> C07D 305/12; C07C 69/76, 59/48  
U.S. Cl. 549—328 12 Claims

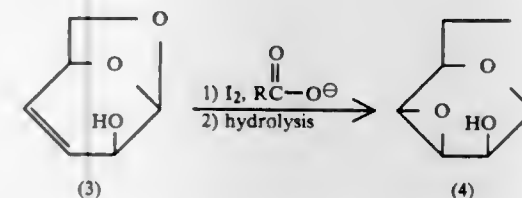
1. A compound having the formula (I):



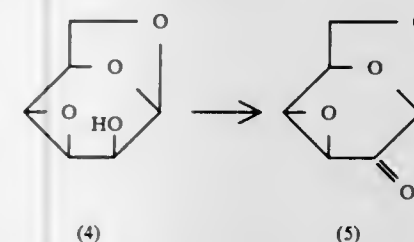
in which R1 is hydrogen or C1-8 alkyl;

R2 is hydroxy or halogen; and

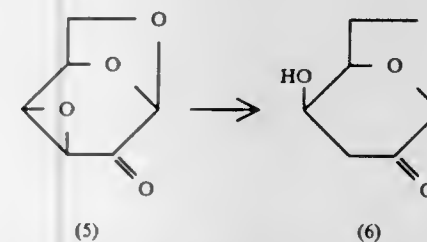
R3 and R4 are respectively hydrogen, hydroxy, halogen, C1-8 alkyl, C1-8 alkoxy or C1-8 acyl.



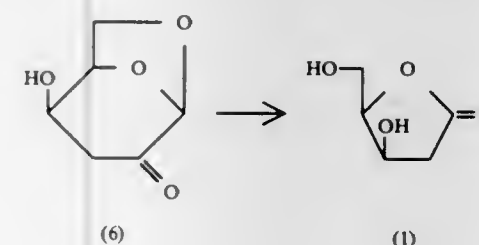
(c) preparing a carbonyl compound represented by formula (5) by oxidizing a hydroxyl group of the 2-position of said compound represented by formula (4) with an oxidizing agent selected from the group consisting of dimethyl sulfoxide in combination with dicyclohexylcarbodiimide, acetic anhydride, phosphorous pentoxide, trifluoroacetic anhydride, oxalyl chloride or halogen, chromium oxide (VI), dichromate, chromium oxide-pyridine complex, pyridinium chlorochromate (PCC), pyridinium dichlorochromate (PDC), manganese dioxide, hypohalite, halic acid, 2,3-dichloro-5,6-dicyano-p-benzoquinone, ruthenium tetroxide, a platinum catalyst, a palladium catalyst, silver carbonate, copper (II) salt, and lead tetraacetate, as shown in the following reaction:



(d) preparing a chemical compound represented by formula (6) by a ring-opening reaction of said chemical compound (5) using sodium phenylselenotrialkoxyborate as an agent for performing a reductive ring-opening reaction of an epoxide selectively at an α-position of the carbonyl group of said compound (5) as shown in the following reaction



and (e) preparing (3R,4R)-3-hydroxy-4-hydroxymethyl-4-butanolide represented by formula (1) by subjecting said chemical compound represented by formula (6) to Baeyer-Villiger oxidation as shown in the following reaction

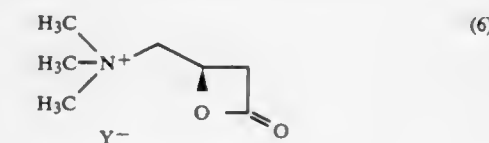


5,412,113  
PROCESS FOR MANUFACTURING L-(+)-CARNITINE  
FROM A WASTE PRODUCT HAVING OPPOSITE  
CONFIGURATION

Fabio Giannesi, Rome; Maria L. Bolognesi, Bologna; Maria O. Tinti, and Francesco De Angelis, both of Rome, all of Italy, assignors to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A., Rome, Italy

Filed Dec. 21, 1993, Ser. No. 170,764  
Claims priority, application Italy, Dec. 21, 1992, RM92A0915  
Int. Cl.<sup>6</sup> C07D 305/12

U.S. Cl. 549—328 7 Claims  
1. A lactone of L-(+)-carnitine of the formula 6



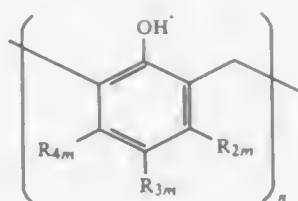
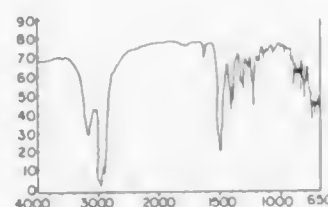
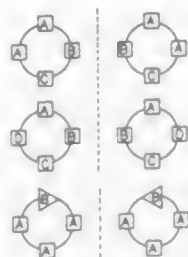
wherein Y- is any monovalent counterion.

5,412,114  
CALIXARENE DERIVATIVES AND PROCESS FOR THE  
PREPARATION THEREOF

Seiji Shinkai; Tautom Matsuda; Takashi Arimura, all of Fukuoka; Hirotsuke Kawabata, and Kozo Tachibana, both of Hyogo, all of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 627,637, Dec. 14, 1990, Pat. No. 5,231,196.  
This application Feb. 9, 1993, Ser. No. 15,408  
Claims priority, application Japan, Sep. 13, 1990, 2-224753  
Int. Cl.<sup>6</sup> C07D 313/00

U.S. Cl. 549—354 4 Claims  
1. A process for the preparation of an asymmetric calixarene derivative which comprises reacting a calixarene derivative represented by the following general formula:



wherein

n is an integer of 4 to 12;  
m is an integer of 1 to n; and  
R<sub>21</sub> to R<sub>2m</sub>, R<sub>31</sub> to R<sub>3m</sub> and R<sub>41</sub> to R<sub>4m</sub> each represents a hydrogen atom, a straight-chain or branched, saturated or unsaturated, acyclic or cyclic group having 1 to 20 carbon atoms and which may contain a heteroatom, a substituted or unsubstituted aromatic group having 4 to 20 carbon atoms, or an aralkyl group having 5 to 20 carbon atoms in the presence of an alkaline earth metal with a compound which replaces all or a part of the hydrogen atoms of the hydroxyl groups of said calixarene derivative with a straight-chain or branched, saturated or unsaturated, acyclic or cyclic group having 1 to 20 carbon atoms which may contain a heteroatom, a substituted or unsubstituted aromatic group having 4 to 20 carbon atoms, or an aralkyl group having 5 to 20 carbon atoms to obtain a conformational isomer of a calixarene derivative having a hindered rotation of its benzene units.

5,412,115

# POLYCONDENSATION OF PHENOLIC HYDROXYL-CONTAINING COMPOUNDS AND POLYHYDRIC ALCOHOLS AND THERMAL CONDENSATION TO FORM POLYETHERCYCLICPOLYOLS

Anne H. Zuzich, and George C. Blytas, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.  
Division of Ser. No. 10,517, Jan. 28, 1993, Pat. No. 5,302,278, which is a continuation of Ser. No. 879,536, May 4, 1992, abandoned, which is a continuation of Ser. No. 672,199, Mar. 19, 1991, abandoned. This application Dec. 1, 1993, Ser. No. 160,340  
Int. Cl.<sup>6</sup> C07D 319/12

U.S. Cl. 549—378

31 Claims

1. A composition prepared by the process for preparing polyethercyclic polyol by copolymerization and thermal condensation, comprising:

(a) heating a reaction mixture comprising a reactant selected from the group consisting of (1) a polyol having at least

three hydroxyl groups of which at least two of the hydroxyl groups are vicinal, (2) precursors of the polyol, (3) cyclic derivatives of the polyol, and (4) mixtures thereof, said heating initiating the thermal condensation;  
(b) removing water formed during the thermal condensation;  
(c) continuing the thermal condensation until at least 1.05 moles of water per mole of reactant are removed, wherein the condensation goes to completion without incurring substantial undesirable degeneration; and  
(d) prior to the condensation going to completion, admixing a phenolic hydroxyl-containing compound with the reaction mixture.

5,412,116

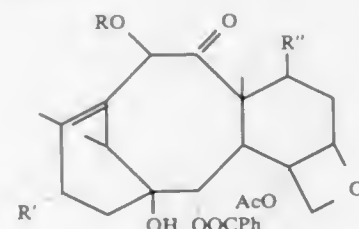
# OXIDATION OF GLYCOSIDE SUBSTITUTED TAXANES TO TAXOL OR TAXOL PRECURSORS AND NEW TAXANE COMPOUNDS FORMED AS INTERMEDIATES

Christopher K. Murray; Jeffrey T. Beckvermit; David T. Bailey, all of Boulder, and S. Kent Peterson, Denver, all of Colo., assignors to Hauser Chemical Research, Inc., Boulder, Colo.  
Continuation-in-part of Ser. No. 973,076, Nov. 6, 1992, abandoned. This application Oct. 7, 1993, Ser. No. 133,449  
Int. Cl.<sup>6</sup> C07D 305/14

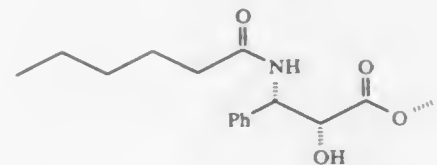
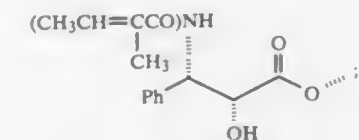
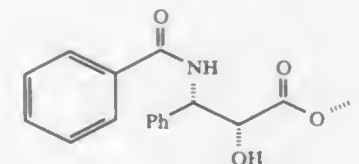
(2) U.S. Cl. 549—379

6 Claims

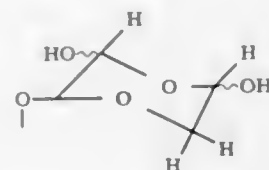
1. A compound useful for the production of taxol or precursors thereof comprising:



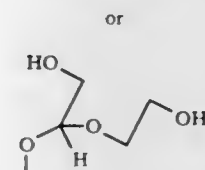
Wherein R represents Ac or H; R' represents:



OH; and R'' represents:



-continued



5,412,117

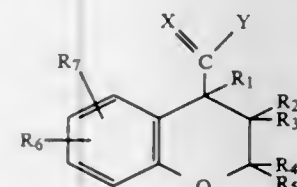
# BENZOPYRAN DERIVATIVES

Hiroshi Koga, Saitama, and Hiroyuki Nabata, Kanagawa, both of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan  
PCT No. PCT/JP91/01005, § 371 Date Jan. 26, 1993, § 102(e) Date Jan. 26, 1993, PCT Pub. No. WO92/02514, PCT Pub. Date Feb. 20, 1992  
PCT Filed Jul. 26, 1991, Ser. No. 962,215  
Claims priority, application Japan, Jul. 27, 1990, 2-199738; Nov. 1, 1990, 2-297009; Mar. 14, 1991, 3-049827  
Int. Cl.<sup>6</sup> C07D 311/58

U.S. Cl. 549—404

10 Claims

1. A benzopyran derivative represented by the formula:



wherein X is an oxygen atom or a sulfur atom, Y represents —NR<sub>8</sub>R<sub>9</sub> wherein R<sub>8</sub> and R<sub>9</sub> represent a substituted lower alkyl with the proviso that the substituent is not lower alkyl or a hydrogen atom, provided that at least one of R<sub>8</sub> and R<sub>9</sub> is a said substituted lower alkyl,

R<sub>1</sub> represents a hydrogen atom, a lower alkyl group or an aryl group, or it is directly bonded to R<sub>2</sub> to form a single bond,

R<sub>2</sub> and R<sub>3</sub>, which may be the same or different, each represents a hydrogen atom or a hydroxyl group, or they are taken together to form =O, or R<sub>2</sub> is directly bonded to R<sub>1</sub> to form a single bond,

R<sub>4</sub> and R<sub>5</sub>, which may be the same or different, each represents a hydrogen atom or a lower alkyl group, or they are taken together to form a polymethylene group, and

R<sub>6</sub> and R<sub>7</sub> represent a nitro group or a hydrogen atom, provided that at least one of R<sub>6</sub> and R<sub>7</sub> is a nitro group.

5,412,118

# THICKENED FOAM STABLE COMPOSITIONS COMPRISING ALKYL(ALKYL GLYCOSID)URONAMIDES

Robert Vermeer, Nutley; Bijan Harichian, South Orange, both of N.J., and Van Au, Peekskill, N.Y., assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

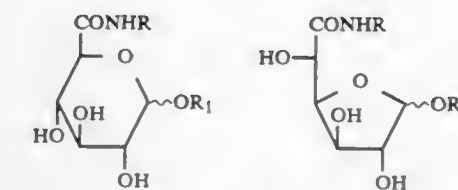
Filed Oct. 12, 1993, Ser. No. 135,238

Int. Cl.<sup>6</sup> C11D 1/68

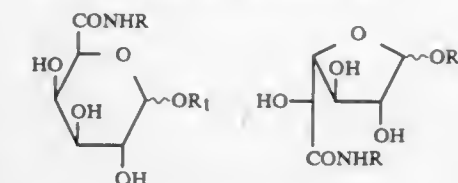
U.S. Cl. 549—417

11 Claims

1. A surfactant composition comprising an alkyl(alkyl glycosid)uronamide wherein said alkyl(alkylglycosid)uronamide is selected from the group consisting of:



alkyl (alkyl D-glucosid) uronamides; and



alkyl (alkyl D-galactosid) uronamides;

wherein:

R<sub>1</sub> is a saturated or unsaturated alkyl or alkenyl group having 1 to 8 carbons; and  
R is a saturated or unsaturated alkyl or alkenyl group having 6 to 24 carbons.

5,412,119

# METHOD OF PREPARING VICINAL AMINOALCOHOLS

Johannes Brussee; Arne van der Gen, and Chris G. Kruse, all of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands  
Filed Feb. 1, 1993, Ser. No. 11,547

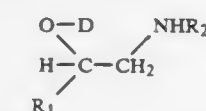
Claims priority, application European Pat. Off., Feb. 4, 1992, 92200310

Int. Cl.<sup>6</sup> C07D 315/00; C07C 215/00

U.S. Cl. 549—419

6 Claims

1. Method for the preparation of an N-substituted vicinal aminoalcohol derivative of formula 1



(1)

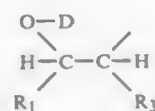
wherein

D is a group protecting the hydroxy group;

R<sub>1</sub> is optionally selected from the group consisting of phenyl, naphthyl, benzofuryl, benzodioxanyl and benzodioxolyl which is substituted with one or more groups X, wherein X is hydroxy, alkoxy(1-5C), alkyl(1-5C)carbonyloxy, amino, alkyl(1-5C)carbonylamino, alkyl(1-5C)sulphonylamino, nitro, alkyl(1-5C)sulphonyl, alkyl(1-5C)carbonyl, halogen, cyano, alkyl(1-5C) or cycloalkyl(5-12C), or wherein R<sub>1</sub> is a saturated or unsaturated straight or branched alkyl group having 1-30 C-atoms which may be substituted with halogen, alkoxy(1-5C), alkylthio(1-5C), phenyl or phenoxy optionally substituted with one or more groups X, and

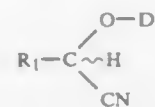
R<sub>2</sub> is a hydrogen atom or a saturated or unsaturated straight or branched alkyl(1-10C) group, optionally substituted with halogen, hydroxy, alkoxy(1-4C) or OD, or a phenyl, phenylalkyl(7-10C) or heteroarylalkyl(1-3C for the alkyl) group, wherein the heteroaryl is selected from the group consisting of benzofuryl, benzodioxanyl and benzodioxolyl, optionally substituted with one to three groups X, or wherein R<sub>2</sub> has the formula 7





wherein

R<sub>3</sub> is hydrogen or alkyl(1-4C); is prepared by reacting a hydroxy-protecting cyanohydrin derivative of formula 2



with a reducing reagent of formula 3

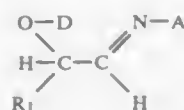


wherein

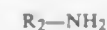
A represents a hydrogen atom or a metal atom selected from the group consisting of alkali, earth alkali or early transition metal atoms,

R is an alkyl(1-6C), alkoxyalkyl(1-6C) or alkoxy(1-6C) group, and

m is, dependent on the valence of A, 0-2; yielding a partially reduced compound of formula (4)



followed by a transimination reaction using a primary amine of formula 5



and reduction of the resulting imine, wherein D, R<sub>1</sub> and R<sub>2</sub> have the abovementioned meanings;

with the proviso that, if R<sub>2</sub> is a hydrogen atom, the transimination reaction step is omitted.

5,412,120

#### PREPARATION OF CARBOXYLIC ESTERS

Rolf Fischer, Heidelberg; Norbert Goetz, Worms; Thomas Kuenhnehoener, Boehl-Iggelheim, and Werner Schnurr, Herxheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

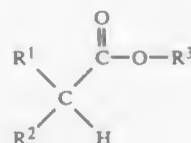
Continuation-in-part of Ser. No. 990,269, Dec. 14, 1992, abandoned. This application Nov. 29, 1993, Ser. No. 158,361  
Claims priority, application Germany, Dec. 13, 1991, 41 41 223.0

Int. Cl.<sup>6</sup> C07D 315/00

U.S. Cl. 549-427

6 Claims

1. A process for preparing monocarboxylic esters of the formula I

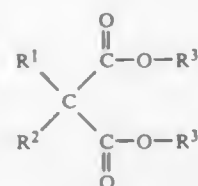


where

R<sup>1</sup> and R<sup>2</sup> are each hydrogen, C<sub>1</sub>-C<sub>12</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-cycloalkyl, acyl, aryl or C<sub>7</sub>-C<sub>20</sub>-aralkyl or together —(CH<sub>2</sub>)<sub>n</sub>—X—(CH<sub>2</sub>)<sub>m</sub>—,

(7)

X is methylene, oxygen, sulfur, NH or NR<sup>3</sup>,  
R<sup>3</sup> is C<sub>1</sub>-C<sub>12</sub>-alkyl, and  
n and m are each from 0 to 8,  
which comprises reacting geminal dicarboxylic esters of the formula II



II

where R<sup>1</sup> to R<sup>3</sup> are each as defined above, at from 150° to 400° C. in the presence of one or more catalysts selected from the group consisting of boron trioxide, aluminum oxide, silicon dioxide, titanium dioxide, zinc oxide, niobium oxide, vanadium pentoxide, molybdenum oxide, tungsten oxide, zirconium dioxide, oxides of chromium, oxides of the elements of the lanthanide series of the periodic table of the elements, zeolites, and heteropoly acids.

5,412,121

#### PROCESS FOR THE PREPARATION OF 4-HYDROXY-3[2H]FURANONES

A. M. Cohen, Amersfoort; W. Lenseink, Voorthuizen, and C. van Ek, Hoogland, all of Netherlands, assignors to Taste-maker, Cincinnati, Ohio

Continuation of Ser. No. 941,612, Sep. 8, 1992, abandoned. This application Dec. 8, 1993, Ser. No. 163,563

Claims priority, application European Pat. Off., Sep. 10, 1991, 91202315

Int. Cl.<sup>6</sup> C07D 307/60

U.S. Cl. 549-477

10 Claims

1. A process for the preparation of 5-alkyl-4-hydroxy-3[2H]furanones and/or 2,5-dialkyl-4-hydroxy-3[2H]furanones, wherein each alkyl group of said alkyl or dialkyl independently has one to six carbons comprising

- aponifying an ester selected from the group of 3, 4-dihydroxyfurans substituted at the 2-and/or 5-position with one or two carbalkoxy groups, wherein each alkoxy group independently contains one to six carbons, and optionally substituted at the 2-or 5-position with an alkyl group with one to six carbon atoms, or tautomeric forms or keto-enol isomers thereof to produce a hydrolyzate,
- treating the hydrolyzate with one or two alkylation reagents which independently may have one to six carbons to simultaneously alkylate and decarboxylate at the 2- and/or 5-position, and
- recovering the 5-alkyl-4-hydroxy-3[2H]furanones and/or 2, 5-dialkyl-4-hydroxy-3[2H]furanones.

5,412,122

#### EPOXIDATION PROCESS

Robert J. Saxton, West Chester; John G. Zajacek, Devon, both of Pa., and Guy L. Crocco, Wilmington, Del., assignors to Arco Chemical Technology, L.P., Greenville, Del.

Filed Dec. 23, 1993, Ser. No. 172,404

Int. Cl.<sup>6</sup> C07D 301/12, 303/04

U.S. Cl. 549-531

15 Claims

1. A process for epoxidation of an olefin comprising contacting said olefin with hydrogen peroxide in the presence of a catalytically effective amount of a crystalline titanium-containing molecular sieve characterized by a framework structure isomorphous to zeolite beta comprised of Si, Ti and Al atoms and containing a plurality of aluminum-associated cationic sites, wherein 25 to 100% of the cations present at such cationic sites are ammonium cations, alkali metal cations, or alkaline earth metal cations and 0 to 75% of the cations are hydrogen cations, for a time and at a temperature effective to selectively form an epoxide of the olefin.

5,412,123

#### ANTHRAQUINONE AND ANTHRACENE DERIVATIVES AS INHIBITORS OF THE CELL-ADHESION MOLECULES OF THE IMMUNE SYSTEM

Narasimha Rao, Alameda; Peng C. Tang, Moraga, and John H. Musser, San Carlos, all of Calif., assignors to Glycomed Incorporated, Alameda, Calif.

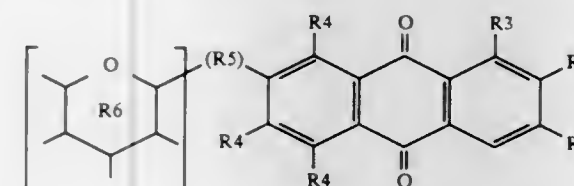
Filed Feb. 8, 1993, Ser. No. 14,913

Int. Cl.<sup>6</sup> C07D 315/00

U.S. Cl. 552-209

17 Claims

1. A compound comprising the following structural formula I:



R<sup>1</sup>=OH, O-alkyl wherein the alkyl contains 1 to 6 carbon atoms, or O-linker wherein the linker group is an alkyl containing 1 to 12 carbon atoms or a heteroalkyl containing 1 to 12 atoms which contains heteroatoms selected from the group consisting of S, N and O;

R<sup>2</sup>=R—COOH, or CH<sub>2</sub>—O—CO<sub>2</sub>H, CH<sub>2</sub>O—R—CO<sub>2</sub>H, OCH<sub>2</sub>CO<sub>2</sub>H, O—R—O—SO<sub>3</sub>, O—R—O—PO<sub>3</sub>, or O—R—CO<sub>2</sub>H wherein R is an alkyl containing 1 to 6 carbon atoms;

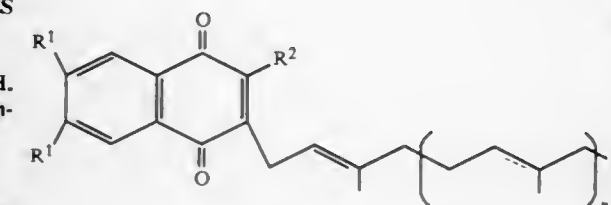
R<sup>3</sup>=H, an alkyl containing 1 to 6 carbon atoms or a heteroalkyl containing 1 to 6 atoms with the heteroatom being selected from the group consisting of N, S and O;

R<sup>4</sup> OH, or O—R' wherein R' is an alkyl containing 1 to 6 carbon atoms or a heteroalkyl containing 1 to 6 atoms with the heteroatom being selected from the group consisting of S and N;

R<sup>5</sup>=—(CH<sub>2</sub>)<sub>n</sub>— wherein n is an integer of from 1 to 12 and the —(CH<sub>2</sub>)<sub>n</sub>— group may be further attached to a heteroatom selected from the group consisting of N, S and O; and

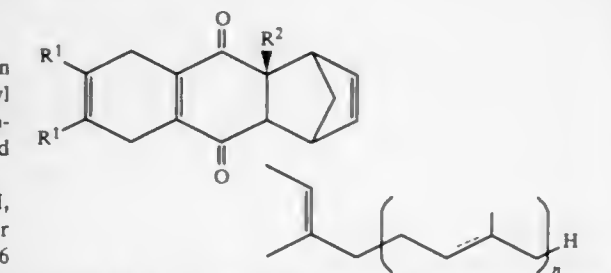
R<sup>6</sup>=Hexose or a hexNAc, or a disaccharide linked by either α- or β-linkage to R<sup>5</sup> through an —O— linker or a linking group which includes as a base atom chain comprised of atoms selected from the group consisting of C, N and S, and

pharmaceutically acceptable salts and multivalent derivatives of a compound of formula I.



(II)

wherein R<sup>1</sup> means a hydrogen atom or methyl group, R<sup>2</sup> is a hydrogen atom or methyl group, n stands for 0 or an integer of 1-9, and a linkage is a single bond or double bond with the proviso that if n is an integer of 2-9, the linkages may be identical with or different optionally from each other, which comprises subjecting a 1,4,4a,5,8,9a-hexahydro-4a-alkenyl-1a,4a-methanoanthraquinone derivative represented by the following formula (I):



(I)

wherein R<sup>1</sup>, R<sup>2</sup>, n and a linkage have the same meaning as defined above, to a Retro Dieis-Alder reaction in the presence of a dehydrogenating agent or oxidizing agent.

5,412,125

#### DIPEPTIDIC AMIDES DERIVED FROM GLYCYL-SERINE AS SURFACTANTS OR HYDRATING AGENTS AND COSMETIC, PHARMACEUTICAL OR ALIMENTARY COMPOSITIONS CONTAINING THE SAME

Michel Philippe, Antony, France, assignor to L'Oreal, Paris, France

Division of Ser. No. 828,662, Feb. 6, 1992, Pat. No. 5,234,909. This application Mar. 24, 1993, Ser. No. 36,265

Claims priority, application France, Feb. 6, 1991, 91 01308  
Int. Cl.<sup>6</sup> C07K 5/062

U.S. Cl. 554-35

1 Claim

1. A dipeptide amide having the formula RCO—NHCH<sub>2</sub>—CONH—CH(CH<sub>2</sub>OH)—COOH  
wherein RCO- represents an oleoyl group or salts thereof.

5,412,126

#### CARBOXYLIC ACID SORPTION REGENERATION PROCESS

C. Judson King, Kensington, Calif., and Loree J. Poole, Baton Rouge, La., assignors to The Regents of the University of California, Oakland, Calif.

Continuation-in-part of Ser. No. 686,543, Apr. 17, 1991, abandoned. This application Mar. 12, 1993, Ser. No. 31,166  
Int. Cl.<sup>6</sup> C11B 7/00

U.S. Cl. 554-185

24 Claims

1. A process for recovering carboxylic acid from a carboxylic acid-containing aqueous feedstream comprising:

- contacting the carboxylic acid-containing feedstream with an acid-sorbing phase under conditions whereby carboxylic acid is sorbed from the feedstream to the acid-sorbing phase, thereby forming an acid-depleted aqueous feedstream and an acid-enriched acid-sorbing phase;
- separating the acid-depleted aqueous feedstream from the acid-enriched acid sorbing phase;
- contacting the separated acid-sorbing phase with an aqueous solution of low molecular weight alkylamine,

5,412,124

#### PREPARATION PROCESS OF NAPHTHOQUINONE DERIVATIVE AND INTERMEDIATE FOR THE PREPARATION THEREOF

Kimio Hamamura, Chiba; Chiaki Seki, Aichi, and Masayuki Konishi, Ibaraki, all of Japan, assignors to Eisai Chemical Co., Ltd., Ibaraki, Japan

Filed Jul. 26, 1994, Ser. No. 280,550

Claims priority, application Japan, Jul. 26, 1993, 5-202551; Dec. 15, 1993, 5-342215

Int. Cl.<sup>6</sup> C07C 50/00

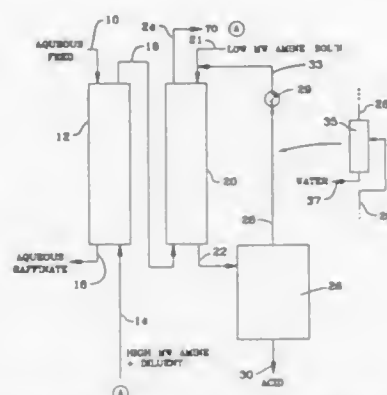
U.S. Cl. 552-299

7 Claims

1. A process for the preparation of a naphthoquinone derivative represented by the following formula (II):

thereby solubilizing said carboxylic acid from the sorbing phase into said aqueous solution as alkylammonium carboxylate, and forming a carboxylic-acid lean acid-sorbing phase;

(d) separating the aqueous solution of alkylammonium carboxylate from the acid-lean acid-sorbing phase;



(e) treating the aqueous solution of alkylammonium carboxylate to decompose the alkylammonium carboxylate to yield the carboxylic acid and the alkylamine; and

(f) recovering the carboxylic acid yielded in step (e).

5,412,127

# PROCESS FOR EXTRACTING MINOR FATTY COMPOUNDS FROM A SUBSTANCE OF BIOLOGICAL ORIGIN

Léon Mentink, Estaires, and Michel Serpelloni, Beuvry-Les-Bethune, both of France, assignors to Roquette Frères, Les-Trem, France

PCT No. PCT/FR91/00708, § 371 Date May 4, 1992, § 102(e) Date May 4, 1992, PCT Pub. No. WO92/04431, PCT Pub. Date Mar. 19, 1992

PCT Filed Sep. 4, 1991, Ser. No. 854,662

Claims priority, application France, Sep. 4, 1990, 90 10969 The portion of the term of this patent subsequent to Dec. 6, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C11B 3/02

U.S. Cl. 554—212

20 Claims

1. A process for extracting minor fatty compounds selected from the group consisting of steroids, fatty alcohols, fat soluble vitamins, pigments, hydrocarbons and flavouring compounds from a substance of biological origin containing fatty substances, comprising the steps of:

selecting a substance of biological origin containing said minor fatty compounds and fatty substances;

selecting a cyclodextrin in pulverulent form capable of forming inclusion complexes with said minor fatty compounds, from the group consisting of substituted and unsubstituted alpha, beta and gamma cyclodextrin;

providing an amount of said cyclodextrin of from 0.5 to 15% relative to the dry matter of the substance of biological origin to be treated;

contacting the amount of cyclodextrin with the substance of biological origin in an aqueous reaction medium at a temperature about 10° C. to 25° C. and maintaining the water content of the reaction medium so as to obtain a saturation level of cyclodextrin in water equal to or greater than 1.67 at the reaction temperature and so that the cyclodextrin is in a partially undissolved form;

mixing during 10 to 120 minutes the cyclodextrin with the substance of biological origin so as to obtain a pasty mixture and to allow the formation of the said inclusion complexes;

separating, the said inclusion complexes formed during the contacting step from the said substance of biological origin by centrifugation, by decantation, or by heating the

mixture obtained to a temperature at which not more than 1% of the fatty substances present in the substance of biological origin are in a solid or crystalline state; and recovering the substance of biological origin with a reduced content of minor fatty compounds.

5,412,128

# CATALYST FOR OLEFIN POLYMERIZATION, PROCESS FOR THE POLYMERIZATION OF OLEFIN, AND TRANSITION METAL COMPOUND EMPLOYABLE FOR THE CATALYST

Junichi Imuta, Junji Saito, Takashi Ueda, all of Waki, and Teruaki Mukaiyama, Tokyo, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

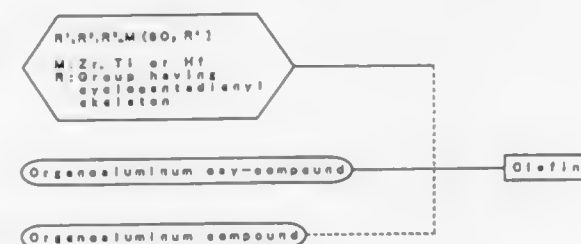
Division of Ser. No. 901,015, Jun. 19, 1992. This application Jul. 9, 1993, Ser. No. 87,875

Claims priority, application Japan, Jun. 20, 1991, 3-148846; Aug. 27, 1991, 3-215606; Sep. 9, 1991, 3-227976; Sep. 9, 1991, 3-227977; Jun. 11, 1992, 4-151853

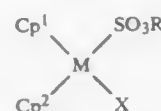
Int. Cl.<sup>6</sup> C07F 7/08, 17/00

U.S. Cl. 556—11

6 Claims



1. A novel transition metal compound having the following formula:



wherein M is a transition metal in Group IVB of the periodic table, each of Cp<sup>1</sup> and Cp<sup>2</sup> is a group having a cyclopentadienyl skeleton, said group having a cyclopentadienyl skeleton optionally having an alkyl group, Cp<sup>1</sup> and Cp<sup>2</sup> optionally are linked to each other through an alkylene group, isopropylidene group, diphenylmethylene group, a silylene group or dimethylsilylene group, R is an alkyl group, an alkyl group substituted with a halogen atom, an aryl group, an aryl group substituted with a halogen atom or an aryl group substituted with an alkyl group and X is SO<sub>3</sub>R, a halogen atom, R, OR, NR<sub>n</sub>, S(O)<sub>q</sub>R, SiR<sub>3</sub> or P(O)<sub>q</sub>R<sub>3</sub>, where R is defined above, n is 1, 2 or 3, and q is 0, 1 or 2.

5,412,129

# STABILIZATION OF PRECURSORS FOR THIN FILM DEPOSITION

Stephen A. DiCarolis, 2212 Cabrillo Ave., Santa Clara, Calif. 94304

Filed Jun. 17, 1994, Ser. No. 261,572

Int. Cl.<sup>6</sup> C07F 1/00, 15/04, 15/06, 3/06

U.S. Cl. 556—40

10 Claims

1. An adduct of the formula:



wherein

M is a cation of an element selected from the group consisting of alkali metals, copper, nickel, cobalt, manganese, and zinc;

E is a crown ether; and

T is an anion of a diketone.

2. A method of manufacturing an adduct of the formula

M—E—T

wherein

M is a cation of an element selected from the group consisting of alkali metals, copper, nickel, cobalt, manganese, and zinc;

E is a crown ether; and

T is an anion of a diketone, comprising the steps of:

A. producing a mixture of metallic M with T and E in a solvent;

B. refluxing the mixture; and

C. stripping away the solvent.

5,412,130

# METHOD FOR PREPARATION OF ORGANIC MOLYBDENUM COMPOUNDS

Thomas J. Karol, Norwalk, Conn., assignor to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

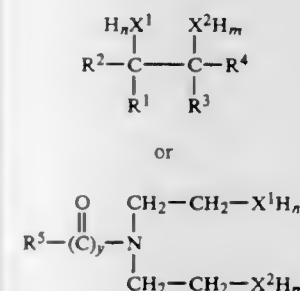
Filed Jun. 8, 1994, Ser. No. 255,690

Int. Cl.<sup>6</sup> C07F 11/00

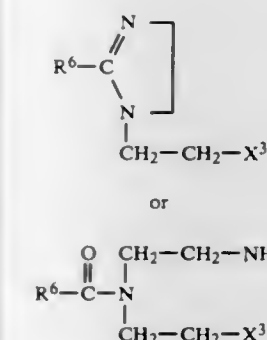
U.S. Cl. 556—57

6 Claims

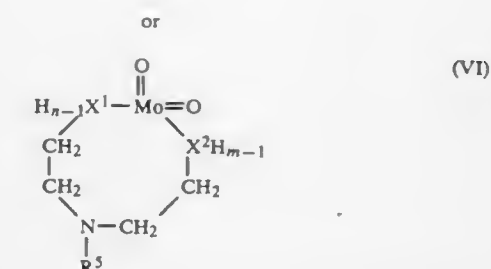
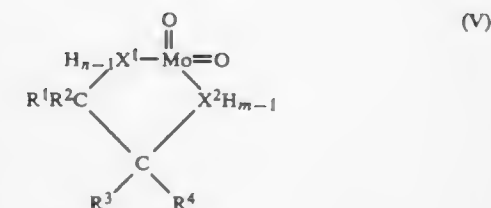
1. A process for preparing a 2,4-heteroatom-substituted molybdena-3,3-dioxocycloalkane compound comprising the steps of selecting a starting material having the structural formula



wherein X<sup>1</sup> and X<sup>2</sup> are selected from the group consisting of O, S or N and where n or m=1 when X<sup>1</sup> or X<sup>2</sup> is O or S and n or m=2 when X<sup>1</sup> or X<sup>2</sup> is N, y=0 or 1, and wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from the group consisting of hydrogen, alkyl, alkenyl, aryl, alkylaryl hydrocarbon group or fatty residue containing from 1 to 50 carbon atoms or polymeric residues having a molecular weight of 150 to 1200; and selected from poly-alpha-olefin, polypropene, polybutylene and polyisobutylene; reacting the starting material with a molybdenum source sufficient to yield about 2 to 20 percent of molybdenum based on the weight of the molybdena-compound in the presence of water and a phase transfer agent of the formula



wherein R<sup>6</sup> is an alkyl group or fatty residue having 8 to 22 carbon atoms and X<sup>3</sup> is a hydroxy or amino group at 60° to 150° C.; removing the reaction water and diluent water and recovering the molybdena-compound of the formula



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, X<sup>1</sup>, X<sup>2</sup>, n and m are defined and correspond to the starting materials in formula (I) and (II).

5,412,131

# TERTIARY AMINO-ALUMINOXANE HALIDES

Samuel A. Sangokoya, Baton Rouge, La., assignor to Albemarle Corporation, Richmond, Va.

Filed Jul. 9, 1993, Ser. No. 87,444

Int. Cl.<sup>6</sup> C07F 5/06

U.S. Cl. 556—175

4 Claims

1. A tertiary amino-aluminoxane halide composition comprising the reaction product obtained by reacting an aluminoxane and from about 0.005 to less than about 0.15 mole per mole of aluminum in said aluminoxane of a tertiary amine hydrohalide in an inert organic solvent at a temperature of from about 25° to 90° C.

5,412,132

# COPOLYMERS OF ISOCYANATO SILICONES AND PLASTICS WHICH CONTAIN ACTIVE HYDROGEN SUBSTITUENTS

Michael A. Lucarelli, Mattoon, Ill.; William J. Raleigh, Rensselaer, and Larry N. Lewis, Scotia, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Continuation of Ser. No. 989,684, Dec. 14, 1992, abandoned.

This application Apr. 28, 1994, Ser. No. 234,492

Int. Cl.<sup>6</sup> C07F 7/08, 7/10

U.S. Cl. 556—414

20 Claims

1. A composition comprising units of the formula:



(III) wherein

M represents a monofunctional siloxane of the formula R<sub>3</sub>SiO<sub>1/2</sub>;

M' represents a monofunctional siloxane of the formula R'<sub>2</sub>SiO<sub>1/2</sub>;

D represents a difunctional siloxane of the formula R<sub>2</sub>SiO<sub>2/2</sub>;

each R is the same or different and independently represents a substituted or unsubstituted monovalent hydrocarbon of from about 1 to about 30 carbon atoms;

(IV) wherein

M represents a monofunctional siloxane of the formula R<sub>3</sub>SiO<sub>1/2</sub>;

M' represents a monofunctional siloxane of the formula R'<sub>2</sub>SiO<sub>1/2</sub>;

D represents a difunctional siloxane of the formula R<sub>2</sub>SiO<sub>2/2</sub>;

each R is the same or different and independently represents a substituted or unsubstituted monovalent hydrocarbon of from about 1 to about 30 carbon atoms;



said R' comprises 1-(1-isocyanato-1-methylethyl)-3-(1-methylethenyl)benzene;  
 "a" is an integer of 1, 2 or 3;  
 "b" is an integer of 0, 1 or 2;  
 a+b=3; and  
 x is an integer of above about 1.

5,412,133

# RADIATION ACTIVE SILICON COMPOUNDS HAVING THIOETHER LINKED FUNCTIONAL GROUPS

Richard P. Eckberg, Saratoga Springs, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 700,073, May 3, 1991, abandoned, which is a continuation of Ser. No. 235,800, Aug. 23, 1988, abandoned, which is a continuation-in-part of Ser. No. 80,723, Jul. 31, 1987, abandoned. This application Oct. 5, 1992, Ser. No. 956,924

Int. Cl.<sup>6</sup> C07F 7/04

U.S. Cl. 556—427 7 Claims  
 1. A UV active silicone compound comprising UV active moieties of the formula:



where R is a divalent hydrocarbon radical of from 1 to 12 carbon atoms; X<sup>1</sup> is —COO— or —OOC—; R<sup>1</sup> is —H or an alkyl group of from 1 to 4 carbon atoms; a is 0 or 1, and Z is —SH.

5,412,134

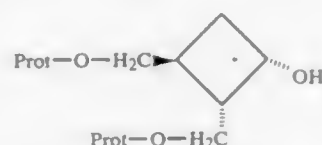
# PROCESS FOR PREPARING DIPROTECTED 2,3-HYDROXYMETHYL CYCLOBUTANOL

Janak Singh; Gregory S. Bisacchi, both of Lawrenceville, and Richard H. Mueller, Ringoes, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

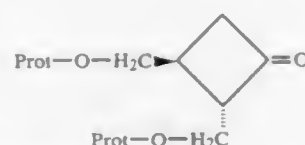
Filed May 26, 1992, Ser. No. 888,077

Int. Cl.<sup>6</sup> C07D 473/18

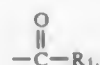
U.S. Cl. 556—437 14 Claims  
 1. A process for preparing a compound of the formula



wherein the hydroxy substituent is cis to the vicinal —CH<sub>2</sub>—O—Prot substituent and two —CH<sub>2</sub>—O—Prot substituents are trans to each other, which comprises treating a compound of the formula

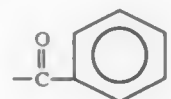


with a reducing agent selected from the group consisting of dialkylaluminum chlorides, alkylaluminum dichlorides, trialkylaluminum compounds, diphenylsilane in the presence of tris(triphenylphosphine)rhodium (I) chloride, and iridium tetrachloride in the presence of phosphorous acid wherein alkyl is straight or branched chain of 1 to 20 carbons; Prot is a hydroxy protecting group selected from the group consisting of benzyl, substituted benzyl,



t-butyl dimethylsilyl, t-butyl diphenylsilyl, (triphenylmethyl)

dimethylsilyl, methyl diisopropylsilyl, and triisopropylsilyl, and R<sub>1</sub> is straight or branched chain lower alkyl of 1 to 6 carbons or phenyl provided that when the reducing agent is a trialkylaluminum compound Prot cannot be



5,412,135

# ORGANIC SILICON COMPOUNDS AND CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Kenichi Fukuda; Kouichi Yamaguchi, both of Takasaki; Shinichi Sato, Annaka; Hirofumi Kishita, Annaka; Masatoshi Arai, Annaka, and Hironao Fujiki, Takasaki, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

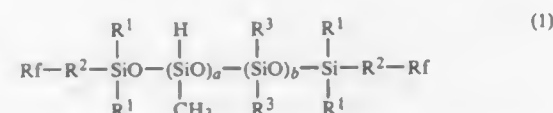
Filed Apr. 20, 1994, Ser. No. 230,470

Claims priority, application Japan, Apr. 21, 1993, 5-117943; Apr. 21, 1993, 5-117944

Int. Cl.<sup>6</sup> C07F 7/08; C08G 77/06

U.S. Cl. 556—448 9 Claims

1. An organic silicon compound of the following formula (1):



wherein R<sup>1</sup> and R<sup>3</sup> are independently selected from monovalent organic groups,  
 R<sup>2</sup> is a divalent organic group,  
 Rf is a perfluoroalkyl group or perfluoropolyether group, and  
 letter a is an integer of at least 1 and b is 0 or a positive integer.

5,412,136

# PROCESS FOR THE PREPARATION OF ALKYL SULFATE POWDER HAVING A HIGH BULK DENSITY

Michael Stehr, Gelsenkirchen; Adelbert Otte, Marl; Helmut Glaser, Gelsenkirchen; Hans-Josef Ratajczak, Marl, and Klaus Schulze, Haltern, all of Germany, assignors to Huels Aktiengesellschaft, Marl, Germany

Filed Aug. 16, 1993, Ser. No. 106,623

Claims priority, application Germany, Aug. 17, 1992, 42 27 210.6

Int. Cl.<sup>6</sup> C07C 305/04

U.S. Cl. 558—43 11 Claims

1. A process for the preparation of alkyl sulfate powders, which comprises spraying an aqueous solution or dispersion of alkyl sulfates having a solids content of about 10 to 60% by weight into a head part of a spraying tower through single-component nozzles under a pressure sufficient to form a spray mist, and drying the resulting spray mist in a co-current manner using an inert gas at a temperature sufficient to afford a powder having a bulk density of from about 300 g/l to about 360 g/l.

5,412,137

# PROCESS FOR PREPARING PHOSPHINYLOXY PROPANAMINIUM INNER SALT DERIVATIVES

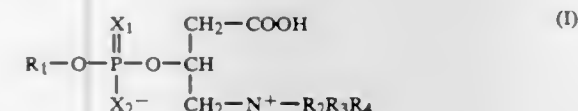
Mahavir Prasad, Hopatcong, and Prasad K. Kapa, Parsippany, both of N.J., assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 73,407, Jun. 7, 1993, abandoned. This application Feb. 16, 1994, Ser. No. 197,050

Int. Cl.<sup>6</sup> C07F 9/09, 9/165

U.S. Cl. 558—146 8 Claims

1. A process for preparing a compound of the formula:



where

X<sub>1</sub> and X<sub>2</sub> are independently O or S, and

R<sub>1</sub> is R<sub>5</sub>—Y—R<sub>6</sub> or R<sub>7</sub>—Z—R<sub>8</sub>,

where

Y is —O—, —S—, —CH<sub>2</sub>—, —CH=CH—, —C≡C—,

—N(R<sub>10</sub>)—CO—, or —CO—N(R<sub>10</sub>)—,

Z is —O—, —S— or —CH<sub>2</sub>—,

R<sub>5</sub> is straight or branched chain (C<sub>1-17</sub>)alkyl or ω-trifluoro-(C<sub>1-8</sub>)alkyl, and

R<sub>6</sub> is straight chained (C<sub>2-18</sub>)alkylene,

and the total number of carbons in R<sub>5</sub>—Y—R<sub>6</sub> is from 7 to 19,

R<sub>7</sub> is unsubstituted phenyl, phenoxyphenyl, biphenyl, naphthyl or naphthoxyphenyl, or phenyl, phenoxyphenyl, biphenyl, naphthyl or naphthoxyphenyl mono-, di-, or tri-substituted with halogen, NO<sub>2</sub>, NH<sub>2</sub>, CN, (C<sub>1-8</sub>)alkyl, (C<sub>1-8</sub>)alkoxy, trifluoromethyl, trifluoromethoxy, or acetyl,

R<sub>8</sub> is straight chained (C<sub>3-15</sub>)alkylene, —(CH<sub>2</sub>)<sub>m</sub>—N(R<sub>1-10</sub>)—CO—(CH<sub>2</sub>)<sub>n</sub>—, —(CH<sub>2</sub>)<sub>m</sub>—CO—N(R<sub>10</sub>)—(CH<sub>2</sub>)<sub>n</sub>—, or —CH<sub>2</sub>—R<sub>11</sub>—O—R<sub>12</sub>—,

m is 1 to 7,

n is 1 to 7,

R<sub>10</sub> is hydrogen, methyl, or ethyl,

R<sub>11</sub> is straight or branched chain alkyl of 1 to 7 carbon atoms,

R<sub>12</sub> is straight chained (C<sub>2-7</sub>)alkylene,

and the total number of carbons in the aryl substituents of R<sub>7</sub> and the carbon atoms in R<sub>8</sub> is from 3 to 15,

R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are each independently straight or branched chain (C<sub>1-4</sub>)alkyl,

and pharmaceutically acceptable salts, physiological hydrolysable esters, and pro-drug forms thereof, comprising the steps of

A) reacting a compound of the formula



with a compound of the formula



in an inert solvent;

Bii) oxidizing and hydrolysing the product obtained with an oxidizing agent of the formula



where R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are as defined above and Q and Q' are independently chlorine, bromine, or iodine, in water to obtain a compound of formula (I) in which X<sub>1</sub> and X<sub>2</sub> are oxygen, or

Bii) thiolating and hydrolysing the product obtained in step A with sulfur and water to obtain a compound of formula

(I) in which one of X<sub>1</sub> and X<sub>2</sub> is sulfur and the other is oxygen, or

Biii) sulfating and sulfolysing the product obtained in step A with sulfur and hydrogen sulfide to obtain a compound of formula (I) in which both X<sub>1</sub> and X<sub>2</sub> are sulfur; and

C) isolating and purifying the compound of formula (I) by chromatography over reverse phase silica gel (C-8) or AMBERLITE XAD-4 nonionic polymeric adsorbent.

5,412,138

# PHOSPHORUS-CONTAINING ACRYLIC COMPOUNDS AND POLYMERS THEREOF

Martine Cerf, Metz; Jean-Luc Mieloszynski, Montigny Les Metz, and Daniel Paquer, Vandoeuvre, all of France, assignors to Elf Atochem S.A., Paris-La Defense, France

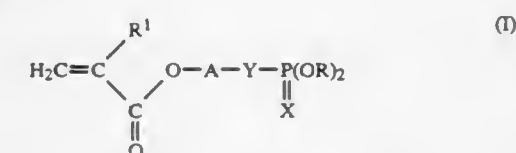
Continuation-in-part of Ser. No. 714,180, Jun. 14, 1991, abandoned. This application Dec. 14, 1992, Ser. No. 993,724

Claims priority, application France, Jun. 14, 1990, 90 07438

Int. Cl.<sup>6</sup> C07F 9/113, 9/173

U.S. Cl. 558—182 17 Claims

1. Acrylic and methacrylic compounds chosen from those of the formula:



in which:

R<sup>1</sup> is chosen from a hydrogen atom and a methyl radical,

A is chosen from (CH<sub>2</sub>)<sub>n</sub> radicals for which n is an integer from 2 to 12 and a —(CH<sub>2</sub>CH<sub>2</sub>O)<sub>d</sub>—CH<sub>2</sub>—CH<sub>2</sub>— where

d is an integer ranging from 1 to 20,

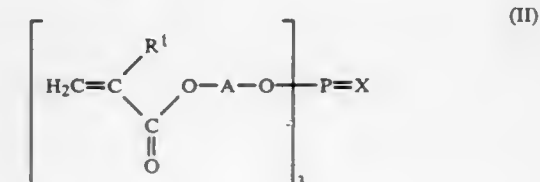
X is chosen from sulphur and oxygen atoms,

Y is chosen from sulphur and oxygen atoms, on condition that X is a sulphur atom and Y is an oxygen atom when A is a —(CH<sub>2</sub>CH<sub>2</sub>O)<sub>d</sub>—CH<sub>2</sub>CH<sub>2</sub>— radical, and

R is chosen from alkyl radicals having 1 to 20 carbon atoms and —(CH<sub>2</sub>)<sub>p</sub>SR<sup>3</sup> group in which p is an integer ranging from 23 to 12 and R<sup>3</sup> is an alkyl radical having 1 to 20 carbon atoms,

with the proviso that A does not represent (CH<sub>2</sub>)<sub>n</sub>, when Y and X both represent an oxygen atom or both represent a sulfur atom and R represents alkyl of 1-20 carbon atoms,

those of the formula:



in which:

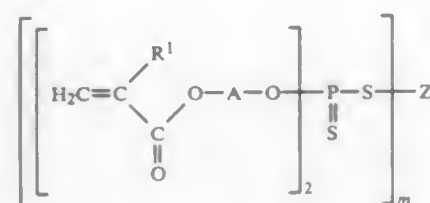
R<sup>1</sup> is chosen from a hydrogen atom and a methyl radical,

A is chosen from (CH<sub>2</sub>)<sub>n</sub> radicals for which n is an integer from 2 to 12 and a —(CH<sub>2</sub>CH<sub>2</sub>O)<sub>d</sub>—CH<sub>2</sub>CH<sub>2</sub>— radical,

where d is an integer from 10 to 20, and

with the proviso that A does not represent —(CH<sub>2</sub>)<sub>n</sub>, when X is oxygen,

X is chosen from sulphur and oxygen atoms, and those of the formula



in which:

R<sup>1</sup> is chosen from a hydrogen atom and a methyl radical, A is chosen from (CH<sub>2</sub>)<sub>n</sub> radicals for which n is an integer from 2 to 12,

m is an integer ranging from 1 to 3, and

Z is chosen from a hydrogen atom, R<sup>2</sup>QH radicals, R<sup>2</sup> being an alkyl radical having 2 to 12 carbon atoms and Q being chosen from oxygen and sulphur atoms, and atoms of the metals from Groups IA, IIA, IIIA, IB, IIB, VIB, VIIB and VIII of the Periodic Table, on condition that Z is R<sup>2</sup>OH when m is 1 and that m is the valence of Z when Z is a metal.

5,412,139

# ORGANOPHOSPHATE DISPERSING AGENT, FILLED THERMOSETTING COMPOSITION CONTAINING SAME, AND APPLICATION THEREOF

Pierre Blanchard, Reyrieux; Jean-Bernard Egraz, Ecully, and Georges Ravet, St Genis-les-Ollieres, all of France, assignors to Coatex, S.A., Caluire, France

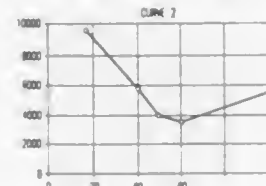
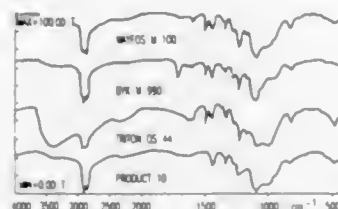
Filed Jan. 14, 1992, Ser. No. 820,257

Claims priority, application France, Jan. 16, 1991, 91 00645

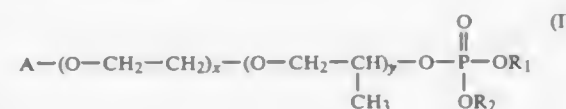
Int. Cl.<sup>6</sup> C07F 9/02

U.S. Cl. 558—186

8 Claims

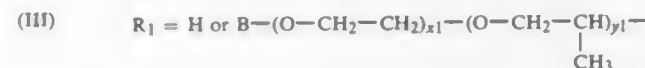


1. An organophosphate dispersing agent for acting on mineral fillers in thermosetting resins, which is one or more compounds of the formula:

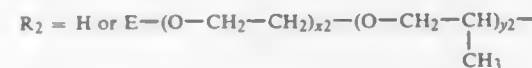


where:

A is a branched or unbranched polyaryl group, x and y are whole numbers between 0 and 100 such that x + y is a whole number greater than 40 but not greater than 100,



x<sub>1</sub> and y<sub>1</sub> are whole numbers between 0 and 100 such that x<sub>1</sub> + y<sub>1</sub> is a whole number not greater than 100, B is a branched or unbranched polyaryl group, or an alkyl, aryl, arylalkyl, alkylaryl, alkanoyl, or amine radical,



x<sub>2</sub> and y<sub>2</sub> are whole numbers between 0 and 100 such that x<sub>2</sub> + y<sub>2</sub> is a whole number not greater than 100, E is a branched or unbranched polyaryl group, or an alkyl, aryl, arylalkyl, alkylaryl, alkanoyl, or amine radical, and R<sub>1</sub> and R<sub>2</sub> may be identical or different.

5,412,140

# METAL-FREE DITHIOPHOSPHORIC ACID DERIVATIVES

Thomas Dimmig, Jena; Gunter Jäger, Freyburg; Thomas Petri, Jena; Wolfram Radig, Apolda; Günther Schilling, Schwetzingen; Jürgen Braun, Speyer, and Volker Schäfer, Altrip, all of Germany, assignors to Rhein Chemie Rheinau GmbH, Mannheim, Germany

Filed Dec. 6, 1993, Ser. No. 165,424

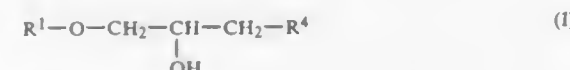
Claims priority, application Germany, Dec. 16, 1992, 42 502 6

Int. Cl.<sup>6</sup> C07F 9/40

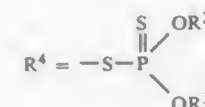
U.S. Cl. 558—208

4 Claims

1. Metal-free dithiophosphoric acid derivatives, corresponding to the following general formula



wherein



and

R<sup>1</sup> is an alkyl or aryl group and either R<sup>2</sup> or R<sup>3</sup> is an alkyl group and the other is an aryl group.

5,412,141

# BISPHOSPHONIC ACID DERIVATIVES AS ANTI-ARTHRITIC AGENTS

Richard A. Nugent, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 570,274, Aug. 21, 1990,

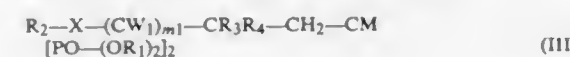
abandoned. This application Feb. 19, 1993, Ser. No. 19,964

Int. Cl.<sup>6</sup> C07C 67/30; C07F 9/40, 9/44, 9/58

U.S. Cl. 558—214

8 Claims

1. Acyclic bisphosphonates of the formula (III)



where

(I) m<sub>1</sub> is 0 or 1;

(II) M is —H, —Cl or —CH<sub>3</sub>;

(III) R<sub>1</sub> are the same or different and are selected from the group consisting of

(A) —H,

(B) C<sub>1</sub>–C<sub>6</sub> alkyl,

(C) —CH<sub>2</sub>—φ;

(IV) R<sub>2</sub> is

(A) — optionally substituted with 1 or 2 —φ or with 1 thru 3

(1) —F,

(2) —Cl,

(3) —Br,

(4) —I,

(5) —NO<sub>2</sub>,

(6) —CN,

(7) —CF<sub>3</sub>,

(8) C<sub>1</sub>–C<sub>10</sub> alkyl,

(9) C<sub>3</sub>–C<sub>7</sub> cycloalkyl,

(10) —OH,

(11) C<sub>1</sub>–C<sub>4</sub> alkoxy,

(12) —SH,

(13) —NH<sub>2</sub>,

(14) —O—CO—R<sub>2.1</sub> where R<sub>2.1</sub> is

(a) C<sub>1</sub>–C<sub>10</sub> alkyl,

(b) C<sub>3</sub>–C<sub>7</sub> cycloalkyl,

(15) —(CH<sub>2</sub>)<sub>n1</sub>—COO—R<sub>2.2</sub> where n<sub>1</sub> is 1 thru 3 and R<sub>2.2</sub> is

(a) —H,

(b) C<sub>1</sub>–C<sub>6</sub> alkyl,

(c) —CH<sub>2</sub>—φ,

(d) —N—CO—R<sub>2.3</sub> where R<sub>2.3</sub> is

(i) C<sub>1</sub>–C<sub>10</sub> alkyl,

(ii) C<sub>3</sub>–C<sub>7</sub> cycloalkyl,

(e) —(CH<sub>2</sub>)<sub>n4</sub>—COO—R<sub>2.9</sub> where n<sub>4</sub> is 1 thru 3 and R<sub>2.9</sub> is

(i) —H,

(ii) C<sub>1</sub>–C<sub>6</sub> alkyl,

(iii) —φ,

(16) —O—S(O)<sub>2</sub>—R<sub>2.4</sub> where R<sub>2.4</sub> is

(a) C<sub>1</sub>–C<sub>10</sub> alkyl,

(b) —φ optionally substituted with 1 thru 3

(i) —F,

(ii) —Cl,

(iii) —Br,

(iv) —I,

(v) —NO<sub>2</sub>,

(vi) —CN,

(vii) —CF<sub>3</sub>,

(viii) C<sub>1</sub>–C<sub>10</sub> alkyl,

(ix) —OH,

(x) C<sub>1</sub>–C<sub>4</sub> alkoxy,

(xi) —O—φ,

(xii) C<sub>1</sub>–C<sub>4</sub> alkylthio,

(xiii) —NH—CO—R<sub>2.3</sub> where R<sub>2.3</sub> is as defined above,

(17) —N(R<sub>2.5</sub>)(R<sub>2.6</sub>) where R<sub>2.5</sub> and R<sub>2.6</sub> are the same or different and are

(a) —H,

(b) C<sub>1</sub>–C<sub>6</sub> alkyl,

(c) C<sub>3</sub>–C<sub>7</sub> cycloalkyl,

(d) —φ,

(18) —N(R<sub>2.7</sub>)—CO—R<sub>2.3</sub> where R<sub>2.7</sub> is

(a) —H,

(b) C<sub>1</sub>–C<sub>6</sub> alkyl,

(c) C<sub>3</sub>–C<sub>7</sub> cycloalkyl,

(d) —φ, and where R<sub>2.3</sub> is as defined above,

(19) —N(R<sub>2.7</sub>)—CO—O—R<sub>2.8</sub> where R<sub>2.8</sub> is

(a) —H,

(b) C<sub>1</sub>–C<sub>6</sub> alkyl,

(c) —φ and

(d) —CH<sub>2</sub>—φ, and where R<sub>2.7</sub> is as defined above,

(20) —N(R<sub>2.7</sub>)—CO—N(R<sub>2.5</sub>)(R<sub>2.6</sub>) where R<sub>2.5</sub>, R<sub>2.6</sub> and R<sub>2.7</sub> are as defined above,

(21) —N(R<sub>2.7</sub>)—SO<sub>2</sub>—R<sub>2.4</sub> where R<sub>2.4</sub> and R<sub>2.7</sub> are as defined above,

(B) 1- and 2-naphthalyl optionally substituted with 1 or 2 —φ, or with 1 thru 3

(1) —F,

(2) —Cl,

(3) —Br,

(4) —I,

(5) —CN,

(6) —CF<sub>3</sub>,

(7) C<sub>1</sub>–C<sub>10</sub> alkyl,

(8) C<sub>3</sub>–C<sub>7</sub> cycloalkyl,

(9) —OH,

(10) —SH,

(11) —NH<sub>2</sub>,

(12) —O—CO—R<sub>2.1</sub> where R<sub>2.1</sub> is as defined above,

(13) —O—S(O)<sub>2</sub>—R<sub>2.4</sub> where R<sub>2.4</sub> is as defined above,

(14) —N(R<sub>2.5</sub>)(R<sub>2.6</sub>) where R<sub>2.5</sub> and R<sub>2.6</sub> are as defined above,

(15) —N(R<sub>2.7</sub>)—CO—R<sub>2.3</sub> where R<sub>2.3</sub> and R<sub>2.7</sub> are as defined above,

(16) —N(R<sub>2.7</sub>)—CO—O—R<sub>2.8</sub> where R<sub>2.7</sub> and R<sub>2.8</sub> are as defined above,

(VA) (R<sub>3</sub>/R<sub>4</sub>-I) R<sub>3</sub> and R<sub>4</sub> together with the attached carbon atom form a cycloalkyl ring of 3 thru 7 carbon atoms,

(VB) (R<sub>3</sub>/R<sub>4</sub>-II) R<sub>3</sub> is —H and R<sub>4</sub> is

(A) —H,

(B) R<sub>2.4</sub>,

(C) —CO—O—R<sub>2.2</sub>,

(D) —CO—R<sub>2</sub>,

(E) —CN,

(F) —CO—NH—R<sub>2</sub>,

(G) —NH—CO—R<sub>2.3</sub>, and

(VC) (R<sub>3</sub>/R<sub>4</sub>-III) R<sub>3</sub> is —H and R<sub>4</sub> is —F, —Cl, —Br or —I,

(VD) (R<sub>3</sub>/R<sub>4</sub>-IV) R<sub>3</sub> and R<sub>4</sub> are the same or different and are C<sub>1</sub>–C<sub>10</sub> alkyl;

(VIA) (W<sub>1</sub>-I) W<sub>x</sub> is

(A) =O,

(B) =S,

(C) =N—N(R<sub>2.7</sub>)<sub>2</sub> where R<sub>2.7</sub> is as defined above,

(VIB) (W<sub>1</sub>-II) W<sub>1</sub> is W<sub>1.1</sub>:W<sub>1.2</sub> where W<sub>1.1</sub> and W<sub>1.2</sub> are the same and are C<sub>1</sub>–C<sub>4</sub> alkoxy,

(VIC) (W<sub>1</sub>-IV) W<sub>1</sub> is —H:W<sub>1.5</sub> where W<sub>1.5</sub> is

(A) —OH,

(B) —SH,

(C) —NH<sub>2</sub>,

(D) —S—W<sub>1.6</sub> where W<sub>1.6</sub> is C<sub>1</sub>–C<sub>4</sub> alkyl,

(E) —O—CO—R<sub>2.1</sub> where R<sub>2.1</sub> is as defined above,

(F) —N(R<sub>2.5</sub>)(R<sub>2.6</sub>) where R<sub>2.5</sub> and R<sub>2.6</sub> are as defined above,

(G) —N(R<sub>2.7</sub>)—CO—R<sub>2.3</sub> where R<sub>2.3</sub> and R<sub>2.7</sub> are as defined above,

(H) —N(R<sub>2.7</sub>)—CO—O—R<sub>2.8</sub> where R<sub>2.7</sub> and R<sub>2.8</sub> are as defined above;

(VII) X is —(CH<sub>2</sub>)<sub>n2</sub>— or —(CH=CH)<sub>n3</sub>— where n<sub>2</sub> is 0 thru 5 and n<sub>3</sub> is 0 thru 2, with the proviso that when R<sub>4</sub> is —R<sub>2.4</sub>, m<sub>1</sub> is 1, or pharmaceutically acceptable salts thereof.

5,412,142

# ASSOCIATIVE MONOMERS

John M. Wilkerson, III, Hixson; Daniel W. Verstrat, Ooltewah, and Milagros C. Barron, Hixson, all of Tenn., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Division of Ser. No. 85,851, Jun. 30, 1993, Pat. No. 5,294,692.

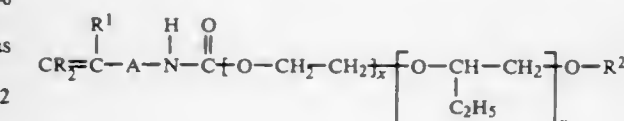
This application Dec. 22, 1993, Ser. No. 172,626

Int. Cl.<sup>6</sup> C07C 271/00

U.S. Cl. 560—33

5 Claims

1. A non-ionic urethane monomer comprising the structure:





wherein R and R<sup>1</sup> are, independently, H, —CH<sub>3</sub> or —CH<sub>2</sub>CH<sub>3</sub>; R<sup>2</sup> is a C<sub>1</sub>–C<sub>4</sub> linear or branched alkyl group; y is an integer from 1 to 50; x is an integer from 1 to 50; the sum of x + y is less than or equal to 100; and A is a C<sub>2</sub>–C<sub>20</sub> alkyl, aryl, alkaryl, or alkylene group.

5,412,143

# PROCESS FOR THE PREPARATION OF 5-(2,4-DIFLUOROPHENYL)-SALICYLIC ACID

Claudio Giordano, Monza; Laura Coppi, Firenze, and Francesco Minisci, Milan, all of Italy, assignors to Zambon Group S.p.A., Vicenza, Italy

Division of Ser. No. 813,661, Dec. 27, 1991, Pat. No. 5,312,975.

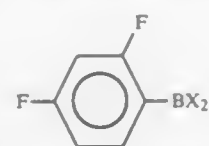
This application Dec. 30, 1993, Ser. No. 174,316

Claims priority, application Italy, Jan. 8, 1991, MI91A0027; Apr. 19, 1991, MI91A1094

Int. Cl.<sup>6</sup> C07F 5/04

U.S. Cl. 558—298

1. A compound of formula



wherein

X is a hydroxy or a C<sub>1</sub>–C<sub>3</sub> alkoxy.

5,412,144

# ORGANIC MATERIALS WITH NONLINEAR OPTICAL PROPERTIES

Samuel I. Stupp, Champaign; Shwan Son, Savoy, both of Ill., and Hong-Chen Lin, Taipei, Taiwan, Prov. of China, assignors to The Board of Trustees of the Univ. of Illinois, Urbana, Ill.

Filed Jan. 12, 1994, Ser. No. 180,405

Int. Cl.<sup>6</sup> C07C 253/33, 69/767

U.S. Cl. 558—406

2 Claims

1. The compound 4-[4-(2R)-2-cyano-7-(4'-pentyloxy-4-biphenylcarbonyloxy)phenylheptylidene]phenylcarbonyloxy]benzaldehyde.

5,412,145

# P2'-MODIFIED HYDROXAMIC ACID COLLAGENASE INHIBITORS

M. J. Crimmin, Marlow Bottom; A. H. Davidson, Witney, and R. P. Beckett, Aston, all of England, assignors to British Bio-Technology Limited, Oxford, England

Division of Ser. No. 760,741, Sep. 16, 1991, Pat. No. 5,300,674.

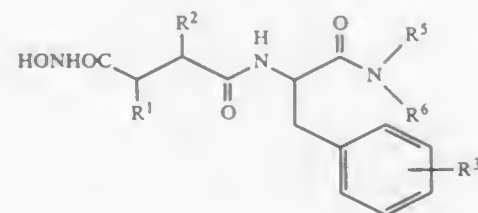
This application Dec. 23, 1993, Ser. No. 172,440

Claims priority, application United Kingdom, Feb. 7, 1991, 9102635

Int. Cl.<sup>6</sup> C07C 255/50, 259/06

U.S. Cl. 558—414

1. A compound of the formula:



wherein

R<sup>1</sup> is hydrogen, (C<sub>1</sub>–C<sub>6</sub>)alkyl, phenyl, phenyl(C<sub>1</sub>–C<sub>6</sub>)alkyl;R<sup>2</sup> is hydrogen, (C<sub>1</sub>–C<sub>6</sub>)alkyl, (C<sub>2</sub>–C<sub>6</sub>)alkenyl, phenyl(C<sub>1</sub>–C<sub>6</sub>)alkyl or cycloalkyl (C<sub>1</sub>–C<sub>6</sub>)alkyl;R<sup>3</sup> represents —CN or a group —O—CH<sub>2</sub>—CO—R<sup>8</sup>

wherein R<sup>8</sup> is a group —NH—(CH<sub>2</sub>)<sub>n</sub>—COOR<sup>10</sup> where n is 1 or 2, and R<sup>10</sup> is hydrogen or a (C<sub>1</sub>–C<sub>6</sub>)alkyl, phenyl or phenyl(C<sub>1</sub>–C<sub>6</sub>)alkyl;

R<sup>5</sup> is hydrogen or (C<sub>1</sub>–C<sub>6</sub>)alkyl;R<sup>6</sup> is hydrogen or methyl, or salts thereof.

5,412,146

# PROCESS FOR THE PREPARATION OF 2-CYANOACETOXYPROPIONIC ESTERS

Manfred Kaufhold, Marl, and Marcel Feid, Köln, both of Germany, assignors to Huels Aktiengesellschaft, Marl, Germany

Filed Jun. 3, 1994, Ser. No. 253,347

Claims priority, application Germany, Jun. 3, 1993, 43 18 381.6

Int. Cl.<sup>6</sup> C07C 253/30

(II-A)

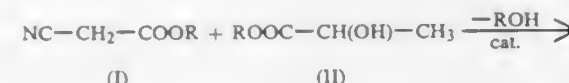
U.S. Cl. 558—442

14 Claims

1. A process for the preparation of 2-cyanoacetoxypropionic esters of the general formula III:



comprising mixing cyanoacetic esters of the general formula I with lactic acid esters of the general formula II:



wherein R denotes a C<sub>1</sub>–C<sub>10</sub> hydrocarbon radical in the presence of a basic catalyst; heating the resulting mixture to promote the reaction of I with II to form III with elimination of an alcohol, ROH; distilling off the alcohol; and terminating the reaction before obtaining the theoretically possible amount of alcohol and after having obtained, in a product mixture containing I, II, III, and any unknown high boiling components (UHC), at least about 25% III of the total amount of I, II, III, and any UHC.

5,412,147

# PROCESS FOR THE CONTINUOUS PREPARATION OF ALKYL NITRITES

Heinz Landscheldt, Duisburg; Paul Wagner, Düsseldorf, and Alexander Klausener, Stolberg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 24, 1993, Ser. No. 157,779

Claims priority, application Germany, Dec. 1, 1992, 42 40 311.1

Int. Cl.<sup>6</sup> C07C 203/00

U.S. Cl. 558—488

17 Claims

1. A process for the preparation of a C<sub>1</sub>–C<sub>6</sub>alkyl nitrite by reacting nitrogen dioxide with a C<sub>1</sub>–C<sub>6</sub>alcohol at a temperature of from 0° C. to 90° C. and a pressure of 0.5 to 10 bar in a counterflow-operated column wherein a mixture of said alcohol and water is fed into the upper part of the column and the nitrogen dioxide or a nitrogen dioxide/inert gas mixture is fed into the lower part of the column and the resulting alkyl nitrite is removed from the column as top product and the co-formed nitric acid is removed from the column as bottom product.

5,412,148

# AMPLIFIER MOLECULES DERIVED FROM DIETHYLENE TRIAMINEPENTAACETIC ACID FOR ENHANCEMENT OF DIAGNOSIS AND THERAPY

John F. W. Keana, Eugene, Oreg., assignor to The State of Oregon Acting by and Through the State Board of Higher Education on Behalf of the University of Oregon, Eugene, Oreg.

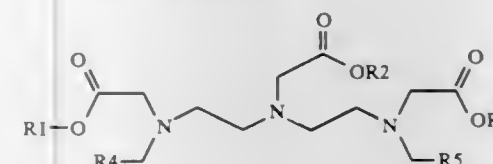
Division of Ser. No. 887,542, May 22, 1992, Pat. No. 5,252,317, which is a division of Ser. No. 403,595, Sep. 5, 1989, Pat. No. 5,135,737, which is a continuation-in-part of Ser. No. 928,943, Nov. 10, 1986, Pat. No. 4,863,717. This application Oct. 6, 1993, Ser. No. 133,652

Int. Cl.<sup>6</sup> C07C 229/04, 229/16, 275/16; C07F 5/00, 11/00

U.S. Cl. 560—35

13 Claims

1. A compound of the formula:

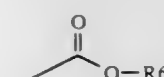


wherein

R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are independently selected from the group consisting of hydrogen, an unshared pair of electrons, and C<sub>1</sub>–C<sub>12</sub> alkyls,

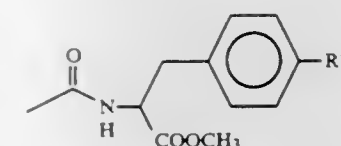
R<sub>4</sub> is selected from the group consisting of

(a)



wherein R<sub>6</sub> is selected from the group consisting of hydrogen, an unshared pair of electrons, and C<sub>1</sub>–C<sub>12</sub> alkyls,

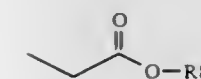
(b)



wherein R<sub>7</sub> is selected from the group consisting of hydrogen, a nitro radical, an amino radical, and

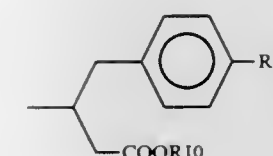
R<sub>5</sub> is selected from the group consisting of

(a)



wherein R<sub>8</sub> is selected from the group consisting of hydrogen, an unshared pair of electrons, and C<sub>1</sub>–C<sub>12</sub> alkyls,

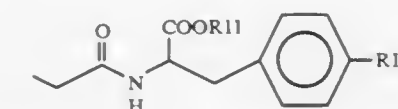
(b)



wherein R<sub>9</sub> is selected from the group consisting of hydrogen, a nitro radical, an amino radical, and an isothiocyanate radical, and wherein R<sub>10</sub> is selected

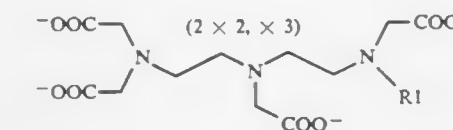
from the group consisting of hydrogen, an unshared pair of electrons, and C<sub>1</sub>–C<sub>12</sub> alkyls, and

(c)



wherein R<sub>11</sub> is selected from the group consisting of hydrogen, an unshared pair of electrons, and C<sub>1</sub>–C<sub>12</sub> alkyls, and wherein R<sub>12</sub> is selected from the group consisting of hydrogen, a nitro radical, an amino radical, and an isothiocyanate radical.

3. An MRI contrast-enhancing agent of the formula:



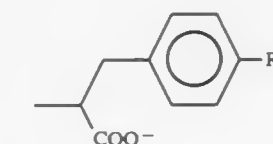
wherein

X<sub>2</sub> is an alkali metal cation,

X<sub>3</sub> is a trivalent paramagnetic metal cation selected from a group consisting of Gd(III), Mn(III), Fe(III), Cr(III), Dy(III), Tb(III), and Nd(III), and

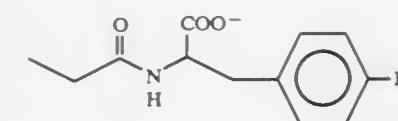
R<sub>1</sub> is selected from the group consisting of

(a)



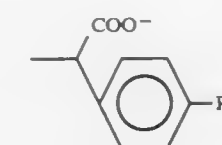
wherein R<sub>2</sub> is selected from the group consisting of hydrogen, a nitro radical, an amino radical, and an isothiocyanate radical,

(b)



wherein R<sub>3</sub> is selected from the group consisting of hydrogen, a nitro radical, an amino radical, and an isothiocyanate moiety, and

(c)



wherein R<sub>4</sub> is selected from the group consisting of hydrogen, a nitro radical, an amino radical, and an isothiocyanate radical.

5,412,149

PROCESS FOR THE PREPARATION OF  
2-OXIMINOACETIC ACID DERIVATIVESDietmar Kuhn, Leverkusen; Herbert Gayer, Monheim, and  
Peter Gerdes, Aachen, all of Germany, assignors to Bayer  
Aktiengesellschaft, Leverkusen, Germany

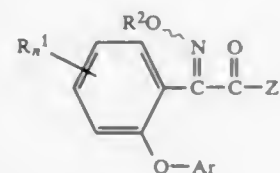
Filed May 6, 1994, Ser. No. 239,196

Claims priority, application Germany, May 14, 1993, 43 06  
187.1; Jun. 21, 1993, 43 20 499.6Int. Cl.<sup>6</sup> C07C 229/10, 249/08

U.S. Cl. 560—35

7 Claims

1. Process for the preparation of 2-oximinoacetic acid derivatives of the general formula (I)



in which

R<sup>1</sup> represents alkyl or alkoxy,R<sup>2</sup> represents alkyl,

Ar represents optionally substituted aryl or heteroaryl,

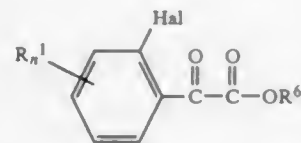
represents a radical of the formula -O-R<sup>3</sup> or -NR<sup>4</sup>R<sup>5</sup> and

n represents a number 0, 1, 2, 3 or 4, where

R<sup>3</sup> represents alkyl andR<sup>4</sup> and R<sup>5</sup> independently of one another each represent

hydrogen, alkyl, halogenoalkyl or alkoxy,

characterized in that 2-oxo-2-phenyl-acetic acid derivatives of the formula (II)



in which

Hal represents halogen,

R<sup>6</sup> represents hydrogen or alkyl andR<sup>1</sup> and n have the meaning given above,

are initially reacted, in a 1st stage, with alcohols of the formula (IIIa)

R<sup>7</sup>-OH (IIIa)

in which

R<sup>7</sup> represents alkyl,

or with diols of the formula (IIIb),

HO-R<sup>7</sup>-R<sup>8</sup>-OH (IIIb)

in which

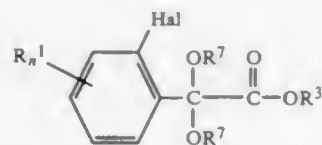
R<sup>7</sup> and R<sup>8</sup> together represent a divalent alkanediyl,

optionally in the presence of a diluent and optionally in the

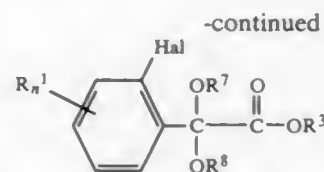
presence of a reaction auxiliary, and, in a subsequent 2nd

stage, the 2-aryl-2,2-dialkoxyacetic acid derivatives of the

formula (IVa)



and



(IVa-2)

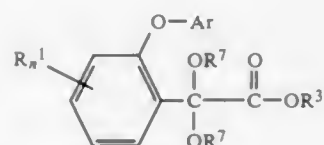
in which

R<sup>1</sup>, R<sup>3</sup>, R<sup>7</sup>, R<sup>8</sup>, Hal and n have the meaning given above, which compounds are thus obtainable, are reacted with hydroxy compounds of the formula (V)

Ar-OH (V)

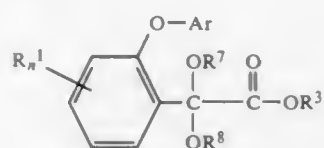
in which

Ar has the meaning given above, optionally in the presence of a diluent and optionally in the presence of a reaction auxiliary, and subsequently the 2-aryl-2,2-dialkoxy-acetic acid derivatives of the formula (VIa)



(VIa-1)

and



(VIa-2)

in which

R<sup>1</sup>, R<sup>3</sup>, R<sup>7</sup>, R<sup>8</sup>, Ar and n have the meaning given above, which compounds are thus obtainable, are reacted in a subsequent 3rd stage with hydroxylamine derivatives of the formula (VII)R<sup>2</sup>-OH-NH<sub>2</sub> (VII)

in which

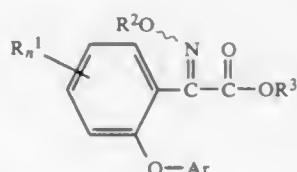
R<sup>2</sup> has the meaning given above

or with their hydrohalide salts, optionally in the presence of

a diluent and optionally in the presence of a reaction

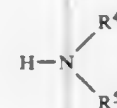
auxiliary, to give the 2-oximinoacetic acid derivatives of the

formula (Ia)



(Ia)

in which

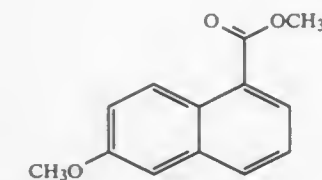
R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, Ar and n have the meaning given above, where the 2-aryl-2,2-dialkoxy-acetic acid derivatives of the formula (IVa) which are obtainable in the first stage or the 2-aryl-2,2-dialkoxy-acetic acid derivatives of the formula (VIa) which are obtainable in the second stage or the 2-oximinoacetic acid derivatives of the formula (Ia) which are obtainable in the third stage are reacted, optionally in an interposed reaction or in a subsequent reaction, in each case with amines of the formula (VIII)

(VIII)

in which

R<sup>4</sup> and R<sup>5</sup> have the meaning given above,

optionally in the presence of a diluent and optionally in the presence of a reaction auxiliary.



(II)

with bromine, wherein between about 0.5 and 0.6 mol of bromine (Br<sub>2</sub>) are employed per mole of methyl 6-methoxy-1-naphthoate and carrying out the bromination in the presence of an oxidant which is capable of oxidizing hydrogen bromide to give bromine.

5,412,150

PROCESS FOR THE PREPARATION OF METHYL  
5-BROMO-6-METHOXY-1-NAPHTHOATEThomas Wessel, Maintal, Germany, assignor to Cassella AG,  
Frankfurt am, Germany

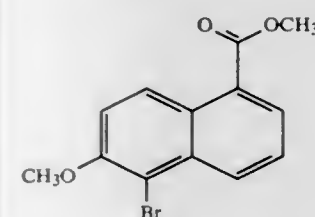
Filed May 23, 1994, Ser. No. 247,595

Claims priority, application Germany, Jun. 1, 1993, 43 18  
069.8Int. Cl.<sup>6</sup> C07L 69/76

U.S. Cl. 560—56

19 Claims

1. Process for the preparation of methyl 5-bromo-6-methoxy-1-naphthoate of formula (I)



(I)

comprising brominating methyl 6-methoxy-1-naphthoate of formula (II)

5,412,151

## THERMOSETTING COATING COMPOSITIONS

Philip C. Heidt; Charles H. Foster, both of Kingsport, Tenn.; J.  
Stewart Witzeman, Den Haag, Netherlands, and Allen L.  
Crain, Church Hill, Tenn., assignors to Eastman Chemical  
Company, Kingsport, Tenn.

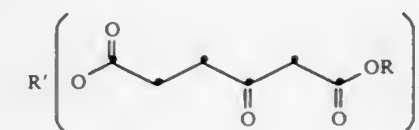
Filed Oct. 22, 1993, Ser. No. 139,661

Int. Cl.<sup>6</sup> C07C 59/305

U.S. Cl. 560—145

5 Claims

1. A compound of formula (2)



wherein

R is C<sub>1</sub>-C<sub>6</sub> alkyl or phenyl;

R' is the residue of a polyol selected from the group consisting of trimethylolpropane, trimethylethane, pentaerythritol, glycerin, glucose, sucrose, and a low molecular weight polyol having a Mn of about 250 to 1000; and X is an integer of from 2 to 12.



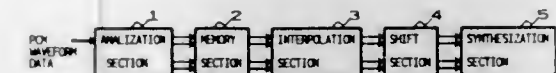
# ELECTRICAL

## 5,412,152 DEVICE FOR FORMING TONE SOURCE DATA USING ANALYZED PARAMETERS

Yasuo Kageyama; Shigeki Fujii, and Yasushi Ohtani, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan  
Filed Oct. 15, 1992, Ser. No. 963,445

Claims priority, application Japan, Oct. 18, 1991, 3-271183; Oct. 29, 1991, 3-282987; Oct. 29, 1991, 3-282988; Oct. 29, 1991, 3-282989; Oct. 29, 1991, 3-282990; Nov. 1, 1991, 3-287965; Nov. 1, 1991, 3-287966; Nov. 1, 1991, 3-287967; Nov. 12, 1991, 3-295772

Int. Cl.<sup>6</sup> G10H 1/057, 1/12, 1/46, 7/12  
U.S. Cl. 84—607 44 Claims



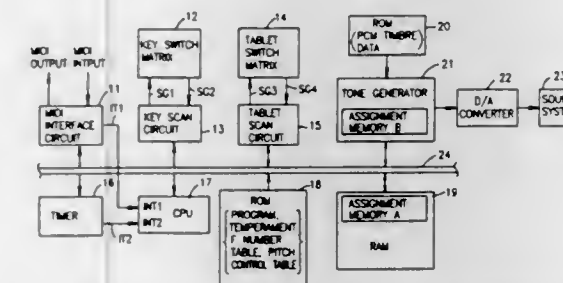
1. A tone source device comprising:  
memory means for storing analysis parameters indicative of frequency and magnitude of respective spectra contained in each of plural frequency band areas of a predetermined audible reproduction region of plural data segments corresponding to a first tone waveform, said data segments being successive parts of the first tone waveform;  
reading means for sequentially reading out the analysis parameters for each of said data segments; and  
synthesization means for, for each of said data segments, forming synthesized tone waveform data on the basis of the analysis parameters read out from said memory means.

## 5,412,153 ELECTRONIC MUSICAL INSTRUMENT HAVING INDEPENDENT PITCH CONTROL FOR EACH KEY

Tsutomu Saito, Shizuoka, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Continuation-in-part of Ser. No. 981,466, Nov. 25, 1992, abandoned. This application Dec. 13, 1993, Ser. No. 166,565

Int. Cl.<sup>6</sup> G10H 7/00, 5/00; H02M 5/00  
U.S. Cl. 84—619 17 Claims



1. An electronic musical instrument having plural keys and having independent pitch control for every key of said instrument, comprising:  
frequency control data storage means for storing frequency control data;  
said frequency control data being stored for only one temperament, said one temperament being equal temperament;  
said frequency control data being stored at intervals smaller than half tones;  
pitch control information storage means for storing, for each key code, pitch control information including the pitch difference between said equal temperament and a temperament other than said equal temperament;

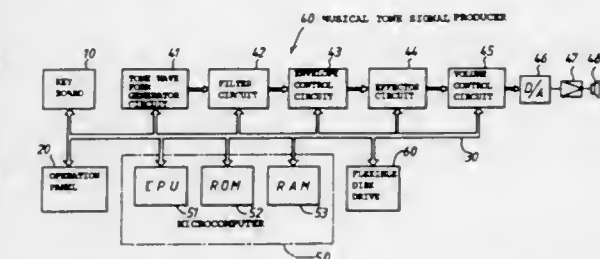
timbre designating means for designating a timbre;  
key code generating means for generating a key code at a designated pitch; and  
temperament designating means for designating a temperament corresponding to a timbre designated by said timbre designating means;  
whereby, based on pitch control information corresponding to said designated temperament and to said designated key code, said frequency control data is read out to determine a tone-ON frequency;  
whereby the amount of frequency control data required to produce a musical tone is equal to the sum of the number of keys multiplied by the number of intervals and the number of keys multiplied by the number of temperaments; and  
whereby musical effects such as vibrato and glide may be achieved with relatively small data storage requirements.

## 5,412,154 TONE COLOR CONTROL APPARATUS FOR MUSICAL TONE SIGNAL PRODUCER

Fumiteru Takeda, and Ojima Fumihiko, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan

Filed Jan. 14, 1993, Ser. No. 4,416  
Claims priority, application Japan, Jan. 14, 1992, 4-005228

Int. Cl.<sup>6</sup> G10H 1/06 9 Claims



4. A tone color control apparatus for controlling each tone color of plural musical tone signals produced at a musical tone signal producer, comprising:  
first memory means for memorizing plural sets of tone color data for control of each tone color of plural different musical tone signals produced at said musical tone signal producer;  
second memory means for memorizing plural sets of layer data each including plural sets of index data for indexing the plural sets of memorized tone color data and plural sets of modification data respectively corresponding with each set of the index data;  
selection means for selecting a desired set of the memorized layer data;  
means for reading out the desired set of the memorized layer data from said second memory means under control of said selection means and for reading out a set of the memorized tone color data indexed by a set of the index data of the read out layer data from said first memory means; and  
modification means for modifying the set of the read out tone color data on a basis of a set of the modification data of the read out layer data and for applying the set of the modified tone color data to said musical tone signal producer.

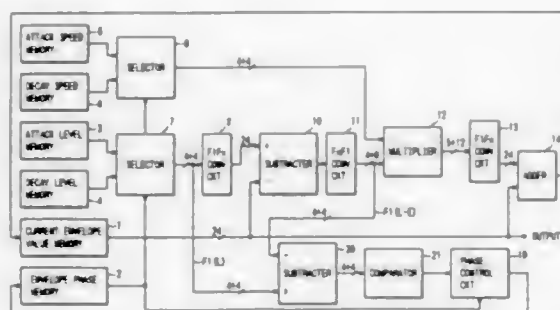
# 5,412,155 ENVELOPE GENERATOR FOR ELECTRONIC MUSICAL INSTRUMENT

Taichi Kosugi, Shizuoka, Japan, assignor to Kabushiki Kaisha Kawai Gakki Selsakusho, Hamatsu, Japan  
Filed Oct. 26, 1993, Ser. No. 143,349

Claims priority, application Japan, Nov. 2, 1992, 4-315580  
Int. Cl.<sup>6</sup> G10H 1/057

U.S. Cl. 84—627

8 Claims



1. An envelope generator in an electronic musical instrument wherein the envelope includes at least one phase; and wherein a current value approaching asymptotically as a function of time to a target level is generated in the at least one phase, said envelope generator comprising:

subtractor means for subtracting, from data representing said target value in a floating point representation, data representing the difference between said target level and said current value in a floating point representation, with deeming as real numbers having exponent parts of the floating point representation as integral parts and fractional parts thereof as the decimal part, and comparator means for comparing the output of said subtractor means with a predetermined constant, and if the output of said subtractor means is greater than the constant, generating a signal showing that an envelope phase transfer condition is met.

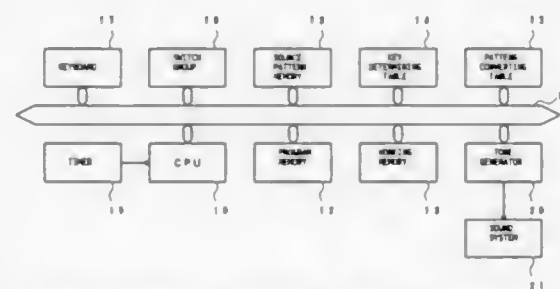
# 5,412,156 AUTOMATIC ACCOMPANIMENT DEVICE HAVING A FUNCTION FOR CONTROLLING ACCOMPANIMENT TONE ON THE BASIS OF MUSICAL KEY DETECTION

Takashi Ikeda, and Satoshi Suzuki, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan  
Filed Oct. 12, 1993, Ser. No. 134,921

Claims priority, application Japan, Oct. 13, 1992, 4-274238  
Int. Cl.<sup>6</sup> G10H 1/38, 1/40

U.S. Cl. 84—635

8 Claims



1. An automatic accompaniment device comprising: input means for inputting performance information; provisional key determination means for determining a provisional key on the basis of a first amount of information from among the performance information input by said input means; definite key determination means for finally determining a definite key on the basis of a second amount of information

from among the input performance information, the second amount of information being larger than the first amount of information; and

automatic accompaniment tone control means for, if a definite key has been determined by said definite key determination means, applying a first control to an automatic accompaniment tone based on the definite key, but, if no definite key has been determined, applying a second control to an automatic accompaniment tone based on the provisional key determined by said provisional key determination means, the first control to the automatic accompaniment tone based on the definite key being performed in a different manner from the second control to the automatic accompaniment tone based on the provisional key.

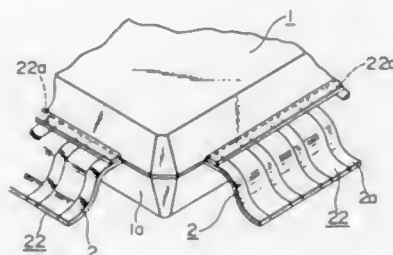
# 5,412,157 SEMICONDUCTOR DEVICE

Hideya Yagoura, Noriaki Higuchi, and Haruo Shimamoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 16, 1993, Ser. No. 91,929

Claims priority, application Japan, Jul. 17, 1992, 4-190663  
Int. Cl.<sup>6</sup> H01L 23/02

U.S. Cl. 174—52.4

9 Claims



1. A semiconductor device comprising: a semiconductor chip; a molded body of a first resin encapsulating said semiconductor chip; a plurality of outer leads extending from said molded body, each outer lead having a first end adjacent said molded body, a free end remote from said molded body, and a length from said molded body to said free end wherein said molded body includes a riser wall transverse to and on one side of said plurality of outer leads, adjacent the first ends of said plurality of outer leads, and projecting toward the free ends of said plurality of outer leads; and a layer of a second resin, different from the first resin, transverse to, connecting, and supporting said outer leads along their lengths.

# 5,412,158 ELECTRIC FENCE WIRE INSULATION

M. Deon Yearwood, Rt. 2, Box 23, Hydro, Okla. 73048  
Filed Jul. 19, 1993, Ser. No. 93,148

Int. Cl.<sup>6</sup> A01K 3/00

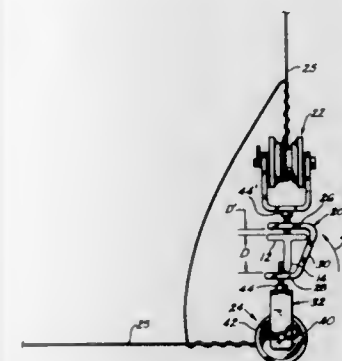
U.S. Cl. 174—163 F

2 Claims

1. An electric fence wire insulator for attachment to a T-shaped post having a stem portion normal to a bar portion, comprising:

a generally U-shaped mounting member having unequal length parallel legs capable of loosely transversely straddling a T-shaped post across an intermediate portion of its stem and bar and having a planar bight portion inclined with respect to the parallel planes of the mounting member legs and substantially parallel with a vertical plane tangentially contacting a laterally outward limit of a T-shaped post stem and one side edge of its bar; and, wire supporting means including opposing U-shaped brackets each having a bight portion and having a bolt secured to the bracket bight portion and threadably extending

through the respective mounting member leg for respectively frictionally contacting a T-shaped post bar opposite



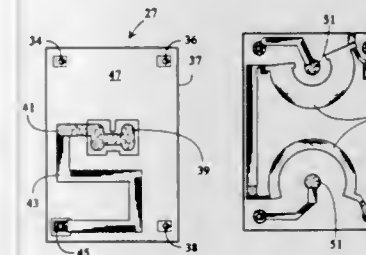
its stem and the stem surface opposite the mounting member inclined bight portion and securing the mounting member to a T-shaped post.

# 5,412,159 HIGH VOLTAGE RESISTIVE NETWORK CIRCUIT BOARD WITH GOOD POTTING ADHESION

Bernard M. Wiltgen, Villa Park, and Arthur J. Lostumbo, Franklin Park, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.  
Filed Sep. 27, 1993, Ser. No. 127,398

Int. Cl.<sup>6</sup> H05K 1/00  
U.S. Cl. 174—250

7 Claims



1. A circuit assembly board useful in potted circuit applications comprising:

a) a ceramic substrate with conductive runs, lead borosilicate resistive networks, and solder pads deposited thereon; and  
b) a dielectric tiecoat deposited selectively onto said substrate and over at least some of said conductive runs or resistive networks, or both, but not covering said solder pads; the dielectric tiecoat being selected for adhering both to the substrate and a subsequently applied potting compound.

# 5,412,160 CIRCUIT BOARD

Takaaki Yasumoto, Kawasaki; Nobuo Iwase, Kamakura; Kaoru Koiwa, Kawasaki; Koji Yamakawa, Kawasaki, and Kiyoshi Iyogi, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Mar. 15, 1994, Ser. No. 212,869

Claims priority, application Japan, Mar. 15, 1993, 5-054350  
Int. Cl.<sup>6</sup> H05K 1/00

U.S. Cl. 174—258

7 Claims

1. A circuit board comprising: a substrate; at least one dielectric film formed on the substrate and made

of at least one material selected from the group consisting of AlN, BN, diamond, diamond-like carbon, BeO and SiC,



said dielectric film having closed pores of a porosity of 5 to 95% by volume; and at least one wiring metal film formed on said dielectric film.

# 5,412,161 HANDWRITING CAPTURE SYSTEM WITH SEGMENTED DIGITIZER

John F. Crooks, Duluth, and Robert L. Protheroe, Lawrenceville, both of Ga., assignors to AT&T Global Information Solutions Company, Dayton, Ohio  
Filed Jun. 21, 1993, Ser. No. 80,278

Int. Cl.<sup>6</sup> G08C 21/00  
U.S. Cl. 178—18

6 Claims



1. A method for calibrating a four-wire digitizer comprising the steps of:

providing a controller; energizing a first strip on a first layer in response to a command from the controller by applying a source and a ground to electrodes associated with the strip; measuring the maximum and minimum coordinates in a first direction on the energized strip; calculating a scalar constant for each electrode of the strip; and calculating an offset constant for each electrode.

# 5,412,162 PRE-FORMED SPEAKER GRILLE CLOTH

William J. Kindel, San Clemente, Calif., assignor to Dana Innovations, San Clemente, Calif.  
Continuation of Ser. No. 958,820, Oct. 9, 1992, abandoned. This application Dec. 29, 1993, Ser. No. 175,186

Int. Cl.<sup>6</sup> B32B 7/00, 15/00, 27/34  
U.S. Cl. 181—150

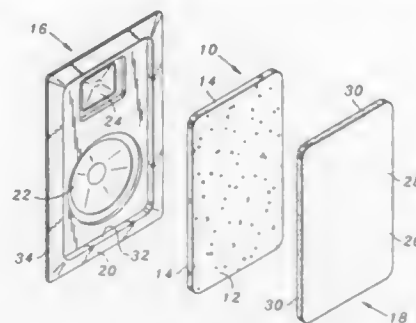
6 Claims

1. A pre-formed grille cloth disposed within a speaker hous-



ing intermediate a apertured grille and a speaker, the grille cloth comprising:

- (a) a perforated fabric pre-formed into a shape generally complimentary to the shape of the speaker grille, said shape having a rectangular planar member and a peripheral member extending perpendicular thereto, said fabric:



- (i) being substantially transparent to acoustic radiation in the audible frequency range;  
(ii) being substantially opaque to visible light; and  
(iii) having a sufficient rigidity to maintain its pre-formed shape while being supported only at its periphery;  
(b) wherein said grille cloth is self-supporting and visually obscures the speaker behind the grille cloth.

5,412,163

## ELEVATOR CONTROL APPARATUS

Sbintaro Tsuji, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 705,923, May 23, 1991, abandoned.

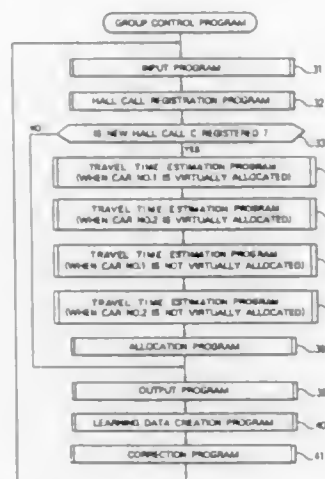
This application Mar. 15, 1993, Ser. No. 32,205

Claims priority, application Japan, May 29, 1990, 2-136979; May 31, 1990, 2-140032

Int. Cl.<sup>6</sup> B66B 1/20

U.S. Cl. 187—382

2 Claims



1. An elevator control apparatus for controlling the operation of elevator cars comprising:

an input data conversion means for converting traffic data, including position of each car, direction of travel of each car and existence of car calls and hall calls into neural network data;

a plurality of neural networks each corresponding to a plurality of time zones in which different traffic patterns are exhibited, each of said neural networks including an input layer for receiving all the data from said input data conversion means, an output layer for outputting signals representative of estimated travel parameters to be used in car allocation, and an intermediate layer provided be-

tween the input and output layers for simultaneously processing all the neural network data in which weighting factors are set and corrected based on learning data derived in part from actual travel times of each car;  
a determination means for determining which traffic patterns the current elevator traffic status corresponds to;  
a switch-over means for selecting one of said plurality of neural networks on the basis of the results of the determination made by said determination means; and  
an output data conversion means for converting the estimated travel parameters output from the output layer of the neural network selected by said switch-over means into control data;  
allocation means for allocating a selected car to a hall call based on the estimated travel parameter signals for the selected car represented by control data output from said output data conversion means;  
whereby the selected car is allocated to a hall call on the basis of the estimated travel parameter.

5,412,164

## DUAL ACTION SWITCH ASSEMBLY WITH SEQUENTIALLY ACTUATED MEMBRANE SWITCHES INCLUDING A RECIPROCATING CIRCUIT BOARD

Michael E. Conway, Youngstown, and Samuel E. Penn, Cortland, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 3, 1993, Ser. No. 161,008

Int. Cl.<sup>6</sup> H01H 3/02, 9/00, 13/70

U.S. Cl. 200—1 B

10 Claims

1. A dual action electric switch assembly comprising,  
a housing, an actuator supported by said housing for movement back and forth between neutral, first and second positions in the housing,  
a travelling circuit board supported by said housing for movement relative thereto,  
a first elastomeric dome switch disposed between the actuator and the travelling circuit board and secured to one of said actuator and travelling circuit board,  
a second circuit board outboard of the travelling circuit board, and  
a plurality of second elastomeric dome switches carried by said second circuit board disposed between said travelling circuit board and the second circuit board,  
said actuator collapsing said first dome switch while said second dome switches hold said travelling circuit board against movement when the actuator is moved from its neutral to its first position, said actuator when moved from its first position to its second position causing said travelling circuit board to move and collapse said second dome switches.

5,412,165

## MULTIPLE SWITCH ASSEMBLY WITH DETENTED ROCKER ACTUATOR

Peter G. Malone, Park Ridge, and Louis C. Lai, Brookfield, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Filed Nov. 19, 1993, Ser. No. 155,058

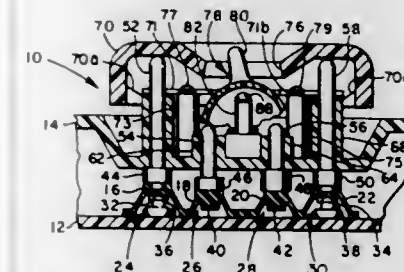
Int. Cl.<sup>6</sup> H01H 3/00, 9/00, 13/00

U.S. Cl. 200—5 R

13 Claims

1. A switch assembly comprising:  
(a) housing means;  
(b) a first and second switching means each having a contact member, movable between a first and a second position said switching means each operable by said movement to effect a switching function;  
(c) a rocker member mounted for rotational movement in a clockwise and anti-clockwise direction on said base means and formed of resilient electrically non-conductive material and having a user contactable position extending from said housing means for manual actuation thereof and other portions thereof defining pivot surfaces engaging corre-

sponding surfaces of said housing means and a certain depending portion defining detent surfaces thereon;  
(d) at least one beam spring disposed in generally spaced parallel arrangement and extending at generally right angles to the direction of said pivotal movement, said at least one beam spring resiliently engaging said detent



surface to provide resilient detenting of said rocker member upon user movement thereof; and,  
(e) a plurality of actuators operably responsive upon movement of said rocker in said directions to alternately effect said movement of said first and second switching means contact members between said first and second positions.

5,412,166

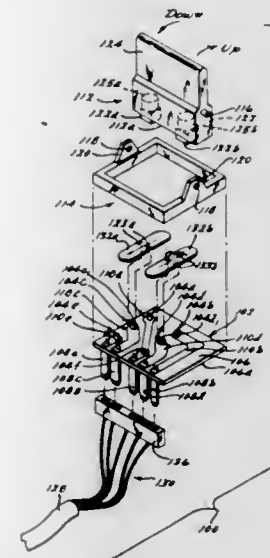
POWER WINDOW SWITCH CONTROL APPARATUS  
Eric J. Krupp, and Thomas P. Benzie, both of Canton, Mich., assignors to United Technologies Automotive, Inc., Hartford, Conn.

Filed Jun. 25, 1993, Ser. No. 83,017

Int. Cl.<sup>6</sup> H01H 21/80

U.S. Cl. 200—6 R

2 Claims



1. A power window switch control apparatus for switching current in the range of about 20 amps to 80 amps to elevationally control placement of a vehicle window, said apparatus comprising:

- a printed circuit board having an outer surface;
- a plurality of switch contacts secured to said printed circuit board;
- a plurality of connector terminals secured to said printed circuit board;
- a plurality of high current carrying copper traces formed on said upper surface of said printed circuit board, each of said copper traces coupling a selected one of said switch contacts and a selected one of said connector terminals electrically together;
- a frame secured to said printed circuit board, said frame

having a pair of outwardly protruding arm portions each having an aperture therethrough;  
a first conductive element and a second conductive element, each of said first and second conductive elements being supported by a corresponding switch contact for rocking movement at approximately a center point of a length thereof; and

a switch control having a plurality of shoulder portions engageable with said apertures of said arm portions of said frame such that said switch control is movable pivotally by an operator between an up position and a down position said switch control being positioned so as to be centered with each said conductive element and including a plurality of activating elements, at least one of said activating elements being disposed so as to be approximately centered over said first conductive element when said switch control is not engaged by an operator of said vehicle, said switch control causing a rocking of said first conductive element such that a first selected pair of said switch contacts is electrically coupled together via said first conductive element when said switch control is in said up position and causing a rocking of said second conductive element such that a selected second pair of said switch contacts is electrically coupled together via said second conductive element when said switch control is moved pivotally into said down position.

5,412,167

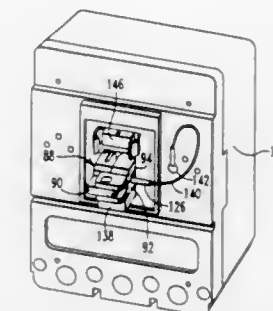
LOCKING DEVICE FOR AN ELECTRICAL SWITCH  
Robert W. Mueller, North Fayette Township, Allegheny County; Glen C. Sisson, Center Township, Beaver County; James G. Maloney, Industry; David A. Parks, Economy; Arthur D. Carothers, Beaver Falls, and William E. Beatty, Jr., Brighton Township, Beaver County, all of Pa., assignors to Eaton Corporation, Cleveland, Ohio

Filed Oct. 8, 1993, Ser. No. 133,430

Int. Cl.<sup>6</sup> H01H 9/28

U.S. Cl. 200—43.14

4 Claims



1. A locking device for restricting movement of an operating handle of an electrical switch, said handle extending through and moveable between opposite ends of a switch opening having parallel sides, said device comprising:

at least two pivotal members connected together for pivotal movement between a collapsed condition and an expanded condition,  
said two pivotal members being insertable in said switch opening adjacent to said handle with said handle adjacent either of said ends of said switch opening and extending between said handle and the other of said ends of said switch opening when in said collapsed condition and being engageable under said parallel sides of said switch opening and lockable therewith when in said expanded condition for said restricting of said movement of said handle, a first of said two pivotal members comprises at least two interconnected outer members and a second of said two pivotal members comprises an inner member, one of said pivotal members having an integral lug with an

aperture pivotally connected to and between another said pivotal member.

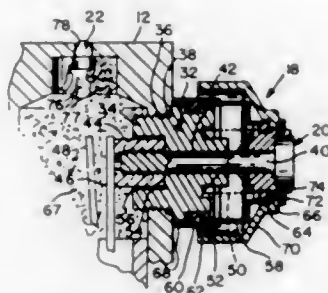
5,412,168

# TOOL EYE/SETTER WITH IMPROVED MEAN TIME BETWEEN FAILURES CONSTRUCTION

Richard L. McKelvey, Rte. 6, Box 525, Joplin, Mo. 64801, and Gary D. Hoofnagle, Rte. #4, Box 567A, Carthage, Mo. 64836  
Filed May 12, 1993, Ser. No. 60,856  
Int. Cl.<sup>6</sup> G01B 7/00; H01H 3/16

U.S. Cl. 200—61.41

5 Claims



1. A tool eye/setter for a computer numerically controlled machine tool of a type comprising:

a columnar housing block formed with an axially extending cavity and a ring of bores extending radially of and in communication with the cavity;

plurality of sensor heads having respective shafts and mounted on the housing in respective bores so that a respective shaft moves inward into the housing cavity when pressure is applied by a tool bit to a respective sensor head; and

at least one switch means, having two contacts, mounted within the housing and actuated by inward movement of a shaft, the improvement residing in that the said at least one switch means comprises:

a plurality of knife contact members mounted inside the housing as a ring and comprising respective arms having respective lead connecting ends anchored in the cavity at a location remote from the respective sensor heads and the respective arms extending axially along the cavity adjacent and spaced from an inner wall surface thereof to locations adjacent and spaced longitudinally from respective shafts and having respective opposite ends formed as inward extending knife contacts,

and a plurality of resilient rod contact members mounted inside the housing in a ring and comprising respective lead connecting ends anchored in the cavity at a location remote from the respective sensor heads and the respective rod contact members extending axially along the cavity in side by side relation with and spaced inward of respective knife contact members with respective opposite free ends of respective rod contact members radially aligned with respective shafts and biased so that contact portions of respective rod contact members adjacent the free ends engage respective knife contacts to form respective electrical connections therewith, with respective free ends of respective rod contact members being engageable by an inward movement of respective shafts to break the electrical connections between the respective rod contacts and the respective knife contacts, the respective contact portions being much closer to the free ends than to the anchored lead connecting portions so that only a small deflection of the rod contact members is necessary to break the electrical connection with the knife contact so that the rod contact will endure repeated operation, and boots covering the respective shafts for preventing gas and fluid communication between the inside and outside of the housing.

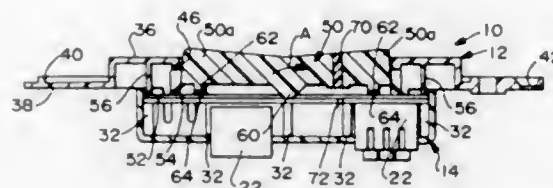
## ROCKER SWITCH WITH IMPROVED ROCKER ACTUATOR

Joseph D. Comer, Elmhurst; Robert DeRoss, Naperville; Robert M. Fuerst, Maple Park; Todd A. Hester, Montgomery, and Edward S. Sommer, Addison, all of Ill., assignors to Molex Incorporated, Lisle, Ill.

Continuation of Ser. No. 881,927, May 12, 1992, abandoned.  
This application Apr. 2, 1993, Ser. No. 41,929  
Int. Cl.<sup>6</sup> H01H 23/00

U.S. Cl. 200—339

6 Claims



1. In an electrical switch assembly which includes a housing mounting a pair of spaced switch means on a printed circuit board, and a rocker actuator rockably mounted for movement relative to said printed circuit board about a rotational axis between the spaced switch means and with wing portions on opposite sides of the rotational axis for alternately actuating the pair of switch means, wherein the improvement comprises said rocker actuator being a one piece component and including a relatively stiff rocker arm rockable about a relatively stiff fulcrum having a tip, integral to said rocker actuator defining said rotational axis and the tip of the fulcrum in contact with a surface of said printed circuit board, a connecting flange means projecting away from the periphery of the rocker arm, and integral flexible intermediate wall means joining the rocker arm and the connecting flange means and supporting the rocker arm in a neutral position whereby the rocker arm flexes the intermediate wall means when the rocker arm is rotated about said axis in either opposite direction from the neutral position to alternate actuating positions, and the flexible intermediate wall means is of a material to return the rocker arm automatically to the neutral position when pressure on the rocker arm is released and said improvement further comprises a front housing part having ribs in alignment with said connecting flange means which forces said flange means against said printed circuit board surface whereby the rocker actuator flange means is sandwiched between said printed circuit board surface and said ribs.

5,412,170

## ELECTRIC SWITCH WITH SLIDING BRIDGING CONTACT

Georg Hofmann, Heilbronn-Horkheim; Hubert Spazierer, and Adam Weber, Bietigheim-Bissingen, all of Germany, assignors to ITT Automotive Europe GmbH, Germany

Continuation of Ser. No. 836,309, Feb. 28, 1992, abandoned.  
This application Sep. 3, 1993, Ser. No. 117,544  
Claims priority, application Germany, Jun. 29, 1990, 40 20 821.4

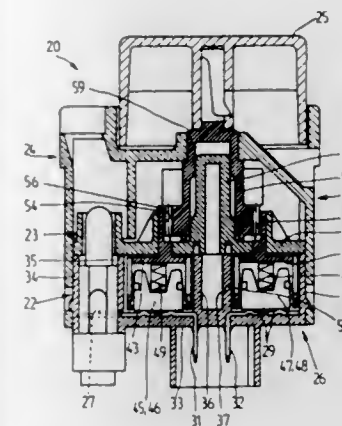
Int. Cl.<sup>6</sup> H01H 1/36

U.S. Cl. 200—536

16 Claims

1. An electric switch comprising:  
a sheet metal blank having a plurality of elongated metal conductors formed therefrom, the metal conductors arranged in two longitudinally extending, co-linear lines;  
a base plate formed of an insulating material, the base plate connected to the sheet metal blank;  
a bridging contact spanning the two lines of metal conductors;  
guiding and operating means for sliding the bridging contact in a predetermined range of motion along the metal conductors; and  
a projection formed on each metal conductor and extending

substantially over an entire range of motion of the bridging contact over each metal conductor;  
two of the metal conductors being arranged longitudinally one behind the other in a direction of motion of the bridging contact to form a transitional place therebetween;



end portions of the projections on the two metal conductors facing each other adjacent the transitional place having a sloping shape.

5,412,171

## COOKING DEVICE HAVING STIRRER MOVABLE ABOUT TWO MUTUALLY PERPENDICULAR AXES

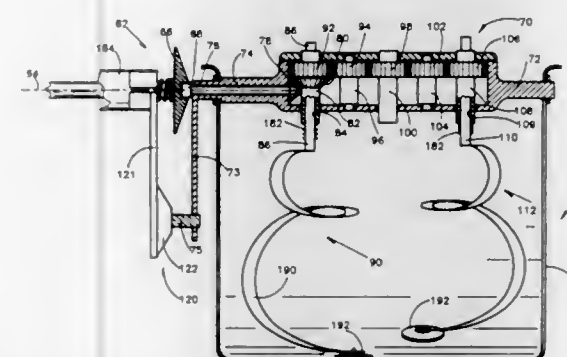
Shimon Yahav, Rehovot, and Yair Daar, Moshav Galia, both of Israel, assignors to Lancet S.A., Piso, Panama

Filed Nov. 15, 1990, Ser. No. 614,308  
Claims priority, application Israel, Apr. 23, 1990, 94178; Sep. 25, 1990, 95793

Int. Cl.<sup>6</sup> H05B 6/12

U.S. Cl. 219—621

16 Claims



1. A domestic cooking system comprising:  
electromagnetic induction apparatus; and  
a utensil having a curved cooking surface having a generally circular cross sectional configuration and also comprising stirring apparatus including:  
at least one stirrer arranged about a stirrer rotation axis and defining an attachment end and a termination end; and  
means for causing said termination end to move in composite dual axis rotational motion along said curved cooking surface and including:  
means for rotating said at least one stirrer about said stirrer rotation axis; and  
means for reciprocally rotating said at least one stirrer about a reciprocal motion axis perpendicular to said stirrer rotation axis.

5,412,172

## SPOT WELDING MACHINE

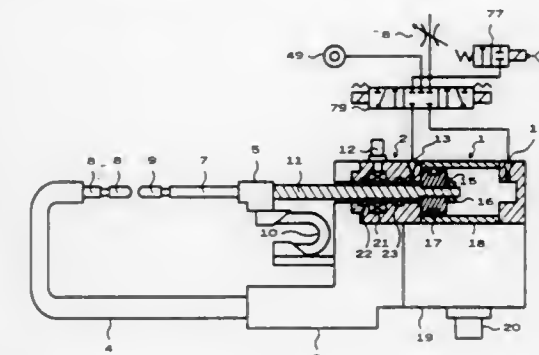
Wataru Ichikawa, Tokyo; Yuji Matsuki, Sayama, and Seiji Hirohashi, Tokyo, all of Japan, assignors to Kabushiki Kaisha SG, Japan

Continuation-in-part of Ser. No. 770,419, Oct. 3, 1991, Pat. No. 5,194,709. This application Feb. 2, 1993, Ser. No. 12,516  
Claims priority, application Japan, Oct. 8, 1990, 2-270013; Oct. 8, 1990, 2-270014; Jun. 28, 1991, 3-185630; May 12, 1992, 4-146523; Oct. 19, 1992, 4-304400

Int. Cl.<sup>6</sup> B23K 11/30

U.S. Cl. 219—86.41

28 Claims



1. A spot welding machine comprising:  
first and second tip electrodes for holding therebetween plates to be joined with a pressing force of a predetermined magnitude and causing current to flow through the plates;  
first and second arms for supporting the first and second tip electrodes and transmitting the pressing force of the predetermined magnitude to the first and second tip electrodes;  
a pressing actuator for moving at least one of the first and second arms to apply the pressing force to said plates via said tip electrodes;  
distance-between-electrodes detection means for detecting a distance between the first and second tip electrodes; and  
brake means for braking a movement of said pressing actuator, wherein said brake means is a full pneumatic type brake which comprises a brake bush provided around a rod of said actuator, a cone-shaped spring for pressing said brake bush against said rod and a brake piston movable along the rod in response to a change in air pressure applied thereto in order to deform said cone-shaped spring against resilient force thereof, and wherein a brake force is applied to said rod by a frictional force produced between said brake bush and said rod.

5,412,173

## HIGH TEMPERATURE PLASMA GUN ASSEMBLY

Stephan E. Muehlberger, San Clemente, Calif., assignor to Electro-Plasma, Inc., Irvine, Calif.

Continuation of Ser. No. 882,518, May 13, 1992, abandoned.  
This application Nov. 22, 1993, Ser. No. 156,388  
Int. Cl.<sup>6</sup> B23K 10/00

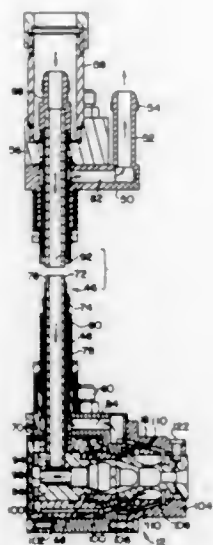
U.S. Cl. 219—121.47

12 Claims

1. A plasma gun assembly comprising the combination of:  
a plasma gun having an anode and a cathode;  
a power supply;  
an anode coupling attached to the power supply and capable of withstanding temperatures up to a given maximum temperature;  
a cathode coupling attached to the power supply and capable of withstanding temperatures up to the given maximum temperature;  
an anode extension extending between and coupling the anode coupling to the anode of the plasma gun, the anode



extension being capable of withstanding temperatures substantially above the given maximum temperature;  
 a cathode extension extending between and coupling the cathode coupling to the cathode of the plasma gun, the cathode extension being capable of withstanding temperatures substantially above the given maximum temperature; and  
 the anode extension comprising a hollow tube, the cathode



extension comprising a tube concentrically disposed within the hollow tube of the anode extension, the tube comprising the cathode extension having a hollow interior, the cathode coupling providing cooling fluid to the plasma gun via the hollow interior of the tube comprising the cathode extension, and the anode coupling receiving cooling fluid returned from the plasma gun via a space between the hollow tube comprising the anode extension and the tube comprising the cathode extension.

5,412,174

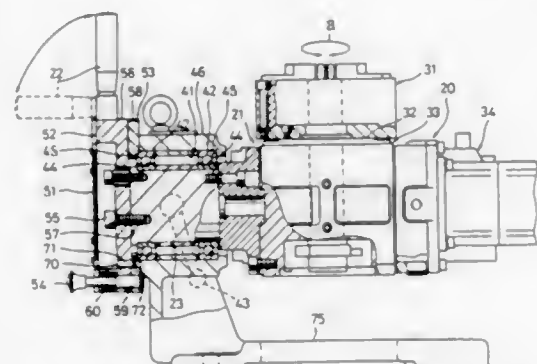
# WORK ROTATING APPARATUS FOR BEAM MACHINING HAVING TILT LIMITING STOPS

Koichi Saeda, Osaka, and Shunji Sakura, Kyoto, both of Japan, assignors to Tsubakimoto Chain Co., Osaka, Japan  
 Filed May 10, 1994, Ser. No. 241,164

Claims priority, application Japan, May 12, 1993, 5-029558  
 Int. Cl.<sup>6</sup> B23K 26/02, 26/08

U.S. Cl. 219—121.82

2 Claims



1. In a work rotating apparatus for a laser beam machine having first and second parts, the first part being a frame and the second part being a shaft supported by said frame for rotation about a first axis, the frame having a portion disposed laterally with respect to said shaft, said work rotating apparatus also having work holding means provided on said shaft,

means for rotating said work holding means about a second axis transverse to said first axis, means for manually rotating said shaft whereby said second axis can be tilted, and means for locking said shaft against rotation whereby the second axis can be fixed at any selected one of a plurality of inclinations, wherein the work holding means is positioned in relation to said frame so that, upon excessive rotation of said shaft in either direction, the work holding means, or work held thereby, can collide with said portion of the frame, the improvement comprising a pin, and a pair of stops, said pin being fixed to one of said first and second parts, and the stops being fixed to the other of said first and second parts, the stops being disposed at separate locations on an arc coaxial with said first axis, and the pin being disposed at a distance from said first axis such that it is engageable with one of said stops as the shaft rotates in first direction, and with the other of said stops as the shaft rotates in the opposite direction, the stops being positioned on said arc at locations such that the stops holding means or work held by said work holding means are prevented from colliding with said portion of the frame.

5,412,175

# METHOD OF OPERATING AN ARC WELDING APPARATUS

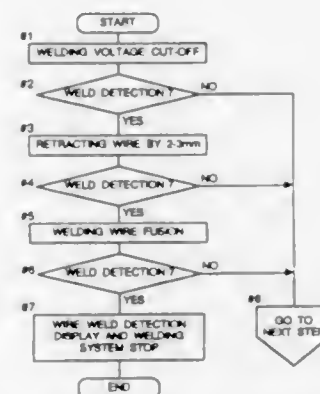
Shigeru Shimogama, Kawanishi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 31, 1994, Ser. No. 220,876

Claims priority, application Japan, Mar. 31, 1993, 5-73189  
 Int. Cl.<sup>6</sup> B23K 9/12

U.S. Cl. 219—125.1

3 Claims



1. A method of operating an arc welding apparatus which controls and moves a welding wire of a welding torch and detects a weld between a work and the welding wire after completion of an arc welding, comprising:  
 a first step of cutting off a welding voltage to the welding wire to thereby extinguish a welding arc;  
 a second step of detecting a welded state between the welding wire and the work;  
 a third step of lifting the welding wire away from the work when the welded state has been detected at the second step;  
 a fourth step of detecting the welded state between the welding wire and the work after completion of the third step;  
 a fifth step of impressing the welding voltage to the welding wire when a weld has been detected at the fourth step;  
 a sixth step of detecting the welded state between the welding wire and the work after completion of the fifth step;  
 a seventh step of executing, when the welded state has been detected at the sixth step, at least one of a stopping of the operation of the arc welding apparatus, displaying the welded state and informing an operator of the welded state; and  
 an eighth step of moving the arc welding apparatus to an-

other location when the welded state has not been detected at the second, fourth, and sixth steps.

5,412,176

# METHOD AND APPARATUS FOR THERMAL INSULATION OF WET SHIELDED METAL ARC WELDS

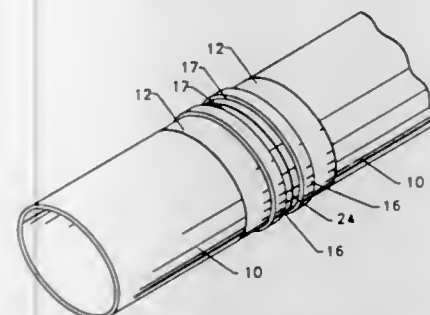
Patrick J. Keenan, San Francisco, Calif., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 18, 1993, Ser. No. 80,418

Int. Cl.<sup>6</sup> B23K 9/00

U.S. Cl. 219—137 R

31 Claims



1. A method for wet shielded metal arc welding comprising:  
 (1) positioning a first workpiece and a second workpiece in contact to form a weld joint having a first weld joint side substantially parallel to a second weld joint side;  
 (2) insulating said weld joint with a synthetic insulator capable of withstanding an elevated welding temperature by positioning said synthetic insulator at a synthetic insulator location displaced with respect to said weld joint so that said weld joint remains visible to a welder performing said method; and  
 (3) welding said first workpiece and said second workpiece together by exposing said weld joint to a shielded metal arc to produce a weld.

5,412,177

# REMOVABLE HEATED COVER FOR A WINDSHIELD WIPER BLADE ASSEMBLY

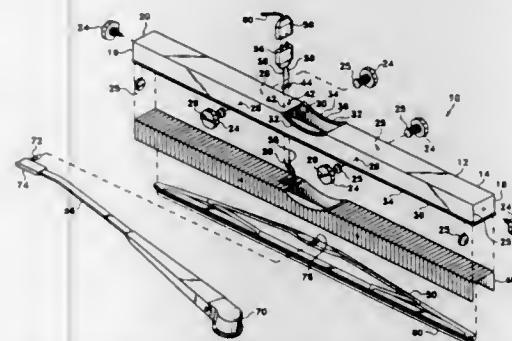
Russell W. Clark, 139th Rainbow, Belton, Mo. 64012

Filed Dec. 8, 1993, Ser. No. 163,886

Int. Cl.<sup>6</sup> H05B 3/84

U.S. Cl. 219—203

9 Claims



1. A removable heated cover for a vehicle windshield wiper blade assembly comprising:  
 a. a cover body having a top wall, a front wall, a rear wall, and two end walls forming a space enclosed on five sides and having an open bottom;  
 b. a longitudinal installation opening in said top wall;  
 c. an electrical resistance heating element fixed to an inner surface of said cover body and including means for connecting said electrical resistance heating element to an electrical system of a vehicle; and

d. means for attaching said cover body to a wiper blade assembly.

5,412,178

# IRON-TIP TEMPERATURE DETECTOR OF ELECTRIC SOLDERING IRON

Toshiharu Tamura, Tomobe, Japan, assignor to Japan Bonkote Company Limited, Ibaraki, Japan

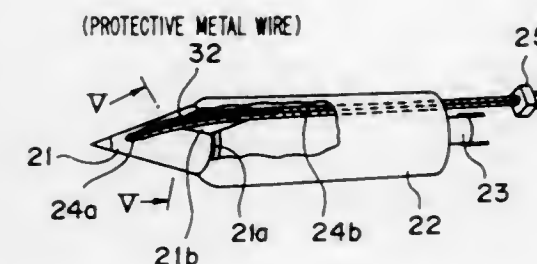
Filed Mar. 24, 1994, Ser. No. 216,866

Claims priority, application Japan, Jul. 23, 1993, 5-203001

Int. Cl.<sup>6</sup> H05B 1/00, 3/42

U.S. Cl. 219—241

10 Claims



1. Structure for use in soldering comprising: a soldering tip having a base and a conical nose extending from said base, a temperature sensor extending lengthwise along the outer surface of said soldering tip, said temperature sensor having a terminal end adjacent an end of said nose remote from said base, and heat-resistant material protecting said temperature sensor, said heat-resistant material comprising metal wire.

5,412,179

# PUSH BUTTON IGNITION SWITCH FOR CONTROLLING GAS FLOW AND IGNITER IN AN IGNITION GUN

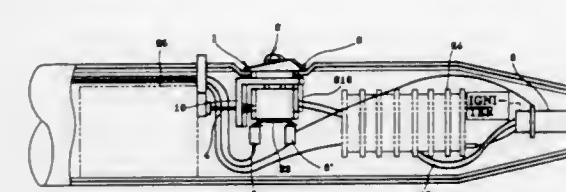
Lin-Tien Chen, 3 Fl., No. 174, Tzu Chiang Str., Taipei, Taiwan, Prov. of China

Filed Aug. 17, 1993, Ser. No. 107,085

Int. Cl.<sup>6</sup> F23Q 7/00; H01H 9/06

U.S. Cl. 219—262

2 Claims



1. In an electric igniter operated flame ignition type ignition gun, the ignition gun having a housing, an electronic igniter and an ignition switch for controlling the operation of an electronic igniter operated flame ignition type ignition gun, the improvement comprising: a sliding base mounted on the housing of the ignition gun so as to slide horizontally on the housing; a firing button supported on a compression spring so as to slide vertically in a hole on said sliding base; a metal spring plate and a stop plate respectively fastened to said firing button by a screw, whereby said sliding base is stopped by said stop plate from sliding horizontally; said metal spring plate causes the electronic ignition to produce sparks as said firing button is depressed, and at the same time said stop plate is released from said sliding base for allowing said sliding base to be moved forward to open a gas tank for making a flame by the sparks.

5,412,180

## ULTRA HIGH VACUUM HEATING AND ROTATING SPECIMEN STAGE

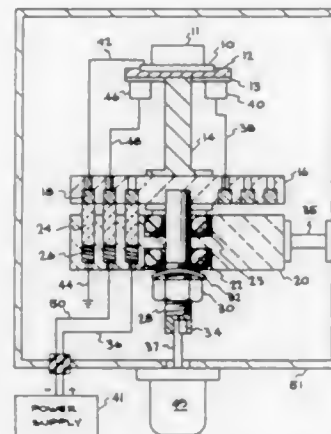
Arthur W. Coombs, III, Patterson, Calif., assignor to The Regents of the University of California, Oakland, Calif.

Filed Dec. 2, 1993, Ser. No. 160,263

Int. Cl.<sup>6</sup> C23C 16/46; H05B 3/68

U.S. Cl. 219—385

18 Claims



1. An apparatus for simultaneously heating and rotating a specimen under ultrahigh vacuum, said apparatus including a vacuum chamber having therein:

- a rotary top housing;
  - a plurality of concentric electrical bearing rings supported within said rotary top housing;
  - a heater stand fixedly connected to said rotary top housing;
  - a heater fixedly connected to said heater stand;
  - a thrust bearing shaft fixedly connected to said rotary top housing;
  - a rotary bearing shaft fixedly connected to said rotary top housing;
  - a rotary bearing bottom housing having a plurality of counter-bored holes aligned with said electrical bearing rings, said thrust bearing being rotatably mounted in said rotary bearing bottom housing, wherein said rotary bearing bottom housing is fixedly connected to said vacuum chamber; electrical contacting means positioned within said counter-bored holes; and
  - means for rotating said thrust bearing within said rotary bearing bottom housing;
- wherein said vacuum chamber comprises means for achieving a vacuum of  $1 \times 10^{-9}$  torr or less.

5,412,181

## VARIABLE POWER DENSITY HEATING USING STRANDED RESISTANCE WIRE

Michael J. Giamati, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 27, 1993, Ser. No. 173,600

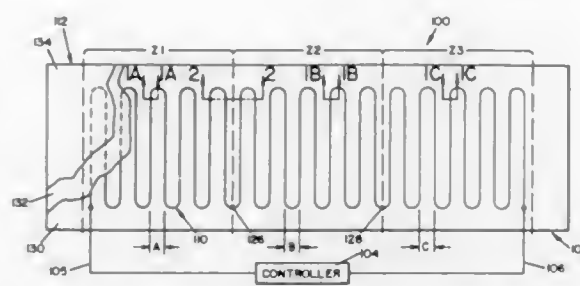
Int. Cl.<sup>6</sup> H05B 3/34

U.S. Cl. 219—548

16 Claims

1. An electrothermal heater comprising:
- a stranded wire comprising a plurality of conductive strands,

said stranded wire being arranged in a predetermined pattern,



wherein the number of said plurality of strands varies as a function of position in said predetermined pattern.

5,412,182

## EDDY CURRENT HEATING FOR HYPERTHERMIA CANCER TREATMENT

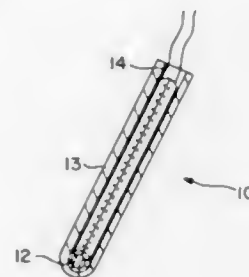
Kwok W. Chan, Chino Hills, Calif., assignor to City of Hope, Duarte, Calif.

Filed Apr. 9, 1992, Ser. No. 865,939

Int. Cl.<sup>6</sup> H05B 6/14

U.S. Cl. 219—635

4 Claims



1. A hyperthermia device comprising:
- a length of metallic needle tube,
  - a wire wound toroidally around said length of metallic needle tube, and
  - means for connecting a power source to said wire, wherein said length of metallic needle tube is heated by eddy currents produced therein when an energized power source is connected to said wire.

5,412,183

## METHOD AND DEVICES FOR INDUCTION HEATING DURING THE PASSAGE OF A METALLURGICAL PRODUCT OF ELONGATED SHAPE

Marc Buffenoir, Metz; Philippe Georges, Terville, and René Pierret, Metz, all of France, assignors to Rotelec, Bagnolet Cedex, France

PCT No. PCT/FR91/00381, § 371 Date Apr. 20, 1993, § 102(e) Date Apr. 20, 1993, PCT Pub. No. WO91/17644, PCT Pub. Date Nov. 14, 1991

PCT Filed May 7, 1991, Ser. No. 946,329

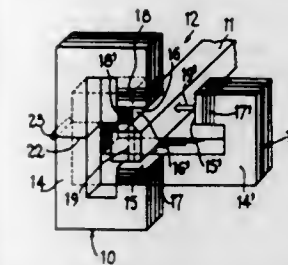
Claims priority, application France, May 10, 1990, 90 05824 Int. Cl.<sup>6</sup> H05B 6/40

U.S. Cl. 219—637

10 Claims

1. Method for induction heating of an elongated metallurgical product with an axis of symmetry; which comprises:
- advancing the product in the direction of the longitudinal axis thereof with respect to at least one magnetic inductor fitted with windings;
  - subjecting the product to at least two magnetic fluxes about the axis of symmetry of the product having non-parallel directions, which are transverse with respect to the longitudinal axis of the product, the fluxes circulating between at least three poles of the inductor wherein said poles are

tudinal axis of the product, the fluxes circulating between at least three poles of the inductor wherein said poles are



equi-angularly distributed around the axis of the symmetry of the product.

5,412,184

## INDUCTION HEATING TOOL

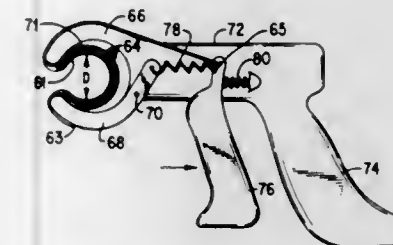
Thomas H. McGaffigan, Half Moon Bay, Calif., assignor to Gas Research Institute, Chicago, Ill.

Filed Apr. 16, 1992, Ser. No. 868,872

Int. Cl.<sup>6</sup> H05B 6/10

U.S. Cl. 219—643

17 Claims



1. A solenoid type, flexible induction tool comprising:
- an elongated jaw-like structure having elongated inner and outer surfaces and current carrying conductors on the inner and outer surfaces perpendicular to an elongated dimension of said jaw-like structure,
  - said jaw-like structure being expandable in a plane perpendicular to the elongated dimension whereby adjacent edges of the jaw-like structure are separable from one another,
  - said current carrying conductors lying in a plane generally perpendicular to the elongated dimension,
  - a first spacing between the conductors on said outer surface being greater than a second spacing between the conductors on said inner surface, and
  - a permeable surface lying closely adjacent said conductors on the inner surface and extending along the elongated dimension.

5,412,185

## INDUCTION HEATING OF POLYMER MATRIX COMPOSITES IN AN AUTOCLAVE

Philip C. Sturman, Jr., Rexford, N.Y., and Robert A. Gray, Cincinnati, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 29, 1993, Ser. No. 160,713

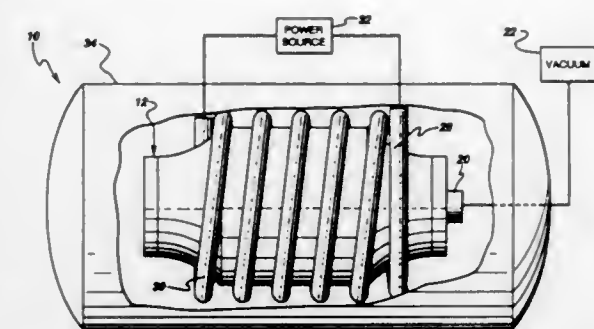
Int. Cl.<sup>6</sup> H05B 6/10

U.S. Cl. 219—651

17 Claims

1. An apparatus for heating a polymer matrix composite workpiece, said apparatus comprising:
- a mandrel for supporting said workpiece, said mandrel comprising a hollow, support member made of a porous material and having a longitudinal axis and an outer work-piece-supporting surface;

material and having a longitudinal axis and an outer work-piece-supporting surface;



a helical induction coil having a longitudinal axis, said longitudinal axis of said induction coil substantially coinciding with said longitudinal axis of said support member; and a power source connected to said induction coil.

5,412,186

## ELIMINATION OF STICKING OF MICRO-MECHANICAL DEVICES

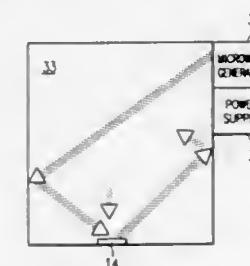
Richard O. Gale, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 23, 1994, Ser. No. 200,260

Int. Cl.<sup>6</sup> H05B 6/80

U.S. Cl. 219—679

8 Claims



1. A method of preventing sticking of contacting elements of a micro-mechanical device, comprising the steps of:
- determining a set of electromagnetic microwave frequencies that when applied to said contacting elements, will cause said radiation to become absorbed by water molecules on the surface of said contacting elements;
  - selecting from said set of electromagnetic microwave frequencies, an applied frequency that provides a desired energy coupling to said contacting elements; and
  - irradiating said contacting elements with radiation having said applied frequency, using a microwave source.

5,412,187

## FUSED MICROWAVE CONDUCTIVE STRUCTURE

Glenn J. Walters, Duxbury, and John A. McCormick, Lakeville, both of Mass., assignors to Advanced Deposition Technologies, Inc., Taunton, Mass.

Filed Jan. 25, 1994, Ser. No. 187,446

Int. Cl.<sup>6</sup> H05B 6/80

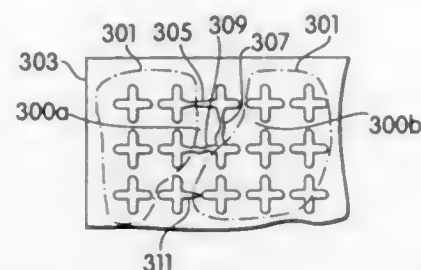
U.S. Cl. 219—728

29 Claims

1. A patterned conductive structure for use in microwave food packaging, the structure comprising:
- a substrate material; and
  - a conductive layer disposed on a surface of the substrate material, the conductive layer having a plurality of apertures.



tures defining at least one fuse link and at least two base areas, the base areas linked to each other by said at least



one fuse link which is more susceptible to breaking upon exposure to microwave energy than the base areas.

5,412,188

## SPORTS STATISTIC RECORDING SYSTEM

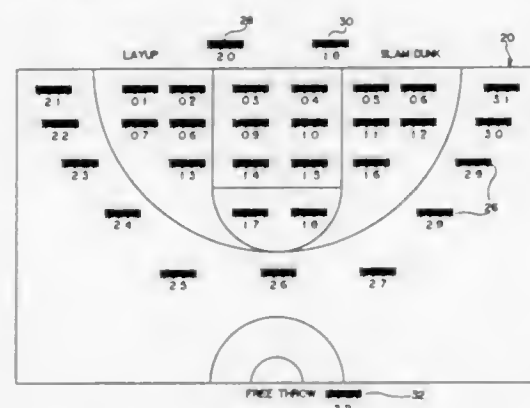
Philip D. Metz, 47 Alten Ave., NE., Grand Rapids, Mich. 49503

Filed Jul. 1, 1993, Ser. No. 86,243

Int. Cl.<sup>6</sup> G06F 15/44

U.S. Cl. 235—375

2 Claims



1. A method for recording and compiling statistical information at a basketball game comprising:  
providing roster bar code means including a plurality of bar codes each uniquely associated with a basketball player;  
providing location bar code means including a plurality of bar codes each uniquely associated with a location on a basketball court;  
providing play bar code means including a plurality of bar codes each uniquely associated with a play that may occur during a basketball game;  
scanning the bar codes on the bar code means rapidly during a basketball game to rapidly create inputted information;  
and  
receiving and compiling the inputted information using a computer to create statistical information related to the basketball game.

5,412,189

## TOUCH SCREEN APPARATUS WITH TACTILE INFORMATION

Brian J. Cragun, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1992, Ser. No. 993,749

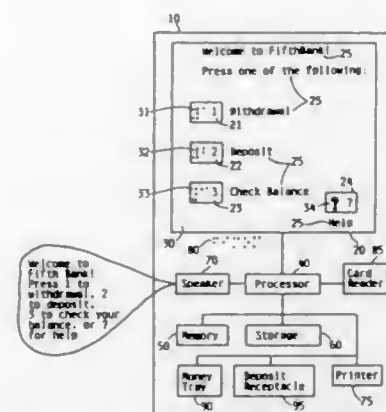
Int. Cl.<sup>6</sup> G06F 15/30

U.S. Cl. 235—379

11 Claims

1. A touch sensitive screen display, comprising:  
a touch sensitive screen surface having a height and a width;  
tactile information integrally connected to at least one touch sensing region on said touch sensitive screen surface, said tactile information having a depth;  
wherein said touch sensitive screen surface is relatively

smooth except for said at least one touch sensing region; and



wherein said depth of said tactile information is sufficient to allow said tactile information to be perceived by human touch.

5,412,190

## ELECTRONIC CHECK PRESENTMENT SYSTEM HAVING A RETURN ITEM NOTIFICATION SYSTEM INCORPORATED THEREIN

Stanley M. Josephson, Dallas; Michael F. Kopesec, Grapevine; P. Darrell Royal, Dallas; Thomas S. Stephens, Addison, and Mitchell D. Thompson, Dallas, all of Tex., assignors to J. D. Carreker & Associates, Inc., Dallas, Tex.

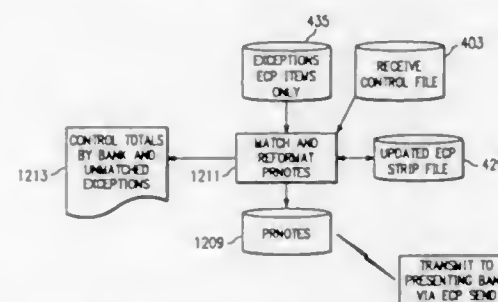
Continuation-in-part of Ser. No. 731,529, Jul. 17, 1991, Pat. No. 5,237,159. This application Feb. 26, 1993, Ser. No. 23,364

The portion of the term of this patent subsequent to Aug. 19, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> G06F 15/30

U.S. Cl. 235—379

31 Claims



1. For use by a presenting bank and a payor bank having check presentment systems between which check-related data may be electronically transmitted, an accelerated method of clearing checks drawn on the payor bank and received by the presenting bank for payment, said method comprising the steps of:

electronically transmitting, from the presenting bank to the payor bank, predetermined presentment information relating to the checks and permitting a determination by the payor bank as to which of the checks are properly payable by the payor bank;  
determining at the payor bank, from the electronic presentment information received thereby, which of the checks are properly payable; and  
electronically transmitting, from the payor bank to the presenting bank, a return notification listing of at least potentially returnable ones of the checks.

5,412,191

## SERVICE DESK FOR THE REGISTRATION, BOOKING AND/OR PAYMENT OF GOODS, VOUCHERS AND THE LIKE

Günter Baitz, Berlin; Joachim Burchart, Schlangen, both of Germany; Rory Gray, Crowthorn, Great Britain; Stefan Mertz, Schliersee, and Dirk Sporleder, Hövelhof, both of Germany, assignors to Siemens Nixdorf Informationssysteme Aktiengesellschaft, Paderborn, Germany

PCT No. PCT/EP91/00551, § 371 Date Mar. 18, 1993, § 102(e) Date Mar. 18, 1993, PCT Pub. No. WO92/04849, PCT Pub. Date Apr. 2, 1992

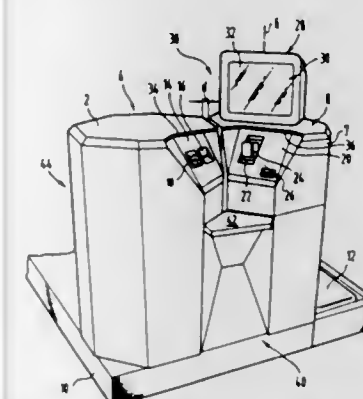
PCT Filed Mar. 21, 1991, Ser. No. 30,366

Claims priority, application Germany, Sep. 21, 1990, 90 13 392 U

Int. Cl.<sup>6</sup> G06K 15/00; G07B 15/02

U.S. Cl. 235—383

18 Claims



1. A service desk for registration, booking and/or payment of goods and vouchers, said service desk having a customer's side and an operator's side opposite said customer's side, comprising:

a service section including first and second parts, said first part always being on said customer's side of said service desk and including at least one reader for machine-readable data accessible from said customer's side, as well as an input keyboard for manual input of data from said customer's side, and  
said second part including means for movement of said second part between a first position at the customer's side for a self-service mode operation and a second position at said operator's side of said service desk for a served mode operation and including at least a visual display unit, a data input device for manual input of data from said customer's side or from said operator's side depending on whether said second part is in said first position or in said second position and at least one output opening.

5,412,192

## RADIO FREQUENCY ACTIVATED CHARGE CARD

Robert J. Hoss, Cave Creek, Ariz., assignor to American Express Company, New York, N.Y.

Filed Jul. 20, 1993, Ser. No. 94,753

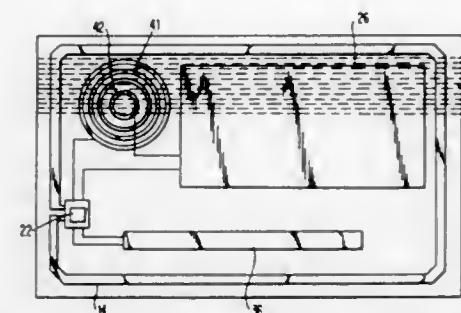
Int. Cl.<sup>6</sup> G06K 19/067; G08B 5/22

U.S. Cl. 235—380

1 Claim

1. An alterable wallet-size data card of the type including a magnetic stripe, the card being capable of responding to a unique RF signal transmitted from a remote source, said data card comprising:  
antenna means in the card for detecting said unique RF signal;  
means for decoding said unique RF signal upon detection thereof;  
transducer means for selectively altering a characteristic of the data card indicative of its status; and  
means for operating said transducer means, in response to

operation of said decoding means, to alter the status of the data card;



wherein said transducer means comprises a magnetic coil positioned over said magnetic stripe, said magnetic coil focusing flux over a portion of said magnetic stripe when said transducer means is operative.

5,412,193

## MOBILE POINT-OF-SALE SUPERMARKET CHECKOUT SYSTEM

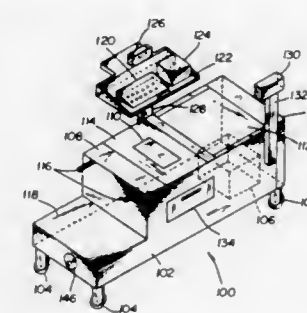
Jerome Swartz, Old Field, and Robert Sanders, Wading River, both of N.Y., assignors to Symbol Technologies, Inc., Bohemia, N.Y.

Continuation-in-part of Ser. No. 863,259, Apr. 3, 1992, abandoned, which is a division of Ser. No. 699,417, May 13, 1991, Pat. No. 5,191,197, which is a continuation-in-part of Ser. No. 193,265, May 11, 1988, Pat. No. 5,144,120. This application May 24, 1993, Ser. No. 65,304

Int. Cl.<sup>6</sup> G06K 15/00

U.S. Cl. 235—383

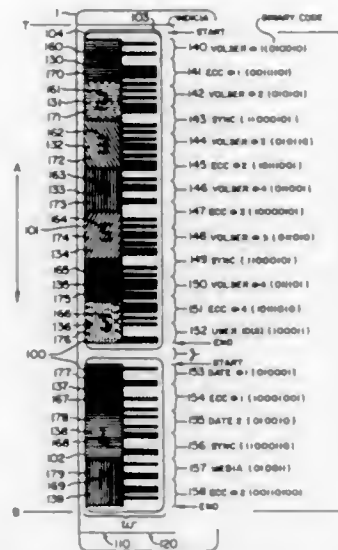
18 Claims



1. A mobile, point-of-transaction system for processing items, comprising:

(a) a wheeled carriage for transporting the system from location to location;  
(b) a scanning terminal mounted on the carriage for joint movement therewith, and operative for electro-optically reading coded indicia on items presented to the terminal, and for determining transaction data for the items;  
(c) transaction means responsive to the terminal and also mounted on the carriage for joint movement therewith, and operative for processing the transaction data for the items to complete the transaction; and  
(d) means for reconfiguring the mobile, point-of-transaction system as a display stand having a display surface during a period of relatively less intense usage;  
wherein (i) said transactional means are located on a shelf overlying said carriage and mounted on a slidable column above said carriage and (ii) said configuring means includes means for detaching said shelf from said column, means for supporting said detached shelf together with said transactional means at a location beneath said display surface within said carriage and a passage for lowering said slidable column into said carriage.

**5,412,194**  
**ROBUST CODING SYSTEM**  
 Hartvig E. Melbye, Boulder, and Robert N. Spurr, Englewood, both of Colo., assignors to Storage Technology Corporation, Louisville, Colo.  
 Filed Mar. 25, 1992, Ser. No. 857,166  
 Int. Cl.<sup>6</sup> G06K 19/00  
 U.S. Cl. 235-437 43 Claims

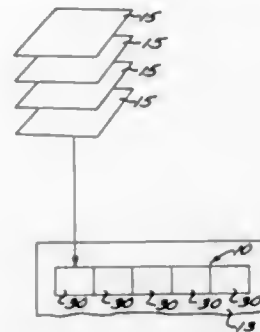


1. An encoded label for an item, comprising:
  - a substrate, including a surface having pro-printed thereon at least two parallel redundant means for identifying said item;
  - a first plurality of  $n$  indicia contained in  $n$  contiguous indicia locations within a first one of said identifying means, said first plurality of indicia defining a first indicia sequence expressive of a first indicator for identifying said item, where  $n$  is a positive integer greater than one;
  - a second plurality of  $m$  indicia contained in  $m$  contiguous indicia locations within a second one of said identifying means, said second plurality of indicia defining a second indicia sequence expressive of a second indicator for identifying said item, where  $m$  is a positive integer greater than one and greater than  $n$ , wherein said second indicator includes said first indicator;
  - wherein said second plurality of  $m$  indicia includes  $r$  error code indicia to enable reconstruction of a plurality of errors in said second indicia sequence when at least one of said indicia in said second indicia sequence on said label is illegible, where  $r$  is a positive integer greater than zero.

**5,412,195**  
**HIGH SECURITY SPECTRAL CODE STRIP**  
 Stephen T. Babbitt, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Dec. 29, 1992, Ser. No. 998,110  
 Int. Cl.<sup>6</sup> G06K 7/10 5 Claims

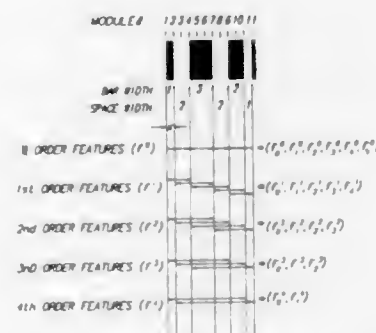
1. An encoded hologram strip comprising a plurality of hologram digits linearly arranged along a longitudinal direction, each hologram digit including at least one parallel fringe reflection hologram wherein each parallel fringe hologram is constructed to diffract playback light having a predetermined wavelength and incidence angle combination at a diffraction angle that is substantially equal to the playback incidence

angle, and wherein the predetermined wavelength and incidence angle combination for each of said parallel fringe holo-



grams is one of a set of predetermined wavelength and incidence angle combinations.

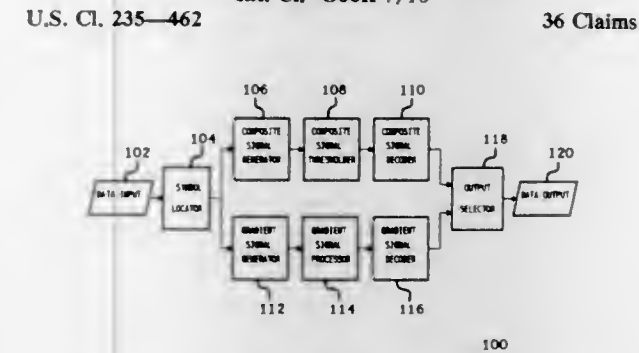
**5,412,196**  
**METHOD AND APPARATUS FOR DECODING BAR CODE IMAGES USING MULTI-ORDER FEATURE VECTORS**  
 Stefan Surka, Sandy Hook, Conn., assignor to United Parcel Service of America, Inc., Atlanta, Ga.  
 Filed Apr. 1, 1994, Ser. No. 221,876  
 Int. Cl.<sup>6</sup> G06K 7/10 24 Claims



1. A method for decoding a pixel image representative of a bar code symbol comprising a plurality of encoded character values each of which corresponds to one of a plurality of prototype bar patterns, each of said prototype bar patterns having a set of predetermined prototype bar width feature values uniquely associated therewith, comprising the steps of:
  - (A) determining a first set of bar width information estimates from said pixel image, said first set of bar width information estimates being representative of an encoded character value stored in said bar code symbol;
  - (B) determining a second set of bar width information estimates from said pixel image, said second set of bar width information estimates being of a different order than said first set of bar width information estimates, said second set of bar width information estimates being representative of said encoded character value stored in said bar code symbol;
  - (C) combining said first and second sets of bar width information estimates to form a multi-order set of bar width information estimates;
  - (D) comparing said multi-order set of bar width estimates to a selected set of predetermined prototype bar width feature values;
  - (E) determining in accordance with said comparison whether said encoded character value stored in said bar code symbol corresponds to said selected set of predetermined prototype bar width information values; and

(F) decoding said encoded character value in accordance with the result of step (E).

**5,412,197**  
**METHOD AND APPARATUS FOR DECODING BAR CODE SYMBOLS USING GRADIENT SIGNALS**  
 Christopher E. Smith, Newtown, Conn., assignor to United Parcel Service of America, Inc., Atlanta, Ga.  
 Continuation of Ser. No. 11,459, Jan. 29, 1993, abandoned. This application Jul. 26, 1994, Ser. No. 280,576  
 Int. Cl.<sup>6</sup> G06K 7/10 36 Claims

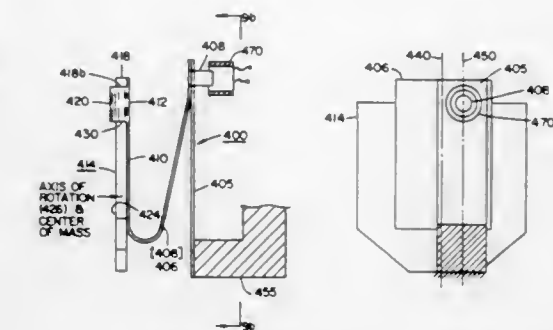


1. A method for reading a bar code symbol in a pixel image, comprising the steps of:
  - (a) selecting a first scan line crossing at least a first portion of said symbol;
  - (b) generating a first gradient signal representative of the dark-to-bright transitions in said first portion of said symbol;
  - (c) generating a second gradient signal representative of the bright-to-dark transitions in said first portion of said symbol, wherein the first gradient signal is distinct from the second gradient signal;
  - (d) selecting a second scan line crossing at least a second portion of said symbol;
  - (e) generating an updated first gradient signal in accordance with the dark-to-bright transitions in said second portion and the first gradient signal;
  - (f) generating an updated second gradient signal in accordance with the bright-to-dark transitions in said second portion and the second gradient signal; and
  - (g) decoding said symbol in accordance with said updated first and second gradient signals.

**5,412,198**  
**HIGH-SPEED SCANNING ARRANGEMENT WITH HIGH-FREQUENCY, LOW-STRESS SCAN ELEMENT**  
 Paul Dvorkis, Stony Brook, N.Y., assignor to Symbol Technologies, Inc., Bohemia, N.Y.  
 Continuation-in-part of Ser. No. 520,464, May 8, 1990, Pat. No. 5,168,149, which is a continuation-in-part of Ser. No. 428,770, Oct. 30, 1989, Pat. No. 5,099,110. This application Nov. 8, 1991, Ser. No. 789,705  
 Int. Cl.<sup>6</sup> G06K 7/10 63 Claims

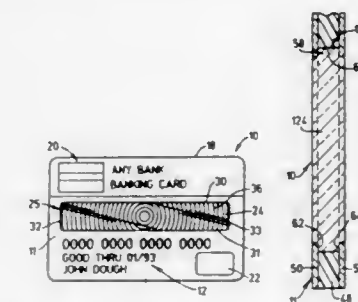
1. In a scanner for reading indicia having portions of different light reflectivity by directing light from said scanner towards said indicia and by collecting reflected light returning from said indicia; an arrangement for scanning the indicia, comprising:
  - (a) a scanner component;
  - (b) holder means mounting said scanner component for angular oscillating movement in first and second scan directions between first and second pairs of scan end positions, said holder means including first and second vibratory means positioned to vibrate in two orthogonal planes and to cooperate for angular oscillating movement in first and second orthogonal scan directions about respective axes for fast and slow oscillatory rotation of said scanner component, said first vibration means comprising

a U-shaped spring having a pair of arms, said scanner component being mounted at the first end of one of the arms, said scanner component being configured and said holder means being attached to the scanner component at a position of said component displaced from the center of mass thereof such that the center of mass of said component coincides with the fast axis of oscillatory rotation of said scanner component on said holder means; and



- (c) read-start means for simultaneously moving said scanner component in said first and second scan directions to simultaneously angularly oscillate said scanner component between said first and second pair of scan end positions for directing the light along said first and second scan directions so as to resultingly implement a two-dimensional scan pattern over the indicia.

**5,412,199**  
**CREDIT CARD WITH MAGNIFYING LENS**  
 Alan Finkelstein, 3761 Whitespeak Dr., Sherman Oaks, Calif. 91403; Donald Dixon, 355 N. Mill St., Aspen, Colo. 81611, and Robert Boede, 6375 Dowling Rd., Omro, Wis. 54963  
 Filed Feb. 12, 1992, Ser. No. 834,490  
 Int. Cl.<sup>6</sup> G06K 19/00 17 Claims



1. A financial transaction card adapted for individual use in reading information stored externally to the card, the card of the type having machine readable information contained thereon identifying the user and the issuing institution for transacting business at locations remote from the issuing institution, the card comprising:
  - a rigid substantially rectangular rigid base comprising
    - (i) a core having a top surface, a bottom surface and a window,
    - (ii) a top layer of sheet material secured to the top surface of the core, and
    - (iii) a bottom layer of sheet material secured to the bottom surface of the core;
  - machine readable information carried on the base for identifying the user and the issuing institution; and
  - a magnifying lens comprising
    - (i) a peripheral rim conforming to the shape of the window and having a thickness corresponding to the thickness of the core, and



(ii) an interior portion having a thickness corresponding to the combined thickness of the bottom layer of sheet material, the top layer of sheet material and the core wherein the magnifying is permanently secured in the window of the base in non-interfering relationship with the machine readable information such that the top and bottom layers of sheet material extend into the window and over the peripheral rim of the magnifying lens.

5,412,200

# WIDE FIELD DISTORTION-COMPENSATING IMAGING SYSTEM AND METHODS

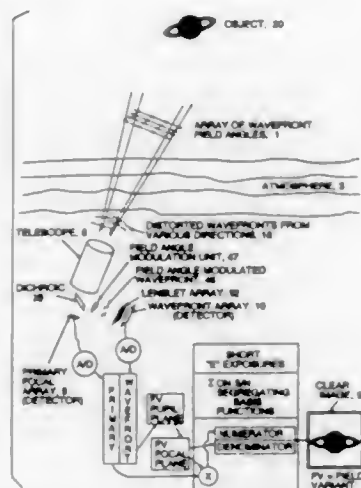
Geoffrey B. Rhoads, 363 SW. Tualatin Loop, West Linn, Oreg. 97068

Filed Mar. 1, 1993, Ser. No. 24,738

Int. Cl.<sup>6</sup> G01J 1/20

U.S. Cl. 250—201.9

20 Claims



1. In an optical system subject to wavefront distortions, the system including a focal plane detector array for receiving light waves and producing data corresponding thereto, a wavefront sensing device, and a data collector/processor, an improvement wherein the wavefront sensing device and the data collector/processor cooperate to characterize wide field variant (i.e. more than paraxial) distortion of light waves received by the focal plane array, and wherein the data collector/processor uses the characterized wide field distortion to process data from the focal plane detector array into an enhanced data set despite said wavefront distortions.

5,412,201

# IMAGE READING APPARATUS WITH SPLIT POSITION DETECTION

Nobumasa Fukuzawa, Yokohama; Akiyoshi Kimura, and Satoru Kutsuwada, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 18, 1993, Ser. No. 62,218

Claims priority, application Japan, May 20, 1992, 4-151206

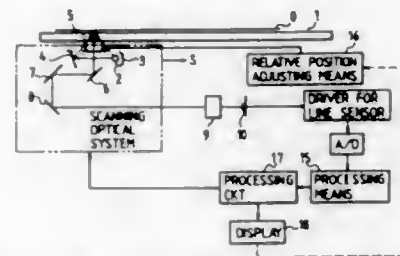
Int. Cl.<sup>6</sup> H01J 40/14

U.S. Cl. 250—208.1

26 Claims

1. An image reading apparatus comprising: scanning means movable to scan an original, and having a slit for passing therethrough a part of light from the original; and a sensor for reading the light passed through said slit; and

detecting means for detecting the relative positional relationship between said slit and said sensor;



the detection by said detecting means being effected at a plurality of detecting positions in the direction of movement of said scanning means.

5,412,202

# OPTICAL SIGNAL INPUT-TYPE AMPLIFIER CIRCUIT

Shinichi Sato, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

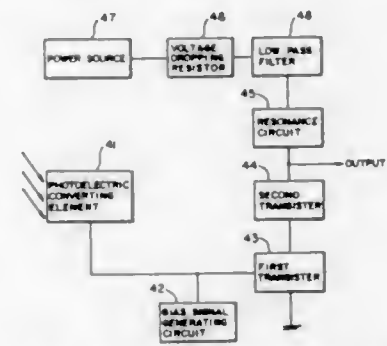
Filed Aug. 31, 1993, Ser. No. 113,808

Claims priority, application Japan, Mar. 18, 1993, 5-059074

Int. Cl.<sup>6</sup> H01J 40/14

U.S. Cl. 250—214 A

15 Claims



1. An optical signal input-type amplifier circuit, comprising: a photoelectric converting element for converting an optical input signal into an electric signal; a bias signal generating circuit for producing a predetermined bias signal; a first transistor having an output terminal, and a control terminal for receiving an input signal from said photoelectric converting element and a bias signal from said bias signal generating circuit; a second transistor having an output terminal cascaded to said first transistor for outputting an amplifying signal from said output terminal of said second transistor; a resonance circuit connected as a load to said output terminal of said second transistor for resonating to a predetermined high-frequency component, said resonance circuit being formed of a coil, a capacitor, and a resistor; a voltage dropping resistor connected between said resonance circuit and a power source; and a low pass filter connected to said resonance circuit and to said voltage dropping resistor.

5,412,203

# CYLINDRICAL CONTAINER INNER SURFACE TESTER

Kouchi Toyama, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Japan

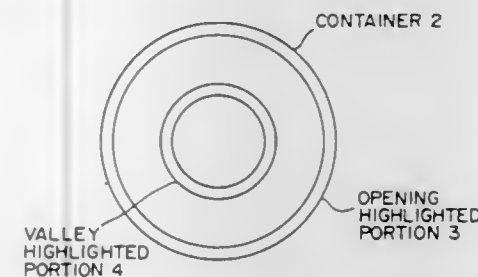
Continuation-in-part of Ser. No. 914,332, Jul. 15, 1992, Pat. No. 5,233,199, and Ser. No. 970,280, Nov. 2, 1992, Pat. No. 5,338,000. This application Nov. 24, 1993, Ser. No. 157,908

Claims priority, application Japan, Jul. 15, 1991, 3-172940; Sep. 12, 1991, 3-232093; Sep. 30, 1991, 3-249946; Oct. 15, 1991, 3-265134; Nov. 1, 1991, 4-286934; Nov. 25, 1992, 4-313827

Int. Cl.<sup>6</sup> G01N 9/04

U.S. Cl. 250—223 B

9 Claims



1. A cylindrical container inner surface tester for illuminating from above an opening of a test container located at a predetermined position with the opening set levelly, for capturing said opening through a TV camera, and for detecting black and white spots on the inner surface of said cylindrical container by analyzing using defect detecting means an image obtained by said TV camera, said tester comprising:

a frame memory for storing as image data a multi-value continuous tone image signal A/D-converted from a continuous tone image signal obtained by scanning said captured image, and an area detecting unit for generating a binary image signal by binary-converting, using a predetermined threshold (THG), a multi-value continuous tone image signal read by horizontally or vertically scanning the frame memory and for determining as a test area an area between a first rise point and a last fall point of each scanning line of said binary image signal.

5,412,204

# METHOD FOR DETECTING AN OUTPUT OF A GYROSCOPE WITH DUAL SYNCHRONIZED DETECTION CIRCUIT AND DUAL SMOOTHING CIRCUIT

Takeshi Nakamura, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

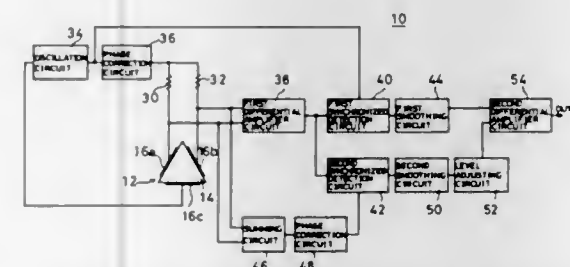
Filed Feb. 17, 1994, Ser. No. 197,869

Claims priority, application Japan, Feb. 22, 1993, 5-094813; Mar. 19, 1993, 5-085711

Int. Cl.<sup>6</sup> G01D 5/34

U.S. Cl. 250—231.12

6 Claims



1. A method for detecting an output of a gyroscope for measuring an output of a vibratory gyroscope including a prism-shaped vibrating body and two detecting members formed on a surface of said vibrating body comprising:

a step for detecting a difference between output signals of said two detecting members by a differential circuit; a step for detecting a sum of the output signals of said two detecting members by a summing circuit; a step for shifting an output signal of said summing circuit by 90 degree by a phase correction circuit; a step for detecting an output signal of said differential circuit in synchronous with a Coriolis detecting signal of said vibratory gyroscope by a first synchronized detection circuit; a step for detecting the output signal of said differential circuit in synchronous with an output signal of said phase correction circuit by a second synchronized detection circuit; a step for smoothing an output signal of said first synchronized detection circuit by a first smoothing circuit; a step for smoothing an output signal of said second synchronized detection circuit by a second smoothing circuit; and a step for eliminating a drift component by composing an output signal of said first smoothing circuit and an output signal of said second smoothing circuit with adjusting a level thereof.

5,412,205

# SCANNER WITH A WING-SHAPED FLUORESCENT TUBE HOUSING AND DUAL-FACETED SCAN WINDOW

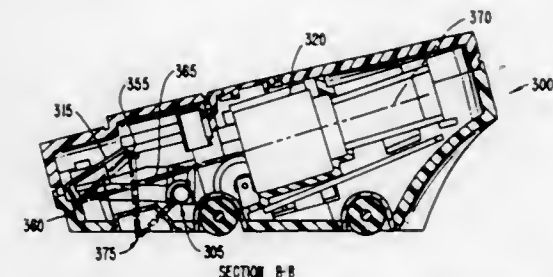
David N. McVicar, Placerville, and Mohammad Ali-Safai, San Jose, both of Calif., assignors to Logitech, Inc., Fremont, Calif.

Filed Nov. 18, 1993, Ser. No. 154,735

Int. Cl.<sup>6</sup> H01J 3/14, 5/16

U.S. Cl. 250—234

15 Claims



1. A scan window for a scanner having a light source, comprising: a frosted planar facet interposed between the light source and an image to be scanned for diffusing light from the light source to said image; and an untextured transparent planar facet, coupled to said frosted planar facet, and positioned for receiving light reflected from said image and passing it to an optical system having a sensor.

5,412,206

# METHOD AND APPARATUS FOR DETERMINING THE DEPTH OF A GAMMA EMITTING ELEMENT BENEATH THE SURFACE

John G. Seidel, McCandless; Frank H. Ruddy, Monroeville; Joseph L. Gonzalez, White Oak Boro, and Thomas V. Congedo, Pittsburgh, all of Pa., assignors to Westinghouse Electric Company, Pittsburgh, Pa.

Filed Feb. 18, 1994, Ser. No. 199,362

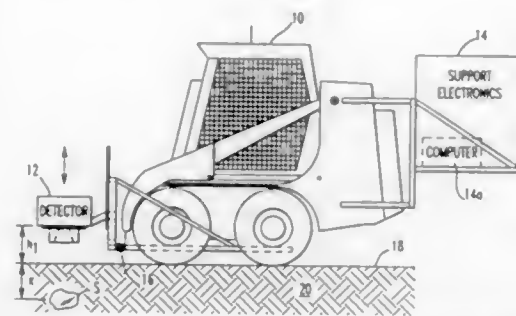
Int. Cl.<sup>6</sup> G01T 1/169; G01V 5/00

U.S. Cl. 250—253

15 Claims

1. A method for determining the depth of a gamma emitting element beneath the surface of a volume of material, comprising the steps of: (a) detecting gamma rays at a first height  $h_1$  above the surface;

- (b) detecting gamma rays at a second height  $h_2$  above the surface;  
 (c) determining a ratio  $R$  representative of the ratio of the



- number of gamma rays detected at  $h_2$  to the number of gamma rays detected at  $h_1$ , or vice versa; and  
 (d) inferring, on the basis of the ratio  $R$ , an estimate of the depth of the gamma emitting element beneath the surface.

5,412,207

# METHOD AND APPARATUS FOR ANALYZING A GAS SAMPLE

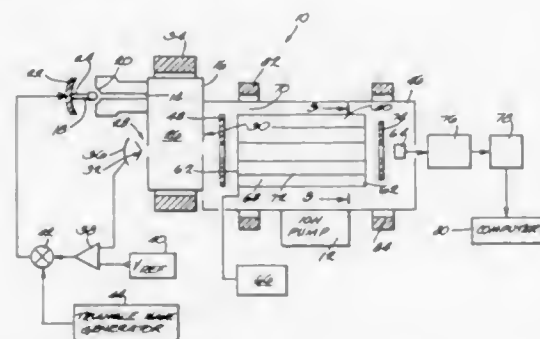
Alexander J. Micco, Lakewood; Donald G. Ellis, and Norman W. Baer, both of Boulder, all of Colo., assignors to Marquette Electronics, Inc., Milwaukee, Wis.

Filed Oct. 7, 1993, Ser. No. 133,592

Int. Cl.<sup>6</sup> B01D 59/44; H01J 49/00

U.S. Cl. 250—288

31 Claims



1. A mass spectrometer system comprising:  
 means for creating an internal vacuum within said mass spectrometer;  
 an ionization chamber;  
 an inlet passage through which a gas sample is introduced into said ionization chamber;  
 valve means associated with said inlet passage for controlling the volume of gas sample introduced into said ionization chamber;  
 a filament for introducing electrons into said ionization chamber whereby the electrons bombard the gas sample thus forming ions;  
 an extractor plate positioned adjacent said ionization chamber and biased such that a proportion of ions and electrons are allowed to pass through said extractor plate;  
 a quadrupole filter adjacent said extractor plate and into which the ions and electrons are directed by said extractor plate, said quadrupole filter is operative to permit a stream of ions with a pre-selected mass-to-charge ratio to pass through said filter and ions other than those having the preselected mass-to-charge ratio being separated from the stream of ions;  
 means for directing electrons toward ions other than those having the pre-selected mass-to-charge ratio in the area of

said quadrupole filter so that the electrons combine with the ions;  
 a sensor for detecting the stream of ions passing through said quadrupole filter; and  
 analyzing means connected with said sensor for analyzing the components of the gas sample.

5,412,208

# ION SPRAY WITH INTERSECTING FLOW

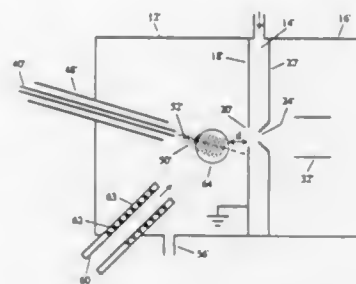
Thomas R. Covey, Richmond Hill, and Joseph F. Anacleto, Brampton, both of Canada, assignors to MDS Health Group Limited, Etobicoke, Canada

Filed Jan. 13, 1994, Ser. No. 181,529

Int. Cl.<sup>6</sup> H01J 49/10

U.S. Cl. 250—288

35 Claims



1. A method of analyzing ions from trace sample molecules in a liquid, comprising the steps of:  
 (a) providing a chamber having a capillary tube therein, said capillary tube having a free end, said chamber having an orifice member spaced from said free end and having an orifice therein;  
 (b) directing said liquid through said capillary tube and out said free end;  
 (c) generating an electric field in said chamber between said free end and said orifice member;  
 (d) producing from said free end a first flow, of charged droplets of said liquid, and directing said first flow in a first direction;  
 (e) producing a second flow, of gas, and heating said second flow;  
 (f) directing said second flow in a second direction different from said first direction for said second flow to intersect said first flow at a selected region for turbulent mixing of said first and second flows in said region;  
 (g) the heated gas from said second flow acting to assist evaporation of the droplets in said first flow to release ions therefrom;  
 (h) and drawing at least some of the ions produced from said droplets through said orifice into an analyzer located outside said chamber beyond said orifice member.

5,412,209

# ELECTRON BEAM APPARATUS

Tadashi Otake; Akimitsu Okura, both of Katsuta; Hiroshi Iwamoto, Ibaraki; Hideo Todokoro; Tsutomu Komoda, both of Tokyo, and Issei Tobita, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 27, 1992, Ser. No. 982,768

Claims priority, application Japan, Nov. 27, 1991, 3-335981; Nov. 27, 1991, 3-335985; Nov. 27, 1991, 3-335986

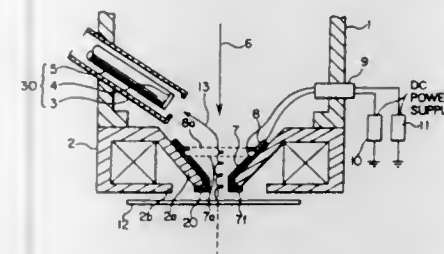
Int. Cl.<sup>6</sup> H01J 37/14

U.S. Cl. 250—310

32 Claims

1. A charged particle beam apparatus for observing a specimen having a recess in its surface, comprising:  
 means for generating a charged particle beam;  
 an objective lens for irradiating and focusing the beam on the surface of the specimen, the objective lens having an upper pole piece and lower pole piece, the lower pole

piece delimiting a first hole and the upper pole piece delimiting a second hole, a size of the first hole being larger than a size of the second hole at least at opposing surfaces of the upper and lower pole pieces, so that the objective lens forms a magnetic field substantially focused on the surface of the specimen, the beam passing through the first and second holes of the lower and upper pole pieces of the objective lens;



- an electrode for generating an electric field on the surface of the specimen and by which, together with the magnetic field, cause electrons characteristic of the specimen which are discharged from the recess to be drawn out of the recess; and  
 a detector for detecting the electrons.

5,412,210

# SCANNING ELECTRON MICROSCOPE AND METHOD FOR PRODUCTION OF SEMICONDUCTOR DEVICE BY USING THE SAME

Hideo Todokoro, Tokyo; Kenji Takamoto, Ome; Tadashi Otake, Katsuta; Fumio Mizuno, Tokorozawa; Satoru Yamada, Ome; Katsuhiro Kuroda, Hachioji; Ken Ninomiya, Higashimatsuyama, and Tokuo Kure, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

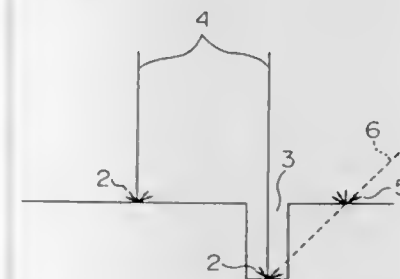
Continuation-in-part of Ser. No. 39,705, Mar. 29, 1993, abandoned, which is a continuation-in-part of Ser. No. 773,729, Oct. 9, 1991, abandoned. This application Dec. 2, 1993, Ser. No. 160,336

Claims priority, application Japan, Oct. 12, 1990, 2-272258; Apr. 10, 1992, 4-089189; Dec. 2, 1992, 4-323128

Int. Cl.<sup>6</sup> H01J 37/26

U.S. Cl. 250—310

70 Claims



1. A scanning electron microscope, comprising:  
 means for irradiating a primary electron beam to an object to be inspected, the primary electron beam having energy sufficient to produce reflection electrons, reflected from within a depression in the object, that penetrate through the object so as to escape from the surface of the object, or that generate secondary electrons in the surface of the object while penetrating through the object; and  
 means for detecting the escaped reflection electrons or the secondary electrons.

5,412,211

# ENVIRONMENTAL SCANNING ELECTRON MICROSCOPE

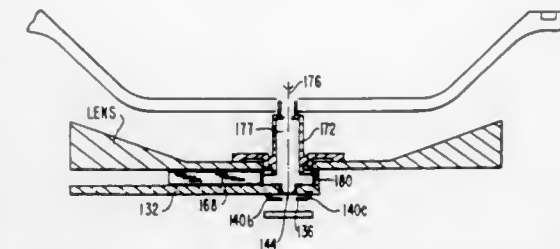
W. Ralph Knowles, North Andover, Mass., assignor to ElectroScan Corporation, Wilmington, Mass.

Continuation-in-part of Ser. No. 100,545, Jul. 30, 1993, Pat. No. 5,362,964. This application Jun. 3, 1994, Ser. No. 253,548

Int. Cl.<sup>6</sup> H01J 37/256, 37/244

U.S. Cl. 250—310

68 Claims



1. An electron detector for an environmental scanning electron microscope comprising a printed circuit board including a detector head having collection electrode means thereon for collecting signals emanating from a specimen to be examined.

5,412,212

# CORONA-CHARGING APPARATUS AND METHOD

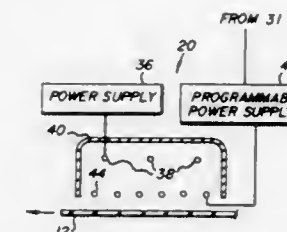
Allen J. Rushing, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 6, 1993, Ser. No. 162,545

Int. Cl.<sup>6</sup> G03G 15/02

U.S. Cl. 250—325

16 Claims



1. Corona-charging apparatus comprising:  
 charging means for charging successive image frames of a moving charge-receiving member to different aim point voltage levels, said charging means including a grid set;  
 control means for adjusting the voltage of said grid set to regulate the rate of charge level produced on a portion of the charge-receiving member aligned with the charging means; and  
 regulator means, cooperating with said control means, and synchronized with the movement of the charge-receiving member such that the voltage of said grid set is adjusted, during a transition period wherein a region of said charge-receiving member that is adjacent a leading edge of an image frame is aligned with the charging means, to an overcharge voltage level substantially higher than a voltage level suitable for achieving on the image frame an aim point voltage level to which the image frame is to be charged to provide a relatively rapid rate of charge deposition on the charge-receiving member and the voltage on the grid set is thereafter adjusted to a lower voltage level suitable for achieving the aim point voltage level on the image frame.



5,412,213

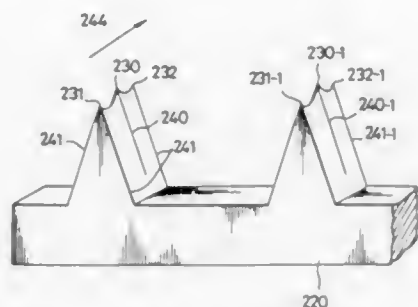
**CHARGER FOR PERFORMING A CORONA DISCHARGE**  
 Eiichi Kido, Yamato-Koriyama; Yuhi Yui, Nabari; Shunju Anzal, Nara; Syoichiro Yoshiura, Yamato-Koriyama; Shinji Imagawa, Yao; Hiroaki Yoshida, Yamato-Koriyama; Yoshikazu Kawasaki, Kagoshima; Itaru Kawabata, Kashiba; Keizo Fukunaga, Ikoma; Toyokazu Mori, Yamato-Koriyama, and Masaru Tsuji, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 29, 1993, Ser. No. 54,058

Claims priority, application Japan, Jun. 26, 1992, 4-169134  
Int. Cl.<sup>6</sup> H01T 19/04

U.S. Cl. 250—326

4 Claims



1. A charger for performing a corona discharging, comprising:
  - an electrode plate formed in a shape of a panel, the panel having a longitudinal direction, a width direction and a thickness direction;
  - a plurality of groups of a plurality of tip projections disposed on said electrode plate, said tip projections in one of said groups being adjacent to each other in the thickness direction of said electrode plate, a plurality of said groups of said projections being arranged in the longitudinal direction of electrode plate;
  - a first ridgeline portion connecting said tip projections in one of said groups and running in said thickness direction; and
  - a second ridgeline portion running in the longitudinal direction in one of said groups.

5,412,214

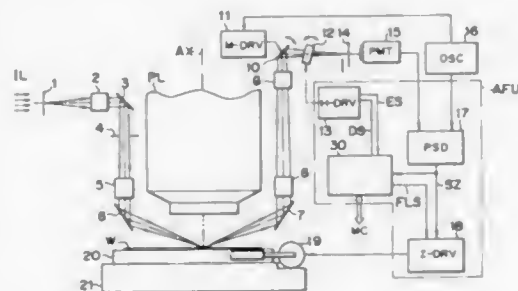
**PROJECTION EXPOSURE METHOD AND APPARATUS WITH FOCUS DETECTION**

Hiroyuki Suzuki, and Osamu Furukawa, both of Tokyo, Japan, assignors to Nikon Corporation, Tokyo, Japan  
 Filed Jul. 7, 1993, Ser. No. 86,984

Claims priority, application Japan, Jul. 9, 1992, 4-182051  
Int. Cl.<sup>6</sup> G01N 21/86

U.S. Cl. 250—548

5 Claims



1. A projection exposure apparatus for exposing a projection image of a rectangular pattern area formed on a mask, which image is formed by a projection optical system, on each of a plurality of shot areas on a photosensitive substrate mounted

on a two-dimensional moving stage by a step-and-repeat scheme, comprising:

focus detection means, having a detection point at a predetermined position within a field of view of said projection optical system, for detecting a position of an upper surface of the photosensitive substrate along a direction of an optical axis of said projection optical system relative to the detection point for a focusing operation;

means for discriminating, based on design arrangement information of the plurality of shot areas with respect to a configuration of the photosensitive substrate, a shot area entirely located outside a boundary line of a prohibition band of predetermined width extending from an outer peripheral end of the photosensitive substrate as a shot area of a first type, and a shot area within the field of view of said projection optical system and partly located inside the boundary line of the prohibition band while the detection point of said focus detection system is located outside the boundary line as a shot area of a second type;

first shift control means operative, when a focusing operation is to be performed with respect to a shot area of the first type in an exposure operation, for temporarily shifting said moving stage such that a point at which a straight line passing through a specific point in the shot area and a central point of the photosensitive substrate crosses the boundary line is substantially matched with the detection point of said focus detection means; and

second shift control means operative, when a focusing operation is to be performed with respect to a shot area of the second type in an exposure operation, for temporarily shifting said moving stage such that a point located on a straight line passing through a closest point of the shot area to the central point of the photosensitive substrate and through the central point of the photosensitive substrate, and located within the shot area inside the boundary line, is substantially matched with the detection point of said focus detection means.

5,412,215

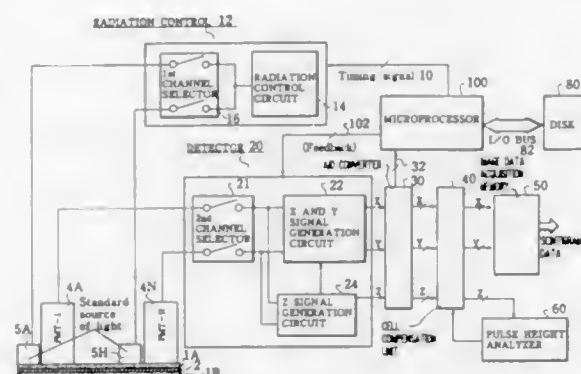
**METHOD AND SYSTEM CAPABLE OF TUNING SCINTILLATION CAMERA BY SMALL NUMBER OF LIGHT REFERENCES**

Keisei Shuto, and Tsutomu Yamakawa, both of Tochigiken, Japan, assignors to Kabushiki Kaisha Toshiba, Tokyo, Japan  
 Filed Oct. 8, 1992, Ser. No. 957,783

Claims priority, application Japan, Oct. 8, 1991, 3-260363  
Int. Cl.<sup>6</sup> G01T 1/164, 1/208

U.S. Cl. 250—363.09

10 Claims



1. A method for detecting a defect in a scintillation camera wherein at least one reference light source is used with a plurality of photomultiplier tubes, and a total number of the reference light sources is smaller than that of the photomultiplier tubes, comprising the steps of:
  - presetting a reference light gain of said at least one reference light source into a memory;

irradiating light from said at least one reference light source to said plurality of photomultiplier tubes, to obtain scintillation signals having gains which are respective to the photomultiplier tubes;

sequentially comparing the gains of the scintillation signals derived from the respective photomultiplier tubes with said reference light gain of said at least one reference light source read out from the memory; and

judging whether or not a variation contained in the compared gains of the respective photomultiplier tubes exceeds a predetermined value, to detect a defect of said at least one reference light source.

5,412,216

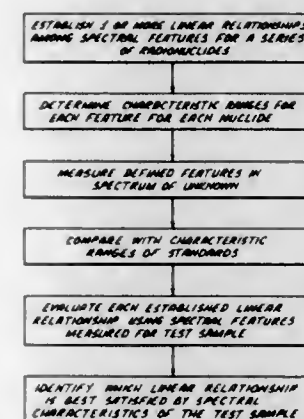
**METHOD AND APPARATUS FOR IDENTIFYING A RADIONUCLIDE IN A LIQUID SCINTILLATION SAMPLE**

Charles L. Dodson, Jr., Orange, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Oct. 29, 1993, Ser. No. 145,378  
Int. Cl.<sup>6</sup> G01T 1/204

U.S. Cl. 250—364

17 Claims



1. A method of identifying a radionuclide in a test sample comprising same, said method comprising:
  - (a) establishing at least one linear equation for a relationship among liquid scintillation spectral characteristics for each of a series of radionuclides which might be present in the test sample;
  - (b) determining characteristic ranges of values of the liquid scintillation spectral characteristics for each of the series of radionuclides;
  - (c) measuring the spectral characteristics employed in said at least one linear equation for the test sample; and
  - (d) comparing the measured spectral characteristics for the test sample against the determined characteristic values.

5,412,217

**DENSITY-MOISTURE MEASURING APPARATUS**  
 Kyoichi Miyashita, Osaka, and Junichi Ogawa, Tokyo, both of Japan, assignors to Earthnics Corporation, Tokyo, Japan  
 PCT No. PCT/JP91/00780, § 371 Date Feb. 11, 1992, § 102(e) Date Feb. 11, 1992, PCT Pub. No. WO91/19969, PCT Pub. Date Dec. 26, 1991

PCT Filed Jun. 11, 1991, Ser. No. 828,948

Claims priority, application Japan, Jun. 13, 1990, 2-156363  
Int. Cl.<sup>6</sup> G01T 3/06; G01N 23/09

U.S. Cl. 250—390.05

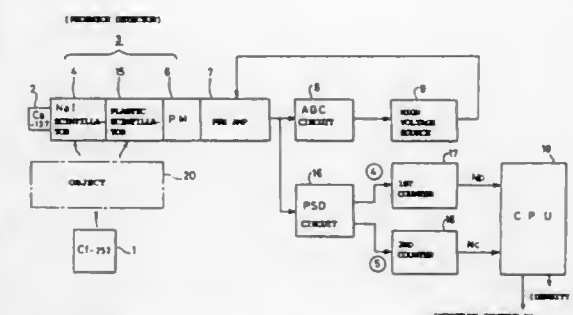
12 Claims

1. A density-moisture measuring apparatus, comprising a phoswich detector including a plastic scintillator for detecting a gamma ray and a fast neutron ray and a scintillator for a gamma ray optically coupled to one photomultiplier, a first source arranged such that an emitted gamma ray and

fast neutron ray pass through an object of measurement to enter said phoswich detector,

first separating means for separating a detected signal from said phoswich detector into a first signal component detected by the plastic scintillator and a second signal component detected by the scintillator for the gamma ray,

said first signal component including first data provided by



said fast neutron ray and second data provided by said gamma ray,

second separating means for separating said first data from said second data based on said second signal component, and

calculating means for calculating density and moisture content of said object of measurement based on said first and second data separated by said second separating means.

5,412,218

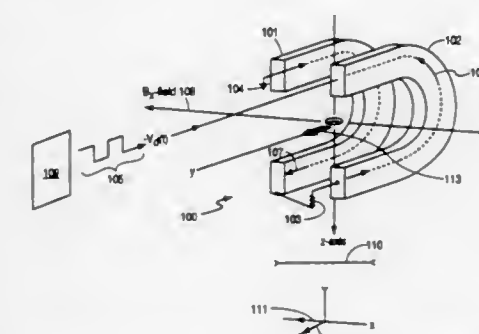
**DIFFERENTIAL VIRTUAL GROUND BEAM BLANKER**  
 Mark A. Gesley, Oakland, and David H. Colby, Fremont, both of Calif., assignors to ETEC Systems, Inc., Hayward, Calif.

Filed Feb. 26, 1993, Ser. No. 23,983

Int. Cl.<sup>6</sup> H01J 37/147, 37/09

U.S. Cl. 250—396 R

24 Claims



1. A method of minimizing beam jitter in a double deflection beam blarker having a first plate and a second plate comprising the steps of:
  - coupling said first and said second plates;
  - providing a first voltage source to said first plate, thereby creating a first current flow in said first plate; and
  - providing a second voltage source to said second plate, thereby creating a second current flow in said second plate, wherein said first and second currents are antiparallel.

**5,412,219**  
**METHOD FOR DETERMINING SURFACE COVERAGE**  
**BY MATERIALS EXHIBITING DIFFERENT**  
**FLUORESCENT PROPERTIES**

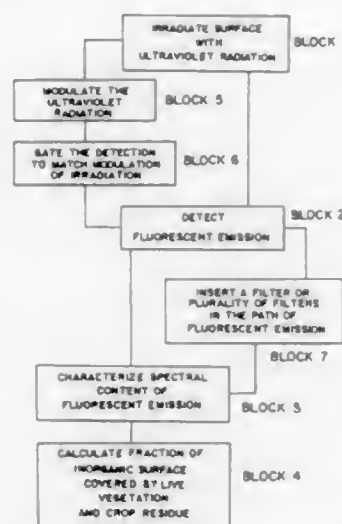
Emmett W. Chappelle, Baltimore; Craig S. T. Daughtry, Columbia, and James E. McMurtrey, III, Upper Marlboro, all of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 22, 1993, Ser. No. 155,605

Int. Cl.<sup>6</sup> G01N 21/64

U.S. Cl. 250—461.1

6 Claims



1. A method for analyzing the fraction of a surface covered respectively by living matter, dead organic matter, and nonorganic matter, comprising the steps of:

- irradiating said surface with ultraviolet radiation to produce fluorescence;
- detecting an emitted fluorescent emission emanating from said surface;
- characterizing a spectral content of said emitted fluorescent emission; and
- calculating the fraction of said surface covered respectively by said living matter, said dead vegetation, and said nonorganic matter.

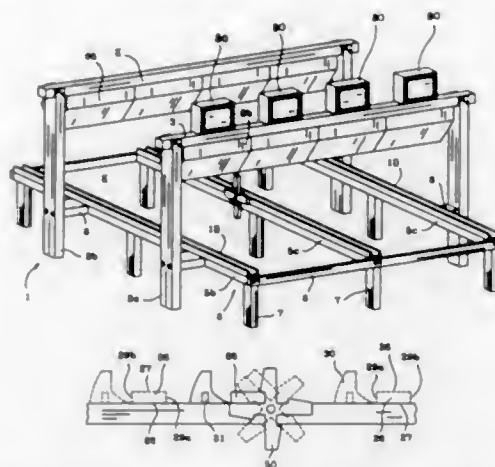
**5,412,220**  
**OPTICAL SCANNING DEVICE FOR LUMBER**  
 Stuart G. Moore, Lions Bay, Canada, assignor to United Industrial Products, Ltd., North Vancouver, Canada  
 Filed Mar. 5, 1993, Ser. No. 26,763  
 Int. Cl.<sup>6</sup> G01B 11/02, 11/30

U.S. Cl. 250—563

26 Claims

1. A lumber inspection device for detecting surface features on boards, said boards each having upper, lower and side longitudinal faces and cross sectional dimensions and at least some of said boards having surface defects on said faces, said device comprising: a frame; an array of optical scanning means mounted to said frame; lumber transport means comprising a conveyor for conveying said boards, said conveyor adapted to transport boards from a rearward portion of said conveyor to a forward portion of said conveyor, with the upper longitudinal faces of said boards facing upwardly when conveyed along said rearward portion; and board rotation means positioned between said rearward and forward portions of said conveyor, said rotation means adapted to engage each board as said board is conveyed along said conveyor, rotate said board by 180 degrees such that its lower longitudinal face faces upwardly and redeposit said board on said conveyor, wherein the upper, lower and side longitudinal faces are sequentially exposed to said optical scanning means wherein said optical scanning

means are positioned above said conveyor, and wherein said scanning means are adapted to scan a predetermined segment of each board each of said segments having a position within said board, said scanning means comprising a lens and signal



processing means to convert an image resolved in said lens into electronic signals and assess surface defects on the board and transmit said information to a central processing unit to determine a lumber grade of each board.

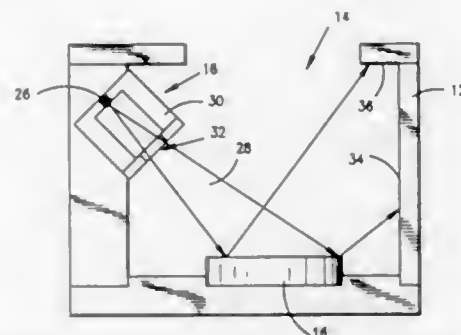
**5,412,221**  
**PARTICLE FALLOUT/ACTIVITY SENSOR**  
 Ihlefeld M. Curtis, Orlando; Robert C. Youngquist, Cocoa; John S. Moerk, and Kenneth A. Rose, III, both of Titusville, all of Fla., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 26, 1994, Ser. No. 233,584

Int. Cl.<sup>6</sup> G01N 15/06

U.S. Cl. 250—573

20 Claims



1. Apparatus for sensing particle fallout comprising a sensor module, said sensor module including:

- a housing having an aperture in a top side thereof and an interior;
- a reflective surface positioned within said housing for receiving particle fallout through said aperture from an area to be monitored;
- illuminating means positioned in the interior of said housing for illuminating said reflective surface with a beam of electromagnetic radiation;
- an electromagnetic radiation responsive detector positioned in the interior of said housing for receiving electromagnetic radiation scattered off of particles collected on said reflective surface, said detector generating an electrical output having a magnitude proportional to the amount of particles collected on said reflective surface;

- an A/D converter for converting said electrical output to a digital signal;
- a sensor module microprocessor for controlling operation of said illuminating means and said detector, and receiving said digital signal from said A/D converter; and,
- a display disposed on said housing and connected to said microprocessor for receiving and displaying said digital signal.

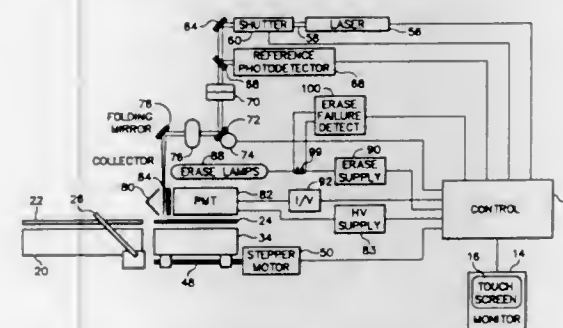
**5,412,222**  
**STORAGE PHOSPHOR READER HAVING ERASE LAMP**  
**FEATURE FAILURE DETECTION**  
 Shahram Hejazi, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 30, 1993, Ser. No. 85,855

Int. Cl.<sup>6</sup> G01N 23/04

U.S. Cl. 250—588

5 Claims



- A storage phosphor reader comprising:
  - a loading station for loading and unloading a storage phosphor from a cassette for containing said storage phosphor;
  - a scanning station for converting a latent x-ray image stored in a storage phosphor into an x-ray image signal;
  - an erasing station for erasing any residual image in a scanned storage phosphor, said erasing station including at least two pairs of fluorescent erase lights;
  - a storage phosphor translation assembly for translating a storage phosphor along a path from said loading station to said scanning station, to said erase station and back to said loading station;
  - an erase light failure detection circuit for selectively detecting when one or two of said at least two pairs of fluorescent erase lights have failed; and
  - control means for controlling said storage phosphor translation assembly and said at least two pairs of fluorescent erase lights a) to erase said storage phosphor at said erase station for a predetermined period of time, when said erase light failure detection circuit detects failure of none of said at least two pairs of fluorescent erase lights; b) to erase said storage phosphor at said erase station for an additional predetermined period of time, when said erase light failure detection circuit detects failure of one of said at least two pairs of fluorescent erase lights; and c) to erase said storage phosphor at said erase station for no more than said predetermined period of time and said predetermined additional period time, to translate said storage phosphor from said erase station to said loading station, and to prompt a reader user that the storage phosphor may not be fully erased, when said erase light failure detection circuit detects failure of two or said at least two pairs of fluorescent erase lights.

**5,412,223**  
**SEMICONDUCTOR DEVICE EXPLOITING A QUANTUM**  
**INTERFERENCE EFFECT**

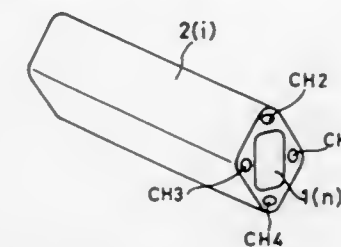
Akira Ishibashi, and Masamichi Ogawa, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan  
 Filed Nov. 10, 1993, Ser. No. 149,954

Claims priority, application Japan, Nov. 11, 1992, 4-326025

Int. Cl.<sup>6</sup> H01L 29/161

U.S. Cl. 257—14

14 Claims



- A semiconductor device exploiting a quantum interference effect, comprising:
  - a rod-shaped semiconductor portion extending in one direction;
  - a prism-shaped semiconductor portion covering said rod-shaped semiconductor portion, said prism-shaped semiconductor portion having side faces and extending in said one direction;
  - at least one source electrode and at least one drain electrode electrically connected to opposite ends of said prism-shaped semiconductor portion; and
  - separate channels extending in said one direction in said prism-shaped semiconductor portion with a single channel along each of a plurality of edges of the side faces thereof.

**5,412,224**  
**FIELD EFFECT TRANSISTOR WITH NON-LINEAR**  
**TRANSFER CHARACTERISTIC**

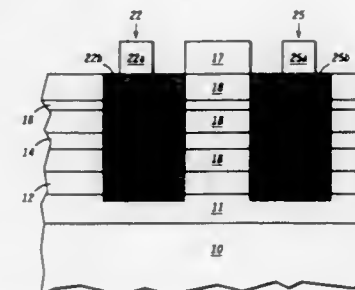
Herbert Goronkin, Tempe; Jun Shen, Phoenix, and Saied Tehrani, Scottsdale, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 8, 1992, Ser. No. 894,989

Int. Cl.<sup>6</sup> H01L 29/161, 29/205, 29/225

U.S. Cl. 257—15

10 Claims



- A field effect transistor with non-linear transfer characteristic comprising: a crystalline substrate; a buffer layer comprising a wide bandgap material formed on the substrate; a first N-channel quantum well of a first material composition formed on the buffer layer; a first barrier layer comprising the wide bandgap material covering the first N-channel quantum well; a quantum well of a second material composition formed on the first barrier layer; a second barrier layer comprising the wide bandgap material covering the quantum well of a second material composition; a second N-channel quantum well of a first material composition positioned over the second barrier layer, wherein the second material composition has a valence band energy greater than the conduction band energy of the first



material composition; a cap layer comprising the wide band-gap material covering the second N-channel quantum well; a gate electrode positioned on top of the cap layer; an N-type drain region formed on one side of the gate electrode; and an N-type source region formed on an opposite side of the gate electrode, wherein the source and drain regions extend from an upper surface of the cap layer through the second N-channel quantum well, to the first N-channel quantum well to electrically couple the first and second N-channel quantum wells in parallel, wherein further any drain-to-source current flows in the first and second n-channel quantum wells and not in the quantum well of a second material composition.

5,412,225

# TUNABLE HEAVY AND LIGHT HOLE COUPLED BANDS IN VARIABLE-STRAIN QUANTUM WELL SEMI-CONDUCTOR HETEROSTRUCTURE FOR NOVEL OPTO-ELECTRONIC DEVICES

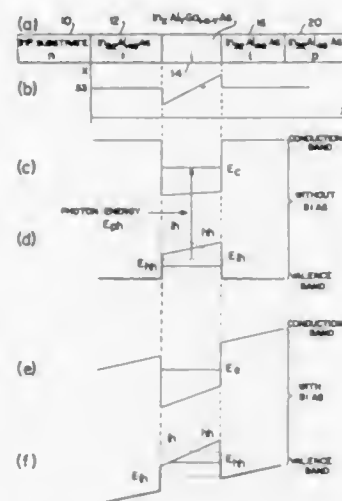
Mitra Dutta, Matawan; Weimin Zhou, Eatontown; Hongen Shen, Howell, and Jagadeesh Pamulapati, Eatontown, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 18, 1994, Ser. No. 199,043

Int. Cl.<sup>6</sup> H01L 27/14, 31/00

U.S. Cl. 257-18

15 Claims



1. An opto-electronic semiconductor device comprising: a variable strained layered quantum well structure including at least two superimposed valence-band heavy- and light-hole triangular bottom quantum wells having mutually opposite slopes; and means for applying a bias potential across a thickness dimension of said quantum wells and generating an electric field therethrough, whereby the confined energy levels of heavy-holes and light-holes in said quantum wells are interchanged so as to cause a change in transmission characteristics of light passing through said device as a result of the heavy- and light-hole energy bands having different anisotropy in light absorption.

5,412,226

# SEMI-CONDUCTOR STRUCTURES

Marek A. Z. Rejman-Greene, Ipswich, and Edward G. Scott, Hadleigh, both of United Kingdom, assignors to British Telecommunications public limited company, London, England

Continuation of Ser. No. 858,971, May 20, 1992, abandoned.

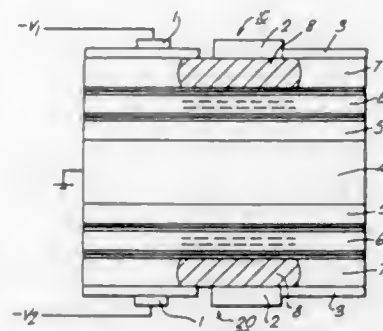
This application Oct. 11, 1994, Ser. No. 321,473

Claims priority, application United Kingdom, Nov. 20, 1989, 8926183

Int. Cl.<sup>6</sup> H01L 29/161, 21/20

U.S. Cl. 257-21

18 Claims



1. A quantum well optical device comprising: a substantially planar substrate; a first multi-layer structure on one side of the substrate, defining a stack of quantum wells configured as an array of individually addressable optical modulators; a second multi-layer structure on the other side of the substrate, defining a stack of quantum wells configured as an array of individual optical detectors; said modulators and detectors being arranged in pairs on opposite sides of the substrate, whereby incoming radiation is modulated by said modulator array to control individually the radiation that impinges upon the detectors.

5,412,227

# MOS-CONTROLLED THYRISTOR WITH NON-PLANAR GEOMETRY

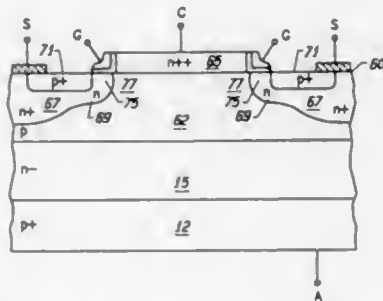
Nathan Zommer, Los Altos, Calif., assignor to IXYS Corporation, Santa Clara, Calif.

Filed Jul. 26, 1993, Ser. No. 97,425

Int. Cl.<sup>6</sup> H01L 29/74, 27/02

U.S. Cl. 257-133

3 Claims



1. A MOS-controlled thyristor semiconductor (MCT) device comprising: a thyristor having a first layer of first conductivity type, a second layer of second conductivity type on and in contact with said first layer, and a first region including third and fourth layers, said third layer being of said first conductivity type and being on and in contact with said second layer, and said fourth layer being of said second conductivity type and being on and in contact with said third layer.

third layer wherein a first junction is formed between said fourth layer and said third layer

a MOSFET having a source region of first conductivity type, a channel region adjacent to said source, and a drain region of first conductivity type adjacent to said channel; wherein said MOSFET and thyristor are integral forming a non-planar MCT wherein said channel and said first junction are in close proximity thereby reducing an effective resistance

wherein:

said MCT having a surface, a portion of said surface of said MCT being a planar region; said third layer has a well region of said second conductivity type, said well region extending to said planar region; said fourth layer is on and in contact with a portion of said third layer; said source region is within said well region and extends to said planar region; said channel region is within a portion of said well region, is adjacent to said planar region, and is between said source region and a portion of said third layer; and said effective resistance causes a forward voltage drop of about 0.6 v. or less.

5,412,228

# MULTIFUNCTIONAL SEMICONDUCTOR SWITCHING DEVICE HAVING GATE-CONTROLLED REGENERATIVE AND NON-REGENERATIVE CONDUCTION MODES, AND METHOD OF OPERATING SAME

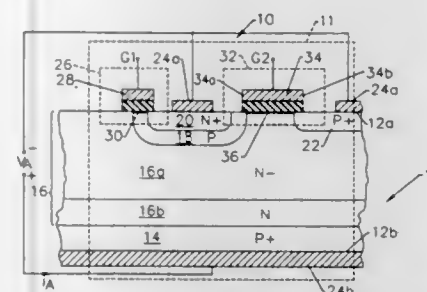
Bantval J. Baliga, Raleigh, N.C., assignor to North Carolina State University, Raleigh, N.C.

Filed Feb. 10, 1994, Ser. No. 194,259

Int. Cl.<sup>6</sup> H01L 29/74, 27/02

U.S. Cl. 257-133

43 Claims



1. A method of operating a base resistance controlled thyristor having an anode region, a first base region of first conductivity type, a second base region of second conductivity type which forms a P-N junction with said first base region, a cathode region of said first conductivity type which forms a P-N junction with said second base region and a diverter region of said second conductivity type which forms a P-N junction with said first base region, comprising the steps of: enabling regenerative conduction in said thyristor by electrically connecting said cathode region to said first base region in response to an application of a first bias signal and biasing said anode region to a first polarity relative to said cathode region; disabling regenerative conduction in said thyristor and enabling non-regenerative conduction in the transistor formed by said anode region, said first base region and said second base region, by electrically connecting said second base region to said diverter region in response to an application of a second bias signal having a polarity opposite said first bias signal, during the application of said first bias signal; and electrically disconnecting said cathode region from said first base region, by removing said first bias signal, to thereby

inhibit regenerative and non-regenerative conduction between said anode region and said cathode region.

5,412,229

# SEMICONDUCTOR LIGHT DETECTING DEVICE MAKING USE OF A PHOTODIODE CHIP

Yoshiki Kuhara; Hideaki Koseki; Hisato Michikoshi, and Ichiro Tonai, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Japan

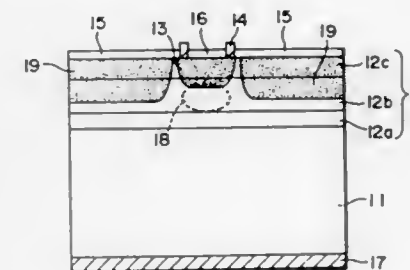
Continuation-in-part of Ser. No. 12,477, Feb. 2, 1993, and a continuation-in-part of Ser. No. 50,720, Apr. 8, 1993, which is a continuation of Ser. No. 751,188, Aug. 29, 1991, abandoned. This application Dec. 1, 1993, Ser. No. 159,577

Claims priority, application Japan, Aug. 31, 1990, 2-230206; Feb. 3, 1992, 4-017606; Feb. 3, 1992, 4-017620

Int. Cl.<sup>6</sup> H01L 27/14, 33/00

U.S. Cl. 257-183

26 Claims



1. A semiconductor light detecting device comprising: a housing having an optical fiber as an optical transmission path inserted therein; a header secured to said housing and integral therewith; and a photodiode chip mounted on said header, said photodiode chip including a compound semiconductor substrate, a cathode electrode provided on a first surface of said compound semiconductor substrate, a compound semiconductor layer of a first conductivity type provided on a second surface of said compound semiconductor substrate, said second surface being opposite to said first surface, a first region of a second conductivity type provided in said compound semiconductor layer, a pn junction area being formed at an interface of said compound semiconductor layer and said first region, said pn junction functioning as a photosensing region, a second region of said second conductivity type surrounding said first region and being spaced from said first region, said second region absorbing carriers generated near said second region in response to incident light, and an anode electrode provided on said first region and electrically connected thereto.

5,412,230

# HIGH ELECTRON MOBILITY TRANSISTOR HAVING IMPROVED ELECTRON CONTROLLABILITY

Yoshikazu Nakagawa, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

Filed Sep. 30, 1992, Ser. No. 954,909

Claims priority, application Japan, Oct. 29, 1991, 3-311826

Int. Cl.<sup>6</sup> H01L 29/872

U.S. Cl. 257-191

2 Claims

1. A high electron mobility transistor comprising: an undoped compound semiconductor layer; a doped compound semiconductor layer having an electron affinity smaller than the undoped compound semiconductor layer; a gate electrode and a pair of cap layers formed on the doped compound semiconductor layer;

source and drain electrodes formed on the pair of cap layers, respectively;

a first high-resistivity compound semiconductor channel layer formed adjacent to the doped compound semiconductor layer and having an electron affinity distribution that increases toward the undoped compound semiconductor layer; and

a second high-resistivity compound semiconductor channel layer formed between the first high-resistivity compound semiconductor channel layer and the undoped compound semiconductor layer and having an electron affinity distribution that decreases toward the undoped compound semiconductor layer,

wherein the first and second high-resistivity compound semiconductor channel layers have a composition of  $Al_xIn_{1-x}Ga_{1-x-y}As$ , where  $x$  monotonically decreases from a



maximum at the boundary with the doped compound semiconductor layer in the direction toward the undoped compound semiconductor layer to a value of zero at a selected location within the first high-resistivity compound semiconductor channel layer, and  $y$  increases in the direction toward the second high-resistivity compound semiconductor channel layer from zero at the selected location within the first high-resistivity compound semiconductor layer to a maximum at the boundary between the first and second high-resistivity compound semiconductor channel layers and decreases in the direction from the boundary between the first and second high-resistivity compound semiconductor channel layers within the second high-resistivity compound semiconductor channel layer to zero at the boundary between that layer and the undoped compound semiconductor layer.

5,412,231

# SEMICONDUCTOR DEVICE HAVING ORGANICALLY DOPED STRUCTURE

Kazuhito Furuya, Yokohama, Japan, assignor to Tokyo Institute of Technology, Tokyo, Japan

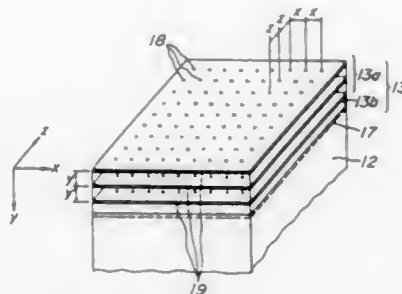
Filed Jan. 27, 1993, Ser. No. 9,755

Claims priority, application Japan, Jan. 29, 1992, 4-014209

Int. Cl.<sup>6</sup> H01L 29/80, 29/225

U.S. Cl. 257—192

29 Claims



1. A semiconductor device, comprising:  
a semiconductor substrate having a main surface;  
an undoped layer provided above said main surface of the semiconductor substrate;  
an electron supply layer applied on said undoped layer, the electron supply layer including a structure that is doped in an organized manner so that impurity atoms are posi-

tioned regularly therein, the structure in said electron supply layer comprising at least one plane in which the impurity atoms are arranged regularly, said at least one plane extending in parallel with a first direction in which an electron wave travels, and wherein the impurity atoms are separated from each other in said first direction and in a second direction perpendicular to said first direction by first and second distances, respectively, which distances are determined in accordance with the wavelength of the electron wave; and

a metal gate layer applied on the electron supply layer.

5,412,232

# SEMICONDUCTOR DEVICE HAVING AN IMPROVED ELECTRON TRANSPORT PROPERTY AT A HIGH ELECTRIC FIELD

Yuji Ando, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

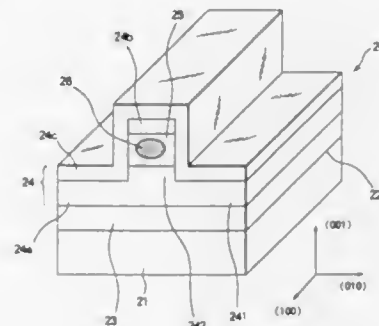
Filed Mar. 11, 1993, Ser. No. 209,065

Claims priority, application Japan, Mar. 12, 1994, 5-051629

Int. Cl.<sup>6</sup> H01L 27/12, 29/161, 29/205

U.S. Cl. 257—194

31 Claims



1. A semiconductor device having a quantum wire structure formed by first and second semiconductor layers, said quantum wire structure being extended towards a predetermined direction, said second semiconductor layer comprising:  
a first electron supplying layer; and  
a second electron supplying layer;  
said first semiconductor layer being interposed between said first and said second-electron supplying layers:  
said first semiconductor layer having a first conduction band which has a first  $\Gamma$ -valley and a first L-valley, said first  $\Gamma$ -valley having a first  $\Gamma$ -valley energy level, said first L-valley having a first L-valley energy level which is not lower than said first  $\Gamma$ -valley energy level:  
said second semiconductor layer having a second conduction band which has a second energy level which is defined by an energy level of the bottom of said second conduction band and which is higher than said first L-valley energy level:  
said predetermined direction being parallel to a prescribed crystal orientation.

5,412,233

# HETEROJUNCTION BIPOLAR TRANSISTOR

Chantal Dubon-Chevallier, Chatillon; Jean Dangla, Les Ulis; Jean-Louis Benchimol, Palaiseau, and François, Alexandre, Vitry Sur Seine, all of France, assignors to France Telecom, Paris, France

Filed Jun. 16, 1993, Ser. No. 78,585

Claims priority, application France, Jun. 17, 1992, 92 07354

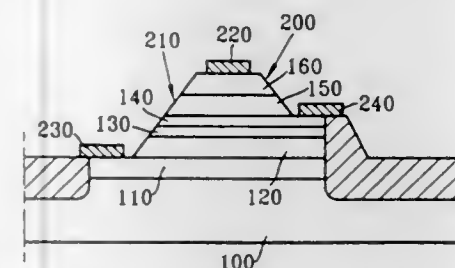
Int. Cl.<sup>6</sup> H01L 33/00

U.S. Cl. 257—197

22 Claims

1. Transistor comprising layers forming collector, base and emitter, and collector, base and emitter ohmic contacts, wherein:

the emitter is made up of two layers of semiconductor material of a first type of conductivity superposed on the base layer: a first thin layer made up of a first material having a large energy gap and a second layer made up of a second material also having a large energy gap;



the base is made up of a semiconductor material of a second type of conductivity;  
the collector is made up of a semiconductor material of the first type of conductivity; and  
the base ohmic contact is deposited on the first thin layer making up the emitter.

5,412,234

# INTEGRATED SEMICONDUCTOR CIRCUIT HAVING IMPROVED BREAKDOWN VOLTAGE CHARACTERISTICS

Franciscus A. C. M. Schoofs, and Adrianus W. Ludikhuijs, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

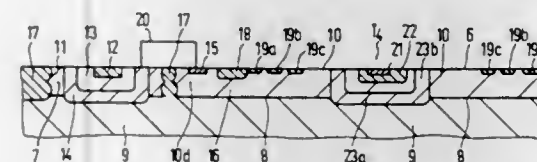
Continuation of Ser. No. 94,801, Jul. 20, 1993, abandoned. This application Aug. 26, 1994, Ser. No. 297,272

Claims priority, application European Pat. Off., Jul. 20, 1992, 92202209

Int. Cl.<sup>6</sup> H01L 29/80

U.S. Cl. 257—256

8 Claims



1. An integrated semiconductor circuit comprising a semiconductor body with a layer-shaped region of a first conductivity type adjoining a surface and bounded at a side remote from the surface by a substrate region of a second conductivity type opposite to the first conductivity type, at least one insulated island being formed in the layer-shaped region with at least one circuit element therein comprising at least a diode with a first main electrode region comprising a surface zone of the second conductivity type provided in the layer-shaped region and with a second main electrode region of the first conductivity type comprising a portion of the layer-shaped region adjoining the first main electrode region and connected to a source region of a junction field effect transistor (JFET) whose channel is formed in a portion of the layer-shaped region situated adjacent the diode, characterized in that said junction field effect transistor comprises a drain region which is formed in a semiconductor island which forms a zone of at least one further circuit element and which is laterally bounded by an island insulation region, said junction field effect transistor comprising a gate region of the second conductivity type extending at an edge of the island and being separated from an adjacent portion of the island insulation region at least partly by an interposed region of the first conductivity type which is a part of the source region of said JFET, the gate region locally adjoining the island insulation region and in conjunction therewith dividing the semiconductor island into two portions

capable of being isolated from one another, and the gate region of said junction field effect transistor comprising a surface zone of the second conductivity type which extends from the surface into the layer-shaped region of the first conductivity type which extends from the surface into the layer-shaped region of the first conductivity type over part of the thickness of this region and which is connected to the substrate of the second conductivity type via adjoining portions of the island insulation region which are formed by a zone of the second conductivity type extending throughout the entire thickness of the layer-shaped region.

5,412,235

# MONOLITHIC INTEGRATED CIRCUIT INCLUDING GATE BIAS TRANSISTOR CONTROLLING THE GATE BIAS APPLIED TO AN AMPLIFYING TRANSISTOR

Yasuharu Nakajima, and Hiroto Matsubayashi, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

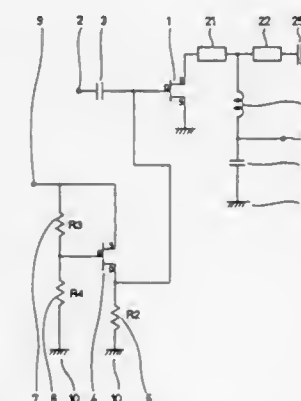
Filed Jan. 27, 1994, Ser. No. 186,924

Claims priority, application Japan, May 19, 1993, 5-116783

Int. Cl.<sup>6</sup> H01L 29/80, 31/112; H03F 3/16

U.S. Cl. 257—272

13 Claims



1. A semiconductor integrated circuit in which transistors, resistors, capacitors, and transmission lines, are monolithically integrated on a semiconductor substrate, said integrated circuit including:

a first field effect transistor having a source, a gate having a gate width, and a drain for amplifying an input signal;  
a gate bias terminal connected to the gate of the first field effect transistor;  
a second field effect transistor having a source, a gate, and a drain having, a gate width smaller than the gate width of the first field effect transistor and fabricated simultaneously with the first field effect transistor;  
a bias supply terminal for the second field effect transistor;  
first, second, and third resistors each having first and second ends;  
a gate bias circuit comprising the second field effect transistor, the bias supply terminal, and the first, second, and third resistors wherein the source of the second field effect transistor is connected to the bias supply terminal, the gate of the second field effect transistor is connected to the bias supply terminal through the first resistor and to ground through the second resistor, and the drain of the second field effect transistor is connected to ground through the third resistor and to the gate bias terminal of the first field effect transistor, whereby the drain voltage of the second field effect transistor compensates for variations in the operating current of the first field effect transistor.



5,412,236

## COMPOUND SEMICONDUCTOR DEVICE AND METHOD OF MAKING IT

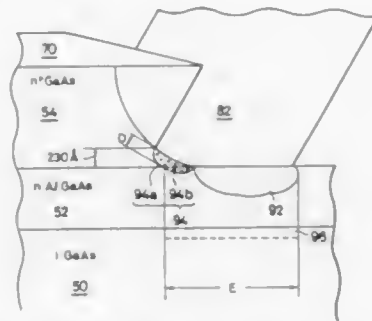
Masahisa Ikeya, Tadashi Saito, and Kazuyuki Inokuchi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 917,381, Jul. 23, 1992, abandoned. This application Apr. 20, 1994, Ser. No. 230,873

Claims priority, application Japan, Jul. 25, 1991, 3-184939 Int. Cl.<sup>6</sup> H01L 29/48, 29/80

U.S. Cl. 257—282

8 Claims



1. A semiconductor device comprising: a semiconductor substrate having a major surface; an active layer formed on the major surface, the active layer having a first region, a second region and a third region disposed between the first and second regions; a first heavily doped layer formed on the first region, the first heavily doped layer having a first upper surface, and having a full-thickness part, a gradually increasing-thickness part and a side wall rising from the first region; a second heavily doped layer formed on the second region, the second heavily doped layer having a second upper surface; a first electrode formed on the first upper surface; and a second electrode formed on the third region, the second electrode having a bottom part and a side wall, the second electrode being disposed nearer to the first heavily doped layer than to the second heavily doped layer, the side wall of the second electrode not being in contact with the first heavily doped layer, and one edge of the bottom part of the second electrode being in contact with a part of the gradually increasing-thickness part of the first heavily doped layer at a location adjacent to a location where the second electrode is in contact with the third region.

5,412,237

## SEMICONDUCTOR DEVICE WITH IMPROVED ELEMENT ISOLATION AND OPERATION RATE

Shigeki Komori, and Katsuhiko Tsukamoto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1993, Ser. No. 26,359

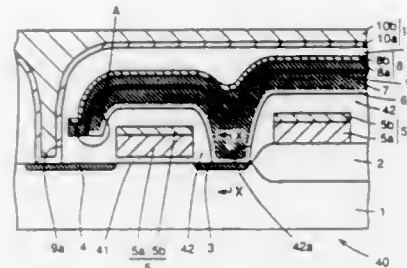
Claims priority, application Japan, Mar. 12, 1992, 4-053835; Jan. 21, 1993, 5-008475

Int. Cl.<sup>6</sup> H01L 27/108, 29/76; H01G 4/06; G11C 11/34 U.S. Cl. 257—306

11 Claims

1. A semiconductor device comprising: a semiconductor substrate, an impurity region formed at a main surface of the semiconductor substrate, a gate electrode formed on the main surface of the semiconductor substrate, insulation formed on the gate electrode and on the main surface of the semiconductor substrate; a first semiconductor layer connected to the impurity region and formed on the insulation and extending above the gate

electrode, the first semiconductor layer including impurities of a predetermined concentration, a second semiconductor layer formed along the surface of the first semiconductor layer and including impurities whose concentration is higher than that of said first semiconductor layer to form a two layer semiconductor structure,



an insulating layer formed on said second semiconductor layer, and a third semiconductor layer formed on said insulating layer, without adjacent right-angled portions between said second and said third semiconductor layers, thereby reducing intensification of an electric field.

5,412,238

## SOURCE-COUPLING, SPLIT-GATE, VIRTUAL GROUND FLASH EEPROM ARRAY

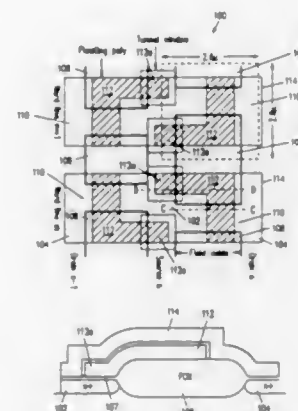
Ming-Bing Chang, Santa Clara, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Sep. 8, 1992, Ser. No. 941,745

Int. Cl.<sup>6</sup> H01L 29/78

U.S. Cl. 257—321

3 Claims



1. A source-coupling, split-gate, virtual ground (SSVG) flash EEPROM array formed in a silicon substrate of a first conductivity type, the SSVG flash EEPROM array comprising:

a plurality of spaced-apart, parallel bit lines of a second conductivity type formed in the silicon substrate to define alternating source and drain lines; a plurality of spaced-apart field oxide islands formed between each pair of adjacent bit lines to define substrate channel regions therebetween; for each channel region, a poly1 floating gate formed over a first portion of said channel region and separated therefrom by a layer of floating gate oxide having a first thickness, said floating gate including a tunnelling portion that extends over the source line associated with said channel region and is separated therefrom by tunnel oxide having a second thickness which is less than the first thickness; and for each floating gate, a poly2 word line formed over said

floating gate and separated therefrom by a layer of oxide/nitride/oxide (ONO), said word line running perpendicular to the bit lines and extending over a second portion of said channel region and separated from said second portion of said channel region by said layer of ONO.

5,412,239

## CONTACT GEOMETRY FOR IMPROVED LATERAL MOSFET

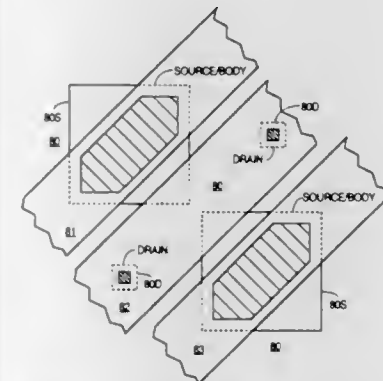
Richard K. Williams, Cupertino, Calif., assignor to Silicon Incorporated, Santa Clara, Calif.

Filed May 14, 1993, Ser. No. 62,507

Int. Cl.<sup>6</sup> H01L 23/48

U.S. Cl. 257—343

15 Claims



1. A lateral MOSFET comprising: a semiconductor substrate having a preselected conductivity; a gate layer overlying said substrate; a plurality of cells arrayed in an orthogonal pattern on a surface of said substrate, each of said cells comprising a region of semiconductor material having a conductivity different in degree or polarity from the conductivity of the substrate, a generally rectangular opening in said gate layer, and a metal contact extending through said generally rectangular opening and making contact with said region of semiconductor material; and a first plurality of metal contact lines extending at an oblique angle to said orthogonal pattern of cells; wherein at least some of said metal contacts have a cross-sectional shape which includes a first pair of sides which are parallel to a first pair of edges of said generally rectangular opening, each of said first pair of sides having a first predetermined separation from one of said first pair of edges, said cross-sectional shape of said metal contact further including a second pair of sides which are parallel to a pair of edges of one of said metal contact lines, each of said second pair of sides having a second predetermined separation from one of said pair of edges of one of said metal contact lines.

5,412,240

## SILICON-ON-INSULATOR CMOS DEVICE AND A LIQUID CRYSTAL DISPLAY WITH CONTROLLED BASE INSULATOR THICKNESS

Shunsuke Inoue, Toru Koizumi, both of Yokohama; Mamoru Miyawaki, Tokyo, and Shigetoshi Sugawa, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 10,438, Jan. 28, 1993, abandoned. This application Jul. 14, 1994, Ser. No. 274,156

Claims priority, application Japan, Jan. 31, 1992, 4-040496

Int. Cl.<sup>6</sup> H01L 27/01, 27/13

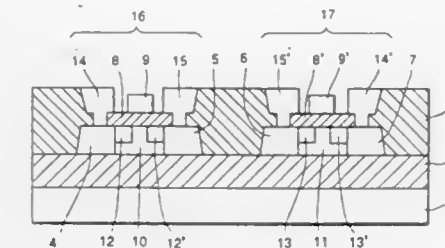
U.S. Cl. 257—347

8 Claims

1. A semiconductor device comprising an insulation layer, a thin-film Si layer formed on said insulation layer and having at least one monocrystal Si region formed therein, and an NMOS transistor and a PMOS transistor formed on said at least one

monocrystal Si region, wherein a thickness  $T_{BOX}$  of said insulation layer at a point where said NMOS and PMOS transistors are formed, a voltage  $V_{SS}$  of a first power supply and a voltage  $V_{DD}$  of a second power supply to be connected to said NMOS and PMOS transistors, respectively, satisfy a relationship expressed by the following inequality:

$$T_{BOX} > (V_{DD} - V_{SS}K_2)/K_1$$



where  $V_{DD} > V_{SS}K_1 = \epsilon_{BOX}^{-1} (Q_{BN} + Q_{BP})$ ,  $K_2 = 2\Phi_{FN} + 2\Phi_{FP} - 1.03$ ,  $\epsilon_{BOX}$  is a dielectric constant of said base insulation layer,  $Q_{BN}$  and  $Q_{BP}$  are respective bulk charges of said NMOS and PMOS transistors when widths of depletion layers of said NMOS and PMOS transistors are maximized, and  $\Phi_{FN}$  and  $\Phi_{FP}$  are pseudo-Fermi potentials of said NMOS and PMOS transistors, respectively.

5,412,241

## METHOD FOR MAKING AN IMPROVED HIGH VOLTAGE THIN FILM TRANSISTOR HAVING A LINEAR DOPING PROFILE

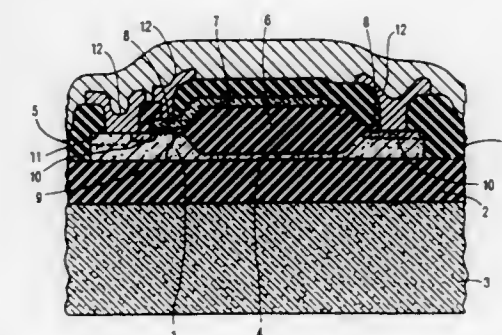
Steven L. Merchant, Yorktown Heights, N.Y., assignor to Philips Electronics North America Corp., New York, N.Y.

Continuation of Ser. No. 811,554, Dec. 20, 1991, Pat. No. 5,246,870, which is a continuation-in-part of Ser. No. 650,391, Feb. 1, 1991, abandoned. This application Aug. 3, 1993, Ser. No. 101,164

Int. Cl.<sup>6</sup> H01L 29/78, 27/12, 29/52

U.S. Cl. 257—409

6 Claims



1. In a thin film SOI device comprising a buried oxide layer, a thin layer of silicon having a lateral linear doping region on said buried oxide layer, a top oxide layer on said thin layer of silicon, a gate region at one end of said thin layer, a drain region at an opposite end of said thin layer, a source region laterally separated from said gate region, the improvement comprising said gate region including a gate electrode and a field plate extending laterally from said gate electrode over said lateral linear doping region, wherein said buried oxide layer and said top oxide layer have the same thickness.

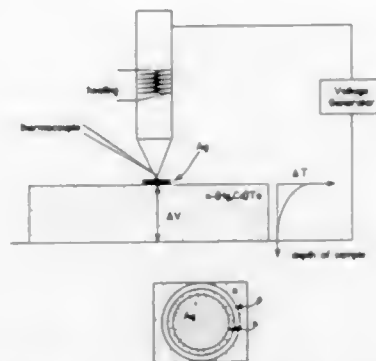
5,412,242

# SEMICONDUCTOR DEVICE WITH P-N JUNCTION BASED ON DOPANT PROFILE IN EQUILIBRIUM WITH INTERNAL ELECTRIC FIELD CREATED BY THIS JUNCTION

David Cahen; Konstantin Gartsman, both of Rehovot, and Igor Lyubomirsky, Tetach-Tigwa, all of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel  
Filed Apr. 14, 1993, Ser. No. 46,176  
Int. Cl.<sup>6</sup> H01L 31/0296

U.S. Cl. 257—442

5 Claims



1. A semiconductor device comprising a body of mercury cadmium telluride of the formula  $\text{Hg}_{0.3}\text{Cd}_{0.7}\text{Te}$  and being of n-type containing a silver dopant which defines in the body a stable p-n junction having a stable concentration gradient in equilibrium with an internal electric field inherently created by the p-n junction.

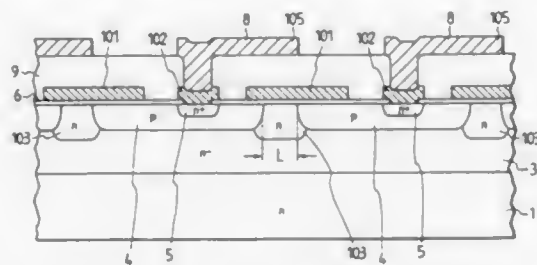
5,412,243

# PHOTOELECTRIC CONVERSION APPARATUS

Masakazu Morishita, Atsugi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 656,590, Feb. 19, 1991, abandoned, which is a continuation of Ser. No. 271,313, Nov. 15, 1988, abandoned. This application Nov. 10, 1992, Ser. No. 974,348  
Claims priority, application Japan, Nov. 18, 1987, 62-289461  
Int. Cl.<sup>6</sup> H01L 29/68, 29/78, 27/14, 31/00

U.S. Cl. 257—462

36 Claims



1. A photoelectric conversion apparatus comprising:  
a semiconductor area of a first conductivity type;  
a plurality of second semiconductor areas of a second conductivity type formed in a position adjacent to said first semiconductor area of the first conductivity type for storing therein carriers produced by optical excitation; and  
a fourth semiconductor area of the first conductivity type adjacent to said second semiconductor area, wherein said second semiconductor area are arranged between said fourth and first semiconductor areas, and said first, second and fourth semiconductor areas constitute a bipolar transistor, wherein adjacent ones of said second semiconductor areas of the second conductivity type adjacent to said first semiconductor area of the first conductivity type are used as

main electrode areas, and a portion of a third semiconductor area of the first conductivity type between said adjacent ones of said semiconductor areas of the second conductivity type adjacent to said first semiconductor area of the first conductivity type is used as a channel area, a gate electrode is arranged corresponding to said third semiconductor area, thereby forming an insulated gate type transistor, wherein said channel area is formed at least substantially as deep as said adjacent ones of said semiconductor areas of the second conductivity type formed in said semiconductor area of the first conductivity type, and wherein said channel area is formed in a depth substantially identical with a depth of at least adjacent one of said second semiconductor area of the second conductivity type adjacent to said first semiconductor areas of the first conductivity type, said channel area has an impurity concentration higher than said first semiconductor area of the first conductivity type, and lower than the impurity concentrations of any of said second semiconductor areas of the second conductivity type.

5,412,244

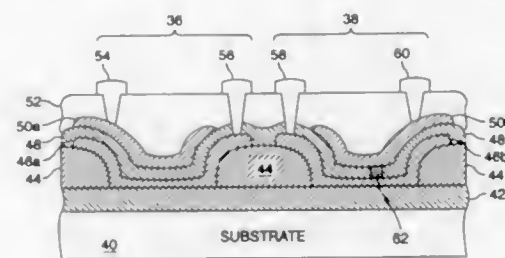
# ELECTRICALLY-PROGRAMMABLE LOW-IMPEDANCE ANTI-FUSE ELEMENT

Esmat Z. Hamdy, Fremont; Amr M. Mohsen; John L. McCollum, both of Saratoga; Shih-Ou Chen, Fremont, and Steve S. Chiang, Saratoga, all of Calif., assignors to Actel Corporation, Sunnyvale, Calif.  
Continuation of Ser. No. 910,422, Jul. 8, 1992, Pat. No. 5,266,829, which is a continuation of Ser. No. 464,223, Jan. 12, 1990, Pat. No. 5,134,457, which is a continuation of Ser. No. 137,935, Dec. 28, 1987, Pat. No. 4,899,205, which is a continuation-in-part of Ser. No. 861,519, May 9, 1986, Pat. No. 4,823,181. This application Apr. 29, 1993, Ser. No. 54,612  
The portion of the term of this patent subsequent to Nov. 30, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H01L 29/46, 29/86, 29/92

U.S. Cl. 257—530

18 Claims



1. An electrically-programmable, low-impedance antifuse element disposed in an integrated circuit formed on a semiconductor substrate, including:  
a first electrode comprising a region in said substrate containing arsenic at a concentration of between about  $1 \times 10^{19}$  to  $1 \times 10^{22}$  atoms/cm<sup>3</sup>, said region having an arsenic pileup doping profile at an upper surface thereof;  
a dielectric layer disposed over said upper surface of said first electrode; and  
a second electrode comprising a layer of arsenic-containing polysilicon disposed over said dielectric layer.

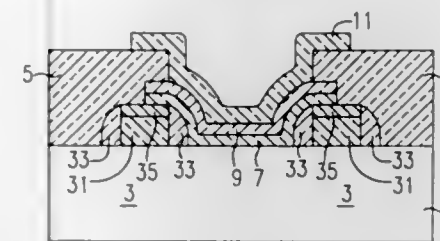
5,412,245

# SELF-ALIGNED VERTICAL ANTIFUSE

David P. Favreau, Coopersburg, Pa., assignor to AT&T Corp., Murray Hill, N.J.  
Continuation of Ser. No. 991,790, Dec. 17, 1992, abandoned.  
This application May 23, 1994, Ser. No. 247,617  
Int. Cl.<sup>6</sup> H01L 45/00, 27/02

U.S. Cl. 257—530

5 Claims



1. An integrated circuit comprising:  
a plurality of electrically conducting interconnect pairs, there being area between said pairs, each of which has a conducting surface;  
a layer of amorphous silicon and a layer of a barrier material, said layers covering the area between said interconnect pairs and contacting at least portions of the surfaces of said interconnect pairs;  
a patterned dielectric layer which has windows which expose portions of the uppermost of said layer of amorphous silicon and said layer of barrier material, there being only one window per pair of electrically conducting interconnect pairs; and  
a layer of metal in said windows.

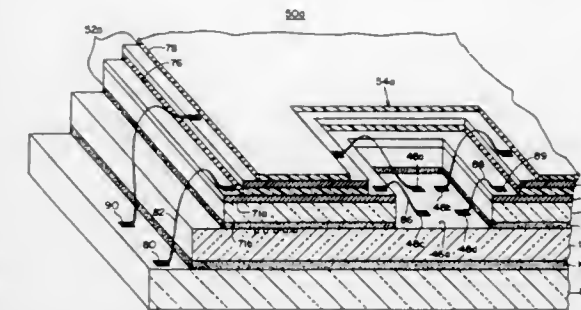
5,412,247

# PROTECTION AND PACKAGING SYSTEM FOR SEMICONDUCTOR DEVICES

Jacob Martin, Wellesley, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.  
Continuation of Ser. No. 386,352, Jul. 28, 1989, abandoned. This application Jan. 25, 1991, Ser. No. 649,219  
Int. Cl.<sup>6</sup> H01L 23/02

U.S. Cl. 257—678

21 Claims



1. A protection and packaging system for a semiconductor circuit with a planar surface having an active region thereon, comprising:  
a flat, hermetically impermeable protective member at least as large as the semiconductor circuit active region having an electrically insulative surface for entirely covering and sealing the region; and  
an adhesive substance entirely covering the semiconductor circuit active region for securely bonding said protective member directly to the semiconductor circuit active region to seal, protect and package the active region.

5,412,248

# SEMICONDUCTOR DEVICE PACKAGE WITH SHAPED PARTS FOR DIRECT COUPLING TO STANDARD CONNECTORS

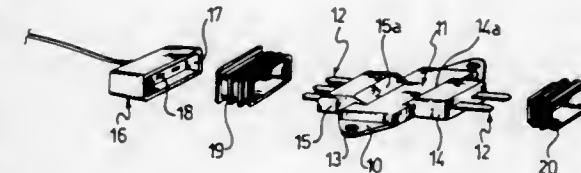
Bruno Murari, Monza, and Giuseppe Libretti, Milan, both of Italy, assignors to SGS-Thomson Microelectronics, S.r.l., Agrate Brianza, Italy  
Filed Oct. 13, 1992, Ser. No. 960,529

Claims priority, application European Pat. Off., Mar. 3, 1992, 92830097

Int. Cl.<sup>6</sup> H01L 23/48, 29/41, 29/52, 29/60

U.S. Cl. 257—693

25 Claims



1. An electronic device package, comprising:  
a metal plate;  
an electronic active semiconductor device mounted to said plate;  
a polymer body totally enclosing said device, and enclosing only part of said plate;  
a first plurality of contact terminals partially embedded in a first face of said body to define, in combination with said first face, a first predetermined standard geometry for harsh-environment electrical connectors, each said contact terminal being operatively electrically connected to a separate respective portion of said device;  
and a second plurality of contact terminals partially embedded in a second face of said body

5,412,246

# LOW TEMPERATURE PLASMA OXIDATION PROCESS

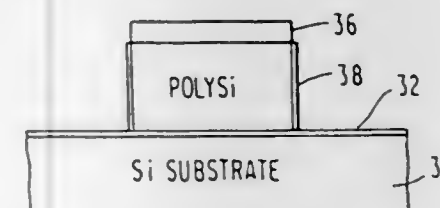
David M. Dobuzinsky; David L. Harmon, both of Essex Junction, Vt.; Srinandan R. Kasi, Croton-On-Hudson, N.Y.; Donald M. Kenney, Shelburne, Vt.; Son V. Nguyen, Williston, Vt.; Tue Nguyen, Essex Junction, Vt., and Pai-Hung Pan, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 915,752, Jul. 21, 1992, Pat. No. 5,330,935, which is a continuation of Ser. No. 602,993, Oct. 24, 1990, abandoned. This application Jan. 26, 1994, Ser. No. 186,568

Int. Cl.<sup>6</sup> H01L 29/12

U.S. Cl. 257—632

8 Claims



1. A semiconductor structure comprising: a substrate, an oxide layer on said substrate, a masked doped polysilicon layer on said oxide layer and a thin oxidized spacer formed by oxygen-ozone plasma oxidation overlying said oxide layer and unmasked portions of said polysilicon layer.



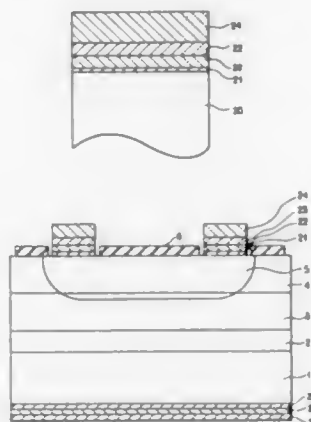
to define, in combination with said second face, a second predetermined standard geometry for harsh-environment electrical connectors, each said contact terminal being operatively electrically connected to a separate respective portion of said active semiconductor device; wherein said plate extends laterally away from said body to provide through holes in said plate for mounting.

5,412,249

# SEMICONDUCTOR DEVICE HAVING LAYERED ELECTRODE

Masahiko Hyugaji, and Reiji Ono, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Mar. 17, 1994, Ser. No. 214,234

Claims priority, application Japan, Mar. 31, 1993, 5-073233  
Int. Cl.<sup>6</sup> H01L 31/0224, 31/0232, 22/482, 29/40  
U.S. Cl. 257-745 5 Claims



1. A semiconductor device including a III-V group compound semiconductor containing In and P, and a layered electrode having a contact with the III-V group compound semiconductor, said layered electrode comprising:
  - a first layer having a contact with the III-V group compound semiconductor and made of Au or an alloy containing Au as a main component;
  - a second layer provided on the first layer and made of Ti, Cr, W or an alloy containing at least one of these elements as a main component;
  - a third layer provided on the second layer and made of Pt, Rh, Pd, Ni, Ta, Mo, or an alloy containing at least one of these elements as a main component; and
  - a fourth layer provided on the third layer and made of Au, Al, Pb, or an alloy containing at least one of these elements as a main component.

5,412,250

# BARRIER ENHANCEMENT AT THE SALICIDE LAYER

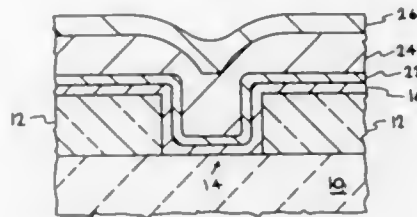
Hunter B. Brugge, San Antonio, Tex., assignor to VLSI Technology, Inc., San Jose, Calif.  
Filed Sep. 24, 1993, Ser. No. 126,353  
Int. Cl.<sup>6</sup> H01L 23/48

U.S. Cl. 257-750 39 Claims

1. An improved method for forming a barrier between a metallized contact and a semiconductor substrate comprising the steps of:

depositing a first metallic layer over a portion of said semiconductor substrate with said first metallic layer deposited into a contact well formed into said portion of semiconductor substrate, said deposition of said first metallic layer performed in a low pressure environment, exposing said first layer of metallic material to a gas, said

exposure of said first metallic layer to said gas performed in said low pressure environment, depositing a second metallic layer over said semiconductor substrate with said first metallic layer is disposed between said semiconductor substrate and said second metallic layer, said deposition of said second metallic layer performed in said low pressure environment, depositing a third metallic layer over said second metallic layer with said second metallic layer disposed between



said first and third metallic layers such that said barrier comprised of said first and second metallic layers minimizes diffusion of said third metallic layer into said semiconductor substrate, said deposition of said third metallic layer performed in said low pressure environment, depositing a fourth metallic layer over said third metallic layer with said third metallic layer disposed between said second and fourth metallic layers, said deposition of said fourth metallic layer performed in said low pressure environment.

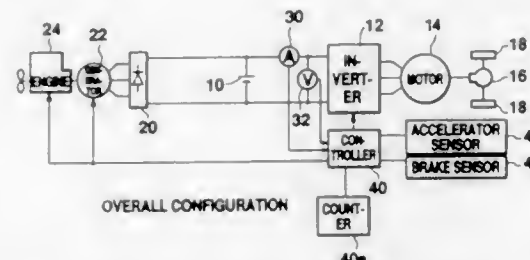
5,412,251

# CONTROLLER OF AN ENGINE DRIVING GENERATOR FOR AN ELECTRIC VEHICLE

Masayuki Furutani, Susono, and Yoshihide Nii, Fuji, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
Filed Jan. 12, 1994, Ser. No. 180,329

Claims priority, application Japan, Jan. 14, 1993, 5-004494;  
Feb. 16, 1993, 5-026887

Int. Cl.<sup>6</sup> B60L 11/02, 11/12  
U.S. Cl. 290-16 6 Claims



1. A controller for controlling the operation of an engine driven generator in an electric vehicle incorporating a motor to be driven by electric power derived from a battery wherein said engine driven generator charges the battery, said battery being supplied with a regenerative power generated at the time of regenerative braking of said motor, the controller comprising:

regenerative braking detection means for detecting the start of regenerative braking;  
voltage detection means for detecting a battery voltage; and  
control means for receiving said detection values from said detection means and, in response to a battery voltage at the start of regenerative braking, for controlling the start of said engine driven generator.

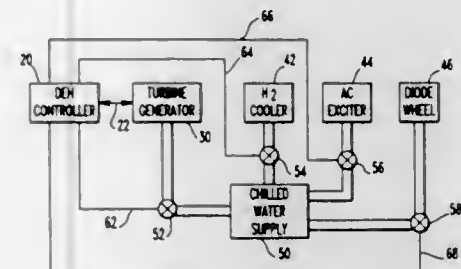
5,412,252

# SYSTEM AND METHOD FOR CONTROLLING TURBINE-GENERATORS BASED ON WHETHER COOLING REGULATORS ARE OFF-LINE

Ali Moradian, Lake Mary; Maurice A. Jenkins, Camelsberry, and Robert L. Frater, Longwood, all of Fla., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.  
Filed Feb. 14, 1994, Ser. No. 195,492

Int. Cl.<sup>6</sup> E01D 19/00; G05B 15/00

U.S. Cl. 290-40 R 18 Claims



10. A system for controlling the acceleration of a turbine-generator where the cooling of the turbine-generator and auxiliary components is controlled by at least one cooling regulator, said system comprising:

at least one cooling regulator for controlling the cooling of the turbine-generator and auxiliary components;  
means for monitoring said at least one cooling regulator to determine whether the cooling regulator is off-line; and  
acceleration control means for controlling the acceleration of the turbine-generator as a function of whether said at least one cooling regulator is determined to be off-line.

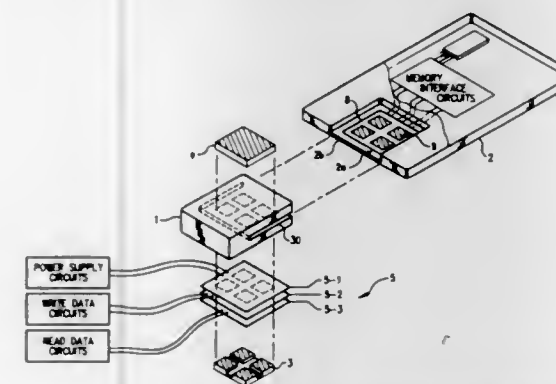
5,412,253

# IC MEMORY CARD WITH NON-CONTACT POWER AND DATA CONNECTION

Wayne E. Hough, P.O. Box 168, Mukilteo, Wash. 98275  
Continuation-in-part of Ser. No. 870,887, Apr. 20, 1992, Pat. No. 5,229,652. This application May 21, 1993, Ser. No. 65,868

The portion of the term of this patent subsequent to Jul. 20, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H01F 38/14  
U.S. Cl. 307-17 15 Claims



1. A non-contact connector for coupling a removable electronic module with a host device, comprising:
  - a host transformer core assembly having first and second core parts mounted in fixed spaced relationship with a gap between confronting core part faces, at least one of said first and second core parts having a quadrafid pattern formed on its confronting face to define core poles;
  - host transformer winding means mounted on said core poles;
  - a removable electronic module core assembly having a

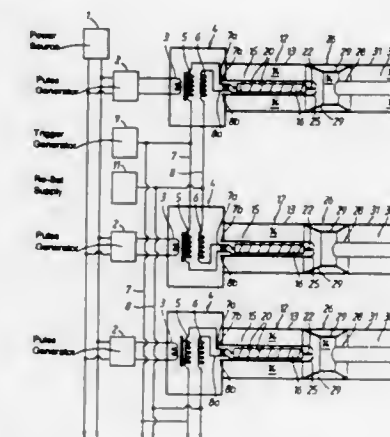
plurality of core pole pieces arranged in a fixed pattern matching the core poles of said host parts quadrafid pattern and being adapted for insertion in said gap between said core part faces to complete magnetic flux paths through said poles of said first and second host core parts and said module pole pieces; and  
module transformer winding means mounted on said module core pole pieces so as to be removably transformer coupled to said host winding means via said complete magnetic flux paths.

5,412,254

# HIGH VOLTAGE PULSE GENERATOR

Trevor H. Robinson, Chelmsford, and Christopher J. Hodge, Ingatstone, both of United Kingdom, assignors to GEC-Marconi Limited, Middlesex, United Kingdom  
Filed Dec. 23, 1992, Ser. No. 997,307

Claims priority, application United Kingdom, Dec. 24, 1991, 9127333  
Int. Cl.<sup>6</sup> H03K 3/53  
U.S. Cl. 307-106 14 Claims



1. A high voltage pulse generator for providing a high voltage pulse across a dielectric switch, the dielectric switch having a main switch electrode and a trigger electrode, the pulse generator comprising:

means for generating a main high voltage pulse, an energy storing pulse forming line having a first end and a second end, the first end of the pulse forming line being connected to the means for generating a main high voltage pulse and the second end of the pulse forming line being connected to the main switch electrode of the dielectric switch;  
means for generating a high voltage trigger pulse, and  
a ferrite loaded shock line having a first end and a second end, the first end of the ferrite loaded shock line being connected to the means for generating the high voltage trigger pulse and the second end of the ferrite loaded shock line being connected to the trigger electrode of the dielectric switch.

5,412,255

# SWITCH DEVICE SUITABLE FOR USE IN AUTOMOTIVE VEHICLES

Werner Wallrafen, Sulzbach, Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Germany  
Continuation of Ser. No. 861,934, Apr. 2, 1992, abandoned. This application Nov. 4, 1993, Ser. No. 148,033  
Claims priority, application Germany, Jul. 7, 1991, 41 835.5

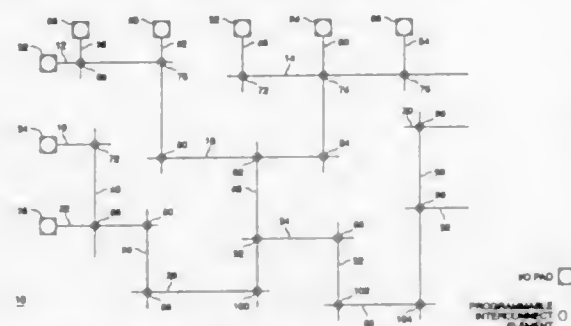
Int. Cl.<sup>6</sup> H03K 17/56; G01D 1/18  
U.S. Cl. 307-116 17 Claims

1. A switch device serving to switch current through a load

- a plurality of input/output pins;
- a plurality of first external conductors and a plurality of first internal conductors disposed in a first direction, selected ones of said first external conductors individually connected to selected ones of said input/output pins and selected ones of said first internal conductors individually connected to first programming pins accessible from the outside of said interconnection architecture;
- a plurality of second external conductors and a plurality of



second internal conductors disposed in a second direction different from said first direction and intersecting selected ones of said first external conductors and selected ones of said first internal conductors at intersections, selected ones of said second external conductors individually connected to selected ones of said input/output pins and selected ones of said second internal conductors individually connected to second programming pins accessible from the outside of said interconnection architecture;



a plurality of programmable interconnect elements, said programmable interconnect elements programmable at a selected programming voltage, selected ones of said programmable interconnect elements connected between (A) selected ones of said first external conductors and said first internal conductors and (B) selected ones of said second external conductors and said second internal conductors, at said intersections.

#### 5,412,262 SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING PLURALITY OF SUPPLY POTENTIAL LINES CONNECTED THERETO, AND SYSTEM EMPLOYING THE SAME

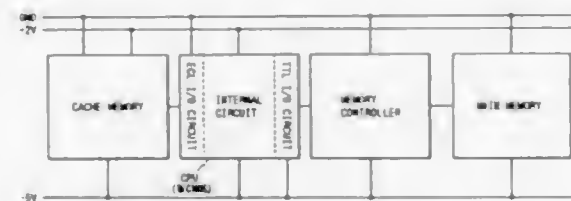
Yoji Nishio; Fumio Murabayashi; Kozaburo Kurita, and Masahiro Iwamura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 41,458, Apr. 2, 1993, which is a continuation of Ser. No. 571,241, Aug. 23, 1990, abandoned. This application Jul. 25, 1994, Ser. No. 279,626

Claims priority, application Japan, Aug. 23, 1989, 1-215077  
Int. Cl.<sup>6</sup> H03K 19/0175, 19/02

U.S. Cl. 326—64

14 Claims



#### 12. A system comprising:

a first supply potential line which has a first potential level;  
a second supply potential line which has a second potential level which is different from said first potential level;  
a third supply potential line which has a third potential level which is different from said first potential level and said second potential level;

at least one ECL interface semiconductor integrated circuit, including an emitter follower, wherein the ECL interface semiconductor integrated circuit is driven by a first difference voltage between said first supply potential line and said third supply potential line, and is coupled to said second supply potential line for operating the emitter follower; and

at least BiCMOS processor, which includes transistors having a device withstand voltage of less than 5 volts and which is coupled to the ECL interface semiconductor

integrated circuit by a data signal line, which is comprised of:

at least one internal circuit which is driven by a second difference voltage between said second supply potential level and said third supply potential level; and  
an interface portion for outputting or inputting data between the internal circuit and the ECL interface semiconductor integrated circuit via said data signal line, wherein said interface portion is driven by said first difference voltage.

#### 5,412,263 MULTIPLE CONTROL VOLTAGE GENERATION FOR MOSFET RESISTORS

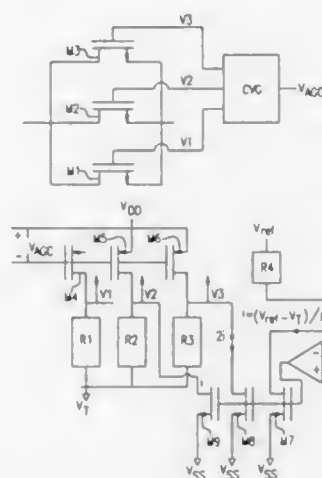
Krishnaswamy Nagaraj, Macungie, Pa., and Reza S. Shariatdoust, Califon, N.J., assignors to AT&T Corp., Murray Hill, N.J.

Filed Sep. 30, 1992, Ser. No. 954,839

Int. Cl.<sup>6</sup> H03K 5/14, 17/687

U.S. Cl. 327—566

6 Claims



#### 1. A variable resistor comprising:

a plurality of first parallel connected field effect transistors, each having a gate electrode, the resistance of said resistor being the source/drain resistances of said transistors;  
means for generating analog control voltages for each of said first field effect transistors, said means comprising a plurality of second field effect transistors, current carrying elements connected between source electrodes of said second field effect transistors and a reference potential, said source electrodes of transistors of said second plurality being connected to said gate electrodes of transistors of said first plurality;

a current transfer circuit, at least one of said second transistors having a source electrode connected to said current transfer circuit; and

means for generating a reference voltage connected to said current transfer circuit.

#### 5,412,264 SIGNAL INPUT/OUTPUT CIRCUIT FOR SEMICONDUCTOR INTEGRATED CIRCUIT

Nobuya Uda, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1993, Ser. No. 128,788

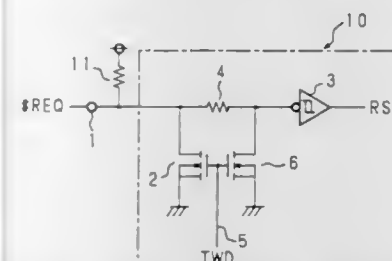
Claims priority, application Japan, Jun. 4, 1993, 5-134521  
Int. Cl.<sup>6</sup> H03K 17/687

U.S. Cl. 327—389

14 Claims

13. A signal generating circuit for a semiconductor integrated circuit, comprising:  
an input terminal receiving an external signal;

an output terminal outputting an internal signal generated within said semiconductor integrated circuit;  
a signal generator connected to said input and output terminals and generating a predetermined signal when the external signal is received at said input terminal; and



first and second transistors connected to said signal generator, receiving said internal signal and driving said signal generator to generate the predetermined signal when the internal signal is received by said first and second transistors.

#### 5,412,265 PLANAR MICRO-MOTOR AND METHOD OF FABRICATION

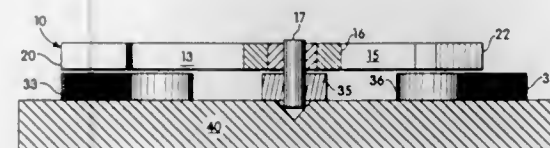
Edward N. Sickafus, Grosse Ile, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 5, 1993, Ser. No. 43,956

Int. Cl.<sup>6</sup> H02K 1/06, 3/00

U.S. Cl. 310—40 MM

18 Claims



#### 1. A planar micro-motor comprising:

a substrate;  
a stator supported by the substrate comprising electromotive force means for receiving electrical current to selectively generate electromagnetic fields in multiple electrical phases, comprising a plurality of micro-coils arrayed in a first plane, with each micro-coil in a different electrical phase than an adjacent micro-coil in said first plane; and  
a rotor having a planar rotor body aligned over the electromotive force means in a second plane parallel with the first plane, the rotor body being rotatable in the second plane in response to the electromagnetic fields applied across a planar gap sandwiched between the planar rotor body and the electromotive force means.

#### 5,412,266 MINIATURE MOTOR WITH MAGNETIZED ROTOR END FACES FORMING AXIAL MAGNETIC ATTRACTION FORCE BETWEEN ROTOR AND HOUSING

Akira Okazaki; Shinichi Matsuda; Takanobu Lee; Ikuo Matsushita, and Masao Take, all of Matsudo, Japan, assignors to Mabuchi Motor Co. Ltd., Chiba, Japan

Filed Apr. 21, 1993, Ser. No. 50,845

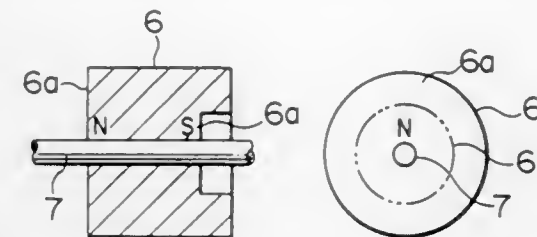
Claims priority, application Japan, Apr. 22, 1992, 4-102767  
Int. Cl.<sup>6</sup> H02K 11/00

U.S. Cl. 310—40 MM

6 Claims

6. A miniature motor, comprising:  
a rotor for a miniature motor, the rotor having a circumferential surface and opposite end faces, said rotor having a plurality of magnetic poles extending axially and extending radially about said outer circumferential surface of

said rotor; a stator having two coils wound on coil bobbins disposed axially; a housing formed into a bottomed hollow cylindrical shape, said housing receiving said two coils; an end plate connected to an open end of said housing, said housing being formed of a ferromagnetic material; a magnetic pole provided on a housing side end face of said



rotor for magnetizing said end faces of said rotor, said end faces being magnetized with a single polarity to form an axial magnetic attraction force between said rotor and said housing, a first end face of N polarity and second end face of S polarity to form an axial magnetic attraction force between said rotor and said housing.

#### 5,412,267 MINIATURE MOTOR AND METHOD OF MAKING SAME

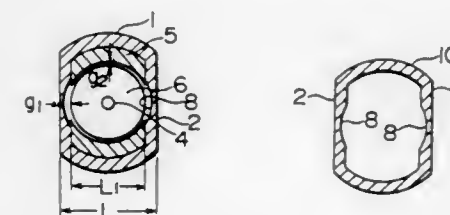
Kazuo Okada; Keisuke Ebihara, and Kazumasa Saiga, all of Matsudo, Japan, assignors to Mabuchi Motor Co., Ltd., Chiba, Japan

Filed May 14, 1993, Ser. No. 61,434

Claims priority, application Japan, May 21, 1992, 4-128366  
Int. Cl.<sup>6</sup> H02K 5/04

U.S. Cl. 310—42

5 Claims



#### 1. Miniature motor, comprising:

a motor case formed into a bottomed hollow cylindrical shape;  
a motor case having a cross-sectional shape with two long sides consisting of two parallel straight lines and two short sides; an end bracket fitted to an open end of said motor case; permanent magnets fixedly fitted to an inside surface of said motor case, an inner surface of said permanent magnets forming a part of an inner cylindrical surface in an assembled state; an armature rotatably supported in said motor case via bearings provided on said motor case and on said end bracket; recesses formed on parallel surfaces inside surfaces of said motor case, said motor case being formed by a drawing operation and ironing parallel to plastically deform material to form said recesses said recesses defining part of said inner cylindrical surface which part is concentric with an axis of said motor case, said recesses being formed on parallel inside surfaces of said motor case and being positioned to define a gap g<sub>1</sub> between inside surfaces of said recess and said armature, said gap g<sub>1</sub> being related to a gap g<sub>2</sub> formed between inside surfaces of said permanent magnets and said armature by relationships that g<sub>1</sub> ≅ g<sub>2</sub>.

5,412,268

**ELECTRICAL TRACTION SYSTEM INTEGRATING THE MOTOR AND BRAKE GENERATOR FUNCTION WITH THE CHARGER AND/OR CONVERTER FUNCTION**  
 Georges Arnaud, Orsay, and Claude Jacques, Chevreuse, both of France, assignors to Auxilec, Chatou, France

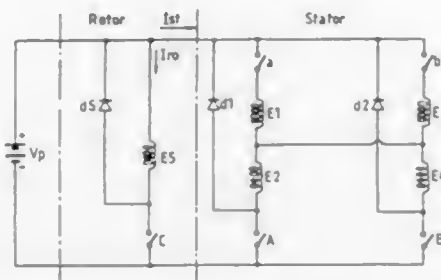
Filed Oct. 15, 1992, Ser. No. 961,373

Claims priority, application France, Oct. 23, 1991, 91 13126

Int. Cl.<sup>6</sup> H02K 11/00, 7/00; H02P 3/14, 3/18

U.S. Cl. 310—67 R

13 Claims



1. An electrical traction system notably for automobiles comprising:

at least one rechargeable supply source,

at least one synchronous electrical motor comprising:

a stator with a plurality of spatially offset windings,

a commutating device with choppers for routing a current given by the rechargeable supply source into said stator windings in order to create a rotating magnetic field when the motor is energized.

means for reconfiguring said stator into a transformer in order to recharge the rechargeable supply source from mains supply when the motor is not energized.

5,412,269

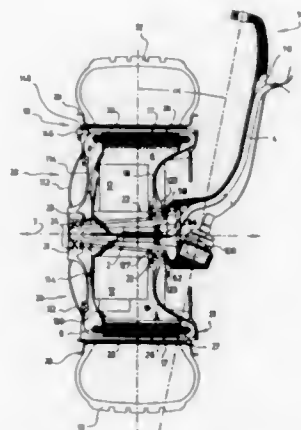
**ELECTRICALLY MOTORIZED WHEEL ASSEMBLY PROVIDED WITH A PERIPHERAL FILLER**  
 Pierre Couture, Boucherville, Canada, assignor to Hydro-Quebec, Montreal, Canada

Filed Jun. 17, 1993, Ser. No. 77,508

Int. Cl.<sup>6</sup> H02K 7/14, 7/10

U.S. Cl. 310—67 R

17 Claims



1. An electrically motorized wheel assembly comprising:

a hollow shaft having a first opening at one end thereof and a second opening, said first opening receiving conductors from outside of said assembly;

a stator coaxial with and fixedly attached to said shaft, said stator comprises a central portion attached to said shaft, a support extending radially from said central portion, and a

peripheral circular pole piece, said pole piece being fixed onto peripheral ends of said support;

a rotor coaxial with said stator and mounted for rotation about said stator, said rotor comprising a housing having a cylindrical wall having an inner surface provided with a magnetic means surrounding said stator and separated therefrom by an air-gap, said housing comprising an inner wall, on a side of said cylindrical wall, and an outer wall, on the other side of said cylindrical wall, said shaft extending through said inner wall and centrally thereof;

a cylindrical filler made of a resilient material, said filler being waterproof, said filler being mounted around said housing, whereby said filler prevents presence of dirt and unwanted impurities between said housing and a rim fixed around an outer surface of said housing.

5,412,270

**MOTOR ASSEMBLY WITH MOUNTING ARRANGEMENT**

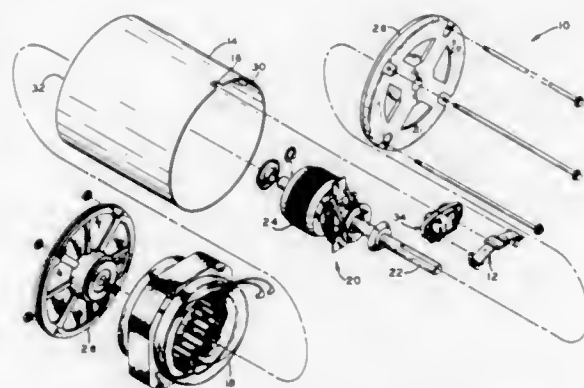
James A. Butcher, and Michael A. Pitzer, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Feb. 4, 1993, Ser. No. 13,698

Int. Cl.<sup>6</sup> H02K 11/00

U.S. Cl. 310—68 R

33 Claims



1. An electric motor assembly, comprising:

a motor housing;

a stator mounted in the housing;

a rotor rotatably mounted in the housing and disposed adjacent the stator;

a pair of end shields mounted adjacent opposing ends of the motor housing having bearings disposed therein for rotatably supporting the rotor;

a motor control component;

a bracket for mounting the control component in the motor housing, said bracket comprising a one-piece resilient body, elastically deformable from a first position to a second position, and having means oppositely disposed on the body for engaging the control component to secure the control component to the body when the body is in the first position, said means at least partially disengaging the component when the body is deformed to the second position so as to allow the component to be separated from the body; and

means for mounting the bracket to the housing such that a top surface of the body is disposed adjacent and interacts with an inner surface of the housing to prevent deformation of the body thereby locking the component to the bracket.

5,412,271

**SMALL SIZED ELECTRIC MOTOR EQUIPPED WITH AN ELECTRIC CONNECTOR**

Yoshiyuki Mizuno, Sagami, Hidehiro Ii, Koube; Satoshi Suzuki, Nagareyama, and Yukibisa Tonooka, Matsudo, all of Japan, assignors to Molex Incorporated - Mabuchi Motor Co., Ltd., Lisle, Ill.

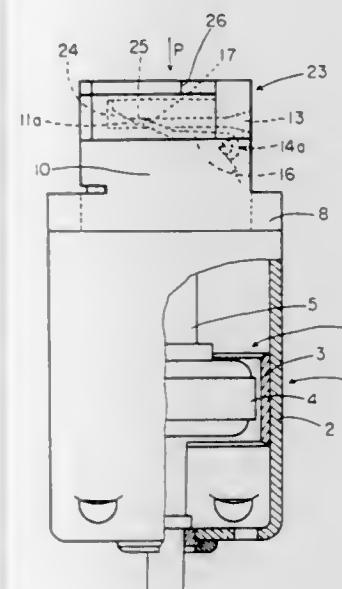
Filed Aug. 9, 1994, Ser. No. 287,994

Claims priority, application Japan, Aug. 25, 1993, 5-050819 U

Int. Cl.<sup>6</sup> H02K 5/22

U.S. Cl. 310—71

2 Claims



1. A small-sized electric motor equipped with an electric connector which permits electrical connection and disconnection of exposed conductors of at least one insulated wire to said motor wherein the improvement comprises:

said motor including a hollow cover formed into a generally cylindrical shape and having at least one end having two elongated terminals passing therethrough and electrically connected to said motor,

said connector including a dielectric housing having openings adapted to receive said elongated terminals of said motor and a slot, communicating with said openings and located in a plane perpendicular to the longitudinal axis of said elongated terminals, adapted to receive said insulated wire and an actuator,

female terminals, mounted in said housing and having two mating ends, one mating end including a generally planar base portion that is transverse to the longitudinal axis of the elongated motor terminal, having an aperture formed in the planar portion to receive one elongated motor terminal,

said other mating end including a flexible arm extending from said planar base portion bent to extend into the conductor receiving slot, and

said actuator adapted to be inserted into said slot in both a partially inserted and a fully inserted position, said actuator, in said partially inserted position, defining a clearance in the slot between the terminals and the actuator allowing the insulated wires to freely pass into and out of said clearance and, in said fully inserted position, forces said exposed conductors into contact with the bent flexible

arms of the female terminals extending into the conductor receiving slot thereby making a good electrical connection between the female terminals and the cooperating respective exposed conductors.

5,412,272

**SUBMERSIBLE EXPLOSION PROOF ELECTRIC BRAKE MOTOR**

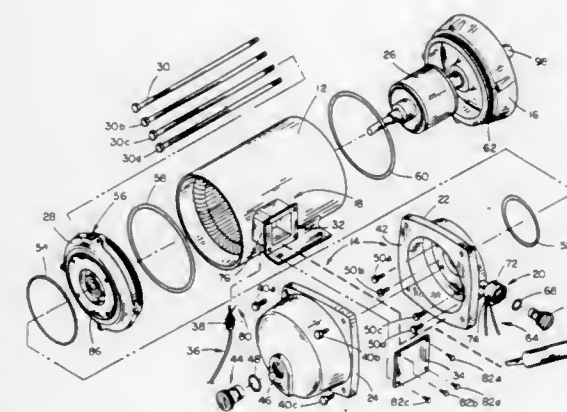
Herman E. Mensching, R.R. 3, Box 113M, Missouri Valley, Iowa 51555

Filed Jan. 24, 1994, Ser. No. 185,364

Int. Cl.<sup>6</sup> H02K 5/12

U.S. Cl. 310—88

5 Claims



1. An improvement to a conventional explosion-proof electric brake motor having a motor housing, a motor electrical conduit attached thereto, a brake housing secured to the motor housing and having a brake electrical conduit attached to the brake housing, a flange secured to the motor housing and adapted to secure the brake motor to a drive mounting for driving a shaft, the improvement comprising:

a first housing waterproof means between said motor housing and said brake housing to provide a waterproof seal therebetween,

first conduit waterproofing means interposed between said brake electrical conduit and said brake housing to provide a waterproof seal therebetween,

a second conduit waterproofing means interposed between said motor electrical conduit and said motor housing and to provide a waterproof seal therebetween,

flange waterproofing means interposed between said flange and said motor housing to provide a waterproof seal therebetween, thereby to provide an explosion-proof electric brake motor which remains operative upon submersion into a body of fluid.



5,412,273

Patent Not Issued For This Number

5,412,274

# DIFFUSELY REFLECTING OPTICAL INTERFERENCE FILTERS AND ARTICLES INCLUDING LAMPS REFLECTORS AND LENSES

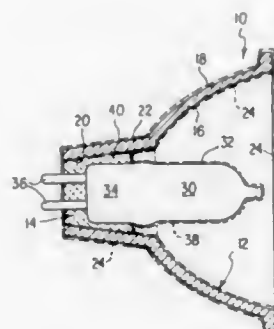
Thomas G. Parham, Gates Mills, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 17, 1992, Ser. No. 992,355

Int. Cl.<sup>6</sup> H01K 1/26

U.S. Cl. 313—112

13 Claims



1. A multilayer optical interference filter having a controlled degree of diffuse reflection over a desired visible wavelength range comprising a plurality of alternating layers of high and low refractive index materials, said high refractive index material being a material having a refractive index higher than that of said low refractive index material, wherein at least one layer of said alternating layers is a light scattering layer comprising titania which contains titania crystals having an effective diameter greater than 0.4 micron in the plane of said layer and wherein at least one of said light scattering titania layers has a surface roughness wherein the peak-to-valley distances exceed 100 Å.

5,412,275

# CAPPED ELECTRIC LAMP WITH CONNECTION CONDUCTOR BUTT WELDED TO A LAMP VESSEL CURRENT CONDUCTOR

Bernardus H. M. A. Dorsemagen, Geldrop, Netherlands, and Manfred Westemeyer, Aldenhoven, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 29, 1993, Ser. No. 55,434

Claims priority, application European Pat. Off., Jul. 13, 1992, 92202134

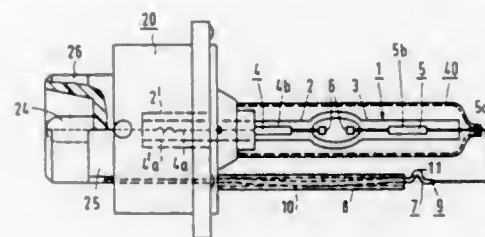
Int. Cl.<sup>6</sup> H01J 5/48

U.S. Cl. 313—318.01

14 Claims

1. A capped electric lamp, comprising:  
a) a lamp cap of insulating material, said lamp cap including a pair of electrical lamp cap contacts;  
b) a quartz glass lamp vessel comprising an electric element

which is energizable for emitting light, said lamp vessel including first and second opposing elongate neck-shaped portions, said neck-shaped portions including respective seals, and first and second molybdenum current conductors each extending from said electric element through a respective seal in a gas-tight manner, said lamp cap holding said lamp vessel at said first seal, and said first current



conductor being connected to one of said lamp cap contacts, the second current conductor issuing from said second seal and terminating at a free end; and  
c) a connection conductor connected to said other lamp cap contact, extending from said lamp cap along said lamp vessel, and having a free end butt welded to said free end of said second current conductor.

5,412,276

# COLOR DISPLAY TUBE HAVING AN INTERNAL MAGNETIC SHIELD

Adrianus J. van Mensvoort, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

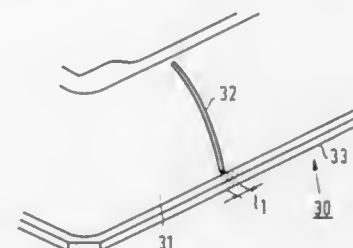
Filed Mar. 22, 1993, Ser. No. 34,025

Claims priority, application European Pat. Off., May 15, 1992, 92201386

Int. Cl.<sup>6</sup> H01J 29/06

U.S. Cl. 313—402

6 Claims



1. A color display tube comprising:  
a. an envelope disposed around a longitudinal axis and including a neck portion, a funnel-shaped portion and a window portion;  
b. a display screen supported on the window portion, said screen having a long direction and a short direction transverse to the long direction and comprising a pattern of phosphors for luminescing in different respective colors;  
c. an electron gun disposed in the neck portion for producing at least one electron beam for deflection across the display screen;  
d. a color selection means disposed proximate the display screen; and  
e. a magnetic shielding structure disposed within the funnel-shaped portion of the envelope for shielding the at least one electron beam from deflection effects of an external magnetic field, said structure having opposed long walls extending substantially in the long direction of the display screen, opposed short walls extending substantially in the short direction of the display screen, said long and short walls having respective first edges collectively defining an electron beam entrance opening facing the electron gun

and having respective second edges collectively defining an electron beam exit opening facing the display screen; the magnetic shielding structure including means for influencing a portion of the external magnetic field propagated in said structure, said means comprising:

- i. at least one elongate aperture formed in each of the opposed long walls, said aperture extending transversely to the long direction; and
- ii. means for resisting the propagation of said portion of the external magnetic field through a portion of the magnetic shielding structure located between one end of said elongate aperture and a respective one of said first or second edges.

5,412,277

# DYNAMIC OFF-AXIS DEFOCUSING CORRECTION FOR DEFLECTION LENS CRT

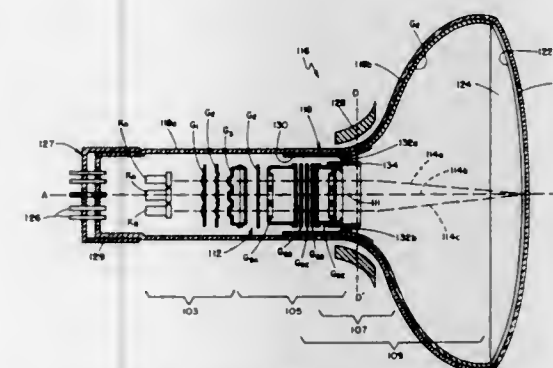
Hsing-Yao Chen, Barrington, Ill., assignor to Chunghwa Picture Tubes, Ltd., Taoyuan, Taiwan, Prov. of China

Filed Aug. 25, 1993, Ser. No. 111,566

Int. Cl.<sup>6</sup> H01J 29/70

U.S. Cl. 313—414

14 Claims



1. A cathode ray tube (CRT) comprising:  
a display screen responsive to a beam of electrons incident thereon for providing an image;  
a source of energetic electrons;  
low voltage beam forming means disposed intermediate said display screen and said source of energetic electrons and adjacent said source of energetic electrons for forming said energetic electrons into a beam and directing said beam along an axis of the CRT toward said display screen;  
high voltage focus lens means disposed intermediate said beam forming means and said display screen on said axis for forming a beam electrostatic focus region in the CRT for focusing the electron beam to a spot on said display screen;  
magnetic deflection means disposed about said focus lens means for forming a beam magnetic deflection region for deflecting the electron beam from said axis and over said display screen such that the electron beam spot is displaced across the display screen in a raster-like manner, and wherein said beam electrostatic focus region and said beam magnetic deflection region overlap and are coincident; and  
dynamic focus correction means in said high voltage focus lens means for applying a non-symmetric electrostatic force field to said beam, wherein said electrostatic field increases in strength with deflection of the beam from the axis of the CRT to correct for off-axis defocusing of the beam, and wherein said dynamic focus correction means includes a plurality of charged grids disposed in a spaced manner along said axis, and wherein each grid includes a respective beam passing aperture with at least two of said beam passing apertures disposed off-center relative to said axis.

5,412,278

# CATHODE-RAY TUBE WITH ANTI-REFLECTIVE COATING

Yasuo Iwasaki, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

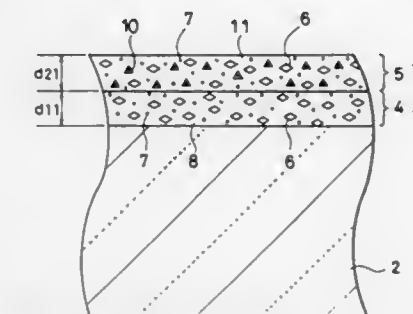
Filed Oct. 15, 1992, Ser. No. 961,325

Claims priority, application Japan, Oct. 22, 1991, 3-273669

Int. Cl.<sup>6</sup> H01J 29/88

U.S. Cl. 313—478

40 Claims



1. A cathode-ray tube comprising:  
a tinted faceplate with an optical transmittance of at most fifty percent; and  
an anti-reflective coating formed on the tinted faceplate, the anti-reflective coating including,  
a first layer adjacent said tinted faceplate, formed of a spin-coated alcohol solution of an organometallic compound, and having a first index of refraction; and  
a second layer adjacent said first layer, formed of a spin-coated alcohol solution of silicon alkoxide, and having a second index of refraction lower than said first index of refraction.

5,412,279

# ANTISTATIC COATING FOR, IN PARTICULAR, A CATHODE RAY TUBE COMPRISING LATEX PARTICLES OF A POLYPYRROLE COMPOUND IN A SILICON DIOXIDE MATRIX

Johannes De Boer, Venlo, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

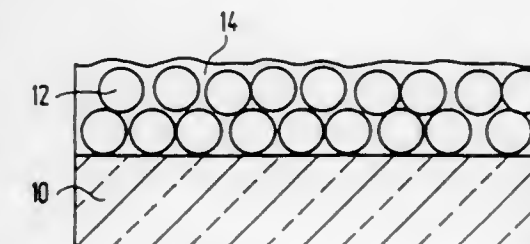
Filed Sep. 18, 1992, Ser. No. 947,664

Claims priority, application European Pat. Off., Sep. 19, 1991, 91202416

Int. Cl.<sup>6</sup> H01J 31/12

U.S. Cl. 313—479

9 Claims



1. An antistatic coating on a substrate, which coating comprises an electroconductive polypyrrole compound, wherein the coating comprises latex particles in a matrix of silicon dioxide, which latex particles consist of the polypyrrole compound.

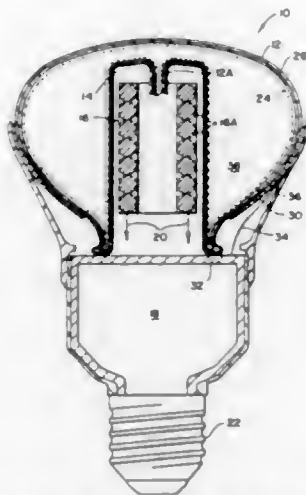
5,412,280  
ELECTRODELESS LAMP WITH EXTERNAL  
CONDUCTIVE COATING

Curtis E. Scott, Mentor; Vito J. Arsena, Highland Heights; Spiro Vamvakas, Rocky River, and Joseph C. Oberle, Chagrin Falls, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 18, 1994, Ser. No. 228,849  
Int. Cl.<sup>6</sup> H01J 65/00, 65/04

U.S. Cl. 313—573

7 Claims



1. An electrodeless, low pressure gas discharge lamp, comprising:

- a vitreous envelope containing a metal vapor and an inert gas, said envelope being shaped with an external chamber for receiving an electrical excitation circuit;
- said excitation circuit being received in said external chamber of said envelope and being effective for exciting said metal vapor to emit light with electromagnetic fields that are passed through said vitreous envelope from outside, to inside, said envelope;
- a circuit for supplying electrical power from power mains to said excitation circuit;
- a transparent, electrically conductive inner coating disposed on the inner surface of said vitreous envelope for suppressing electromagnetic interference on said power mains; and
- an electrically conductive outer coating on the outer surface of said vitreous envelope that is capacitively coupled to said inner coating, via a wall of said vitreous envelope, and that is maintained at a suitable potential for suppressing electromagnetic interference on said power mains;
- said outer coating comprising a matrix of a contiguous, inorganic, glass layer bonded to an exterior surface of said vitreous envelope, and conductive particles embedded in said matrix in a sufficiently dense manner to form a conductive coating.

5,412,281  
PHASE SMOOTHING CATHODE FOR REDUCED NOISE  
CROSSED-FIELD AMPLIFIER

George K. Farney, Boxford, Mass.; Chris L. Wheeland, Winfield, Pa.; Kenneth F. Ramacher; Edward M. Doyle, both of Montoursville, Pa., and Michael S. Worthington, Hughesville, Pa., assignors to Litton Systems, Inc., Beverly Hills, Calif.

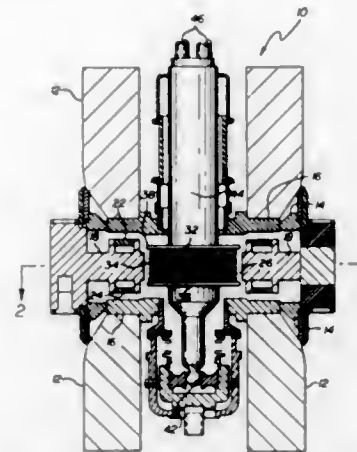
Filed Mar. 31, 1993, Ser. No. 40,514  
Int. Cl.<sup>6</sup> H01J 23/05, 25/42

U.S. Cl. 315—39.3

20 Claims

7. A low noise crossed-field amplifier having a cylindrical cathode coaxially spaced from and surrounded by an annular anode structure, said cathode having an emitting surface which emits a cloud of electrons, said electron cloud rotating about

said cathode in an interaction area disposed between said emitting surface and said anode structure in response to a magnetic field applied thereto, said crossed-field amplifier comprising: means disposed in said cathode for phase smoothing said rotating electron cloud during crossed-field interaction by



removing out-of-phase electrons from said cloud, said phase smoothing means collecting said out-of-phase electrons;

wherein an RF signal traveling on said anode structure is amplified by said crossed-field interaction with said rotating cloud of electrons.

5,412,282  
RADIATION FIN STRUCTURE OF A MAGNETRON  
Seong T. Kang, Buchun, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

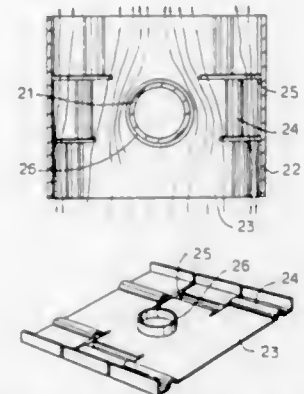
Filed Dec. 16, 1992, Ser. No. 991,325

Claims priority, application Rep. of Korea, Dec. 16, 1991, 23085/1991

Int. Cl.<sup>6</sup> H01J 25/50, 23/033

U.S. Cl. 315—39.51

12 Claims



1. A radiation fin for a magnetron, said radiation fin for radiating heat generated during oscillation of the magnetron, said radiation fin comprising:

- means for positioning said radiation fin about an anode of the magnetron, said anode having front and back sides;
- a cold air inlet side disposed at said front side said anode; and
- guide means for guiding a flow of cold air passing across said radiation fin from said front side to said back side of said anode, said guide means comprising:
- a plurality of pairs of confronting protrusions disposed at opposite side portions of said radiation fin, each of said protrusions having an elongated shape extending in a direction aligned with the flow of said cold air across said radiation fin, each said pair of confronting protrusions

having a respective distance therebetween, said plurality of pairs of confronting protrusions arranged such that distances between successive pairs of confronting protrusions gradually decrease in the direction from said cold air inlet side disposed at said front side of said anode of said fin to said back side of said anode, and said pairs of confronting protrusions disposed along a substantial portion of an entire length of said radiation fin aligned along the direction of the flow of cold air.

5,412,283  
PROTON ACCELERATOR USING A TRAVELLING  
WAVE WITH MAGNETIC COUPLING

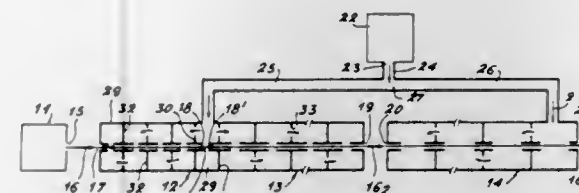
Dominique Tronc, Chatou, France, assignor to CGR MeV, Buc, France

Filed Jul. 20, 1992, Ser. No. 915,266

Claims priority, application France, Jul. 23, 1991, 91 09292  
Int. Cl.<sup>6</sup> H05H 9/02

U.S. Cl. 315—5.41

20 Claims



1. A travelling wave type of linear proton accelerator used to obtain a beam of protons with a determined energy, said accelerator comprising a source that emits a beam of protons propagated at a velocity below that of light along a given direction, at least one accelerator structure of the type using travelling waves with magnetic coupling being positioned in such a way that the proton beam coming from said source penetrates said accelerator structure and emerges therefrom at the determined energy, and at least one klystron giving the high frequency energy to said accelerator structure, said accelerator structure including a plurality of cells, the length of which is variable and extends in the direction of propagation of said proton beam, in order to compensate for the variation of the velocity of the protons when they become accelerated in said structure; wherein the travelling waves with magnetic coupling are forward or backward, in fundamental mode or harmonic mode.

5,412,284  
TWO PHOTOCCELL CONTROLLED LIGHTING SYSTEM  
EMPLOYING FILTERS FOR THE TWO PHOTOCCELLS  
THAT CONTROL ON/OFF OPERATION FOR THE  
SYSTEM

Martha H. Moore, 1102 Claire, Austin, Tex. 78703, and Robbie C. Koenig, 1000 S. Danville Rd. Stonebridge Apartment #618, Kilgore, Tex. 75662

Continuation of Ser. No. 857,325, Mar. 25, 1992, abandoned.  
This application Sep. 12, 1994, Ser. No. 304,596

Int. Cl.<sup>6</sup> H05A 33/00

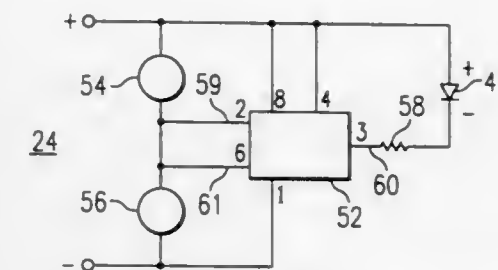
U.S. Cl. 315—155

7 Claims

1. A cordless lighting system for a decorative tree, comprising:

- a control transmitter for generating light signals of first and second frequencies;
- a plurality of light elements, each of the light elements comprising:
- a light source for generating visible light of the first frequency;
- a battery for supplying power to activate the light source;
- a bistable switch having an input, and an output connected to the light source;
- first and second photocells, each photocell having a col-

ored lens such that the lens of the first photocell causes the first photocell to respond to light signals of the first frequency and the lens of the second photocell causes the second photocell to respond to light signals of the second frequency, thereby generating first and second control signals to the input of the bistable switch, wherein the first control signal controls the bistable switch to activate the light source for generating visible light of the first frequency and the second control signal



controls the bistable switch to deactivate the light source; and a plurality of clamps, each of the clamps for attaching a light element to the tree; wherein upon activation of the light source of a first light element, light of the first frequency is received by the first photocell of a second light element to thereby activate the light source of the second light element such that the first and second light elements are lit in a cascaded manner.

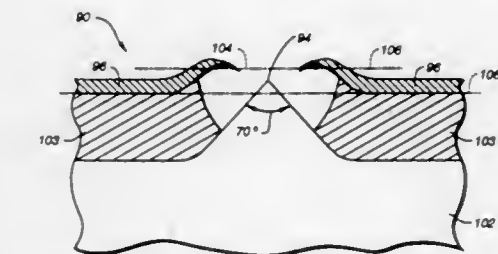
5,412,285  
LINEAR AMPLIFIER INCORPORATING A FIELD  
EMISSION DEVICE HAVING SPECIFIC GAP  
DISTANCES BETWEEN GATE AND CATHODE  
Hirosbi Komatsu, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 790,281, Nov. 7, 1991, abandoned, which is a continuation-in-part of Ser. No. 624,424, Dec. 6, 1990, abandoned. This application Jun. 3, 1993, Ser. No. 73,149

Int. Cl.<sup>6</sup> H05B 37/02

U.S. Cl. 315—169.1

16 Claims



1. A linear amplifier, comprising: a field electron emission device configured to operate in a current driven mode having a cathode, a gate, and an anode; input means for receiving a time varying input voltage and causing a time varying gate current that is substantially proportional to said input voltage to flow through said gate and be amplified by operation of said field electron emission device to produce an anode current; and anode load means connected to said anode for deriving an output voltage from said anode current; a separation distance between said cathode and anode and a separation distance between said cathode and gate being selected such that said output voltage varies substantially linearly with said input voltage.



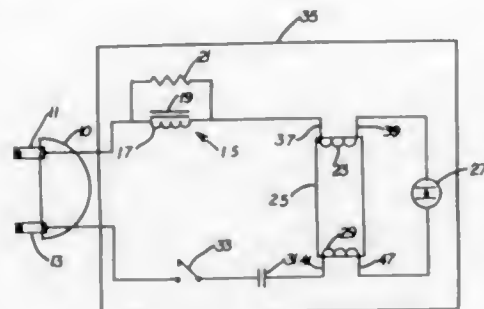
5,412,286  
VARIABLE VOLTAGE BALLAST SYSTEM FOR  
MINI-FLUORESCENT LAMP

Ashfaq Kazi, Anaheim Hills, and Syed M. A. Hussain, Diamond Bar, both of Calif., assignors to American Power Products, Inc., Chino, Calif.

Filed Jun. 2, 1993, Ser. No. 70,215  
Int. Cl.<sup>6</sup> H05B 37/00

U.S. Cl. 315—242

13 Claims



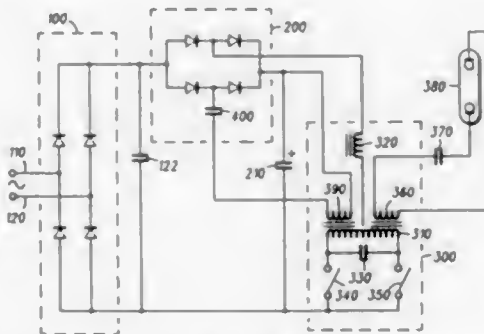
1. A ballast system for a low power fluorescent lamp adaptable to changes in system input conditions, comprising:
  - (a) a plug having a pair of terminals for electrical connection thereto of an AC input power source;
  - (b) an inductive element having a single inductive winding coupled in series relation to said AC input power source and said low power fluorescent lamp whereby said inductive element remains operable in regulating the current through said low power fluorescent lamp for an input power source root mean square voltage within the range from approximately 100 to 250 volts; and,
  - (c) a capacitive element coupled in series relation to said AC input power source and said lower power fluorescent lamp having a predetermined capacitance value corresponding to a given combination of said inductive element inductance and said input power source root mean square voltage values, whereby a replacement of only said capacitive element being sufficient to compensate said ballast system for variations in said input power source root mean square voltage within said root mean square voltage range.

5,412,287  
CIRCUIT FOR POWERING A GAS DISCHARGE LAMP  
Peter W. Shackle, Arlington Heights, Ill., assignor to Motorola Lighting, Inc., Buffalo Grove, Ill.

Filed Dec. 9, 1993, Ser. No. 164,245  
Int. Cl.<sup>6</sup> H05B 41/16

U.S. Cl. 315—247

14 Claims



1. A circuit for powering a gas discharge lamp from a source of a first frequency AC power comprising:
  - a first rectifier for converting the first frequency AC power into a first DC power; a capacitor coupled to the rectifier for storing the DC power as energy; an inverter compris-

ing a driver and a transformer; the driver having a driver input and a plurality of driver outputs, the driver input coupled to the capacitor for converting the energy stored in the capacitor into a second frequency AC power; the transformer having a transformer input and one or more transformer outputs; and having a resonant capacitor connected in parallel with the input, the transformer input and the resonant capacitor forming a parallel resonant tank circuit, the parallel resonant tank circuit coupled to the lamp for powering the lamp; a power factor correction signal source for producing a power factor correction signal; a second rectifier having a second rectifier input and a second rectifier output, the second rectifier including a capacitor coupled in series between the rectifier and the power factor correction signal source for limiting the output current of the rectifier, the second rectifier input coupled to the power factor correction signal source for receiving the power factor correction signal, the second rectifier output providing a second DC power; and the second DC power being used for the purpose of correcting the input power factor of the circuit.

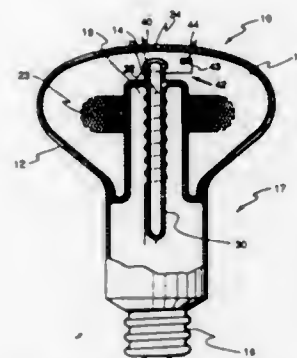
5,412,288  
AMALGAM SUPPORT IN AN ELECTRODELESS  
FLUORESCENT LAMP

Joseph C. Borowiec, Schenectady, and John P. Cocoma, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 15, 1993, Ser. No. 166,857  
Int. Cl.<sup>6</sup> H05B 41/16

U.S. Cl. 315—248

11 Claims



1. A solenoidal electric field (SEF) fluorescent discharge lamp, comprising:
  - a light-transmissive envelope containing an ionizable, gaseous fill for sustaining an arc discharge when subjected to a radio frequency magnetic field and for emitting ultraviolet radiation as a result thereof, said envelope having an interior phosphor coating for emitting visible radiation when excited by said ultraviolet radiation, said envelope having an apex portion, said envelope further having a re-entrant cavity formed therein;
  - an excitation coil contained within said re-entrant cavity for providing said radio frequency magnetic field when excited by a radio frequency power supply; and
  - an exhaust tube extending through said re-entrant cavity, said exhaust tube having an extension into said envelope toward said apex portion of said envelope, said extension having a rim portion for holding an amalgam support in position within said lamp envelope, said amalgam support holding at least one amalgam in a predetermined location within said envelope.

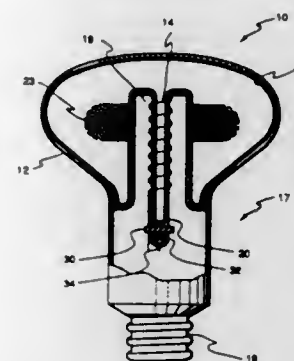
5,412,289  
USING A MAGNETIC FIELD TO LOCATE AN  
AMALGAM IN AN ELECTRODELESS FLUORESCENT  
LAMP

Robert J. Thomas, and Hsueh-Rong Chang, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 15, 1993, Ser. No. 166,858  
Int. Cl.<sup>6</sup> H05B 41/16

U.S. Cl. 315—248

9 Claims



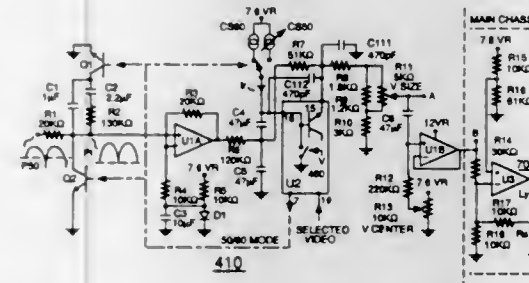
1. An electrodeless solenoidal electric field (SEF) fluorescent discharge lamp, comprising:
  - a light-transmissive envelope containing an ionizable, gaseous fill for sustaining an arc discharge when subjected to a radio frequency magnetic field and for emitting ultraviolet radiation as a result thereof, said envelope having an interior phosphor coating for emitting visible radiation when excited by said ultraviolet radiation, said envelope having a re-entrant cavity formed therein;
  - an excitation coil contained within said re-entrant cavity for providing said radio frequency magnetic field when excited by a radio frequency power supply;
  - an exhaust tube extending through said re-entrant cavity, said exhaust tube having one end opening into said envelope and another end having a tip; and
  - an amalgam situated within said exhaust tube and maintained in a predetermined position toward said tip of said exhaust tube, said amalgam comprising a magnetic material in combination with at least one metal and mercury, said amalgam being initially located in said exhaust tube by an externally generated magnetic field.

5,412,290  
50 HZ PARABOLIC SIGNAL FILTER  
Kenneth J. Helfrich, Hamilton, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Mar. 8, 1994, Ser. No. 207,915  
Int. Cl.<sup>6</sup> G09G 1/04; H03K 4/08

U.S. Cl. 315—371

20 Claims



1. A scanning waveform generators, comprising:
  - means for generating a switching signal, said switching signal having a first state indicative of a video signal operating at a first scanning frequency and having a second

state indicative of said video signal operating at a second scanning frequency;

means responsive to said switching signal for generating a sawtooth shaped signal at one of said first and said second scanning frequencies;

a source of a parabolically shaped signal synchronized with said video signal scanning frequency;

means for generating an S correction signal coupled to said source and to said sawtooth signal generating means; and,

means coupled to said S correction signal generating means for filtering said parabolically shaped signal responsive to said switching signal generator, said filtering means generating a filtered parabolic signal having substantially the same shape during scanning operation at either one of said first and said second scanning frequencies.

5,412,291  
RECONFIGURABLE APPLIANCE ELECTRONIC  
CONTROL SYSTEM WITH AUTOMATIC MODEL  
DETERMINATION, INTERNALLY RESTRUCTURABLE  
CONTROL AND FLEXIBLE PROGRAMMABLE TEST  
MODES

Thomas R. Payne, and Steven A. Rice, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

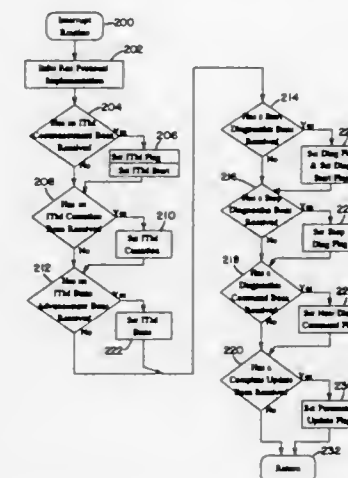
Division of Ser. No. 968,991, Oct. 30, 1992, Pat. No. 5,306,995.

This application Jan. 18, 1994, Ser. No. 182,463

Int. Cl.<sup>6</sup> H02P 1/58

U.S. Cl. 318—102

13 Claims



5,412,293

## POWER SUPPLY FOR MOTOR USABLE WITH AN ELECTRIC VEHICLE

Yukihiko Minezawa, Okazaki, and Hitoshi Dobkoshi, Sapporo, both of Japan, assignors to Kabushiki Kaisha Equos Research, Tokyo, Japan

Continuation of Ser. No. 977,073, Nov. 16, 1992, abandoned.

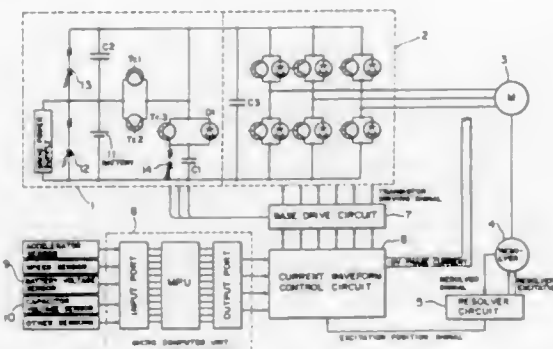
This application May 2, 1994, Ser. No. 236,156

Claims priority, application Japan, Nov. 18, 1991, 3-328287

Int. Cl.<sup>6</sup> H02P 3/00

U.S. Cl. 318—376

22 Claims



1. An electric vehicle for generating at least part of a driving force by a motor, comprising:
  - a driving circuit for driving said motor;
  - a power source unit for supplying electrical power to said motor, said power source unit being regeneratively charged by said motor;
  - a large-capacity capacitor that stores an electrical charge and supplies electrical power to said motor, said large-capacity capacitor being regeneratively charged by said motor;
  - a first sensor for detecting a voltage of said power source unit;
  - a second sensor for detecting a voltage of said large-capacity capacitor; and
  - means for distributing a regenerative power of said motor to said large-capacity capacitor and said power source unit, an amount of regenerative power distributed to said large-capacity capacitor and an amount of regenerative power distributed to said power source unit being determined in response to voltage detected by said first sensor and said voltage detected by said second sensor, so as to regeneratively charge said power source unit and said large-capacity capacitor.

5,412,294

## APPARATUS FOR PREVENTING TRANSMISSION SHOCK IN AUTOMATIC TRANSMISSION EQUIPPED VEHICLES

Kiyoharu Anzai, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 10, 1994, Ser. No. 240,364

Claims priority, application Japan, Aug. 11, 1993, 5-199533

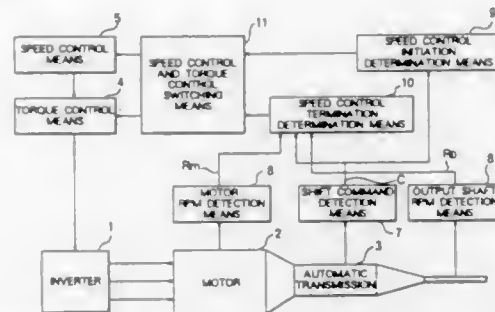
Int. Cl.<sup>6</sup> H02P 7/00; B60K 17/06

U.S. Cl. 318—432

5 Claims

1. An apparatus for preventing transmission shock in an automatic transmission equipped vehicle powered by an inverter driven motor via a transmission, wherein said apparatus comprises:
  - a torque control means for controlling a drive torque of said motor;
  - a speed control means for controlling a drive speed of said motor via said torque control means;
  - a motor rpm detection means for detecting an rpm of said motor;

- a shift command detection means for detecting a shift command of an automatic transmission;
- an output shaft rpm detection means for detecting an output shaft rpm of said automatic transmission;
- a speed control initiation determination means for determining a timing for initiating a speed control of said motor by sensing said shift command;
- a speed control termination determination means for determining a timing for terminating said speed control of said motor based on said output shaft rpm, said shift command and said motor rpm; and



- a speed control and torque control switching means for switching a control of said motor between said speed control and said torque control based on outputs of said speed control initiation determination means and said speed control termination determination means; where
- said speed control and torque control switching means switches said motor from said torque control into said speed control in response to said speed control initiation timing, and switches said motor from said speed control into said torque control in response to said speed control termination timing.

5,412,295

## ABNORMALITY DETECTION CIRCUIT FOR A MOTOR FOR USE IN A COPIER

Kazubisa Maruyama; Masaru Ushio; Junji Sato; Satoshi Sakata; Tomoo Kudo; Tadashi Matsudaira; Hiroyuki Watanabe, and Yoshikazu Maekawa, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

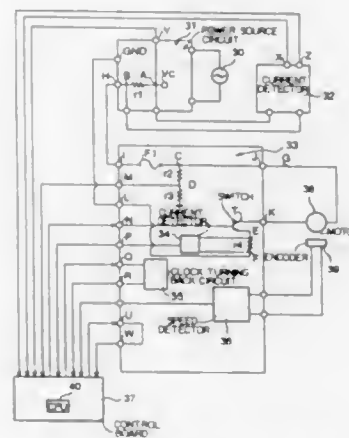
Filed Oct. 18, 1993, Ser. No. 138,357

Claims priority, application Japan, Oct. 23, 1992, 4-309641; Nov. 6, 1992, 4-322568; Nov. 9, 1992, 4-323687

Int. Cl.<sup>6</sup> H02K 17/32

U.S. Cl. 318—434

10 Claims



1. An electric circuit for a motor for use in a toner image forming apparatus, comprising:
  - a motor to rotate a photoreceptor on which a toner image is formed;

- a power source circuit;
- a driving circuit including, a connecting line to connect the power source circuit with the motor, and a switch to selectively open and close the connecting line;
- the driving circuit further including:
  - an abnormal rotational speed detector for detecting an abnormal rotational speed of the motor and for outputting an abnormal rotational speed signal to a control means;
  - an abnormal section detecting circuit including: a current detector; a voltage detector; and a line connection checking circuit;
- the abnormal section detecting circuit being connected to monitor the motor, the power source circuit, and the driving circuit so that a current, a voltage and a line connection at predetermined positions in the electric circuit are detected by said current detector, said voltage detector and said line current checking circuit; and
- the abnormal section detecting circuit providing an output signal to said control means that is indicative of a detection result of the monitoring by said abnormal section detecting circuit;
- the control means controlling the abnormal section detecting circuit in accordance with a plurality of predetermined sequential checking steps after receipt of the abnormal rotational speed signal;
- said control means further determining a location of an abnormal portion of the motor and the electric circuit causing the abnormal rotational speed of the motor on the basis of the output signal from the abnormal section detecting circuit.

5,412,296

## COMPUTER-AIDED SELF-LEARNING INTERMITTENT WINDSHIELD WIPER CONTROLLER

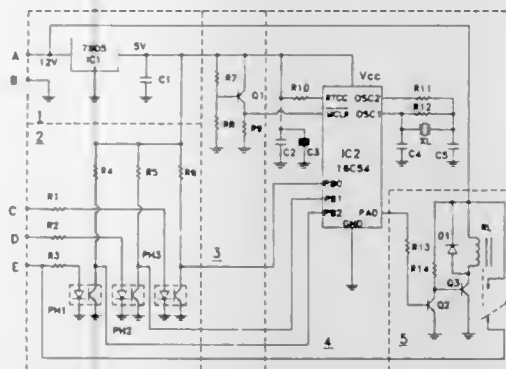
Ming-Hsien Chien, and Chieh-Chin Huang, both of No. 7-3, Lane 425, SEC. 1, Chieh Shou Rd., Paite Hsiang, Taoyuan Hsien, Taiwan, Prov. of China

Filed Oct. 19, 1992, Ser. No. 962,824

Int. Cl.<sup>6</sup> B60S 1/08

U.S. Cl. 318—444

1 Claim



1. A computer-aided self-learning intermittent wiper controller comprising:
  - a wiper means for sweeping a windshield;
  - a wiper switch means for selecting the operation of said wiper means, said wiper switch means having a four-position selection switch, including a high speed, a low speed, an intermittent, and an off positions;
  - a motor means for driving said wiper means;
  - a driving circuit means for driving said motor means;
  - a water jet switch means for activating a windshield wash;
  - a microprocessor means for receiving an intermittent position signal responsive to said wiper switch means in said intermittent position, for receiving a motor cam position signal responsive to a windshield wiper motor cam in a home position, for receiving a water jet switch signal responsive to the activation of said water jet switch

- means, for generating a signal representative of whether said wiper switch means has been manually activated, and for supplying signals to said driving circuit means;
- wherein said microprocessor means measures and memorizes a time interval between a first time said wiper switch means has been manually activated and a second time said wiper switch means has been manually activated, and causes said wiper means to intermittently sweep said windshield at said memorized time interval until said wiper switch means is turned off to reset a different time interval, or turned off and manually reactivated before the expiration of said memorized time interval, at which time, a new time interval is memorized, the new time interval equals the time between the last sweep of said wiper means and the latest activation of said wiper switch means;
- said microprocessor means receives said water jet switch signal indicating said water jet switch means has been activated, and causes said wiper means to sweep said windshield continuously until said water jet switch means is released, after that, causes said wiper means to sweep said windshield continuously for a predetermined time period, stop for a next predetermined time period, and sweep once after the next predetermined time period.

5,412,297

## MONITORED RADIO FREQUENCY DOOR EDGE SENSOR

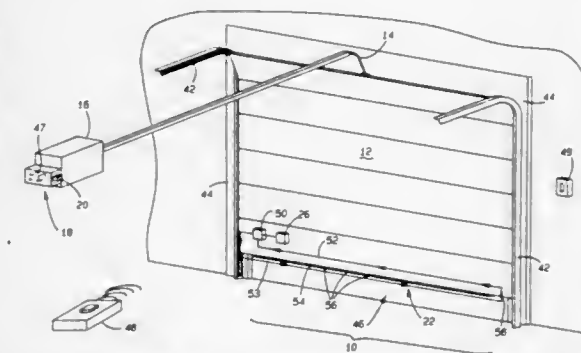
John E. Clark, Ann Arbor, and James S. Murray, S. Lyon, both of Mich., assignors to Stanley Home Automation, Troy, Mich.

Filed Jun. 27, 1994, Ser. No. 265,761

Int. Cl.<sup>6</sup> E05F 15/16; H01H 3/16

U.S. Cl. 318—468

6 Claims



1. A door edge safety sensor for use with an automatic door operator having a motor coupled for moving a door between open and closed conditions to cover an opening and a controller for controlling operation of the motor corresponding to command signals, the sensor comprising:
  - a tactile obstruction detector for generating a safety signal;
  - a door vibration detector for detecting movement of the door between the opened and closed positions;
  - a safety signal transmitter operable in response to detected door movement to provide a coded radio frequency transmission for receipt by the automatic door operator such that the transmission varies between a first and second state corresponding with an active and deactive state, respectively, of such safety signal; and
  - control electronics with provision for a battery power supply electrically communicating with said obstruction detector, said vibration detector, and said signal transmitter and operable between a waiting and active state in response to said vibration detector detecting door movement, said control electronics operable in such active state to monitor status of the safety signal from said obstruction detector;
  - wherein said control electronics interrupt the transmission from said safety signal transmitter in response to said



tactile obstruction detector detecting an obstruction and generating a safety signal indicative thereof, such that in response thereto the automatic door operator reverses the motor which moves the door to a fully open condition.

5,412,298

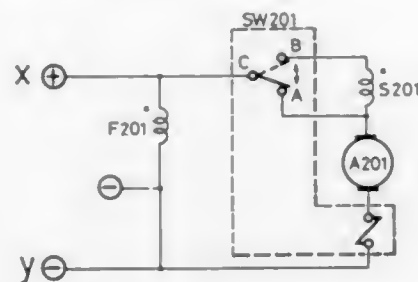
**MOTOR CONTROL CIRCUIT HAVING SERIES OR COMPOUND EXCITATION DURING STARTING AND SHUNT EXCITATION DURING NORMAL RUNNING**  
Tai-Her Yang, 5-1 Talpin St., Si-Hu Town, Dzan-Hwa, Taiwan, Prov. of China

Filed Aug. 11, 1993, Ser. No. 104,638

Int. Cl.<sup>6</sup> H02P 1/18

U.S. Cl. 318—529

13 Claims



1. A motor control circuit, comprising:  
a series motor which includes a series field winding, a shunt field winding, and means including a switch device for connecting the series winding in series between a power supply and an armature of the motor for providing series operation during start up or overload, and for bypassing the series winding during normal operation to provide a shunt connection during normal operation.

5,412,299

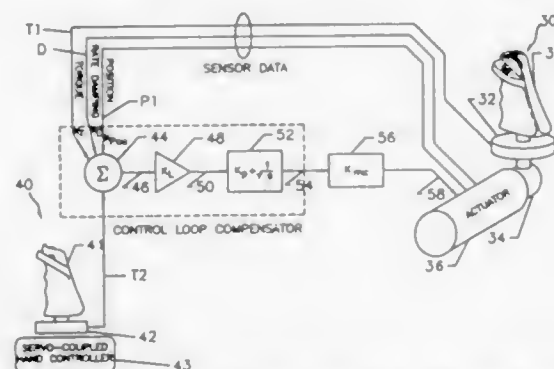
**VARIABLE SERVO LOOP COMPENSATION IN AN ACTIVE HAND CONTROLLER**  
William W. Gregory, St. Petersburg; Wayne E. Lance, Largo, and Jeffrey W. Hegg, North Redington Beach, all of Fla., assignors to Honeywell, Inc., Minneapolis, Minn.

Filed Dec. 21, 1993, Ser. No. 171,549

Int. Cl.<sup>6</sup> B64C 13/16

U.S. Cl. 318—628

25 Claims



1. An active hand controller system for use with a flight control computer providing a force scaling command signal, said active hand controller system having a first hand controller means connected to a first actuator means, comprising:  
rate detecting means for providing a rate signal from said first actuator means;  
torque detecting means for providing a first torque signal from said first hand controller means;  
position detecting means for providing a first position signal from said first actuator means; and  
processing and control means for accepting said rate signal,

said first torque signal said first position signal, and said force scaling command signal and providing a drive signal to said first actuator, said processing and control means including a plurality of parameters, each said parameter being adjustable to a value, said plurality of parameter values determining a relationship of said drive signal to said rate signal, said torque signal, said position signal and said force scaling command signal; and

state detecting and parameter controlling means for accepting and processing according to a first sequence, said first torque signal, said first position signal, and said force scaling command signal, and providing a plurality of control parameter adjustment signals to adjust said adjustable control parameters to a plurality of values, said plurality of values having a relationship to said torque signal, said position signal and said force scaling command signal.

5,412,300

**NUMERICAL CONTROL DEVICE AND METHOD FOR CONTROL OF MOVEMENT OF A TOOL**

Piotr J. Meyer, Szczecin, Poland, and Noel Ripoll-Ensenat, Eindhoven, Netherlands, assignors to Grundig Aktiengesellschaft, Furth, Germany

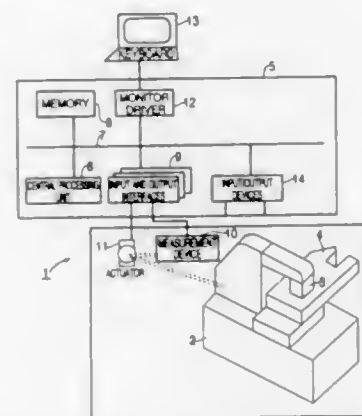
Filed Apr. 23, 1993, Ser. No. 52,309

Claims priority, application European Pat. Off., Apr. 23, 1992, 92201145

Int. Cl.<sup>6</sup> G05B 19/18

U.S. Cl. 318—568.11

5 Claims



1. A numerical control device for controlling movement of a tool, steerable by a steering device, along a tool path to create a contour on a workpiece, said numerical control device comprising:

input means for receiving (i) contour data representing the contour desired on the workpiece and (ii) offset data representing the offset between a reference point on the tool and a working edge of the tool engaging the workpiece;

calculating means for calculating the tool path from said contour data and said offset data, said calculating means including parameterizing means for generating a plurality of spline segments parameterizing the tool path, each spline segment including end points having positions and slopes derived from said contour data and said offset data; and

control signal generating means for generating control signals for the steering device to steer the tool along the calculated tool path.

said control signal generating means generating control signals for a portion of said tool path prior to said parameterizing means generating all of the spline segments for the tool path,

said input means being receptive, after the control signal generating means begins generating control signals, of at least one of (i) revised contour data and (ii) revised offset

data for the portion of the tool path for which control signals have not been generated,  
said calculating means parameterizing the tool path for the remaining portion of the tool path for which control signals have not been generated using revised data received by the input means;

wherein said calculating means further includes approximating means for approximating each spline segment by a mathematical equation such that a maximum deviation between said tool path and said calculated tool path defined by said mathematical equation is directly derivable as said calculated tool path is being determined; and  
wherein said contour data is in the form of parameters describing a multiple differential equation, and said calculating means includes

means for receiving said parameters describing said multiple differential equation,  
means for determining from said contour data and said offset data an estimated maximum error ( $\epsilon_{max}$ ) between said tool path and said calculated tool path,  
determining means for determining the length of said spline segments,

reducing means for reducing the length of said spline segments if said estimated maximum error exceeds a predetermined tolerance and wherein said approximating means approximates each spline segment with a polynomial.

5,412,301

**DRIVE FOR A DRAFTING ARRANGEMENT**

Erich Jorrot, and Urs Keller, both of Seuzach, Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

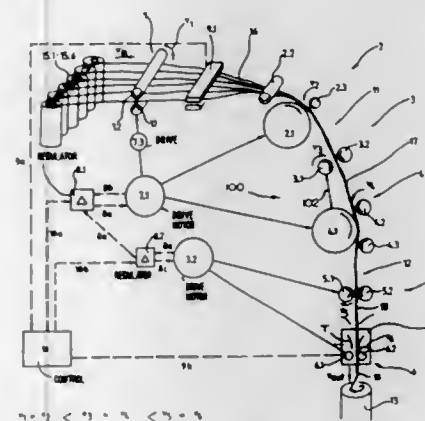
Continuation of Ser. No. 729,328, Jul. 12, 1991, abandoned. This application Jan. 3, 1994, Ser. No. 176,699

Claims priority, application Switzerland, Jul. 13, 1990, 02357/90

Int. Cl.<sup>6</sup> G06F 15/46; G01D 3/04; D01H 5/32

U.S. Cl. 318—640

12 Claims



1. A regulated drive for a drafting arrangement, said regulated drive comprising:

a regulated drive motor being operatively connected to drive a drive shaft for driving at least a portion of said drafting arrangement;

a regulation circuit for regulating said regulated drive motor;

position determining means for determining an angular position of said drive shaft within said drafting arrangement, while said drive shaft is at a standstill, and for generating a standstill position signal which indicates said angular position, while said drive shaft is at a standstill;

said regulation circuit comprising means for monitoring said standstill position signal after stopping said drive motor and before starting said drive motor, and means for regu-

lating said regulated drive motor as a function of the monitored standstill position signal; and  
said drafting arrangement comprising means for regulating mass fluctuations of textile material processed by the drafting arrangement.

5,412,302

**ROTARY BODY DRIVE CONTROL APPARATUS CAPABLE OF COMPENSATING FOR VARIATIONS OF TRANSFER CHARACTERISTICS**

Mamoru Kido; Kenji Kanzaki; Noribumi Sato; Minoru Kasama, and Tosio Anzai, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

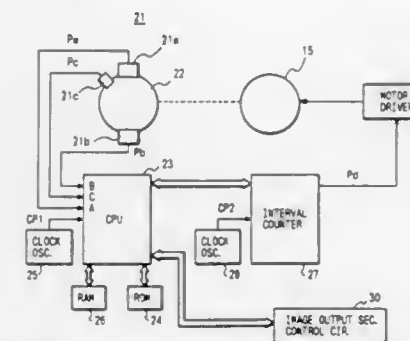
Filed Oct. 19, 1993, Ser. No. 137,770

Claims priority, application Japan, Dec. 1, 1992, 4-322076

Int. Cl.<sup>6</sup> H02P 5/00, 8/00

U.S. Cl. 318—685

6 Claims



tively slow-changing operating conditions, said controller having principal operating components which consist essentially of:

- a power supply receiving input AC power from a source;
- a sensor for measuring a magnitude of an operational parameter R of said system;
- a system component for converting said operational parameter into a proportional voltage representative of a derivative of a corresponding power/voltage curve;
- low pass filter means for shaping said proportional voltage;
- an integrating amplifier for comparing the shaped proportional voltage to a preselected reference voltage;
- a zero volt detector generating a pulse each time said power supply voltage passes through zero;
- a ramp generator for converting said pulse into a timing signal;
- a firing circuit comparator for combining said shaped proportional voltage with said timing signal to produce a timed control signal;
- a triac triggered by said firing comparator to feed current to said AC motor;

whereby said servo controller iteratively compares said power requirements to power delivered and reduces the delivered power to the lowest level required and provides full voltage firing of said triac as needed without using a regenerative feedback circuit.

5,412,304

#### COOLED PRIMARY OF AUTOMOBILE BATTERY CHARGING TRANSFORMER

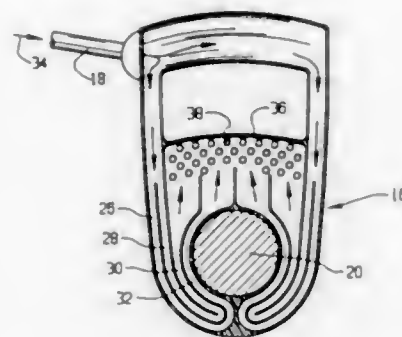
Russell M. Abbott, Riverside, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 9, 1993, Ser. No. 103,618

Int. Cl.<sup>6</sup> H02J 7/00

U.S. Cl. 320—2

31 Claims



15. An automotive vehicle having a slot therein and having electric transformer secondary structure adjacent said slot, including a secondary electrical winding and a magnetic core forming a portion of a magnetic circuit;

an inductive charge coupler for insertion into said slot, said inductive charge coupler having a primary electrical winding and primary magnetic core for completing the magnetic circuit when said inductive charge coupler is in said slot, said inductive charge coupler being connected to a fixed power source for energization of said primary magnetic core so that electric power is transferred to said vehicle; and

cooling means on said inductive charge coupler for cooling said inductive charge coupler.

#### 5,412,305 APPARATUS WITH DISCRETE CIRCUITS FOR CHARGING ELECTRICAL ACCUMULATOR WITH MULTIPLE GROUP OF CELLS

René Jeanneret, Merzigen, Switzerland, assignor to SMH Management Services AG, Biel, Switzerland

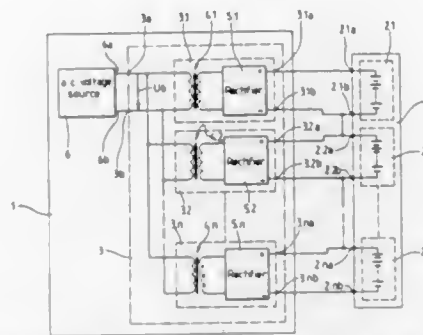
Filed May 28, 1993, Ser. No. 68,106

Claims priority, application France, Jun. 1, 1992, 92 06691

Int. Cl.<sup>6</sup> H02J 7/08

U.S. Cl. 320—17

5 Claims



1. An apparatus for charging a rechargeable electrical energy accumulator for producing a first d.c. voltage, said accumulator having cells arranged in multiple groups of cells each group comprising at least one cell, and each group of said multiple groups of cells having group terminals and providing a second d.c. voltage across said group terminals, said apparatus comprising a source for producing a first a.c. voltage and a plurality of discrete charging circuits each for charging a corresponding group of said multiple groups of cells, each of said charging circuits having charging terminals for connection to corresponding group terminals of said corresponding group of said multiple groups of cells, one of said group terminals being a positive terminal of said accumulator and another of said group terminals being a negative terminal of said accumulator, group terminals other than said positive and negative accumulator terminals being connected such that all of the cells of said accumulator are connected in series with one another between said positive and negative accumulator terminals, and each of said charging circuits comprising a respective transformer having a primary winding connected to said source and a secondary winding, and a rectifier having inputs connected to said secondary winding and outputs connected to said charging terminals, the primary windings of the respective transformers of said charging circuits being independent of each other.

5,412,306

#### METHOD AND APPARATUS FOR CHARGING A BATTERY

Vernon Meadows, Coral Springs; Anaba A. Anani, Lauderhill, and Jose M. Fernandez, Plantation, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 14, 1993, Ser. No. 120,499

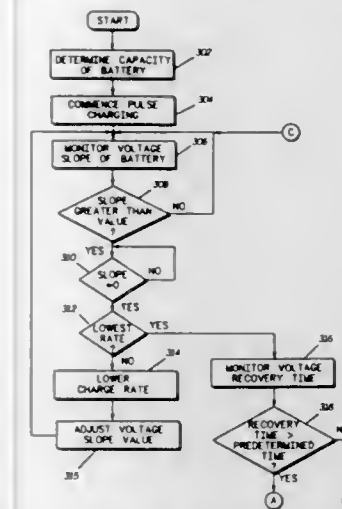
Int. Cl.<sup>6</sup> H01D 10/44

U.S. Cl. 320—20

5 Claims

1. A method for charging a battery, the battery having a battery voltage, comprising the steps of: charging the battery at a first charge rate; monitoring the battery voltage while it is being charged at the first charge rate; calculating the voltage slope of the battery; determining when the voltage slope of the battery reaches a predetermined value; determining when the voltage slope reaches zero after the voltage slope of the battery has reached the predetermined value; charging the battery at a second charge rate which is lower

than the first charge rate when the voltage slope is equal to zero; discontinuing the charging of the battery; monitoring the voltage of the battery in order to determine



how long it takes for the battery voltage to reach a predetermined voltage level after the charging of the battery has been discontinued; and commencing to charge the battery again when the battery voltage has reached the predetermined voltage level.

5,412,307

#### RESIDUAL CAPACITY INDICATING DEVICE

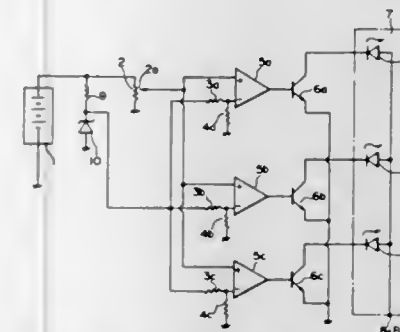
Morio Yoshimatsu, Kanagawa, Japan, assignor to Sony Corporation, Japan

Continuation of Ser. No. 895,686, Jun. 9, 1992, abandoned. This application Aug. 9, 1993, Ser. No. 110,648

Int. Cl.<sup>6</sup> H02J 7/00

U.S. Cl. 320—44

5 Claims



1. A residual capacity indicating device for indicating the residual capacity of a battery having a discharge voltage which decreases as said battery is discharged and having said capacity which increases with an increase in temperature, said residual capacity indicating device comprising:

reference voltage generating means for detecting said discharge voltage of said battery and for producing a battery reference voltage; temperature compensating means for detecting said discharge voltage, for temperature compensating said discharge voltage, and for outputting a temperature compensated reference voltage; voltage dividing means for receiving said temperature compensated reference voltage and for producing a plurality of comparison reference voltages, each of said plurality of comparison reference voltages being a different fraction of said temperature compensated reference voltage; a plurality of comparators each having a non-inverting input

for receiving said battery reference voltage from said reference voltage generating means and having an inverting input for receiving said comparison reference voltages from said voltage dividing means, each comparator producing a comparison output signal based upon a comparison of said battery reference voltage to said respective one of said comparison reference voltages and

a plurality of indicating means each connected to a respective comparator, said indicating means indicating the residual capacity of said battery on the basis of said comparison output signals.

5,412,308

#### DUAL VOLTAGE POWER SUPPLY

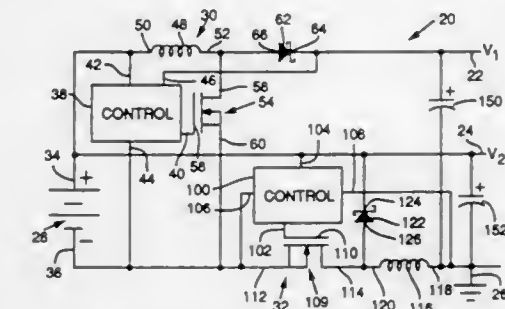
Preston D. Brown, Eugene, Oreg., assignor to Hewlett-Packard Corporation, Palo Alto, Calif.

Continuation of Ser. No. 1,019, Jan. 6, 1994, abandoned. This application Mar. 15, 1994, Ser. No. 214,088

Int. Cl.<sup>6</sup> G05F 1/577

U.S. Cl. 323—267

13 Claims



1. A power supply comprising: first and second output terminals and a ground terminal, the first and second output terminals and a ground terminal, the first and second output terminals providing output voltages of  $V_1$  and  $V_2$ , respectively; an input voltage source providing an input voltage of  $V_{in}$ ; first regulator means coupled between the input voltage source and the first output terminal for converting  $V_{in}$  to  $V_1$ , the first regulator means capable of providing an output voltage higher than  $V_{in}$ , and capable of providing an output voltage lower than  $V_{in}$ ; second regulator means coupled between the input voltage source, the second output terminal, and the ground terminal for converting  $V_{in}$  to  $V_2$ ; wherein neither the first nor second regulator means includes a transformer.

5,412,309

#### CURRENT AMPLIFIERS

Paul T. Ueunten, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 22, 1993, Ser. No. 20,664

Int. Cl.<sup>6</sup> G05F 3/16; H03F 3/45

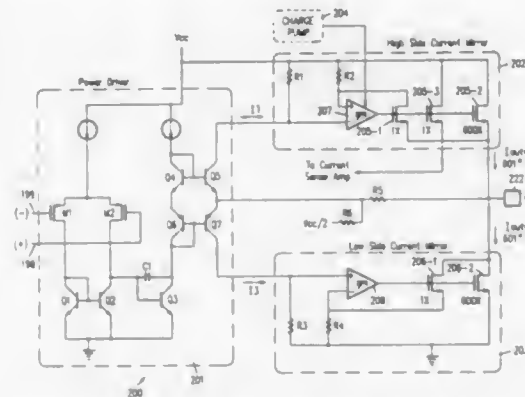
U.S. Cl. 323—316

24 Claims

1. A current amplifier comprising: an input lead for receiving an input current to be amplified; an output terminal for providing an output current as a function of said input current; a first supply voltage lead; a second supply voltage lead; an anti-shoot through circuit having an input lead coupled to said input lead of said current amplifier, a first output lead coupled to said output terminal of said current amplifier, a second output lead, and a third output lead; a pull up circuit comprising: a first transconductance amplifier having a first differential input lead coupled to said second output lead of said



- anti-shoot through circuit, a second differential input lead, and an output lead;
- a first resistor connected between said first differential input lead of said first transconductance amplifier and said first supply voltage lead;
  - a second resistor connected between said second differential input lead of said first transconductance amplifier and said first supply voltage lead;
  - a first transistor having a first current handling lead coupled to said second differential input lead of said first transconductance amplifier, a second current handling lead connected to draw current through said first transistor, and a control lead coupled to said output lead of said first transconductance amplifier; and
  - a second transistor having a first current handling lead coupled to said first supply voltage lead, a second current handling lead connected to said output terminal, and a control lead coupled to said output lead of said first transconductance amplifier; and
  - a pull down circuit comprising:



- a second transconductance amplifier, having a first differential input lead coupled to said third output lead of said anti-shoot through circuit, a second differential input lead, and an output lead;
- a third resistor connected between said first differential input lead of said second transconductance amplifier and said second supply voltage lead;
- a fourth resistor connected between said second differential input lead of said second transconductance amplifier and said second supply voltage lead;
- a third transistor having a first current handling lead coupled to said second differential input lead of said second transconductance amplifier, a second current handling lead connected to draw current through said third transistor, and a control lead coupled to said output lead of said second transconductance amplifier; and
- a fourth transistor having a first current handling lead coupled to said second supply voltage lead, a second current handling lead connected to said output terminal, and a control lead coupled to said output lead of said second transconductance amplifier.

5,412,310

**SWITCHABLE INDUCTOR FOR STRONG CURRENTS**  
Ivan Wolk, Arnouville les Gonesse, and Guy Boulzaguet, Nanterre, both of France, assignors to Thomson-CSF, Puteaux, France

Filed May 7, 1993, Ser. No. 57,829

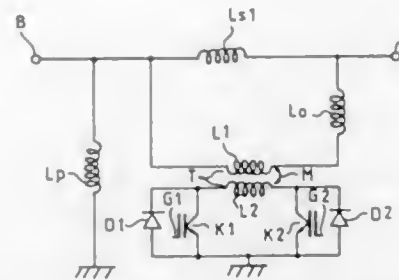
Claims priority, application France, May 12, 1992, 92 05722  
Int. Cl.<sup>6</sup> H01F 21/00; H03J 5/00

U.S. Cl. 323—355

18 Claims

- 4. A switchable inductor, comprising:
  - a first and second terminals;
  - a transformer having a primary winding with two terminals and a secondary winding having two terminals, the primary winding being coupled to at least one inductor, the

primary winding having the two terminals thereof respectively connected to said first terminal and said second terminal, and the two terminals of the secondary winding being respectively connected to third and fourth terminals;



a switching means, connected to the third and fourth terminals for short circuiting and open circuiting the third and fourth terminals to vary an inductance across the first and second terminals.

5,412,311

**SYSTEM FOR UNAMBIGUOUSLY DETERMINING THE PHASE OF AN INPUT SIGNAL OF RELATIVE TO A CLOCK REFERENCE SIGNAL**

Albrecht Rothermel, VS-Villingen, Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Germany

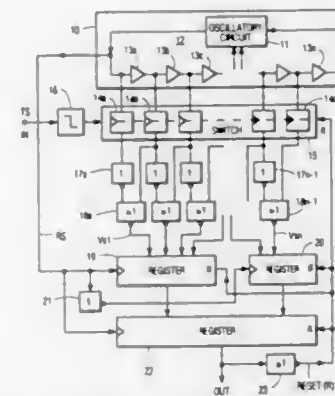
Filed Apr. 6, 1993, Ser. No. 43,395

Claims priority, application Germany, Apr. 8, 1992, 42 11 701.1

Int. Cl.<sup>6</sup> G01R 25/00

U.S. Cl. 324—76.82

4 Claims



- 1. In a clocked signal processing system including means for comparing an input signal with respect to a reference signal, apparatus providing an unambiguous determination of a phase of said input signal relative to said reference signal, comprising:
  - comparison means responsive to said input signal and to said reference signal for providing plural output comparison signals representative of a phase relationship between said input signal and said reference signal, said comparison means including first means for altering a state of one of said plural comparison signals as a function of a significant change in the state of said input signal;
  - a downstream stage having signal inputs, signal outputs, and a clock input responsive to said reference signal;
  - second means for conveying a first group of said comparison signals to respective inputs of said downstream stage synchronous with said reference signal as a function of a first clock with a first phase derived from said reference signal; and
  - third means for conveying a second group of said comparison signals to respective inputs of said downstream stage

synchronous with said reference signal as a function of a second clock with a second phase different from said first phase and also derived from said reference signal; wherein output signals from said downstream stage provide an unambiguous indication of a phase of said input signal relative to said reference signal.

5,412,312

**FREQUENCY AND INSTANTANEOUS VOLTAGE LEVEL METER**

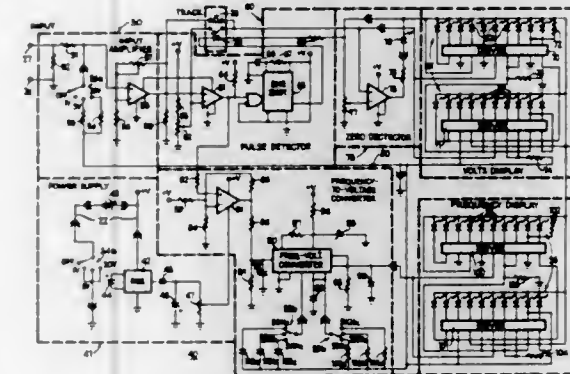
Matthew M. Crass, and Robert D. Braun, both of Kenosha, Wis., assignors to Snap-on Incorporated, Kenosha, Wis.

Filed Oct. 1, 1992, Ser. No. 955,348

Int. Cl.<sup>6</sup> G01R 19/00, 29/00

U.S. Cl. 324—122

19 Claims



- 15. Apparatus for providing a visual display of the instantaneous voltage and the frequency of a variable electric analog signal comprising: voltage display means including a series of voltage display elements respectively corresponding to different voltage level ranges, voltage display drive means coupled to said voltage display means and responsive to the analog signal for causing a voltage display element to produce a visual indication for as long as the instantaneous voltage of the analog signal lies in the voltage level range corresponding to the display element, limit selection means for selecting a predetermined voltage limit, comparison means for comparing the analog signal to the predetermined voltage limit and generating a limit signal when the instantaneous voltage of the analog signal passes beyond the predetermined limit, limit display means coupled to said comparison means and responsive to said limit signal for producing a visual indication, frequency display means including a series of frequency display elements respectively corresponding to different frequency ranges, means responsive to the limit signal for generating a drive signal having the frequency of the limit signal, and frequency display drive means coupled to the frequency display means and responsive to the drive signal for causing a frequency display element to produce a visual indication when the frequency of the limit signal lies in the frequency range corresponding to the frequency display element.

5,412,313

**METHOD TO REDUCE TEST VECTORS/TEST TIME IN DEVICES USING EQUIVALENT BLOCKS**

William C. Martin, Carrollton, Tex., assignor to VLSI Technology, Inc., San Jose, Calif.

Continuation of Ser. No. 643,599, Jan. 22, 1991, abandoned. This application Oct. 9, 1992, Ser. No. 959,179

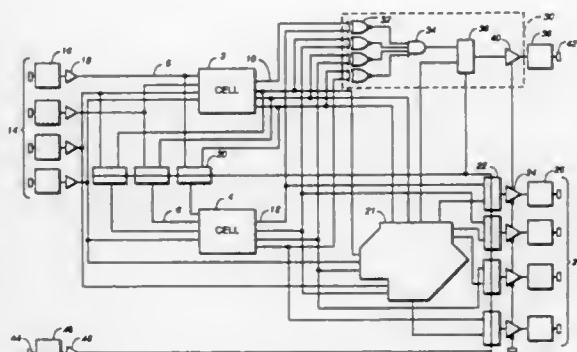
Int. Cl.<sup>6</sup> G01R 31/02

U.S. Cl. 324—158.1

19 Claims

- 1. A method for testing the functionality of a circuit having a normal mode of operation and a test mode of operation comprising the steps of:
  - producing a test vector for testing functionality of a first cell included in the circuit;
  - applying the test vector during the test mode to a first num-

ber of cells included in the circuit, said first number of cells including at least the first cell and at least one additional cell of the circuit in parallel; and



examining an output from a second number of said cells less than said first number of cells during said test mode to verify that said first number of cells produces a desired output in response to said test vector.

5,412,314

**TESTING APPARATUS FOR SEMICONDUCTOR DEVICE FORMED ON TAPE CARRIER**

Satoru Fukunaga, Junichirou Hisatomi, both of Tenri; Kazuhiro Nakamura, Ikoma; Ken'ichi Ohi, Osaka; Hideki Tanaka, Ashiya, and Masayuki Tabuchi, Daito, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

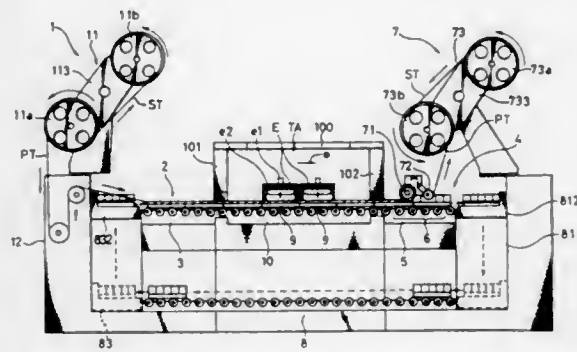
Filed Jan. 22, 1993, Ser. No. 6,306

Claims priority, application Japan, Feb. 7, 1992, 4-022879

Int. Cl.<sup>6</sup> G01R 31/28

U.S. Cl. 324—158.1

17 Claims



- 1. An apparatus for testing a semiconductor device formed on a carrier tape, comprising:
  - an inlet station;
  - an outlet station;
  - a conveying path connecting said inlet station and said outlet station, said conveying path being moved with said carrier tape;
  - an inlet pusher disposed at said inlet station for pushing, with a first force, a test board in a feeding direction along the conveying path by a distance corresponding to a width of said test board, said test board having a package socket mounted thereon for receiving a segment of said carrier tape with said semiconductor device thereon;
  - a contacting device positioned in opposed relationship to said conveying path for electrically contacting the pushed test board and for applying an electrical signal to said semiconductor device for performing a test of said semiconductor device for testing purposes;
  - a braking device disposed at said outlet station for braking

the test board with a second force as the test board is received at the outlet station, the second force being less than the first force; and  
a test board returning device for receiving said test board from said outlet station and returning said received test board to said inlet station.

5,412,315

**SEMICONDUCTOR INTEGRATED CIRCUIT ADAPTED FOR A CURRENT-LEAK TEST**  
Noriko Tsuda, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

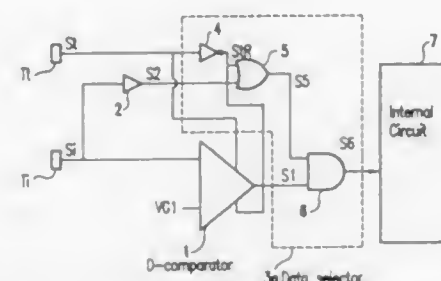
Filed Nov. 23, 1993, Ser. No. 157,223

Claims priority, application Japan, Nov. 26, 1992, 4-317017

Int. Cl.<sup>6</sup> G01R 31/28

U.S. Cl. 324—158.1

10 Claims



10. A semiconductor integrated circuit adapted for a current-leak test, including both a first circuit of an analog circuit and a second circuit of a digital circuit, the semiconductor integrated circuit comprising:

operation mode signal generating means that outputs an operation mode signal of a first logic level when performing a current-leak test of the semiconductor integrated circuit, and that outputs an operation mode signal of a second logic level when operating the semiconductor integrated circuit in normal operation;

disable means that inhibits the operation of the first circuit and forcibly fixes an output of the first circuit to a prescribed logic level when the operation mode signal is of the first logic level, and enables operation of the first circuit when the operation mode signal is of the second logic level;

a third circuit that is a logic gate logically equivalent to the first circuit in normal operation, that receives a data signal identical to that supplied to the first circuit; and

selection means, having a first data input connected to the output of the first circuit and a second data input connected to an output of the third circuit, that transmits the output of the first circuit to an internal circuit of the semiconductor integrated circuit when the operation mode signal is of the second logic level, and transmits the output of the third circuit to the internal circuit when the operation mode signal is of the first logic level,

wherein the selection means has first and second gate means; the first gate means receiving the operation mode signal and output of the third circuit and outputting output of the third circuit when the operation mode signal is of the first logic level, and when the operation mode signal is of the second logic level, outputting a signal of logic level identical to the signal of the prescribed logic level outputted by the first circuit when the operation mode signal is of the first logic level; and

the second gate means receiving the output of the first circuit and the output of the first gate means and transmitting output of the first gate means when the operation-mode signal is of the first logic level, and when the operation mode signal is of the second logic level, transmitting the output of the first circuit.

5,412,316  
**MAGNETOSTRICTIVE LINEAR POSITION DETECTOR WITH AXIAL COIL TORSIONAL STRAIN TRANSDUCER**  
Arthur Dumais, Rochester, and Richard D. Koski, Troy, both of Mich., assignors to Patriot Sensors and Controls, Clawson, Mich.

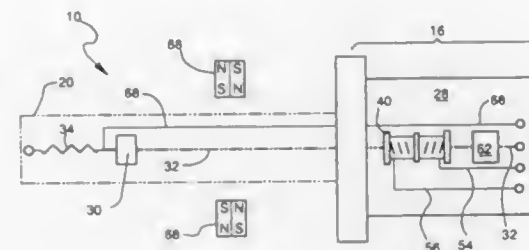
Continuation of Ser. No. 766,518, Sep. 27, 1991, abandoned. This application Oct. 15, 1992, Ser. No. 961,399

The portion of the term of this patent subsequent to May 21, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> G01B 7/14, 7/26; G01F 23/50

U.S. Cl. 324—207.13

2 Claims



1. A magnetostrictive linear displacement detector comprising:

a magnetostrictive wire having opposite head and foot ends and defining a measurement interval therebetween;

a return wire having a foot end electrically coupled to said foot end of said magnetostrictive wire and a head end;

a magnet disposed for displacement along the said magnetostrictive wire within said measurement interval, the position of said magnet within said measurement interval being the linear displacement detected;

said magnet including

a first magnet section having a toroidal shape around the magnetostrictive wire with radially disposed magnetic poles, a south magnetic pole disposed inwardly and a North magnetic pole disposed outwardly; and

a second magnet section disposed adjacent to said first coil section, having a toroidal shape around the magnetostrictive wire with radially disposed magnetic poles, a North magnetic pole disposed inwardly and a South magnetic pole disposed outwardly;

an electrical excitation means electrically coupled to said head end of said magnetostrictive wire and said head end of said return wire for producing a predetermined electrical excitation through said magnetostrictive wire and said return wire; and

a torsional strain sensor disposed proximate to said head end of said magnetostrictive wire for generating an electrical indication of torsional strain within said magnetostrictive wire, said torsional strain sensor including

a first coil section axially wound in a clockwise direction around the magnetostrictive wire for a length parallel to the magnetostrictive wire, and

a second coil section disposed adjacent to said first coil section, connected in series with said first coil section and axially wound in a counterclockwise direction around the magnetostrictive wire for a length parallel to the magnetostrictive wire, the total length of said first and second coil sections selected to be short in relation to the speed of propagation of electrical signals through the magnetostrictive wire and long in relation to the speed of propagation of torsional strain through the magnetostrictive wire.

5,412,317  
**POSITION DETECTOR UTILIZING ABSOLUTE AND INCREMENTAL POSITION SENSORS IN COMBINATION**

Kozo Kyoizumi, Toyonaka, Japan, assignor to Santest Co., Ltd., Osaka, Japan

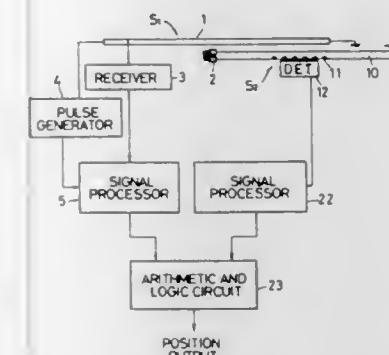
Filed Apr. 16, 1993, Ser. No. 48,665

Claims priority, application Japan, Jul. 7, 1992, 4-202954

Int. Cl.<sup>6</sup> G01B 7/14; G01D 5/12, 5/244

U.S. Cl. 324—207.14

5 Claims



1. A position detecting system for determining the position of a movable object within a stroke region, including:

means, comprising a first position sensor, for detecting the absolute position of said movable object over the entire stroke region and producing a first output;

means, comprising a second position sensor, for detecting the position of said movable object within any one of a plurality of ranges within said stroke region and into which said stroke region is divided, said ranges being disposed within said stroke region at a uniform pitch, and said second position sensor producing a second output;

the first and second position sensors being independent of each other, and operated in parallel with each other, each of said position sensors comprising first and second elements, the first and second elements of each sensor being movable relative to each other, and the second elements of both position sensors being fixed to each other; and means responsive to said first and second outputs for producing an output indicative of the position of said movable object within said stroke region, said responsive means including correcting means, responsive to said second output, for effecting a correction of the position of said movable object as detected by said first position sensor.

5,412,318

**DEVICE FOR DETECTING ATTEMPTS AT FRAUD ON AN APPARATUS FOR READING AND WRITING ON A CHIP CARD**

Pbllippe Vaulin, Viuz en Sallaz, France, assignor to Landis &amp; Gyr Business Support AG, Zug, Switzerland

Continuation-in-part of Ser. No. 967,620, Oct. 28, 1992, abandoned. This application Jan. 27, 1993, Ser. No. 9,874

Claims priority, application Switzerland, Mar. 17, 1992, 00854/92; May 25, 1992, 01679/92; Nov. 16, 1992, 03519/92

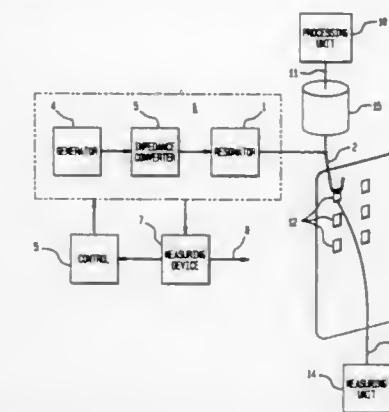
Int. Cl.<sup>6</sup> G01R 27/14, 31/00

U.S. Cl. 324—708

6 Claims

1. A method of detecting attempts at fraud by connection of an electric feed line (13) to a connecting point (12) of a chip card (3) in an apparatus for reading and writing in a memory on the chip card (3), having a measuring device (7) connected to a resonance unit (6) having a resonator (1) coupled to the connecting point (12) and whose electrical properties are varied by the feed line (13) and detected by the measuring device (7), comprising measuring the impedance at the input of the

resonator (1) and comparing said impedance to a reference value, said reference value being related to the impedance of



the resonator (1) without the feed line (13) being connected to said connecting point (12).

5,412,319

**DEVICE TO DETECT DISTURBANCES IN AN ELECTROMAGNETIC FIELD INDUCED BY SURFACE FAULTS IN A METALLIC BAR OR WIRE ROD IN MOVEMENT**

Lorenzo Ciani, Udine, Italy, assignor to Ceda SpA Construzioni Elettromeccaniche e Dispositivi d'Auto-mazione, Buttrio, Italy

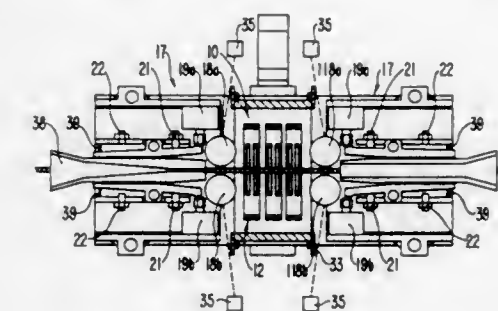
Filed Mar. 11, 1993, Ser. No. 29,589

Claims priority, application Italy, Mar. 20, 1992, UD9-2A0042; Mar. 20, 1992, UD92A0043

Int. Cl.<sup>6</sup> G01N 27/90

U.S. Cl. 324—241

10 Claims



1. A fault detection device to detect surface faults in a hot metallic bar or wire rod travelling along a nominal feed axis at speeds up to 130 meters per second, comprising:

a pair of lateral clamping and guide rolls able to move between a first intake position in which the rolls are spaced a predetermined distance apart and a second inspection position in which the rolls are in contact with and guide the bar or rod; and, downstream of the pair of lateral clamping and guide rolls, at least two measurement assemblies, each of said at least two measurement assemblies comprising first coil and at least a pair of second coils, the first coils generating an alternating magnetic flow which causes on the surface of the bar or rod parasitic currents that generate in the second coils a magnetic feedback flow, the first and second coils lying on the same axis, the at least two measurement assemblies having their lengthwise axes able to move from an open position defining an intake hole, to an inspection position defining a resulting inspection hole, wherein the lengthwise axes of the measurement assemblies coincide substantially with the nominal feed axis when the measurement assemblies are in the open position and wherein the lengthwise axes of the



measurement assemblies are substantially parallel to the nominal feed axis and are positioned substantially at an equal distance apart on about a circumference, said each measurement assembly further includes externally a rotation pivot having its axis substantially parallel to the nominal feed axis, the rotation pivots being symmetrically arranged substantially along the circumference, each said measurement assembly being pivotable around its rotation pivot between said open and said inspection position, a center of the circumference lying substantially on the nominal feed axis, when the measurement assemblies are in the inspection position, wherein an index of filling of the resulting inspection hole is greater than 0.8, the index of filling being defined by a ratio between a cross-sectional area of the bar or rod and an area of the resulting inspection hole.

5,412,320

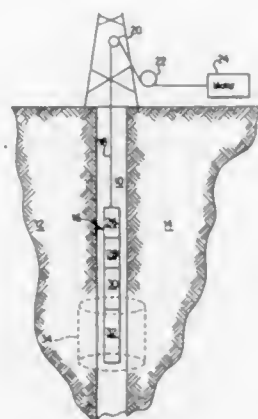
# NUCLEAR MAGNETIC RESONANCE DETERMINATION OF PETROPHYSICAL PROPERTIES OF GEOLOGIC STRUCTURES

George R. Coates, Austin, Tex., assignor to Numar Corporation, Malvern, Pa.

Continuation-in-part of Ser. No. 701,516, May 16, 1991, abandoned. This application Jun. 15, 1992, Ser. No. 898,990  
Int. Cl.<sup>6</sup> G01V 3/00

U.S. Cl. 324—303

20 Claims



1. A method for determining the composition of a geologic structure using a NMR logging tool, comprising the steps of: imparting a polarizing magnetic field to a geologic structure for a predetermined period of time; measuring nuclear magnetic resonance signals representing spin-echo relaxation of a population of particles in the geologic structure; constructing a chain of spin-echo signals characteristic of said population of particles; determining values for the porosity (PHI) of the geologic structure from said chain of spin-echo signals; determining values for the bulk-volume irreducible water (BVI) of the geologic structure from said chain of spin-echo signals; and deriving additional petrophysical properties of the geological structure from said porosity (PHI) values and from said bulk volume irreducible water (BVI) values and displaying the derived properties in a human-readable form.

5,412,321

# MAGNETIC RESONANCE IMAGING METHOD AND APPARATUS

Satoru Kohno, and Neoto Iijima, both of Kyoto, Japan, assignors to Shimadzu Corporation, Kyoto, Japan

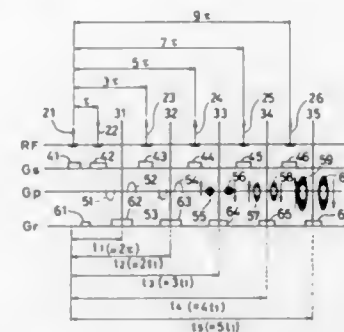
Filed Nov. 29, 1993, Ser. No. 158,269

Claims priority, application Japan, Nov. 30, 1992, 4-345528

Int. Cl.<sup>6</sup> G01R 33/20

U.S. Cl. 324—309

6 Claims



1. A magnetic resonance imaging method for emitting a single excitation RF pulse and then a plurality of refocusing RF pulses to an examinee to generate echo signals successively, said method comprising the steps of: (a) emitting said single excitation RF pulse and then said plurality of refocusing RF pulses to the examinee to generate echo signals successively; (b) applying slice selecting gradient field pulses for selecting a slice plane simultaneously with said excitation RF pulse and said refocusing RF pulses; (c) applying phase encoding gradient field pulses for phase-encoding a key echo signal and subsequent echo signals among the echo signals resulting from steps (a) and (b) above, without applying the phase encoding gradient field pulses for phase-encoding echo signals generated before said key echo signal, said key echo signal being a signal having collected data of lines in and adjacent a center region of a raw data space of said slice plane; and (d) applying reading gradient field pulses in respect of the echo signals for which said phase encoding gradient field pulses have been applied.

5,412,322

# APPARATUS AND METHOD FOR SPATIALLY ORDERED PHASE ENCODING AND FOR DETERMINING COMPLEX PERMITTIVITY IN MAGNETIC RESONANCE BY USING SUPERIMPOSED TIME-VARYING ELECTRIC FIELDS

Ernest Wollin, Leesburg, Fla., assignor to Wollin Ventures, Inc., Leesburg, Fla.

Filed Jun. 24, 1993, Ser. No. 81,188

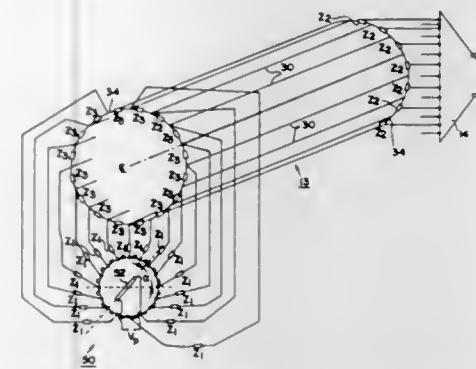
Int. Cl.<sup>6</sup> G01R 33/28

U.S. Cl. 324—318

33 Claims

27. An apparatus for generating magnetic field gradients for use in magnetic resonance imaging of an object, comprising: means for generating a time varying voltage having a first frequency which is lower than a Larmor frequency of said object; means for receiving said time varying voltage and for generating a time varying electric field across said object; and means for rotating said time varying electric field about said

object at an angular frequency which is much less than said first frequency;



wherein said time varying electric field produces a magnetic field gradient in said object.

5,412,323

# BATTERY CONDITION DETECTING APPARATUS AND CHARGE CONTROL APPARATUS FOR AUTOMOBILE

Hidetoshi Kato, Suzuka; Nobuo Mayumi, Toyohashi, and Masatoshi Togawa, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

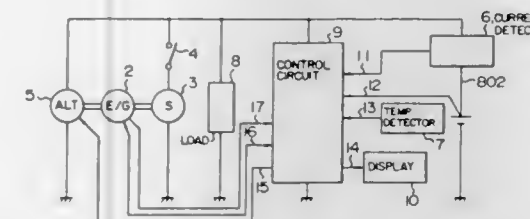
Division of Ser. No. 721,338, Jul. 1, 1991, Pat. No. 5,280,231.

This application Dec. 10, 1993, Ser. No. 164,813

Int. Cl.<sup>6</sup> G01R 27/26; H02J 1/00

U.S. Cl. 324—429

9 Claims



1. A battery condition detecting apparatus comprising: battery current detecting means for detecting charge/discharge currents of a battery; battery voltage detecting means for detecting a terminal voltage of the battery; battery current accumulating means for accumulating the charge/discharge currents of said battery which has been detected by said battery current detecting means; first battery capacity detecting means for detecting a first battery capacity based on the voltage of the battery which is detected by said battery voltage detecting means when the discharge current of said battery detected by said battery current detecting means is a predetermined value; second battery capacity detecting means for detecting a second battery capacity by adding the charge/discharge currents accumulated by said battery current accumulating means after the detection of the first battery capacity to an initial capacity setting means so as to be detected as a second battery capacity; initial capacity setting means for comparing the first battery capacity with a previously detected second battery capacity, for setting as the initial capacity of the battery the smaller of the first battery capacity and the previously detected second battery capacity, and for setting the first battery capacity as the initial battery capacity when the previously detected second battery capacity fails to exist.

5,412,324

# APPARATUS AND METHOD FOR CALIBRATING ELECTRIC BUS BAR INSULATING COATINGS

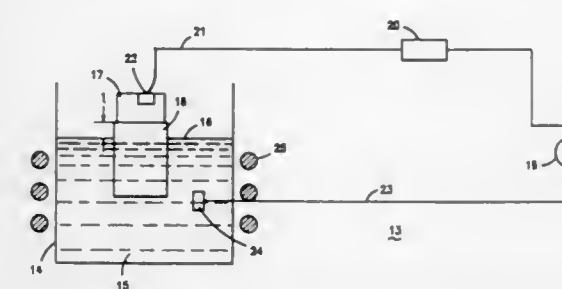
Ira B. Goldman, Waterbury, Conn.; Louis A. Rosen, Stantonville, Tenn.; Edward J. Marshall, Middletown, Conn.; James E. Fredrickson, and Charles L. Young, both of Selmer, Tenn., assignors to General Electric Company, New York, N.Y.

Filed Nov. 4, 1993, Ser. No. 145,714

Int. Cl.<sup>6</sup> G01R 31/02

U.S. Cl. 324—551

4 Claims



1. Apparatus for determining the time of failure of electric bus insulating coatings comprising: a water-filled container; means for heating said water to a predetermined temperature; means for suspending a plurality of electric bus bars containing insulating coatings of a predetermined thickness in said water; means for applying a predetermined voltage to said bus bars; means for applying a predetermined voltage to said water; circuit interruption means electrically connected with said bus bars providing indication of moisture seepage through said coatings as an indication of the time of failure of said insulating coatings.

5,412,325

# PHASE NOISE MEASUREMENT SYSTEM AND METHOD

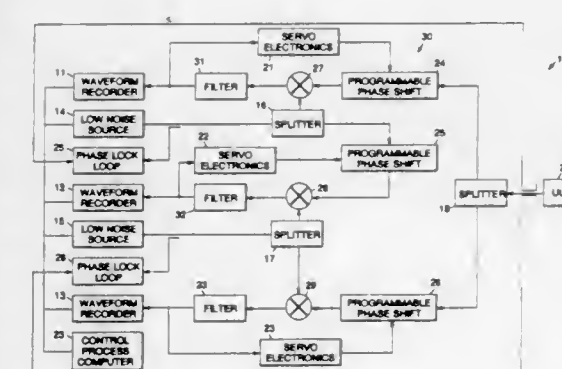
Clifford W. Meyers, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 23, 1993, Ser. No. 173,534

Int. Cl.<sup>6</sup> G01R 27/00

U.S. Cl. 324—613

6 Claims



1. A phase noise measurement system comprising: a primary signal source for providing a first signal whose phase noise is to be measured; second and third signal sources for providing second and third signals that each have substantially the same frequency and a similar noise content as first signal provided by the primary signal source; mixing means for mixing each of the first, second, and third

signals two at a time to generate three respective difference signals;  
 servo means for processing the three difference signals to remove carrier signals and long term signal drift therefrom;  
 waveform recorder means coupled to the mixing means for capturing the respective three difference signals;  
 processing means coupled to the waveform recorder means for statistically analyzing the three difference signals to compute composite power spectral densities therefor, and for computing respective individual power spectral densities of the first, second and third signals from the composite power spectral densities, and hence determining the phase noise of the primary signal source.

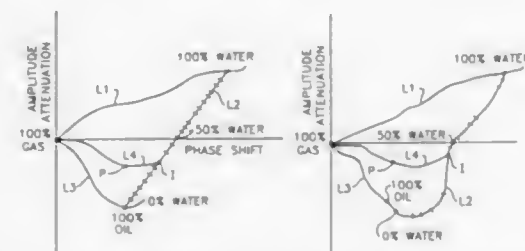
# 5,412,326 MEANS AND METHOD FOR ANALYZING A PETROLEUM STREAM

John D. Marrelli; Michael G. Durrett; David A. Helms, all of Houston; Lisa L. Pepin, Sugar Land, and Gregory J. Hatton, Kingwood, all of Tex., assignors to Texaco Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 459,618, Jan. 2, 1990, abandoned. This application Jun. 25, 1993, Ser. No. 81,714  
 Int. Cl.<sup>6</sup> G01N 22/00

U.S. Cl. 324—640

2 Claims

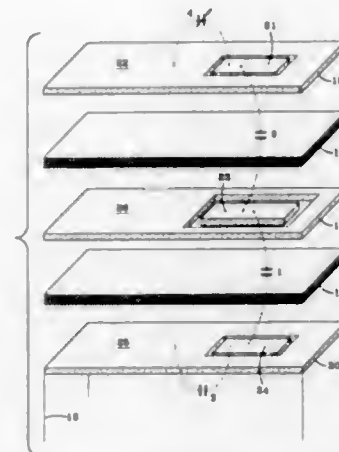


1. A method of analyzing a petroleum stream having oil, water and gas comprising the steps of:  
 providing means to inject microwave energy into the petroleum stream;  
 providing means to receive microwave energy from the petroleum stream; and  
 providing output means utilizing the injected microwave energy, the received microwave energy and known values for 100% oil, 100% gas and 100% water, to relate the known values of 100% oil, 100% gas and 100% water to a phase difference between the injected microwave energy and the received microwave energy, the intensity of the received microwave energy, and a corrected phase shift between the microwave energy being injected and the microwave energy being received to generate two maps utilizing reference points derived from a line L1 connecting the reference points for 100% water and 100% gas, a line L2 connecting the reference points for 100% oil and 100% water, and a line L3 connecting the reference points for 100% oil and 100% gas, one map being for oil continuous mixtures and the other map being for water continuous mixtures;  
 determining a measurement point P within the map utilizing the injected microwave energy and the received microwave energy; and  
 generating an output in accordance with the relationship of the measurement point p to the map.

# 5,412,327 DISTANCE SENSOR UTILIZING A BRIDGE CIRCUIT INCORPORATING VARIABLE CAPACITANCES

Michael Meinen, 7 Rosenstrasse, Nordstemmen, Germany 34471

Filed Sep. 20, 1993, Ser. No. 124,277  
 Int. Cl.<sup>6</sup> G01R 27/26; H01G 7/00; G01B 7/14  
 U.S. Cl. 324—686 10 Claims



1. A capacitive sensor for use in determining the distance to an object, the sensor comprising:  
 a capacitance bridge circuit carried by a printed circuit board; the printed circuit board having a first layer, a second layer and at least one inner layer therebetween;  
 an electrode area etched on the first layer and forming a capacitance between the electrode area and a conductive surface of the first layer which varies proportionally with the distance between the electrode area of the first layer and the object;  
 an electrode area etched on the second layer and forming a reference capacitance between the electrode area and a conductive surface of the second layer;  
 a feed area etched on at least one inner layer, a feed area being disposed opposite of and electrically insulated from, an electrode area while being capacitively coupled thereto, the feed area being adapted for coupling to an oscillator; and  
 wherein each electrode area generates a signal, the difference therebetween being a measure of the imbalance of the bridge circuit.

# 5,412,328 NON-CONTACT CURRENT INJECTION APPARATUS AND METHOD FOR USE WITH LINEAR BIPOLAR CIRCUITS

Barry J. Male, West Granby, and Douglas L. Anneser, East Granby, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

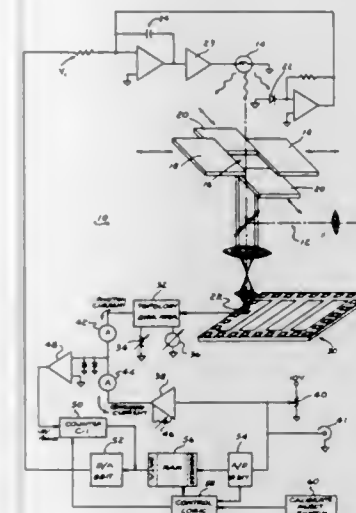
Continuation of Ser. No. 999,610, Dec. 31, 1992, abandoned.  
 This application Jun. 29, 1994, Ser. No. 267,296  
 Int. Cl.<sup>6</sup> G01R 31/28

U.S. Cl. 324—752

10 Claims

1. A non-contact current injection apparatus for use in testing functional integrity of an electronic circuit, said apparatus comprising:  
 means for illuminating with optical energy a predetermined location of said electronic circuit;  
 means for generating a control signal, said illuminating means being responsive to said control signal for illuminating said predetermined location with a predetermined amount of said optical energy, said control signal being indicative of said predetermined amount of said optical energy;

means for monitoring an end effect produced in said electronic circuit and for providing an actual signal indicative thereof; and  
 means for comparing said actual signal to a desired signal



indicative of a desired end effect produced in said electronic circuit, and for providing a difference signal indicative of any difference therebetween, said means for generating a control signal being responsive to said difference signal.

# 5,412,329 PROBE CARD

Shinji Iino, Yamanashi; Tamio Kubota, Kofu, and Keiichi Yokota, Nirasaki, all of Japan, assignors to Tokyo Electron Yamanashi Limited, Nirasaki, Japan

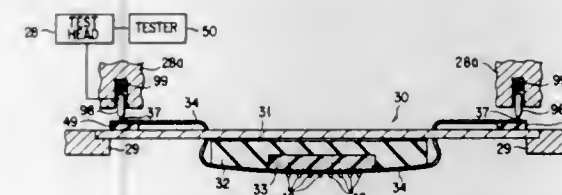
Continuation of Ser. No. 978,389, Nov. 18, 1992, abandoned.

This application Jul. 26, 1994, Ser. No. 280,567

Claims priority, application Japan, Nov. 18, 1991, 3-301961  
 Int. Cl.<sup>6</sup> G01R 1/06

U.S. Cl. 324—754

12 Claims



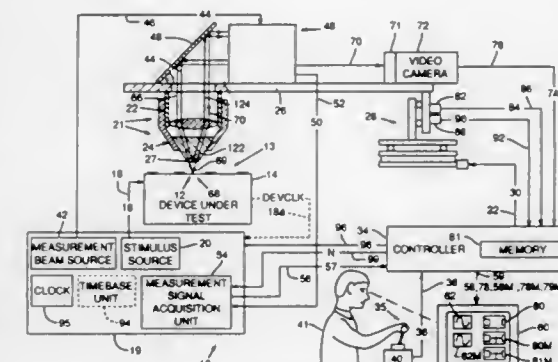
1. A probe card used in a probing test machine which sends and receives test signals into circuits through pads of an object of testing, thereby examining the electrical characteristics of the circuits, comprising:  
 a supporting plate;  
 a circuit base supported by the supporting plate and including printed circuits connected electrically to test signal supply means;  
 contactors connected electrically to the printed circuits of the circuit base and adapted to be brought into contact with the pads of the object of testing in equally corresponding relation;  
 an insulating member supported by the supporting plate;  
 an elastic member embedded in the insulating member and for backing up a section of the circuit base on which the contactors are vertically mounted, the elastic member being held firmly in the insulating member; and  
 wherein the elastic member is elastically deformed when the contactors are pushed to the pads so as to cause the

contactors within the section to be displaced in a vertical direction.

# 5,412,330 OPTICAL MODULE FOR AN OPTICALLY BASED MEASUREMENT SYSTEM

Mihir K. Ravel; Michael D. Jones, and Steven H. Pepper, all of Portland, Oreg., assignors to Tektronix, Inc., Wilsonville, Oreg.

Filed Jun. 16, 1993, Ser. No. 77,905  
 Int. Cl.<sup>6</sup> G01R 31/308, 31/02  
 U.S. Cl. 324—753 24 Claims



1. A moveable optical module in an optically based system for measuring a physical characteristic of a selected region of a device under test with the use of a measurement beam, comprising:

a guide for the measurement beam;  
 a material that is in optical communication with the guide, that undergoes a change in refractive index in response to the physical characteristic, and that is operable to produce from the measurement beam an information-carrying beam having an optical characteristic indicative of the physical characteristic;  
 a beam direction unit operable to direct the measurement beam onto the material;  
 a beam analysis unit operable to receive the information-carrying beam and to produce therefrom a test signal indicative of the optical characteristic and from which information about the physical characteristic may be derived; and  
 a mechanically rigid mounting structure moveable relative to the device under test,  
 the measurement beam traversing a first path segment extending from the guide to the material and having a first path segment location relative to them, and the information-carrying beam traversing a second path segment extending from the material to the beam analysis unit and having a second path segment location relative to them, the guide, the material, the beam direction unit, and the beam analysis unit mounted to the mounting structure so that movement of the mounting structure relative to the device under test does not change the first or the second path segment location and does not change relative alignment of the guide, the material, the beam direction unit, and the beam analysis unit.



5,412,331

## WORD LINE DRIVING CIRCUIT OF A SEMICONDUCTOR MEMORY DEVICE

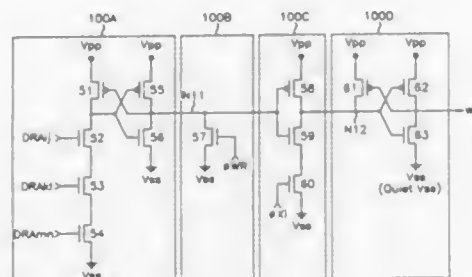
Dong S. Jun, Seoul; Seung C. Oh, Suwon; Moon G. Kim, Suwon, and Sung G. Lee, Suwon, all of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Kyungki-do, Rep. of Korea  
Filed Nov. 1, 1993, Ser. No. 143,894

Claims priority, application Rep. of Korea, Oct. 31, 1992, 1992-20343; Aug. 11, 1993, 1993-15514

Int. Cl.<sup>6</sup> H03K 3/01

U.S. Cl. 326—105

9 Claims



1. A word line driving circuit for use in a semiconductor memory device having a first supply voltage to which a pumping voltage higher than a supply voltage supplied from the exterior of the memory device is applied, and a second supply voltage to which a ground voltage is applied, said word line driving circuit comprising:

decoding means connected between said first supply voltage and said second supply voltage, for receiving row address signals;

transfer means coupled to an output node of said decoding means and to a word line boosting signal;

word line driving circuit output means connected between said first supply voltage and said second supply voltage, and coupled to an output node of said transfer means, for driving a word line, in response to an output signal of said transfer means; and,

wherein said second supply voltage connected to said word line driving circuit output means is coupled to a pad connected to a ground voltage pin of the semiconductor memory device and is only connected to said word line driving circuit.

5,412,332

## DRIVE CIRCUIT FOR A FLYBACK CONVERTER WITH SWITCHING TRANSISTORS IN BRIDGE ARRANGEMENT

Schelte Heeringa, and Geert J. Bosscha, both of Drachten, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

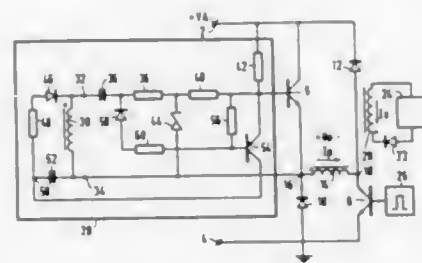
Filed Sep. 29, 1993, Ser. No. 128,979

Claims priority, application European Pat. Off., Oct. 2, 1992, 92203026

Int. Cl.<sup>6</sup> H03K 3/00

U.S. Cl. 327—110

16 Claims



1. A drive circuit for driving a control electrode of a switching transistor having a main current path in series with a primary winding of a transformer connected between a first and

a second power supply terminal, which drive circuit comprises:

a starting resistor connected between the control electrode of the switching transistor and the first power supply terminal,

a secondary winding of the transformer having a first terminal and a second terminal, which second terminal is connected to a first main electrode of the switching transistor at a first node,

a coupling capacitor and a series resistor, which are connected in series between the first terminal of the secondary winding and the control electrode of the switching transistor, and

a discharge diode connected between the second terminal of the secondary winding and a tap of the series resistor, characterized in that the drive circuit further comprises:

a voltage source having a voltage terminal for supplying a bias voltage which relative to the first node is higher than and of the same sign as the forward voltage of the discharge diode, and

a further switching transistor of a conductivity type opposite to the conductivity type of the first-mentioned switching transistor, which further switching transistor has a first main electrode connected to the control electrode of the first-mentioned switching transistor, a second main electrode connected to the voltage terminal and a control electrode coupled to the first terminal of the secondary winding.

5,412,333

## SEMICONDUCTOR DEVICE HAVING BONDING OPTIONAL CIRCUIT

Kazuo Okunaga, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

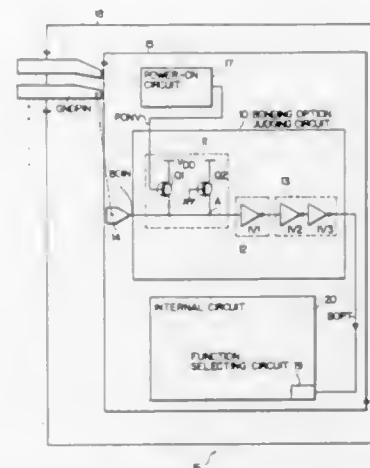
Filed Jun. 10, 1993, Ser. No. 74,673

Claims priority, application Japan, Jun. 10, 1992, 4-150177

Int. Cl.<sup>6</sup> H03K 3/01

U.S. Cl. 327—198

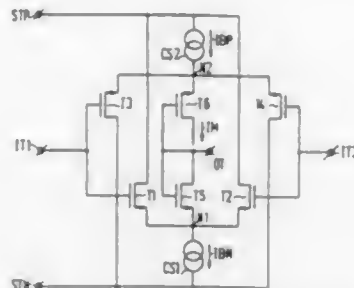
9 Claims



1. A common-mode signal sensor for supplying a common-mode signal in response to a difference signal, comprising: first and second supply terminals, a first input terminal and a second input terminal for receiving the difference signal, an output terminal for supplying the common-mode signal, a first and a second transistor, each having a first main electrode, a second main electrode and a control electrode, the first main electrodes of the first and the second transistor being interconnected at a first node, the second main electrodes thereof being directly connected to the first supply terminal and the control electrode of the first transistor being coupled to the first input terminal, a first current source coupled to the first node to



supply a first bias current (IBN), a third and a fourth transistor, each having a first main electrode, a second main electrode and a control electrode, the first main electrodes of the third and the fourth transistor being interconnected at a second node, the second main electrodes thereof being coupled to the second supply terminal and the control electrode of the fourth transistor being coupled to the second input terminal, and a second current source coupled to the second node to supply a second bias current (IBP), characterised in that the first and the second transistor are of a first conductivity type, the third and the



fourth transistor are of a second conductivity type opposite to the first conductivity type, the control electrode of the third transistor is coupled to the first input terminal, the control electrode of the second transistor is coupled to the second input terminal, a fifth transistor of the first conductivity type having a first main electrode connected to the first node and having a second main electrode and a control electrode connected to the output terminal, and a sixth transistor of the second conductivity type having a first main electrode connected to the second node and having a second main electrode and a control electrode connected to the output terminal.

5,412,344

# CLASS AB AMPLIFIER WITH IMPROVED PHASE MARGIN

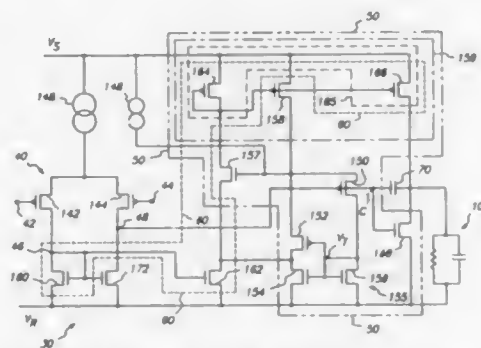
Stephen J. Franck, Felton, Calif., assignor to GEC Plessey Semiconductor, Inc., Scotts Valley, Calif.

Filed Nov. 19, 1993, Ser. No. 155,584

Int. Cl.<sup>6</sup> H03F 3/45

U.S. Cl. 330—255

12 Claims



1. A class AB amplifier circuit having improved phase margin, the amplifier circuit comprising:  
a transconductance amplifier input stage having non-inverting and inverting inputs and first and second outputs, for generating signals at the first and second outputs in response to a voltage applied between the inverting and non-inverting inputs;  
a first load means having a load input and a load output, the load input being connected to the first output of the transconductance amplifier input stage and the load output being connected to a reference voltage, to form a compensation node at the common connection of the first output and the load input;  
current gain means having an input and an output, the input

being connected to the second output of the transconductance amplifier input stage and the output being connected to a current summing output node, for providing an increased current transconductance path from the transconductance amplifier input to the current summing output node to couple a first output current to the current summing output node in response to a signal at the inputs of the transconductance amplifier input stage;

a class AB gain stage having an input connected to the compensation node and an output connected to the current summing output node, for sourcing and sinking a second output current at the current summing output node in response to a voltage signal at the compensation node; and

a compensation capacitor connected between the compensation node and the current summing node, for providing feedback to the compensation node, the amplifier circuit being effective to provide high frequency response at the current summing output node that is dominated by the transconductance input stage and DC current drive provided by the class AB gain stage.

5,412,345

# AMPLIFIER ARRANGEMENT HAVING A RELATIVELY STABLE REFERENCE POTENTIAL

Joachim Brilka, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

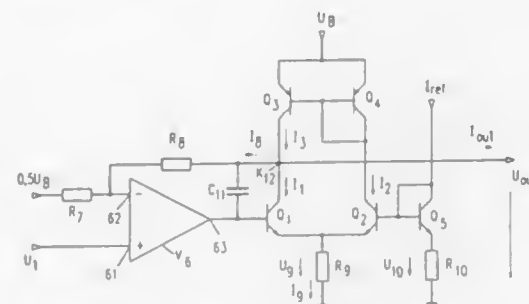
Filed Mar. 18, 1994, Ser. No. 215,444

Claims priority, application Germany, Apr. 7, 1993, 43 11 411.3

Int. Cl.<sup>6</sup> H03F 3/45

U.S. Cl. 330—257

8 Claims



1. An amplifier arrangement comprising:  
a first differential amplifier which comprises a first and a second transistor whose emitters are coupled to a reference potential via a common first resistor, the collector of the first transistor forming an output node of the amplifier arrangement;  
a second differential amplifier to whose input side the input signal of the amplifier arrangement is applied, whose output side is coupled to the base of the first transistor of the first differential amplifier, and having an inverting input coupled to the output node of the amplifier arrangement;  
a first current mirror circuit having an input transistor to which a reference current is applied, having an output transistor which is formed by the second transistor of the first differential amplifier, and having the emitter side of both transistors coupled to a reference potential, and  
a second current mirror circuit to whose input side the output signal of the first current mirror circuit is applied and whose output side is coupled to the output node of the amplifier arrangement, which second current mirror circuit has two transistors coupled to a supply potential at the emitter side, which transistors are scaled in such a manner that the current supplied by the amplifier arrangement at its output side is twice as large as the input current applied to the arrangement.

5,412,346

# VARIABLE GAIN VOLTAGE SIGNAL AMPLIFIER

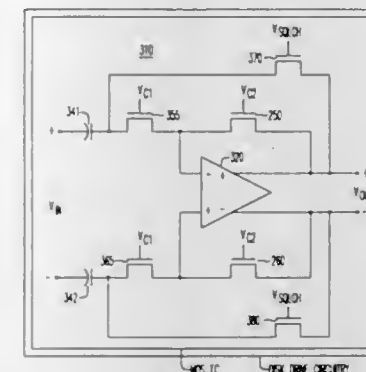
Harley F. Burger, Jr., Mertztown, Pa.; John M. Khoury, New Providence, N.J., and Tandur L. Viswanathan, Kempton, Pa., assignors to AT&T Corp., Murray Hill, N.J.

Filed Dec. 13, 1993, Ser. No. 166,488

Int. Cl.<sup>6</sup> H03G 3/20

U.S. Cl. 330—282

18 Claims



1. An integrated circuit comprising:  
an amplifier including an inverting input voltage signal terminal and an output voltage signal terminal; and  
a switch;  
said amplifier including an input signal path coupled to said input voltage signal terminal and a feedback signal path coupling between said input voltage signal terminal and said output voltage signal terminal;  
said input signal path comprising a capacitor coupled in series with a resistor;  
said feedback signal path comprising another resistor;  
at least one of said resistors comprising an electronic signal-controlled resistor;  
said switch being adapted to selectively couple between the capacitor in said input signal path and said output voltage signal terminal.

5,412,347

# COMPACT CASCADABLE MICROWAVE AMPLIFIER CIRCUITS

Brian J. Minnis, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

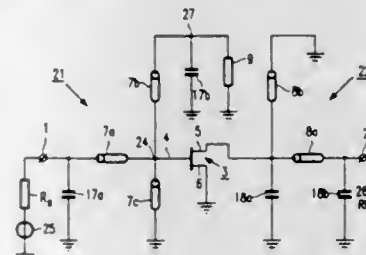
Filed Dec. 1, 1993, Ser. No. 160,714

Claims priority, application United Kingdom, Dec. 3, 1992, 9225282; Jun. 17, 1993, 9312472

Int. Cl.<sup>6</sup> H03F 3/60

U.S. Cl. 330—286

12 Claims



1. A microwave circuit comprising an amplifying device which is connected to an input terminal by an input coupling circuit and to an output terminal by an output coupling circuit, wherein the input coupling circuit comprises a bandpass filter network for travelling-wave transmission within its passband and terminates in the input terminal at one end and a terminating resistor at an opposite end, and the amplifying device is connected at a capacitive node of the network for receiving an input signal from a travelling wave which is transmitted from the input terminal, and which passes the capacitive node to be

dissipated in the terminating resistor, and the output coupling circuit is a bandpass reactively-matched network having the amplifying device and the output terminal at opposite ends of the network.

5,412,348

# COMPOUND TRIPLE CASCODED MIRROR

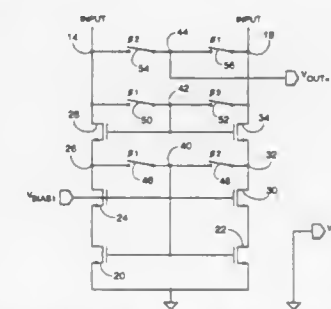
Dan B. Kasha, and Donald A. Kerth, both of Austin, Tex., assignors to Crystal Semiconductor, Inc., Austin, Tex.

Filed Jul. 1, 1993, Ser. No. 87,842

Int. Cl.<sup>6</sup> H03F 3/16

U.S. Cl. 330—288

10 Claims



1. A cascode active load for a differential to single-ended output amplifier stage, comprising:  
a power node disposed at a predetermined voltage level;  
a first input current node;  
a second input current node, said second input current node comprising a voltage output node for the amplifier stage;  
a first cascode leg having:  
n transistors, each having a gate a source and a drain with a source/drain path disposed between said source and drain, said n transistors arranged with the source/drain paths thereof connected in a series configuration from said first input current node to said power node,  
the gate of each of said n transistors connected to either the drain of one of said n transistors that is disposed at a voltage level disposed a greater distance away from the voltage level of said power node or to an external bias voltage dedicated to that transistor such that each of said n transistors is operating in a saturated region,  
two of said n transistors connected in a ratioed cascode configuration with the gate of one of the two transistors therein connected to the drain of another of the two transistors that is disposed at a voltage level disposed a greater distance away from the voltage level of said power node, and the gate of said another of the two transistors connected to the external bias voltage, and  
no more than n-1 of said n transistors connected in a ratioed cascode configuration, the other of said n transistors having the gate thereof connected to the drain thereof; and  
a second cascode leg having n transistors arranged with the source/drain paths thereof connected in a series configuration between said second input current node and said power node, each of said n transistors in said second cascode leg corresponding in position to one of said n transistors in said first cascode leg, with the gates of the corresponding ones of said n transistors in said second cascode leg and said first cascode leg being connected together such that current through the corresponding one of said n transistors in said first cascode leg is mirrored to the corresponding one of said n transistors in said second output leg.

5,412,349

## PLL CLOCK GENERATOR INTEGRATED WITH MICROPROCESSOR

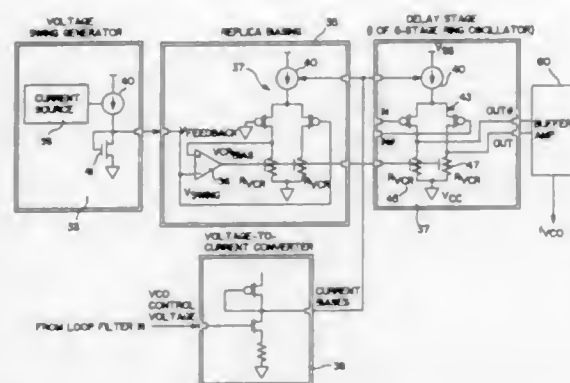
Ian Young, Keng L. Wong, and Jeffrey K. Greason, all of Portland, Oreg., assignors to Intel Corporation, Santa Clara, Calif.

Filed Mar. 31, 1992, Ser. No. 861,288

Int. Cl.<sup>6</sup> H03L 7/099; H03B 5/02

U.S. Cl. 331-34

7 Claims



1. A phase locked loop deskewed clock generator for generating a clock signal for internal use by a microprocessor from an external clock source which generates an external clock signal wherein said clock generator forms an integrated circuit with said microprocessor, said clock generator comprising:

- a clock driver means for generating an internal clock signal for internal use by said microprocessor;
- a phase frequency detector means for detecting a phase difference between said external clock signal and said internal clock signal and generating a phase error signal with a pulse width having a duration equal to an amount of time the internal clock signal leads or lags the external clock signal;
- a charge pump means for receiving said phase error signal and creating a control voltage change caused by a packet of charge equal to the amount of time the internal clock signal leads or lags the external clock signal;
- a loop filter means for receiving and stabilizing the control voltage generated by the charge pump;
- a voltage controlled oscillator means for receiving the stabilized control voltage and generating an intermediate clock signal having a predetermined frequency, said voltage controlled oscillator including:
  - a voltage to current converter means coupled to said loop filter means for converting said stabilized control voltage to a first current bias signal;
  - replica biasing means coupled to said voltage to current converter means for generating a second current bias signal;
  - delay stage means coupled to said voltage to current converter means and said replica biasing means for generating a differential signal representing differences between said first current bias signal and said second current bias signal;
  - a voltage swing reference generator means coupled to said replica biasing means for generating a voltage bias signal which tracks with process variations in said replica biasing means and said delay stage means;
  - an amplifier means coupled to said delay stage means for converting the differential signal generated by said delay stage means to a large swing, high frequency clock signal;
- means for generating a clock driver control signal as a function of said intermediate clock signal for controlling said clock driver.

5,412,350

## LOW FREQUENCY OSCILLATOR USING CAPACITIVE CHARGING/DISCHARGING

Dong-hun Kim, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

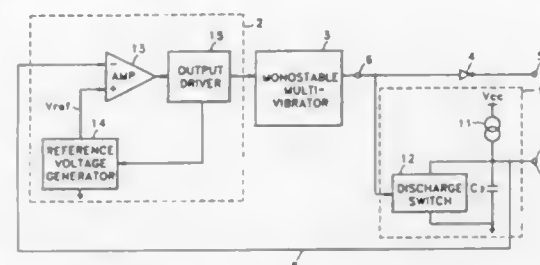
Filed Oct. 7, 1993, Ser. No. 133,229

Claims priority, application Rep. of Korea, Oct. 7, 1992, 18406

Int. Cl.<sup>6</sup> H03K 3/023, 3/282

U.S. Cl. 331-111

6 Claims



- A low-frequency oscillator comprising:
  - charging and discharging means for charging capacitor means with a constant current source and for discharging said capacitor means in response to a discharge control signal;
  - voltage comparator means for comparing a voltage across said capacitor means with a reference voltage to generate a comparator output; and
  - monostable multi-vibrator means, having a predetermined RC time constant and being triggered by said comparator output, for generating said discharge control signal to cause said discharging of said capacitor means for a period determined by said RC time constant;
- said voltage comparator means comprising:
  - reference voltage generator means for providing said reference voltage as one of a first reference voltage during a charging period of said capacitor means by said charging and discharging means and a second reference voltage lower than said first reference voltage during said discharging period by said charging and discharging means;
  - comparison means for comparing said reference voltage with said voltage across said capacitor means and for generating a differential output when said voltage across said capacitor means exceeds said reference voltage; and
  - output driver means for triggering said monostable multi-vibrator means with said comparator output according to said differential output, said output driver means generating an output driver reference signal to initiate generation of said first reference voltage when said voltage across said capacitor means discharges to said second reference voltage.

5,412,351

## QUADRATURE LOCAL OSCILLATOR NETWORK

Christian Nystrom, Flintslavagen 12, Sollentuna, Sweden S-19154, and Charles Persico, 1063 Morse Ave., #18-203, Sunnyvale, Calif. 94089

Filed Oct. 7, 1993, Ser. No. 132,903

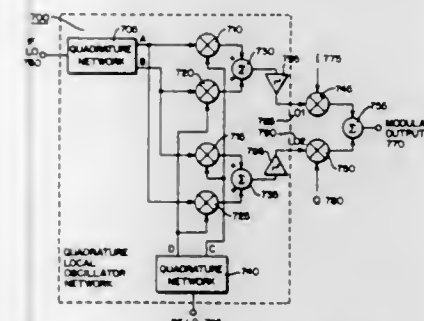
Int. Cl.<sup>6</sup> H04L 27/20, 27/22

U.S. Cl. 332-103

20 Claims

- A quadrature local oscillator network comprising:
  - a first quadrature circuit for dividing a first input signal into a first in-phase signal and a first quadrature signal 90° out of phase;
  - a second quadrature circuit for dividing a second input signal into a second in-phase signal and a second quadrature signal 90° out of phase;
  - a first mixer for mixing said first in-phase signal and said second in-phase signal;

- a second mixer for mixing said first quadrature signal and said second quadrature signal;
- a third mixer for mixing said first quadrature signal and said second in-phase signal;
- a fourth mixer for mixing said first in-phase signal and said second quadrature signal;
- a first combiner for combining the outputs of said first and second mixers into a first local oscillator output signal;



- a second combiner for combining the outputs of said third and fourth mixers into a second local oscillator output signal;
- a first amplitude limiting amplifier connected to the first combiner; and
- a second amplitude limiting amplifier connected to the second combiner, wherein said first and second local oscillator output signals have substantially equal amplitudes and a substantially balanced quadrature phase relationship.

5,412,352

## MODULATOR HAVING DIRECT DIGITAL SYNTHESIS FOR BROADBAND RF TRANSMISSION

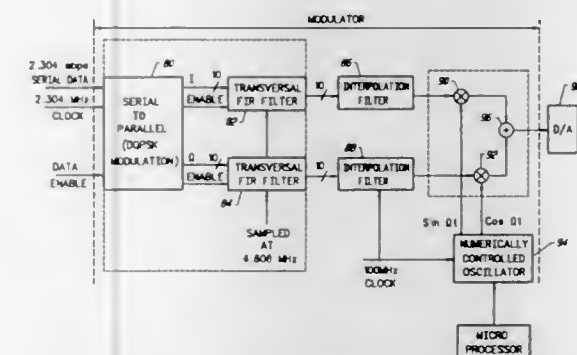
Hatch Graham, Morgan Hill, Calif., assignor to Stanford Telecommunications, Inc., Sunnyvale, Calif.

Filed Apr. 18, 1994, Ser. No. 228,808

Int. Cl.<sup>6</sup> H03C 3/00

U.S. Cl. 332-103

5 Claims



- An RF modulator for reverse channel baseband to RF frequency translation in a CATV cable data transmission system comprising
  - means for receiving and digitally sampling an input data stream and providing a sampled digital data stream;
  - digital mixer means including a digitally tunable oscillator for receiving said sampled digital data stream and providing a digital RF data stream in selected frequency bands;
  - said mixer means including in-phase and quadrature phase mixers and a numerically controlled oscillator driven by a 100 MHz clock for modulating said in-phase and quadrature phase digital data stream to a selected RF frequency band in the range of 5-40 MHz; and an adder for combining said in-phase and quadrature phase digital data streams.

5,412,353

## PHASE-LOCKED LOOP FREQUENCY MODULATION CIRCUIT FOR INPUT MODULATION SIGNALS HAVING LOW-FREQUENCY CONTENT

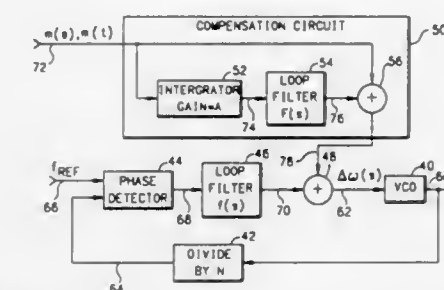
Naom Chaplik, Steven H. Gardner, and Seton P. Kasmir, all of San Diego, Calif., assignors to Pacific Communication Sciences, Inc., San Diego, Calif.

Filed Nov. 12, 1993, Ser. No. 152,445

Int. Cl.<sup>6</sup> H03C 3/08; H03L 7/06

U.S. Cl. 332-127

3 Claims



- A frequency-modulation circuit, comprising:
  - a phase-locked loop, including
    - a voltage controlled oscillator (VCO) for providing an output signal having a given frequency;
    - means for adding a compensation signal to a loop filter output signal to provide a control signal to the VCO for controlling the frequency of the VCO output signal;
    - means for processing an output signal from the VCO with a frequency reference signal to provide a phase error signal indicative of a phase difference between the reference frequency signal and the VCO output signal; and
    - a loop filter having a predetermined transfer function for filtering the phase error signal to provide the loop filter output signal that is added to the compensation signal; and
  - a compensation circuit for processing an input modulation signal to provide the compensation signal that is added to the loop filter output signal by processing the input modulation signal to provide the same effect as adding the input modulation signal to an integrated input modulation signal that is filtered by a filter having said predetermined transfer function to provide the compensation signal.

5,412,354

## SINGLE LAYER DOUBLE RING HYBRID MAGIC-TEE

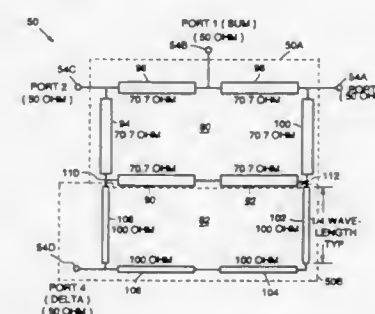
Clifton Quan, Arcadia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 2, 1994, Ser. No. 252,709

Int. Cl.<sup>6</sup> H01P 5/16

U.S. Cl. 333-121

12 Claims



- A single plane, double ring magic-tee circuit operable over a microwave frequency band having a nominal center frequency, comprising:
  - means for receiving and digitally sampling an input data stream and providing a sampled digital data stream;
  - digital mixer means including a digitally tunable oscillator for receiving said sampled digital data stream and providing a digital RF data stream in selected frequency bands;
  - said mixer means including in-phase and quadrature phase mixers and a numerically controlled oscillator driven by a 100 MHz clock for modulating said in-phase and quadrature phase digital data stream to a selected RF frequency band in the range of 5-40 MHz; and an adder for combining said in-phase and quadrature phase digital data streams.



an interconnected plurality of transmission line segments each having a nominal electrical length of one-quarter wavelength at said center frequency, said segments defined in a common plane;

said segments interconnected to define first, second, third and fourth circuit ports on first and second rings of segments, said first and second rings sharing a plurality of said segments;

said first port defined on said first ring at a connection between first ends of first and second segments, said second and third ports defined on said first ring equidistant from said first port, so that a microwave signal input at said first port is divided equally in phase between said second and third ports;

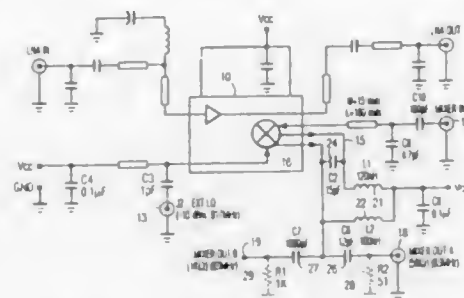
said fourth port defined on said second ring and spaced unequally from said second and third ports, wherein the difference in electrical lengths from said fourth port to said second port and from said fourth port to said third port is nominally  $\frac{1}{4}$  wavelength at said center frequency, wherein a microwave signal input at said fourth port is divided equally and out of phase between said second and third ports.

5,412,355

**RESONANT BALUN WITH ARBITRARY IMPEDANCE**  
Sheng-Hann Lee, Cupertino, Calif., assignor to Philips Electronics North America Corporation, New York, N.Y.  
Filed Dec. 3, 1993, Ser. No. 160,994  
Int. Cl.<sup>6</sup> H03H 7/42, 7/48

U.S. Cl. 333—124

16 Claims



1. A resonant balun circuit comprising:  
first and second balanced input ports for receiving a balanced input signal at an operating frequency  $\omega$ ;

a reference voltage terminal;

a first inductance having a value  $L1$  connected between the first input port and the reference voltage terminal;

a second inductance having a value  $L2$  connected between the second input port and the reference voltage terminal;

a first capacitance having a value  $C1$  connected between the first and second input ports, the first capacitance also substantially satisfying the condition

$$\omega = 1/[(L1)(C1)]^{1/2}$$

a first unbalanced output port; and

a second capacitance connecting the second input port to the first output port.

5,412,356

**DIGITAL INTERFACE CABLE**  
Richard N. Marsh, Cool, and Bruce A. Brisson, Auburn, both of Calif., assignors to Constant Velocity Transmission Lines, Inc., Auburn, Calif.  
Filed Oct. 26, 1992, Ser. No. 966,313  
Int. Cl.<sup>6</sup> H03H 7/00

U.S. Cl. 333—167

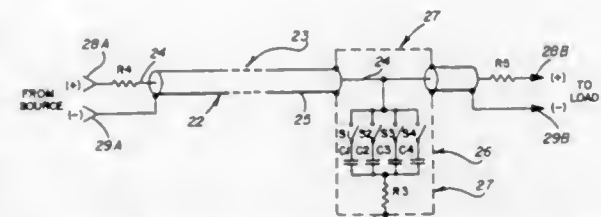
22 Claims

1. A cable having a source end and a load end for propagating audio frequency signals in a digital format comprising:

means for coupling the source end of the cable to a source of audio signals in a digital format;

means for coupling the load end of the cable to a load; and

means including a discrete capacitor capacitance the magnitude of which is a function of the magnitude of said distributed capacitance and which is coupled to the cable between the source and load ends thereof for providing the cable with a predetermined bandwidth and the magnitude of said predetermined capacitance of said discrete capacitor.



tributed capacitance and which is coupled to the cable between the source and load ends thereof for providing the cable with a predetermined bandwidth and the magnitude of said predetermined capacitance of said discrete capacitor.

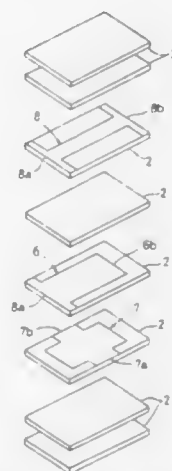
5,412,357

**NOISE FILTER HAVING NON-LINEAR VOLTAGE-DEPENDENT RESISTOR BODY WITH A RESISTIVE LAYER**

Kazutaka Nakamura, Hiroji Tan, Yasunobu Yoneda, and Yukio Sakabe, all of Nagaokakyo, Japan, assignors to Murata Mfg. Co., Ltd., Nagaokakyo, Japan  
Filed Mar. 24, 1993, Ser. No. 36,438  
Claims priority, application Japan, Mar. 25, 1992, 4-100429  
Int. Cl.<sup>6</sup> H03H 7/06

U.S. Cl. 333—181

15 Claims



1. A noise filter for receiving an input voltage pulse having a predetermined high level and outputting an output voltage which is less than a predetermined lower level, the noise filter comprising:

(A) a varistor including:  
semiconductor ceramics having a pair of end surfaces opposed to each other and a pair of side surfaces connecting said pair of end surfaces;

first and second end surface electrodes respectively formed on said end surfaces of said semiconductor ceramics for receiving said input voltage and outputting said output voltage, respectively;

at least one side surface electrode formed on a side surface of said semiconductor ceramics;

a first inner electrode formed inside said semiconductor ceramics and electrically connected to said first end surface electrode; and

a second inner electrode formed inside said semiconductor ceramics so as to be overlapped with the first inner elec-

trode while being separated from the first inner electrode by a semiconductor ceramic layer,

said second inner electrode being electrically connected to said side surface electrode; and

(B) a resistance layer having a high resistivity formed inside said semiconductor ceramics as a separate layer from said first and second inner electrodes of said varistor and electrically connected between said first and second end surface electrodes,

said resistance layer providing a voltage drop between said first and second end surface electrodes in response to an input voltage pulse of said predetermined high level such that voltage at said second end surface electrode is less than said predetermined lower level.

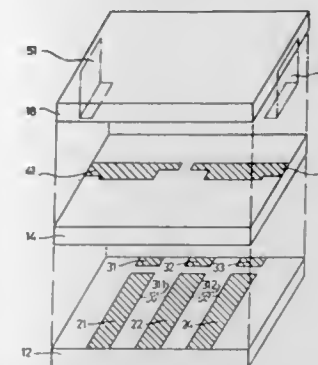
5,412,358

**LAYERED STRIPLINE FILTER**  
Takami Hirai, Nishikamo, and Shinsuke Yano, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Japan  
Filed Mar. 1, 1993, Ser. No. 24,303  
Claims priority, application Japan, Feb. 28, 1992, 4-043313; Feb. 28, 1992, 4-043315

Int. Cl.<sup>6</sup> H01P 1/203

U.S. Cl. 333—204

34 Claims



1. A transmission line filter, comprising:  
a first ground electrode;

a dielectric layer disposed on said first ground electrode;

an input-side resonator disposed in said dielectric layer;

an output-side resonator disposed in said dielectric layer substantially adjacent to said input-side resonator, said output-side resonator being inductively coupled with said input-side resonator; and

an input electrode and an output electrode coupled to said input-side and output-side resonators, respectively, at least one of said input and output electrodes being disposed in another dielectric layer in an opposed facing relationship both to a portion of said input-side resonator and to a portion of said output-side resonator, so as to overlap only said portions of input-side and output-side resonators.

5,412,359

**COAXIAL DIELECTRIC FILTER HAVING ADJACENT RESONATORS DISPOSED IN OPPOSITE DIRECTIONS**  
Satoshi Kazama, Takasaki, and Tatsuya Imaizumi, Gunma, both of Japan, assignors to Taiyo Yuden Co., Ltd., Tokyo, Japan  
Filed Jun. 29, 1993, Ser. No. 85,318  
Claims priority, application Japan, Jun. 30, 1992, 4-197541

Int. Cl.<sup>6</sup> H01P 1/205

U.S. Cl. 333—206

24 Claims

1. A wave filter apparatus comprising:  
(a) a base structure comprising:  
(i) a base plate;

(ii) at least two base terminal conductor regions formed on the base plate;

(iii) a grounding conductor region formed on the base plate; and

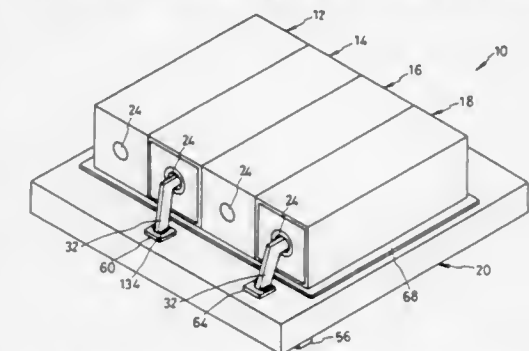
(iv) a resonator coupling element electrically connected

between the base terminal conductor regions, the resonator coupling element comprising a capacitor formed by a pair of capacitor conductor regions embedded in the base plate; and

(b) at least two dielectric resonators mounted to the base structure, each dielectric resonator comprising:  
(i) a dielectric body substantially in the shape of an elongate tube;

(ii) an inner conductor formed on an inside surface of the dielectric body;

(iii) an outer conductor formed on an outside surface of the dielectric body and electrically connected to the grounding conductor region of the base structure;



(iv) a shorting conductor formed on a first end of the dielectric body for electrically interconnecting the inner and the outer conductors; and

(v) a terminal formed on a second end of the dielectric body and electrically connected to the inner conductor and to one of the base terminal conductor regions of the base structure, wherein the at least two dielectric resonators are disposed side by side and oriented in opposite longitudinal directions on the base structure whereby the terminals of the dielectric resonators, and the base terminal conductor regions of the base structure, are both spaced from each other a greater distance than if the dielectric resonators are oriented in the same direction.

5,412,360

Patent Not Issued For This Number

5,412,361

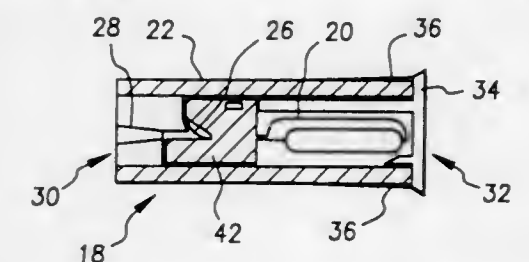
**SOLDERLESS FLUSHMOUNT SECURITY PROXIMITY SWITCHES AND METHODS OF CONSTRUCTING AND UTILIZING SAME**

Randy L. Combest, and John O. Beck, both of Florence, Oreg., assignors to Nascom, Inc., Newberg, Oreg.  
Filed Oct. 23, 1992, Ser. No. 965,429

Int. Cl.<sup>6</sup> H01H 9/00

U.S. Cl. 335—205

5 Claims



1. A proximity switch for a security system, said proximity switch comprising a magnet and a reed switch portion, said reed switch portion comprising:  
a casing enclosing said reed switch with associated circuitry;

a least one aperture in said casing sized to accommodate an

external connecting wire, one end of said wire being substantially stripped;  
 wire securement means adjacent said aperture, said wire securement means adapted to operatively connect said reed switch to said wire by trapping said substantially stripped end of said wire without the use of tools;  
 said reed switch adapted to generate a signal when not in the proximity of said magnet;  
 said wire securement means comprises a block-like member operatively connected at a first end to said reed switch and having trap means at an end opposite said first end aligned with said aperture; and  
 said opposite end of said block-like member having a substantially V-shaped indent.

5,412,362

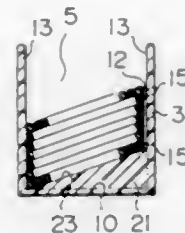
## DEFLECTION COIL AND FABRICATION METHOD THEREOF

Hiroshi Ikeuchi, Kyoto, Japan, assignor to Murata Mfg. Co., Ltd., Japan

Continuation of Ser. No. 49,730, Apr. 20, 1993, abandoned. This application Oct. 17, 1994, Ser. No. 324,372

Claims priority, application Japan, Apr. 24, 1992, 4-132029; Apr. 24, 1992, 4-132030

Int. Cl.<sup>6</sup> H01H 1/00; G09G 1/04; H01B 11/04; H01F 7/06  
 U.S. Cl. 335—213 15 Claims



1. A deflection coil preformed into a saddle shape comprising a plurality of layers of conductive wire ribbon layered atop each other and against a spacer in the bottom of a coil groove wherein, a cross-section taken along a right angle to said layered wire ribbon forms a non-rectangular parallelogram with adjoining sides intersecting one another at other than 90 degrees.

5,412,363

## OPEN ACCESS SUPERCONDUCTING MRI MAGNET

Bruce C. Breneman; Raymond E. Sarwinski, both of San Diego, and Yen-Hwa L. Hsu, Solana Beach, all of Calif., assignors to Applied Superconducting, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 811,306, Dec. 20, 1991. This application Jun. 10, 1994, Ser. No. 259,914

Int. Cl.<sup>6</sup> H01F 7/22; G01V 3/00

U.S. Cl. 335—216 10 Claims

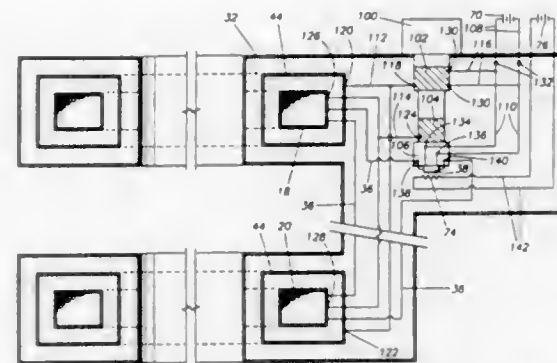
1. An open access magnetic resonance imaging apparatus, comprising:

a substantially open ferromagnetic frame including an upper end plate and a lower end plate mounted horizontally, spaced apart, and generally parallel to one another on at least one support column, to define a patient receiving area therebetween accessible to additional medical equipment and personnel;

first and second toroidal shaped coils of superconducting wire mounted to said upper and lower end plates, respectively, for generating a magnetic flux field along a vertical polar axis, with a return path for said magnetic flux field provided by said support column and by said upper and lower end plates, said superconducting wire having a low transition temperature;

magnetic flux shaping means mounted to each said end plate for shaping said flux field to provide generally parallel lines of magnetic flux within said patient receiving area,

said flux shaping means including a rose shim mounted to each said end plate;  
 a cryocooler; and  
 first and second solid thermal conductors attached to said cryocooler, said first and second solid thermal conductors



being mounted in thermally conductive contact with said first and second superconducting coils, respectively, for cooling said superconducting coils by conductive heat transfer, to maintain said superconducting coils at a temperature below said low transition temperature of said superconducting wire.

5,412,364

## TONER PACK AND DEVELOPMENT DEVICE FOR USE IN ELECTROPHOTOGRAPHIC APPARATUS

Michihisa Iguchi; Hiroshi Hashizume; Seiji Arai; Yoshiaki Okano; Chinobu Sakai; Hirotaka Fukuyama; Takahito Kabai; Kouichirou Satou; Tetsuya Nakamura, and Satoshi Katagata, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

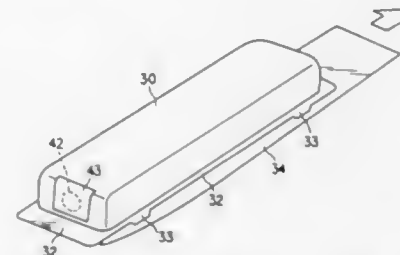
Filed Jul. 20, 1993, Ser. No. 93,826

Claims priority, application Japan, Jul. 24, 1992, 4-198334; Aug. 31, 1992, 4-257321

Int. Cl.<sup>6</sup> G03G 15/08

U.S. Cl. 355—260

35 Claims



1. A toner pack detachably mounted to a developing device of a frictional charging type of an electrophotographic apparatus and formed of a polyolefin-based resin including a mineral filler, the mineral filler being calcium carbonate, the toner pack including an inlet, sealed with a flammable sheet, for filling the toner pack with toner.

5,412,365

## HIGH FIELD MAGNETS FOR MEDICAL APPLICATIONS

Manlio G. Abele, New York, and Henry Rusinek, Great Neck, both of N.Y., assignors to New York University, New York, N.Y.

Continuation of Ser. No. 909,143, Jul. 27, 1992, abandoned. This application Jan. 24, 1994, Ser. No. 185,726

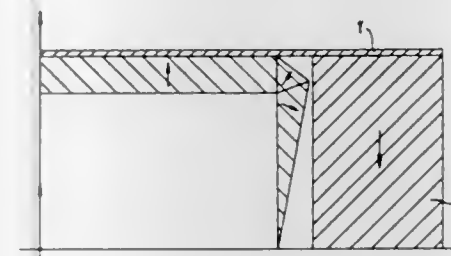
Int. Cl.<sup>6</sup> H01F 7/02

U.S. Cl. 335—306

9 Claims

7. A permanent magnetic structure comprising a layer of a

permanent magnetic material having a given remanence, said layer surrounding the sides of a cavity in a predetermined cross section thereof and generating a uniform field in the cavity,



and a return path external of said layer, with respect to said cavity, for flux generated by said layer of magnetic material, said return path being at least partially of a permanent magnetic material.

5,412,367

## TRANSFORMER

Seiki Shibui, Chobu, and Masaaki Sano, Tokyo, both of Japan, assignors to Nippon Densan Corporation, Japan

Division of Ser. No. 734,899, Jul. 24, 1991, Pat. No. 5,245,497.

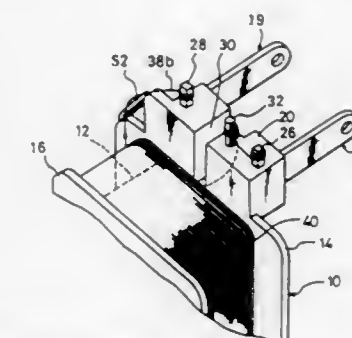
This application Mar. 24, 1993, Ser. No. 36,504

Claims priority, application Japan, Jul. 31, 1990, 2-204334; Oct. 31, 1990, 2-296445

Int. Cl.<sup>6</sup> H01F 15/10

U.S. Cl. 336—192

6 Claims



1. A transformer comprising:  
 a bobbin having a primary winding frame and a secondary winding frame;  
 a primary coil wound around said primary winding frame;  
 a secondary coil wound around said secondary winding frame;  
 a pair of connection pins electrically connected to a power source, one of said connection pins being electrically connected to one end of said primary coil, the other of said connection pins being electrically connected to the other end of said primary coil;  
 means for reducing tension in said primary coil, including a projection spaced apart from said connection pins and provided on said bobbin, said projection being engageable with said primary coil and movable relative thereto for reducing tension in said primary coil; and  
 said other end of said primary coil being electrically connected to said other connection pin via said means for reducing tension after said primary coil has been wound around said primary winding frame, said means for reducing tension being movable after said other end of said primary coil has been connected to said other connection pin via said means for reducing tension in order to reduce tension in said other end of said primary coil so as to protect the primary coil from disconnection.

5,412,368

## DIGITAL SIGNAL COMPARISON CIRCUITRY

Richard J. Gammack; Catherine L. Barnaby, and Anthony I. Stansfield, all of Bristol, England, assignors to Inmos Limited, Bristol, England

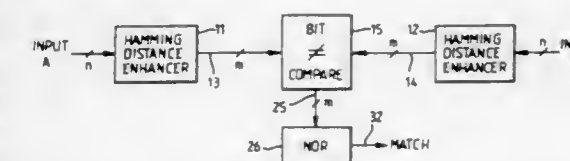
Filed Jun. 29, 1993, Ser. No. 84,418

Claims priority, application United Kingdom, Jun. 30, 1992, 9213818

Int. Cl.<sup>6</sup> G06F 7/02

U.S. Cl. 340—146.2

12 Claims



1. A method of comparing a first multibit digital signal with a second multibit digital signal wherein to increase speed of obtaining an output signal said method comprises inputting



input signals for each of said first and second signals and forming a respective codeword for each input signal, each codeword being at least one bit longer than the respective input signal and formed by a common error correcting code for both signals to provide increased minimum Hamming distance for the respective codewords, comparing respective bit locations of the codewords to form a plurality of match indicating signals for respective bit locations thereby indicating any mismatch by a mismatch at at least two bit locations, supplying said match indicating signals in parallel to gating circuitry arranged to provide an output indicating a match or mismatch between said codewords, said output being provided with a time delay less than that required for a single bit mismatch.

5,412,369

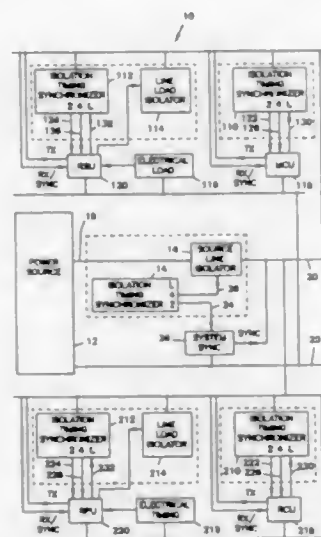
## TWO-WIRE CONTROL SYSTEM

Robert D. Kirchner, 6227 Covington Way, Goleta, Calif. 93117  
Continuation of Ser. No. 911,014, Jul. 9, 1992, abandoned, which is a continuation of Ser. No. 593,761, Oct. 5, 1990, abandoned.  
This application Dec. 22, 1993, Ser. No. 171,828

Int. Cl.<sup>6</sup> H04B 3/00

U.S. Cl. 340—310.03

9 Claims



1. A two wire control system, comprising:
  - a source line isolator alternating between a high impedance state and a low impedance state, coupled at a first end to a power source and at a second end to at least one transmission wire, for isolating the power source from the transmission wire while in the high impedance state;
  - a line load isolator alternating between a high impedance state and a low impedance state, coupled at a first end to the transmission wire and at a second end to at least one load, for isolating the transmission wire from the load while in the high impedance state; and
  - means, coupled to the line load isolator, for synchronizing the high and low impedance state of the line load isolator with the source line isolator.

5,412,370

## CAR THEFT PREVENTION DEVICE

Leonard C. Berman, 8308 Regents Rd., Suite 1H, San Diego, Calif. 92122, and Joseph C. Noe, 14636 Evening Star Dr., Poway, Calif. 92064

Continuation-in-part of Ser. No. 965,594, Oct. 23, 1992, abandoned. This application Jan. 21, 1993, Ser. No. 7,144

Int. Cl.<sup>6</sup> B60R 25/10

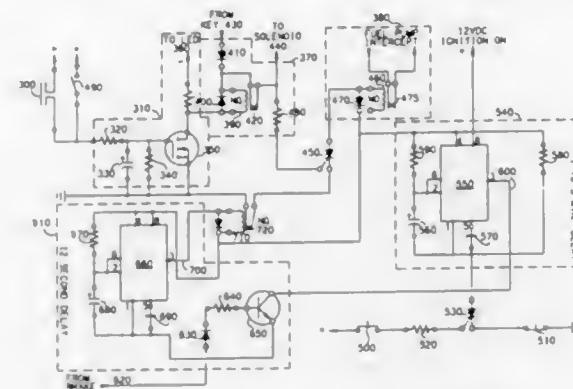
U.S. Cl. 340—426

2 Claims

1. A vehicle anti-theft system for preventing unauthorized starting of the vehicle and for preventing unauthorized flight of the vehicle, the vehicle having a first circuit for starting the

engine and a second circuit for allowing the engine to run once started, said system comprising:

- first interrupt means for interrupting electrical power to the first circuit;
- second interrupt means for interrupting electrical power to the second circuit;
- sequence means, electrically connected to said first and second means, including a starting sequencer means for permitting starting of the engine and allowing running of the engine and also including a flight prevention sequencer means for prohibiting running of the engine, wherein said sequence means comprises:
  - a normal operation switch, electrically connected to said first and second interrupt means, said normal operation switch actuable by an authorized vehicle user to initiate said starting sequencer means;
  - a theft switch, electrically connected to said second interrupt means, said theft switch actuable by the authorized



- vehicle user to initiate said flight prevention sequencer means;
- wherein said flight prevention sequencer comprises means for delaying activation of said second interrupt means until a predetermined flight period has expired;
- wherein said flight prevention sequence means further comprises:
  - means for detecting slowing or stopping of the vehicle wherein said delay means delays activation of said second interrupt means until said predetermined flight period has expired and said detection means detects a slowing or stopping of the vehicle;
  - wherein said detection means comprises:
    - a brake switch actuable by a vehicle user when the user slows or stops the vehicle; and
    - means for timing the duration for which said brake switch is activated, wherein said brake switch being activated for a predetermined continuous braking time comprises said detected slowing or stopping.

5,412,371

## DETECTOR ARMING VEHICLE SECURITY SYSTEM

Neil B. Kaplan, 2239 Quail Ridge S., Palm Beach Gardens, Fla. 33418  
Continuation of Ser. No. 943,058, Sep. 10, 1992, abandoned. This application Dec. 29, 1993, Ser. No. 175,178

Int. Cl.<sup>6</sup> B60R 25/10

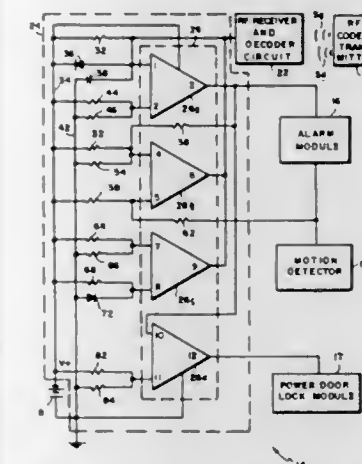
U.S. Cl. 340—426

7 Claims

1. An electronic security system for protecting a vehicle having an interior space with a door into said space, said system comprising settable vehicle securing means which, when set by an arming signal, secures the vehicle in response to a trigger signal;

- an arming circuit which, when activated, provides an arming signal to set said securing means;
- means for activating and deactivating said arming circuit;
- detection means for detecting a presence in said space and

- providing a trigger signal to said securing means in response thereto;
- inhibiting means for inhibiting activation of said arming circuit so long as a presence is detected in said space before said securing means are set;



- locking means for locking a door into said space, said locking means each having a locked position and an unlocked position, and
- control means responsive to said arming signal for controlling the locking means so as to inhibit the locking means from assuming the locked position when a presence is detected in said space before said securing means are set.

5,412,372

## ARTICLE DISPENSER FOR MONITORING DISPENSING TIMES

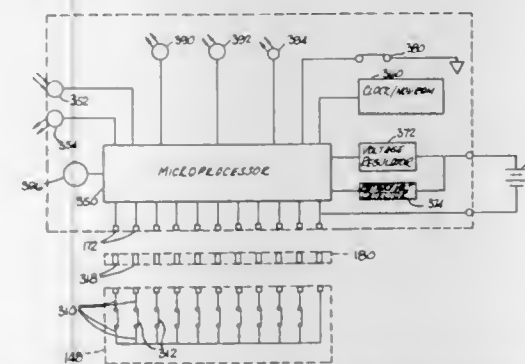
Larry E. Parkhurst, Boulder, Colo., and Edward M. Aten, Clarkson Valley, Mo., assignors to Medical Microsystems, Inc., Boulder, Colo.

Filed Sep. 21, 1992, Ser. No. 948,208

Int. Cl.<sup>6</sup> G08B 21/00

U.S. Cl. 340—563

49 Claims



1. A dispensing device for dispensing articles from an article package that includes an array of article retention areas each being designed to hold at least one article therein and each being accessible for article removal, said device comprising a housing for receiving said article package; a separate sensing array having a plurality of sensing regions wherein there is at least one corresponding sensing region for at least one said article retention area, such that the removal of an article will cause a change in a sensing parameter in said corresponding sensing region, said sensing array being positionable on the housing adjacent the article package; and detection means for determining said sensing parameters in said sensing regions of said sensing array the detection means being electrically con-

nected to the sensing array by an elastomeric electrical connector.

5,412,373

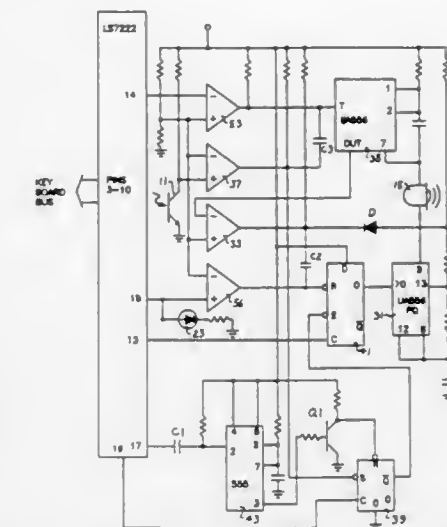
## WALLET SECURITY DEVICE

Robert G. Wajda, 4415 17th Ave., Parkersburg, W. Va. 26101  
Continuation-in-part of Ser. No. 52,529, Apr. 29, 1993. This application Aug. 25, 1994, Ser. No. 294,807

Int. Cl.<sup>6</sup> G08B 13/189

U.S. Cl. 340—571

6 Claims



1. A portable personal article carrying security device attachable to a portable personal article carrier for either gender, the portable personal article carrier having an exterior portion and an interior portion, the interior portion thereof designed for transporting personal articles of the user therein, said portable personal article carrying security device comprising:

- a keypad attachable to the interior portion of the portable personal article carrier;
- a photodetector attachable to the exterior portion of said portable personal article carrier so as to be exposed to ambient light when the portable personal article carrier is exposed to ambient light;
- an alarm annunciator;
- a decoder means for detecting when a predetermined disarm code is entered onto said keypad and when a predetermined arm code is entered onto said keypad;
- first alarm control means for preventing the actuation of said alarm annunciator when said decoder means detects that the last entry on said keypad was said disarm code;
- a timer means enabled upon the initial detection of light by said photodetector for delivering a timeout signal upon the expiration of a predetermined period of time; and
- second alarm control means for enabling the actuation of said alarm annunciator upon the detection of said arm code being the last code entered onto said keypad and the detection of said timeout signal.

5,412,374

## METHOD AND APPARATUS FOR DETECTING AND INDICATING THE LOCATION OF A HIGH TEMPERATURE ZONE ALONG THE LENGTH OF A FIRE DETECTING CABLE

Henry H. Clinton, 10 Shore Rd., Clinton, Conn. 06413

Filed May 24, 1994, Ser. No. 248,374

Int. Cl.<sup>6</sup> G08B 17/00

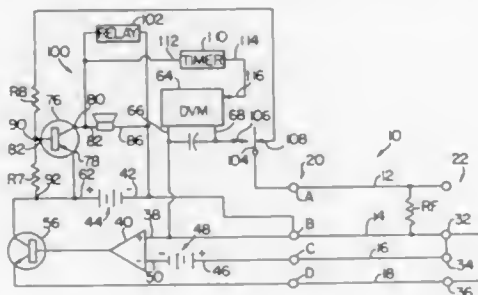
U.S. Cl. 340—584

10 Claims

1. Apparatus for sensing and indicating the location of a "hot spot" along the length of a temperature sensing cable means of the type having at least first and second longitudinally extend-

ing and spaced apart conductors covered with an electrically insulating jacket having a composition which exhibits a resistance element characteristic and becomes electrically conductive when the temperature of the insulating jacket at any location along its surface exceeds a predetermined temperature and, at least third and fourth longitudinally extending and spaced apart conductors each of which is covered with a non-conducting electrical insulating jacket wherein each of said conductors is of substantially identical length with one end of each conductor being defined as the NEAR END and the opposite end of each conductor being defined as the FAR END, said apparatus comprising:

electronic circuit means defining a linear stable voltage feedback loop having input means coupled to the NEAR END of the temperature sensing cable and having output means coupled to the FAR END of the temperature sensing cable for maintaining through said third and fourth conductors a predetermined magnitude DC voltage potential between the NEAR END and the FAR



END end of said first one of the electrically conductive insulating jacket conductors of said cable means;  
a first DC voltage reference potential power source means for supplying said predetermined magnitude DC voltage potential, and  
voltage measurement means coupled to the NEAR END ends of the first and second ones of the electrically conductive insulating jacket conductors of said cable means for sensing and measuring a voltage potential developed between said NEAR END end of said first one of the electrically conductive insulating jacket conductors of said cable means and the "hot spot" when the temperature of the electrically conductive insulating jacket exceeds the predetermined temperature to establish a conduction path between the first and second conductors at the "hot spot" whereby the proportionality of the measured voltage to the predetermined magnitude of said DC voltage reference potential is directly indicative of the distance along said temperature sensing cable means from the NEAR END to the location of the "hot spot".

5,412,375

**METHOD OF SELECTING AN AIR INTERFACE FOR COMMUNICATION IN A COMMUNICATION SYSTEM**  
Daniel E. Wood, Crystal Lake, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 27, 1993, Ser. No. 127,216  
Int. Cl.<sup>6</sup> H01H 67/00

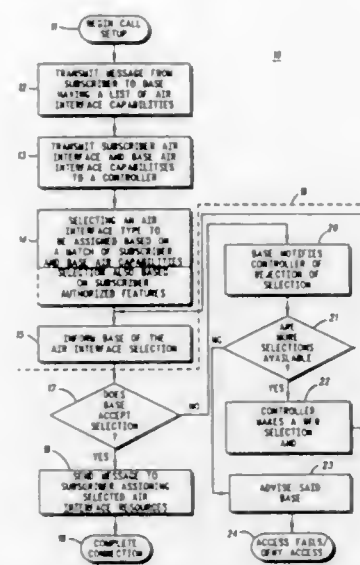
U.S. Cl. 340—825.03

14 Claims

1. A method, for use in a communication system having a plurality of air interfaces, of assigning one of said plurality of air interfaces to a subscriber, said method comprising the steps of:

transmitting a message from said subscriber to a base of said communication system, said message having a list of air interface capabilities of said subscriber;  
transmitting said list of air interface capabilities and a list of air interface capabilities of said base to a controller of said communication system;  
selecting, at said controller, an air interface based upon a

comparison of said lists of air interface capabilities of said subscriber and said base;  
informing said base of said air interface selected by said controller; and



directing said subscriber to utilize said air interface selected by said controller.

5,412,376

**METHOD FOR STRUCTURING COMMUNICATIONS NETWORK BASED ON ASYNCHRONOUS TRANSFER MODE**

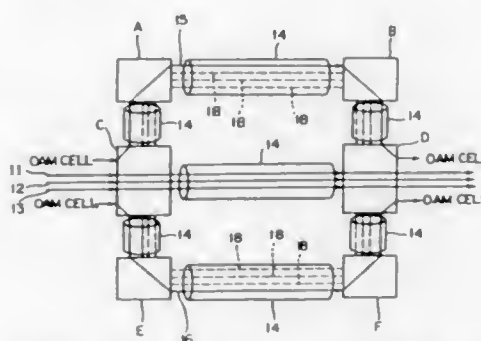
Takafumi Chujo; Hiroaki Komine; Keiji Miyazaki; Takao Ogura, and Tetsuo Soejima, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 789,959, Nov. 12, 1991, abandoned.

This application Feb. 17, 1994, Ser. No. 197,548

Claims priority, application Japan, Nov. 9, 1990, 2-302558  
Int. Cl.<sup>6</sup> H04Q 1/00

U.S. Cl. 340—825.01

11 Claims



1. A method for structuring a communications network based on an asynchronous transfer mode holding communications with cells transferred between a first node on the upstream side and a second node on the downstream side, said first node and second node being connected by a working route and by a plurality of alternate routes each including a plurality of intermediate nodes, said working route including at least one link accommodating working virtual paths and connecting said first and second nodes, each of said alternate routes including a plurality of links connecting adjoining nodes, and each of said links being capable of accommodating a plurality of virtual paths, said method for structuring a communications network comprising the steps of:

preparing a first VPI conversion table according to which

the virtual path identifier (VPI) of the input cell is converted to be output under normal communicating conditions;

preparing a plurality of second VPI conversion tables according to which the VPI of the input cell is converted into the VPI for an alternate virtual path corresponding to every failure pattern, the VPI for an alternate virtual path being shared by a plurality of failure patterns;  
reorganizing said first and second VPI conversion tables for each node;

distributing the reorganized first and second VPI conversion tables to all said nodes;

setting up an alternate route monitoring and switching virtual path in each of said alternate routes;

transmitting a monitoring cell along each of said alternate routes such that said second node, when a failure occurs in said working route, detects the failure and transmits an alarm for station to said first node;

said first node, upon receipt of the alarm for station, transmits a switching command cell to switch said first VPI conversion tables to said second VPI conversion table along each of said alternative route monitoring and switching virtual paths;

said first node and said intermediate nodes switch said first VPI conversion table to said second VPI conversion table prepared in advance corresponding to every failure pattern; and

convert the VPI of the input cell in accordance with the switched second VPI conversion table and transmit the cell along said alternate route, whereby an alternate virtual path is set up in said alternate route.

5,412,377

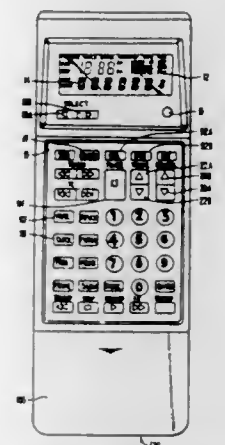
**UNIVERSAL REMOTE CONTROL PROGRAM SCHEDULING SYSTEM**

Benjamin F. Evans, 47 Burton Hill Rd., Weatherford, Tex. 76086, and Jerry J. Heep, 111 Wildflower Trail, Weatherford, Tex. 76087

Continuation of Ser. No. 830,795, Feb. 17, 1994, abandoned, which is a continuation of Ser. No. 562,780, Jun. 8, 1990, abandoned. This application Feb. 18, 1994, Ser. No. 198,690  
Int. Cl.<sup>6</sup> G05B 19/02

U.S. Cl. 340—825.22

8 Claims



1. A handheld controller for transmitting instructions to a plurality of remotely controllable devices and for receiving and storing a schedule of at least one operating event input by a user to be executed at a preselected time, the remote controller comprising:

(a) a keyboard including a plurality of keys for inputting instructions from a user;  
(b) a memory for storing instructions to be performed by said remote controller;  
(c) a multiple-day function flag associated with said at least one operating event for indicating whether said at least

one operating event is to be executed on more than one day at said preselected time;

(d) a multiple-week function flag associated with said at least one operating event for indicating whether said at least one operating event is to be executed only once or weekly;

(e) a clock for tracking real time;

(f) comparison means connected to said clock, said keyboard, and said memory for comparing a current time tracked by said clock to said preselected time stored in said memory and for issuing a start signal when said current time is equal to said preselected time;

(g) means for wireless transmission of a particular set of instructions to said plurality of remotely controllable devices in response to said start signal to initiate execution of said at least one operating event;

(h) means for detecting if said multiple-day function flag is set and for repeating said at least one operating event at said preselected time only on weekdays if said multiple-day function flag is set to a first state and repeating said at least one operating event at said preselected time only on weekend days if said multiple-day function flag is set to a second state; and

(i) means for detecting if said multiple-week function flag is set and for executing said at least one operating event weekly if said multiple-week function flag is set and executing said at least one operating event only once if said multiple-week function flag is not set.

5,412,378

**ANTITHEFT PROTECTION OF DEVICES**

Jon K. Clemens, 1 Bellflower La., San Carlos, Calif. 94070

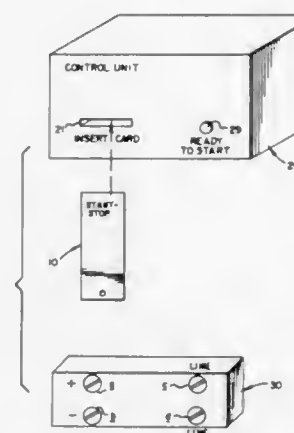
Continuation-in-part of Ser. No. 536,744, Jun. 13, 1990,

abandoned. This application Feb. 20, 1992, Ser. No. 839,129

Int. Cl.<sup>6</sup> H04Q 1/00

U.S. Cl. 340—825.34

9 Claims



1. Apparatus for protecting a vehicle from unauthorized operation, said vehicle having a first location not accessible from the operator's compartment and containing at least one critical operational component which must be enabled for said vehicle to operate, and a second location which is accessible from the operator's compartment, comprising:

activator means having stored therein a coded signal selected from a plurality of coded signals;

control means positionable at said second location and having a memory means including a first input for receiving said coded signal from said activator means and a second input, which when enabled by an initializing signal from the ignition switch, causes said control means to repeatedly produce said coded signal as long as said initializing signal is in an enabled state; and

means positionable at said first location including a code detector means for receiving said coded signal and comparing the same with a stored signal, and a switch means



connected to said critical operational component so that when said coded signal matches said stored signal said switch means is closed thereby enabling said critical operational component.

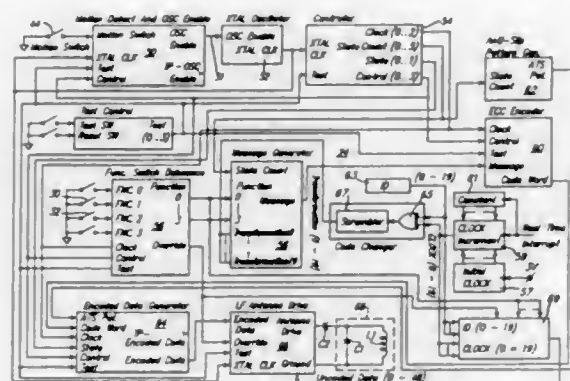
5,412,379

**ROLLING CODE FOR A KEYLESS ENTRY SYSTEM**  
Thomas J. Waraksa, Clarkston; Paul A. Michaels, Livonia; Sherri A. Slaughter, Troy; James A. Polier, Sterling Heights, and Irvin B. Rea, Royal Oak, all of Mich., assignors to Lectron Products, Inc., Rochester Hills, Mich.  
Continuation-in-part of Ser. No. 513,900, Apr. 24, 1990, Pat. No. 5,319,364, which is a division of Ser. No. 199,476, May 27, 1988, Pat. No. 4,942,393. This application May 18, 1992, Ser. No. 885,624

Int. Cl.<sup>6</sup> G08C 19/00

U.S. Cl. 340—825.72

18 Claims



1. A keyless entry system for gaining entry to a vehicle, comprising:

- a portable beacon including a transmitter for transmitting a coded beacon signal, a beacon clock circuit for producing a beacon clock code that is continually changing at a predetermined rate, and code generation means for producing said coded beacon signal in accordance with said beacon clock code such that the content of said coded beacon signal continually changes;
- a receiver associated with the vehicle, said receiver including an antenna for receiving said coded beacon signal when said beacon is within a predetermined range; and controller means for decoding said coded beacon signal and activating a first predetermined function associated with the vehicle upon receipt of a valid coded beacon signal from the beacon, said controller means including means for updating a receiver clock code at substantially said predetermined rate to coincide with the changing beacon clock code.

5,412,380

**ELECTRONIC CROSSPOINT SWITCHING DEVICE OPERATING AT A HIGH SIGNAL TRANSMISSION RATE**

Yoshio Matsuda; Harufusa Kondoh; Hiromi Notani, and Isamu Hayashi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1992, Ser. No. 953,344

Claims priority, application Japan, Jan. 18, 1992, 4-006959  
Int. Cl.<sup>6</sup> H04Q 3/52

U.S. Cl. 340—825.85

18 Claims

1. An electronic crosspoint switching device, comprising:
- a plurality of input data line pairs arranged in rows, and transmitting a plurality of differential input data signals, respectively;
  - a plurality of output data line pairs arranged in columns, and

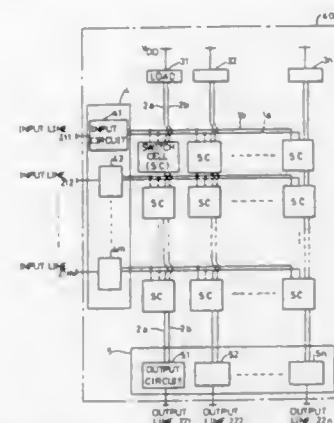
transmitting a plurality of differential output data signals, respectively;

a plurality of switch cells arranged in said rows and columns, and selectively applying a differential signal on said plurality of input data line pairs to one of said plurality of output data line pairs;

each of said switch cells comprising

switching control signal storage means for storing a switching control signal for controlling a connection between a corresponding input data line pair and a corresponding output data line pair,

differential driving means responsive to a differential



potential at said corresponding input data line pair for driving differentially said corresponding output data line pair, and

enabling means responsive to the switching control signal stored in said switching control signal storage means for enabling said differential driving means; and

a plurality of current mirror circuit means, each connected between a first power supply potential and a corresponding one of said plurality of output data line pairs, wherein each of said current mirror circuit means operates so that a current equal to that flowing in one data line of the corresponding one of the output data line pairs, flows to the other data line.

5,412,381

**SIGNALLING MEANS**

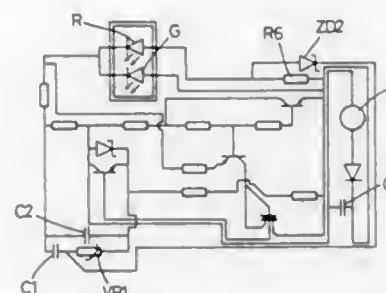
Martin E. Dicks, Everton, England, assignor to Astucia-Sociedade de Desenvolvimento de Patentes, LDA, Funchal  
Filed Jun. 18, 1993, Ser. No. 79,636

Claims priority, application United Kingdom, Jul. 8, 1992, 9214474; Mar. 12, 1993, 9305080

Int. Cl.<sup>6</sup> B60Q 7/00

U.S. Cl. 340—908.1

14 Claims



1. A signalling device (1, 11) comprising: visible signal means (8, 13, 15) for producing a visible signal; and at least one chargeable means (7, C3) for charging to a degree determined by the length of time that light from a passing vehicle headlight illuminates said at least one chargeable means, and for activating

ing said visible signal means (8; 13, 15) for a period of time determined by the degree to which said at least one chargeable means has been charged by said headlight illumination, after said headlight has ceased to illuminate said at least one chargeable means (7, C3) and until said at least one chargeable means (7, C3) has discharged.

5,412,382

**INTEGRATED ELECTRONIC PRIMARY FLIGHT DISPLAY**

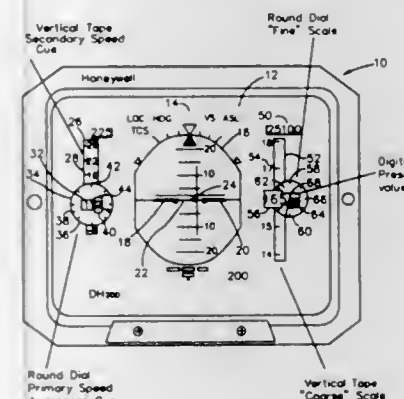
Thomas M. Leard, Carefree, Ariz., and Stephen D. Fulton, Federal Way, Wash., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 30, 1993, Ser. No. 175,834

Int. Cl.<sup>6</sup> G01C 21/00

U.S. Cl. 340—974

13 Claims



1. A primary flight display for an aircraft, comprising:
- a display field including a central attitude indicator;
  - a vertically disposed, movable airspeed scale on a first side of said central attitude director;
  - a first window for digital display located along said movable airspeed scale;
  - a first dial having a first movable indicator located along said movable airspeed scale;
  - means responsive to the airspeed of said aircraft for moving said first movable indicator to display macro airspeed information on said dial and moving said airspeed scale relative to said window to display airspeed in said window;
  - a vertically disposed movable altitude scale on a second side of said central attitude director;
  - a second window for digital display located along said movable altitude scale;
  - a second dial having a second movable indicator located along said movable altitude scale;
  - means responsive to the altitude of said aircraft for moving said second movable indicator in response to a change in aircraft altitude and moving said altitude scale relative to said second window to display altitude in said second window.

5,412,383

Patent Not Issued For This Number

5,412,384  
**METHOD AND SYSTEM FOR ADAPTIVELY BUILDING A STATIC ZIV-LEMPER DICTONARY FOR DATABASE COMPRESSION**

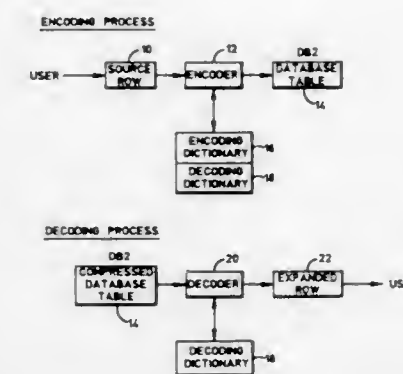
Chung-Chia Chang, San Jose; Gregory L. Davoli, Los Gatos; Mohamed H. El-Ruby, San Jose; Craig A. Friske, San Jose; Balakrishna R. Iyer, San Jose; John P. Lazarus, San Jose; David Wilhite, Los Angeles, all of Calif., and Kenneth E. Plambeck, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 48,820, Apr. 16, 1993, abandoned. This application Aug. 10, 1994, Ser. No. 288,675

Int. Cl.<sup>6</sup> H03M 7/38

U.S. Cl. 341—79

12 Claims



1. In a computer-implemented system for compressing input data consisting of sequences of source symbols selected from a source alphabet to form output data consisting of sequences of code symbols selected from a code alphabet according to a static dictionary stored in memory, said dictionary representing a static parse-tree having nodes representing said code symbols, said nodes being linked into paths representing said source symbol sequences, a method for creating said static dictionary comprising the steps of:

- (a) repeatedly performing the steps of
  - (a.1) determining a source symbol sequence from said input data,
  - (a.2) adding at least one node to said parse-tree responsive to said source symbol sequence, and
  - (a.3) assigning a use count value to said at least one node responsive to the number of said source symbol sequence occurrences; and
- (b) reducing said parse-tree to a first predetermined plurality of nodes by repeatedly deleting from said parse-tree one or more childless nodes having a use count value less than a predetermined use count value threshold.

5,412,385

**ERROR CORRECTION TESTING SYSTEM AND METHOD FOR A MULTISTAGE A/D CONVERTER**  
Christopher W. Mangelsdorf, Reading, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Feb. 22, 1993, Ser. No. 20,559

Int. Cl.<sup>6</sup> H03M 1/10

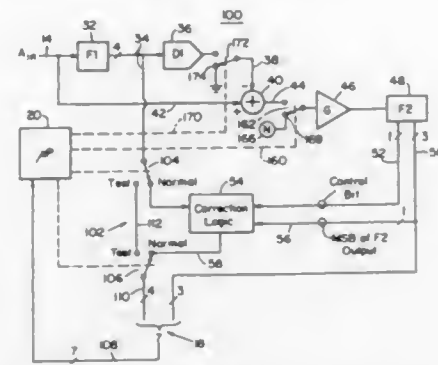
U.S. Cl. 341—120

6 Claims

1. An error correction testing system for a multistage A/D converter, comprising:
- a first A/D converter, responsive to an analog input signal, to provide a coarse digital output signal;
  - a digital to analog converter responsive to said coarse digital output signal to provide a coarse intermediate analog output signal;
  - means for subtracting said analog input signal and said coarse intermediate analog output signal to obtain a residue signal having a predetermined ideal range;
  - a second A/D converter for providing a fine digital output signal and having an added range beyond its normal range for accommodating said residue signal going beyond this

predetermined ideal range as a function of an error in said first A/D converter;

correction means for combining said coarse and fine digital output signals for enabling said second A/D converter to compensate, using its added range, for transition errors in



the coding levels of said first A/D converter and produce a composite high resolution output signal; and testing means for disabling said correction means and indicating the code transitions of the first A/D converter relative to the code transitions of the second A/D converter representing error in the first A/D converter.

5,412,386

# ARRANGEMENT FOR CONVERTING A PLURALITY OF ELECTRICAL ANALOG MEASUREMENT SIGNALS THAT ARE APPLIED SIMULTANEOUSLY TO ITS INPUT TERMINALS INTO A CORRESPONDING PLURALITY OF DIGITAL SIGNALS, USING AN ANTIALIASING FILTER ON THE INPUTS

Tevfik Sezi, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Germany

PCT No. PCT/DE92/00279, § 371 Date Jan. 3, 1994, § 102(e) Date Jan. 3, 1994, PCT Pub. No. WO92/20025, PCT Pub. Date Nov. 12, 1992

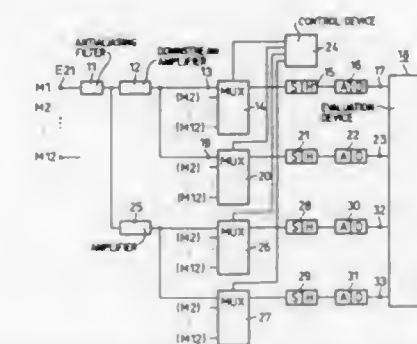
PCT Filed Apr. 3, 1992, Ser. No. 140,109

Claims priority, application Germany, May 3, 1991, 41 14 971.8

Int. Cl.<sup>6</sup> H03M 1/00

U.S. Cl. 341-141

11 Claims



6. An apparatus for converting a plurality of analog signals into a plurality of corresponding digital signals, comprising:

- a plurality of antialiasing filters, each having an input receiving one of the plurality of analog signals and each having a filtered analog signal as an output;
- a first multiplexer having a plurality of inputs receiving the filtered analog signals from the plurality of antialiasing filters, and outputting a first sequence of the filtered analog signals in consecutive order;
- a second multiplexer having a plurality of inputs receiving the filtered analog signals from the plurality of antialiasing filters, and outputting a second sequence of the filtered

analog signals in reverse order from the first sequence of filtered analog signals;

- a first digitizer receiving the first sequence from the first multiplexer, and outputting a first sequence of digital values corresponding to the first sequence of the filtered analog signals;
- a second digitizer receiving the second sequence from the second multiplexer, and outputting a second sequence of digital values corresponding to the second sequence of the filtered analog signals;
- an evaluation device having a first input receiving the first sequence of digital values, having a second input receiving the second sequence of digital values, wherein, during a first evaluation interval, said evaluation device receives at least two digital values for each of the plurality of analog signals, calculates a mean value from said at least two digital values for each of the plurality of analog signals, and outputs these mean values as the plurality of corresponding digital signals; and
- a control device having a first control output coupled to the first multiplexer, and having a second control output coupled to the second multiplexer, wherein said control device controls the first and second multiplexers to create the first and second sequences.

5,412,387

# ERROR REDUCTION IN SWITCHED CAPACITOR DIGITAL-TO-ANALOG CONVERTER SYSTEMS BY BALANCED SAMPLING

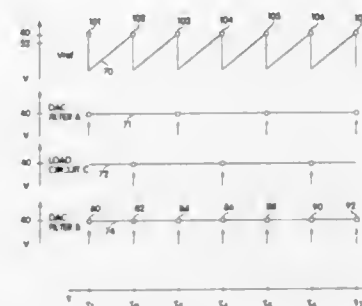
Scott Vincelette, Glenmoore, Pa.; Paul F. Ferguson, Jr., Dracut, and Robert W. Adams, Acton, both of Mass., assignors to Analog Devices, Inc., Norwood, Mass.

Filed Apr. 6, 1993, Ser. No. 44,370

Int. Cl.<sup>6</sup> H03M 1/66

U.S. Cl. 341-150

15 Claims



1. A DAC system comprising:

- a first DAC connected and operable to sample a reference source, which provides a reference, at a first rate;
- a second DAC connected and operable to sample the reference source at a second rate, the second rate being greater than the first rate; and
- at least one load circuit connected and operable to sample the reference source at a third rate such that the level of the reference provided by the reference source is substantially the same each time a sample is taken.

5,412,388

# POSITION AMBIGUITY RESOLUTION

Stanley W. Attwood, Sun Lakes, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 11, 1993, Ser. No. 105,235

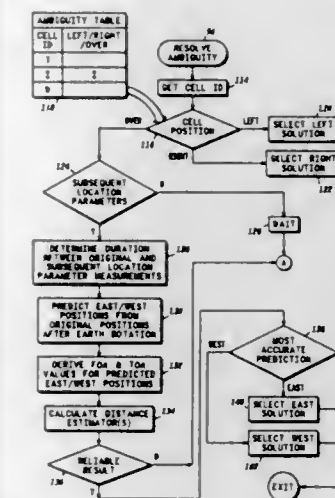
Int. Cl.<sup>6</sup> G01S 5/02; G01C 21/00

U.S. Cl. 342-357

31 Claims

1. A method of distinguishing an actual position from an image position in a location determination system, said method comprising the steps of:

obtaining a set of original location parameters, said original set describing a first position and a second position; acquiring a set of subsequent location parameters; and



selecting, as said actual position, the one of said first and second positions which, in response to said sets of original and subsequent location parameters, appears to move in a generally eastward direction over time.

5,412,389

# MULTIBEAM POSITION AMBIGUITY RESOLUTION

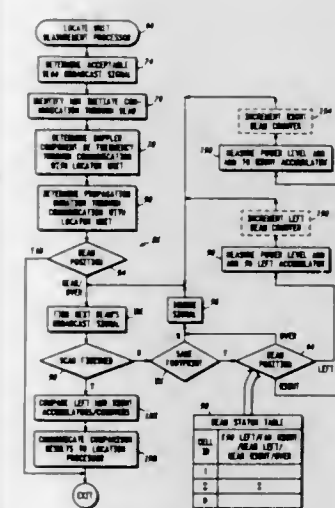
Keith A. Olds, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 11, 1993, Ser. No. 105,988

Int. Cl.<sup>6</sup> G01S 5/02; G01C 21/00

U.S. Cl. 342-357

20 Claims



1. A method of distinguishing an actual position from an image position in a location determination system, said actual position being identified from first and second positions symmetrically located about a distinguishing line, and said method comprising the steps of:

- projecting a plurality of antenna beams in a plurality of diverse directions, wherein a first portion of said beams project on a first side of said distinguishing line and a second portion of said beams project on a second side of said distinguishing line;
- receiving a signal transmitted through one of said beams; and
- selecting, as said actual position, the one of said first and

second positions which resides on the same side of said distinguishing line as the beam through which said signal was received.

5,412,390

# APPARATUS AND METHOD FOR REDUCING CO-CHANNEL INTERFERENCE FROM A RADIO FREQUENCY SIGNAL

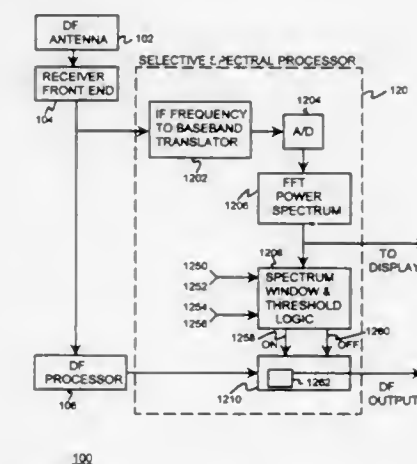
David L. Peavey, Fremont; Katherine A. Tieszen, Cupertino; Kristina Pagnini, Fremont; Fred E. Schader, San Jose; Timothy D. Stephens, Milpitas; Nicholas Cianos, Menlo Park, and John R. Conkle, Los Gatos, all of Calif., assignors to Delfin Systems, Santa Clara, Calif.

Filed Aug. 24, 1993, Ser. No. 110,884

Int. Cl.<sup>6</sup> G01S 5/02

U.S. Cl. 342-417

15 Claims



1. An apparatus for reducing co-channel interference in a direction finding (DF) system, the DF system including a DF antenna, a receiver coupled to the antenna and a processor for receiving signals from the receiver; the apparatus comprising: means for converting analog signals from the receiver to digital signals;

- means for converting the digital signals to spectral signals; the digital signal converting means including a plurality of bandpass filter means and a square law detecting means coupled to the band pass filter means;
- means for monitoring the spectral signals for interfering signals and signals of interest;
- means for receiving the spectral signals; the spectral signal receiving means having at least one threshold input and having at least one spectrum window input, the spectral signals receiving means providing a stop signal if the interfering signal is greater than the threshold level and within the spectrum and a continue signal, if the interfering signal is less than the threshold level and;
- means for integrating the signals of interest from the processor responsive to the stop and continue signals.

5,412,391

# ADAPTIVE DECORRELATING SIDELobe CANCELLER

Bernard L. Lewis, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 6, 1977, Ser. No. 841,491

Int. Cl.<sup>6</sup> G01S 3/16, 3/28

U.S. Cl. 342-379

6 Claims

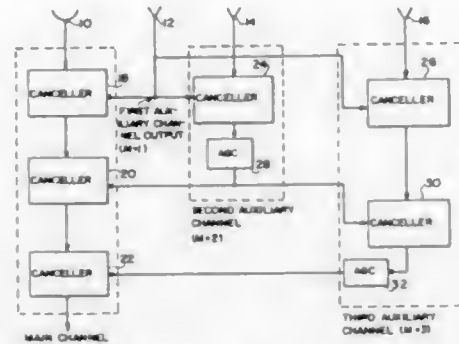
1. A canceller system that decorrelates signals by removing correlated components comprising:

- multiple signal source means for providing multiple input signals;
- a main channel having multiple serially connected cancellers



each having a main terminal, an auxiliary terminal and an output terminal, the first of said serially connected cancellers receiving one of said input signals at its main terminal and the remainder of said cancellers each receiving at its main terminal the output from the output terminal of the preceding canceller; and

M auxiliary channels including: a) the first of said auxiliary channels ( $M=1$ ) being one of said input signals and providing a first auxiliary channel output to one of said cancellers of said main channel; b) the remaining auxiliary channels ( $M>1$ ) each having, respectively,  $M-1$  serially connected canceller means each said canceller means



having a main terminal, an auxiliary terminal and an output terminal, the first serially connected canceller of each auxiliary channel receiving at its main terminal one of said input signals and the remainder of the serially connected cancellers receiving the output from the preceding canceller at its main terminal, the last serial canceller for each auxiliary channel providing the auxiliary channel output, each canceller of an auxiliary channel receiving at its auxiliary terminal the auxiliary channel output from a different one of the preceding auxiliary channels, the auxiliary channel outputs also each being provided to the auxiliary terminal of a different one of the main channel cancellers.

5,412,392

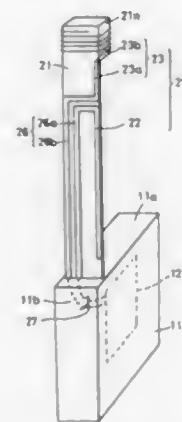
**PORTABLE RADIO UNIT HAVING STRIP ANTENNA WITH PARALLEL TWIN-LEAD FEEDER**  
Koichi Tsunekawa, Kanagawa, Japan, assignor to NTT Mobile Communications Network, Inc., Tokyo, Japan

Filed Sep. 23, 1993, Ser. No. 125,458

Claims priority, application Japan, Sep. 28, 1992, 4-258077  
Int. Cl.<sup>6</sup> H01Q 1/24, 1/10/8

U.S. Cl. 343—702

8 Claims



1. A portable radio unit comprising:  
a housing;  
a radio circuit provided in said housing;

- a dielectric plate secured at one end to said housing and protrusively provided thereon;
- a first strip antenna element formed on said dielectric plate and extending lengthwise thereof from said one end toward the other end of said plate and having an electrical length approximately equal to a quarter of the working wavelength;
- a second antenna element having a coil provided on said dielectric plate at the side opposite from said housing with respect to said first strip antenna element;
- a parallel twin-lead feeder formed on said dielectric plate and extending to said one end and connected at one end of said parallel twin-lead feeder to adjacent inner ends of said first and second antenna elements; and
- a second feeder connected between the other end of said parallel twin-lead feeder and said radio circuit.

5,412,393

**RETRACTABLE ANTENNA ASSEMBLY WITH BOTTOM CONNECTOR**

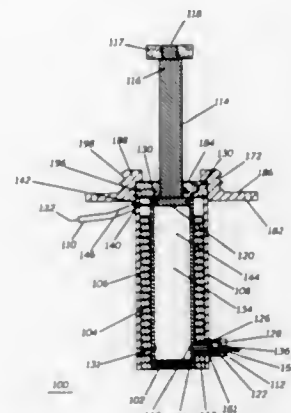
James T. Wiggernhorn, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 8,429, Jan. 25, 1993, abandoned. This application Mar. 7, 1994, Ser. No. 207,239

Int. Cl.<sup>6</sup> H01Q 1/24, 1/10

U.S. Cl. 343—702

13 Claims



1. An antenna assembly, comprising:
  - a transmission line comprising a housing having first and second ends, the housing including a dielectric sleeve and a conductive sleeve, the housing having a cavity extending from the first end toward the second end;
  - an antenna feedpoint electrically coupled to the transmission line;
  - an antenna element carried by the housing, the antenna element being movable within the transmission line between a first position wherein the antenna element forms an active antenna portion, and a second position substantially within the transmission line wherein the antenna element is operatively inactive as an antenna; and
  - connector means, for supporting an external antenna connection when the antenna element is in the first position and when the antenna element is in the second position, the connector means having a contact portion located toward the second end of the housing, the connector means being electrically coupled by the antenna element to the antenna feedpoint when the antenna element is at the second position, the connector means being electrically decoupled from the antenna feedpoint when the antenna element is at the first position.

5,412,394

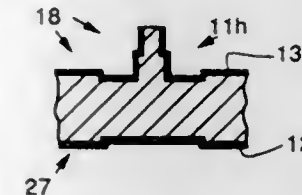
**CONTINUOUS TRANSVERSE STUB ELEMENT DEVICE ANTENNA ARRAY CONFIGURATIONS**

William W. Milroy, Playa del Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 751,282, Aug. 29, 1991, now Re. 5,266,961. This application Aug. 10, 1993, Ser. No. 104,467  
The portion of the term of this patent subsequent to Nov. 30, 2010, has been disclaimed.  
Int. Cl.<sup>6</sup> H01Q 13/00

U.S. Cl. 343—785

8 Claims



1. A shaped-beam antenna array employing continuous transverse stubs as radiating elements comprising:

a planar sheet of dielectric material having two generally parallel broad surfaces separated by a predetermined distance and having a plurality of elongated, raised, relatively thin, rectangular dielectric members formed along a broad surface of the sheet of dielectric material that extend across one dimension of the broad surface and that extend away from the broad surface, and wherein the plurality of thin rectangular dielectric members are spaced apart from each other by a predetermined distance and wherein the rectangular dielectric members vary in length; and

a conductive material disposed on the broad surfaces of the sheet of dielectric material and on transversely extending edgewalls formed by the plurality of thin rectangular dielectric members so as to define a parallel plate waveguide having a plurality of continuous variable length transverse stubs disposed on one plate thereof, and wherein distal ends of the plurality of thin rectangular dielectric members are free of the conductive material so as to define a plurality of radiating elements, and wherein an edge of the sheet of dielectric material is free of conductive coating so as to define a feed for the shaped-beam antenna array,

whereby precise control of individual phase elements result from the variable length transverse stubs.

5,412,395

**METHOD FOR DRIVING DISPLAY DEVICE**

Hiroshi Maeda, Yamatokooryama, and Takuro Omori, Ikoma, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 530,804, May 30, 1990, abandoned.

This application Jun. 1, 1992, Ser. No. 892,736

Claims priority, application Japan, May 30, 1989, 1-138807

Int. Cl.<sup>6</sup> G09G 3/36

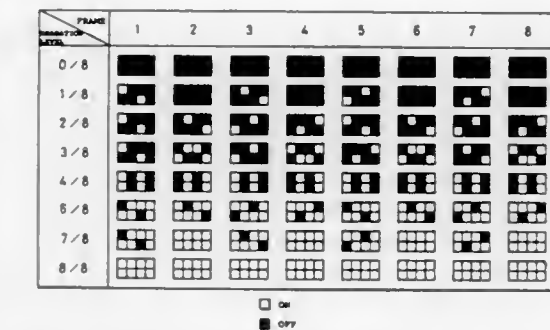
U.S. Cl. 345—89

22 Claims

1. A method for driving a multilevel gradation display device comprising the steps of:

grouping all pixels of the display device into a plurality of groups, each composed of a plurality of pixels;  
grouping the plurality of pixels in each group into a plurality of subgroups, each composed of a plurality of pixels;  
setting a plurality of frame time periods as one integration time period, during which a plurality of pixels in each group are selected to be in a first display state, thereby creating the display capable of multiple levels of gradation over a plurality of integration time periods; and  
selecting a plurality of pixels in each group to be in a first display state, the number of pixels selected being dependent upon gradation display level selected, for each of the

frame time periods within each of a plurality of integration time periods, each of the pixels in each subgroup within each group being non-contiguous with each other and



being selected to be in the same display state for each frame time period in each of the integration time periods for each of the plurality of gradation display levels in the multilevel gradation display.

5,412,396

**DRIVER CIRCUIT FOR SHUTTERS OF A FLAT PANEL DISPLAY**

Terence J. Nelson, New Providence, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

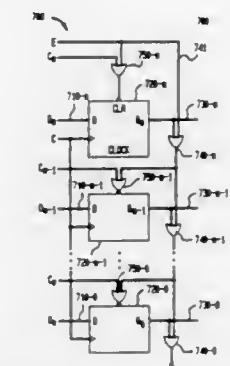
Continuation of Ser. No. 49,038, Apr. 16, 1993, Pat. No.

5,311,206. This application Nov. 9, 1993, Ser. No. 149,263

Int. Cl.<sup>6</sup> G09G 3/36

U.S. Cl. 345—89

2 Claims



1. A display producing gray-scale images by means of data lines responsive to pulse-width modulation and driven by a circuit that comprises a shift register having one cell for each data input of the display, each cell comprising:

a memory for periodically receiving and storing an  $m+1$  bit number  $D_m D_{m-1} \dots D_0$ , the  $m^{\text{th}}$  bit  $D_m$  is the most significant bit and wherein the  $0^{\text{th}}$  bit  $D_0$  is the least significant bit, said memory comprising a plurality of flip-flops each for storing a bit of said  $m+1$  bit number, means for receiving  $m+1$  delay signals which each correspond to one of said  $m+1$  bits and applying said delay signals to a clear input of corresponding ones of said flip-flops, the delay signal associated with each bit having twice the period of the delay signal associated with a preceding bit, said delay signals setting each bit to logic zero, one at a time from the  $m^{\text{th}}$  bit to the  $0^{\text{th}}$  bit, after a delay equal to one half the period of the delay signal corresponding to the bit,

an OR circuit connected to an output of each of said flip-flops and to the output of the preceding OR circuit, said output of each OR circuit also being connected to said clear input of the succeeding flip-flop except for the OR circuit corresponding to the  $D_0$  bit, and  
a cell output for driving said associated shutter with a volt-

age depending, at any time, on whether said  $m+1$  bit number stored in said memory is zero or non-zero, said cell output being the output of said OR circuit corresponding to the  $D_0$  bit.

5,412,397

# DRIVING CIRCUIT FOR A MATRIX TYPE DISPLAY DEVICE

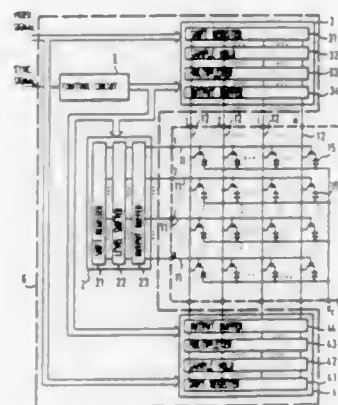
Yoshiharu Kanatani, Nara; Hirofumi Fukuoka, Osaka, and Yoshihiko Orii, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 869,900, Apr. 15, 1992, abandoned, which is a continuation of Ser. No. 417,164, Oct. 4, 1989, abandoned. This application Jan. 3, 1994, Ser. No. 177,202 Claims priority, application Japan, Oct. 4, 1988, 63-250349

Int. Cl.<sup>6</sup> G09G 3/36

U.S. Cl. 345—99

7 Claims



1. In a driving circuit for a matrix type display device which comprises picture elements arranged in a matrix suited for an interlaced scanning method, switching elements connected respectively to said picture elements, scanning lines each of which is connected to a switching terminal of said switching elements which are arranged in one direction, and signal lines each of which is connected to a signal terminal of said switching elements which are arranged in a direction crossing said one direction, said driving circuit comprises:

a first driving means for, during a writing period in a previous half of each horizontal scanning period, selecting a scanning line included in a group of said scanning lines which correspond to a field to be scanned, and for, during an erasing period in a late half of each of the horizontal scanning periods selecting another scanning line which is adjacent to said selected scanning line and is included in another group of scanning lines which do not correspond to the field to be scanned, said writing period for said selected scanning line and said erasing period for said another scanning line sharing one horizontal scanning period respectively with a pulse in said one horizontal scanning period of each field;

a second driving means for, during said writing period in a writing field corresponding to the field to be scanned, applying to said signal lines a signal voltage above a threshold level of said picture elements determined by the liquid crystal's characteristics referenced to a voltage applied to a counter electrode, the level of said signal voltage corresponding to a video signal, and

a third driving means for, during said erasing period, applying one voltage to said signal lines to set the voltage applied to said picture elements to a level below the threshold level of said picture elements referenced to a voltage applied to a counter electrode, each of said signal lines being connected to both said second driving means and said third driving means.

## 5,412,398 ELECTROPHORETIC DISPLAY PANEL AND ASSOCIATED METHODS FOR BLINKING DISPLAYED CHARACTERS

Frank J. DiSanto, North Hills, and Denis A. Krusos, Lloyd Harbor, both of N.Y., assignors to Copytele, Inc., Huntington Station, N.Y.

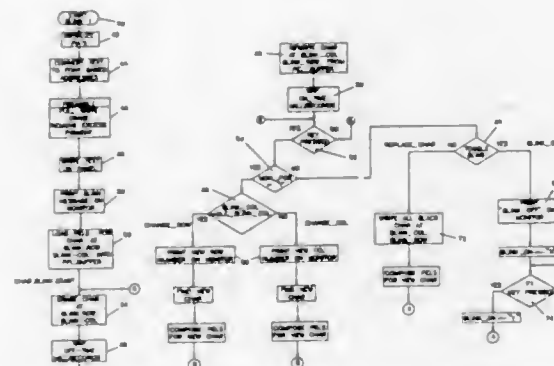
Continuation-in-part of Ser. No. 88,615, Jul. 7, 1993, Pat. No. 5,359,346, which is a continuation of Ser. No. 841,364, Feb. 25, 1992, abandoned. This application Mar. 8, 1994, Ser. No. 208,136

The portion of the term of this patent subsequent to Oct. 25, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> G09G 3/34

U.S. Cl. 345—107

16 Claims



1. An electrophoretic display apparatus adapted to display a plurality of written character lines with at least one selected character of said written character lines blinking in a manner visible to a user of said apparatus, comprising:

a fluid-tight envelope;  
an electrophoretic fluid contained within said envelope;  
a matrix of row and column electrodes passing through said envelope and said fluid, said row and column electrodes defining row and column electrode intersections;  
a plurality of anode segments passing through said envelope, wherein each displayed character area of said written character lines is defined by at least one of said anode segments and a corresponding group of said row and column electrode intersections;  
supply means for supplying individual voltages to said at least one anode segments and said corresponding group of said row and column electrode intersections to write characters to said display;

control means coupled to said supply means, for controlling the magnitude, timing and duration of said individual voltages supplied by said supply means to cause written characters to remain continuously visible to said user while simultaneously causing a selected one of said written characters to blink when said control means repeatedly causes said supply means to apply a first potential bias of a given polarity between a group of row and column intersections and an associated anode segment corresponding to said selected one of said written characters, said first potential bias being applied for a duration of time which is sufficient enough to erase said selected one of said written characters and a second potential bias of a polarity opposite to said given polarity, between said group of row and column intersections and said associated anode segment for a duration of time sufficient to rewrite said selected one of said written characters.

## 5,412,399 IMAGE OUTPUT CONTROL APPARATUS

Zenichiro Hara, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

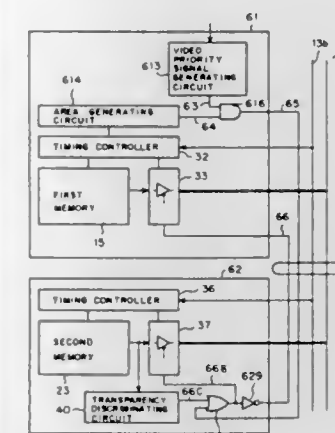
Filed Feb. 15, 1991, Ser. No. 655,856

Claims priority, application Japan, May 23, 1990, 2-132840

Int. Cl.<sup>6</sup> G09G 1/00

U.S. Cl. 345—113

16 Claims



16. An image output control apparatus comprising: first memory means for storing video image data; second memory means for storing digital data; video priority signal means for generating a logical high level signal if the video image data has priority for a pixel to be driven;

transparency discriminating means, responsive to said second memory means, for generating a logical high level signal if the digital data stored in said second memory means relating to said pixel is transparent; and control means, responsive to said first memory means and said video priority signal means, for driving said pixel based on video image data relating to said pixel stored in said first memory means if either of said video priority signal means or said transparency discriminating means generates a logical high level signal.

## 5,412,400 PROCESS MONITORING SYSTEM AND A WINDOW DISPLAYING METHOD THEREFOR

Kazuko Takahara; Kazuhiko Ishii, and Hideyuki Sato, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 22, 1991, Ser. No. 796,347

Claims priority, application Japan, Nov. 24, 1990, 2-320376; Dec. 29, 1990, 2-416570

Int. Cl.<sup>6</sup> G09G 1/06

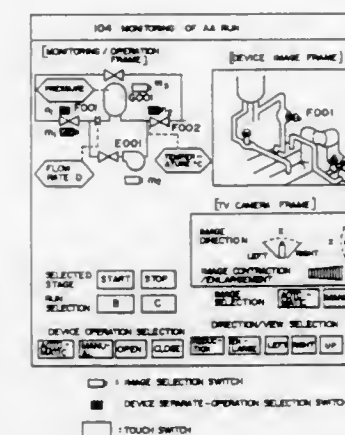
U.S. Cl. 345—119

39 Claims

1. A window displaying method for a display device included in a process monitoring system for a plant, comprising the steps of:

preparing a plurality of process monitoring display frames to be displayed on the display device, and preparing a plurality of window frames to be displayed in windows which are opened in the process monitoring display frames; preregistering in a memory, for at least one display frame of said plurality of process monitoring display frames, a first window area for display of a window at a position of relatively low importance with respect to information content of said display frame under a first process condition and a second window area for display of a window at a different position of relatively low importance with respect to information content of said display frame under a second process condition; and displaying a selected one of the window frames in a selected

window area selected on a basis of an existing process condition and corresponding to one of said first window



area and said second window area upon a request for a window display within said display frame.

5,412,401

## DIGITAL VIDEO EFFECTS GENERATOR

Bruno Wolf, Rochester, N.Y., and Linda M. Kulmacezewski, San Jose, Calif., assignors to Abekas Video Systems, Inc., Redwood City, Calif.

Continuation of Ser. No. 96,646, Jul. 23, 1993, abandoned, which is a continuation of Ser. No. 685,825, Apr. 12, 1991, abandoned.

This application Aug. 8, 1994, Ser. No. 287,525

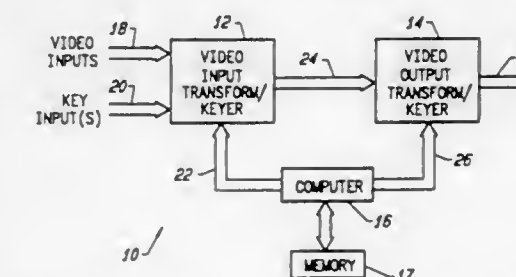
Int. Cl.<sup>6</sup> G09G 1/06

U.S. Cl. 345—139

34 Claims

## MICROFICHE APPENDIX INCLUDED

(2 Microfiche, 180 Pages)



1. A digital video effects generator for selectively linking a plurality of video effects for sequential execution thereof, wherein each of said plurality of video effects includes a plurality of keyframes, said digital video effects generator comprising:

storage means for receiving and storing first and second pluralities of transformation control data representing first and second effects, respectively, wherein said first effect comprises a first plurality of keyframes including a first keyframe and said second effect comprises a second plurality of keyframes including a second keyframe, and further wherein said received first and second pluralities of transformation control data include first and second pluralities of keyframe parametric data corresponding to said first and second keyframes, respectively, and still further wherein said first keyframe corresponds to a first image with a first plurality of pinned corners and said second keyframe corresponds to a second image with a second plurality of pinned corners; and computer means for selectively accessing said stored first and second pluralities of keyframe parametric data and linking said first and second effects via said first and second keyframes for sequential execution thereof with a



transition image therebetween including a third plurality of mutually pinned corners, wherein said computer means programmably processes said selectively accessed first and second pluralities of keyframe parametric data, and wherein each one of said third plurality of pinned corners has a spatial position relative to the other ones of said third plurality of pinned corners which is substantially maintained during a transition from said first keyframe to said second keyframe.

5,412,402

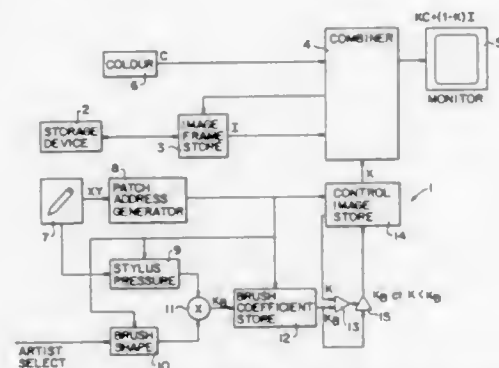
## ELECTRONIC GRAPHIC SYSTEMS

Anthony D. Searby, and Paul R. N. Kellar, both of Newbury, England, assignors to Quantel Limited, Newbury, England  
Continuation-in-part of Ser. No. 576,647, Aug. 31, 1990, Pat. No. 5,142,616. This application Mar. 6, 1991, Ser. No. 665,597  
Claims priority, application United Kingdom, Jan. 31, 1991, 9102084

Int. Cl.<sup>6</sup> G09G 5/04

U.S. Cl. 345—153

30 Claims



1. An electronic graphic system for use in modifying data defining an image, in which graphic system control data representing a desired distribution of interpolation coefficients is created and stored in a control store by way of a binary algorithm in which stored control data in the control store is compared with created control data created in response to manipulations of user operable input means via a comparator and is replaced with the created data via a gate when the created control data is greater than the stored control data so that the created data becomes the stored data; the stored control data stored in the control store being used to control the combining by interpolation of data representing a user selected color with data representing an initial image held in an image frame store separate from the control store to produce combined data; and the combined data being output for display of a modified image represented thereby on a monitor, the system being arranged such that the initial image data stored in the image frame store remains unmodified until such time as the user indicates his satisfaction with the displayed image.

5,412,403

## VIDEO DISPLAY CONTROL CIRCUIT

Kazuyuki Nishizawa, and Kazuhide Kawata, both of Tokyo, Japan, assignors to NEC Corporation, Japan  
Continuation of Ser. No. 702,063, May 17, 1991, abandoned.  
This application Sep. 2, 1993, Ser. No. 116,044  
Claims priority, application Japan, May 17, 1990, 2-128052  
Int. Cl.<sup>6</sup> G09G 1/14

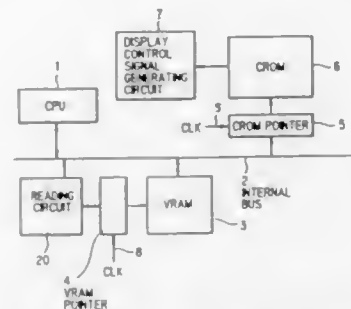
U.S. Cl. 345—192

5 Claims

1. A video display control circuit, comprising:  
a first memory for storing plural characters at predetermined addresses;  
a second memory for temporarily storing addresses of characters to be displayed on a screen;  
control means for writing addresses designating characters to be displayed on said screen into said second memory;  
a pointer for sequentially supplying read addresses to said

second memory and sequentially reading said addresses stored therein from said read addresses of said second memory;

bus means for transferring said addresses read from said read-addresses of said second memory to said first memory; and  
reading means connected to said pointer and to said bus, said reading means for reading a read address currently supplied from said pointer to said second memory, to said control means under control of said control means;  
wherein characters are sequentially read from said first



memory in accordance with said addresses sequentially transferred through said bus means from said second memory, and said read address currently supplied from said pointer is received in said control means by said reading means, whereby characters to be written to a selected address of said second memory are written only when said control means detects that said read address currently supplied from said pointer is subsequent to said selected address of said second memory thereby avoiding any collision between rewritten of said selected address of said second memory and reading of said selected address from said second memory.

5,412,404

## VIDEO GRAPHICS APPARATUS

Gerald W. Candy, 2 Freeland Duncan Road Park Gate, Southampton SO3 7BD, United Kingdom

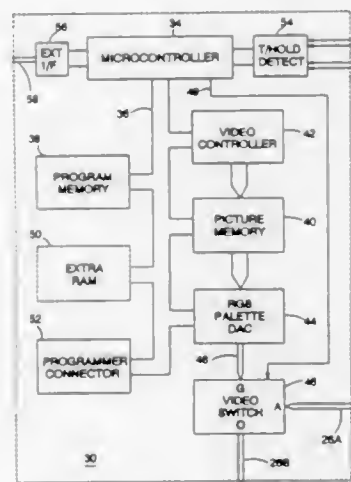
Filed Jan. 22, 1993, Ser. No. 1

Claims priority, application United Kingdom, Jul. 16, 1992, 9215122

Int. Cl.<sup>6</sup> G09G 5/00

U.S. Cl. 345—211

11 Claims



1. Video graphics apparatus for attachment to or incorporation in a video system which includes a video display device, user operable input devices and a system controller which is

responsive to said user operable input devices and outputs video image signals for driving said display device, said apparatus comprising:

a memory for the storage of alternative image signals for display on said video display device;  
a sensing arrangement connectable to said video system for detecting whether said user operable input devices are being operated;  
an interruption controller connected to said sensing arrangement;  
a video switch having a first video input connected, in use, to receive said video signals output by said system controller, a second video input connected, in use, to said alternative image signals from said memory, a video output connected, in use, to said video display device; and  
a control input connected, in use, to receive control signals generated by said interruption controller for selecting a connection of said first, or said second video input to said video output;  
wherein said interruption controller on the detecting an absence of operation of said operable input devices for a time period as determined by a timer, outputs a control signal to said video switch to select said connection of said second video input to said video output for a predetermined interval in order to interrupt said video image signals output by said system controller for said predetermined interval and to substitute the alternative image signals from said memory for display on said video display device.

5,412,405

## LINE THERMAL PRINTER HAVING POWER SUPPLY CAPACITY MATCHED TO NUMBER OF PRINTING DOTS

Shinji Nureki, and Kazuhisa Oonishi, both of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

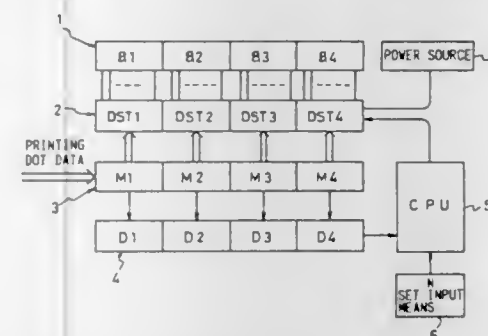
Filed Mar. 15, 1991, Ser. No. 670,293

Claims priority, application Japan, Mar. 16, 1990, 2-67863

Int. Cl.<sup>6</sup> B41J 2/36

U.S. Cl. 347—182

14 Claims



1. A line thermal printer comprising:

a thermal head comprised of a plurality of physical blocks each having a plurality of heat generation elements to which power is supplied selectively for effecting dot printing on a line;  
driving means having driving blocks corresponding to said physical blocks, respectively, for applying selectively the power to said heat generation elements in line sequence for each line in accordance with printing dot data;  
a printing dot data memory having memory blocks corresponding to said driving blocks, respectively, for supplying the printing dot data to said driving means in synchronism with line sequence timing;  
a printing dot counter having counter blocks corresponding to said memory blocks, respectively, for counting a printing dot number according to the printing dot data stored in corresponding printing dot data memory blocks for each line; and  
control means for controlling application of power to said

heat generation elements to effect line-sequential dot printing by successively

forming a logic block sum comprising a printing dot number which is counted in a first remaining counter block, including in the logic block sum a printing dot number which is counted in any next subsequent remaining counter block that does not cause the logic block sum to exceed a predetermined maximum allowable number of the heat generation elements to which the power may be applied simultaneously, while not including in the logic block sum any next remaining counter block that does cause the logic block sum to exceed the predetermined maximum allowable number so as to form a maximized logic block comprising each said counter block included in the logic block sum,

forming maximized logic blocks successively by repeating said forming and including steps for all remaining counter blocks not included in one of said maximized logic blocks, and  
controlling the driving blocks to separately apply the power to said heat generation elements for each of said maximized logic blocks.

5,412,406

## LINE HEAD DRIVING WITH BATCH-PRINTING

Hisayoshi Fujimoto, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

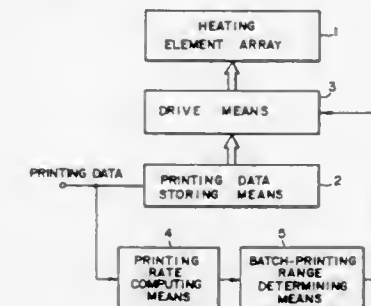
Filed Feb. 24, 1993, Ser. No. 21,973

Claims priority, application Japan, Feb. 24, 1992, 4-036238

Int. Cl.<sup>6</sup> B41J 2/355

U.S. Cl. 347—180

8 Claims



6. A printing apparatus comprising:

(a) input means for inputting printing data into said printing apparatus;  
(b) a thermal head for printing a recording sheet in accordance with said printing data; and  
(c) means for supplying an electric power to said thermal head, and said thermal head comprising:  
an array of heating elements,  
printing data storing means for storing inputted printing data,  
means for computing a printing rate for the inputted printing data,  
batch-printing range determining means responsive to the computed printing rate for determining the range of heating elements used in a batch printing, and  
drive means for driving the heating elements in accordance with the printing data stored in said memory means and the batch-printing range determined by said batch-printing range determining means.

5,412,407

# HEAT TRANSFER RECORDING APPARATUS WITH COMMON DRIVE SOURCE FOR DRIVING PLURAL ELEMENTS

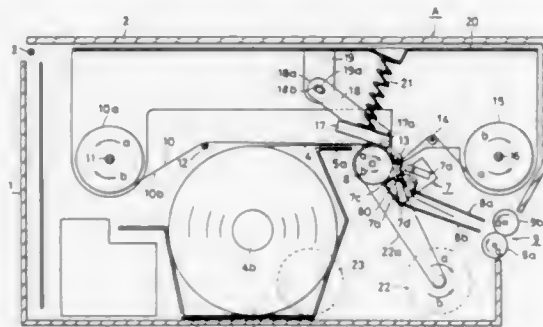
Akio Okubo, Tokyo; Toshiyuki Hayashi, and Masahiro Funakoshi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 844,939, Mar. 4, 1992, which is a continuation of Ser. No. 333,283, Apr. 5, 1989, abandoned. This application Jan. 18, 1994, Ser. No. 182,386

Claims priority, application Japan, Apr. 7, 1988, 63-84033  
Int. Cl.<sup>6</sup> B41J 2/325, 17/08, 17/10

U.S. Cl. 342-215

8 Claims



1. A heat transfer recording apparatus in which heat energy which is generated by recording means in accordance with recording signals is applied to a heat transfer printing medium so as to cause an ink of said heat transfer printing medium to be transferred to a recording medium so as to record a predetermined image, comprising:

recording means for recording an image on said recording medium by superposing said heat transfer printing medium having said ink thereon atop said recording medium and applying heat to said heat transfer printing medium, causing said ink to be transferred to said recording medium;

heat transfer printing medium transporting means for transporting said heat transfer printing medium from a supply position to a take-up position;

recording medium transporting means for transporting said recording medium;

recording medium transport driving means for driving said recording medium transporting means;

cutting means for cutting said recording medium;

discharging means for discharging said recording medium cut by said cutting means; and

printing medium transport driving means for driving said heat transfer printing medium transporting means, said printing medium transport driving means being a drive source for selectively causing operation of said heat transfer printing medium transporting means and then at least one of said cutting means and said discharging means, said cutting means and said discharging means not being operated simultaneously.

5,412,408

# BEAM RECORDING APPARATUS WITH INTENSITY CONTROL

Michio Itoh, Hachioji, and Hiromichi Yamada, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 744,424, Aug. 13, 1991, abandoned.

This application May 21, 1993, Ser. No. 64,745

Claims priority, application Japan, Aug. 16, 1990, 2-216354  
Int. Cl.<sup>6</sup> H04N 1/21

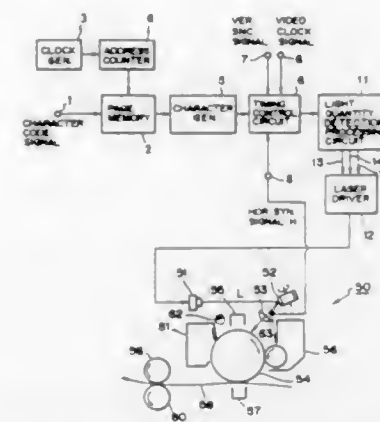
U.S. Cl. 347-132

18 Claims

9. An image recording apparatus which uses light beam modulated by pixel data, comprising:

light beam generating means for generating the light beam having a beam diameter  $d$  defined as the diameter at which the light beam intensity lowers to  $1/e^2$  ( $e$  being the base of

the natural logarithms) of the light beam intensity at the light beam center; and



beam scanning means for scanning the beam at the scan line interval  $p$ , wherein  $d/p \geq 1.8$ .

5,412,409

# IMAGE REGISTRATION FOR A RASTER OUTPUT SCANNER (ROS) COLOR PRINTER

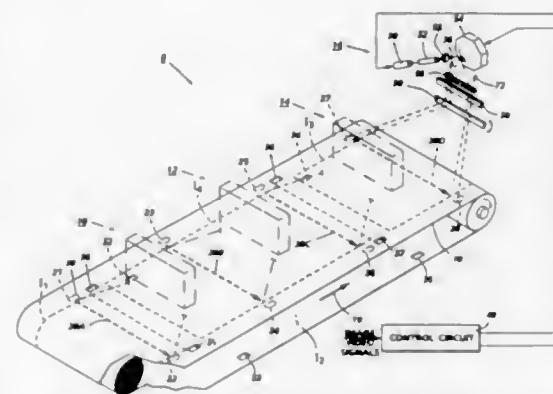
Daniel W. Costanza, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 3, 1993, Ser. No. 55,335

Int. Cl.<sup>6</sup> H04W 1/21

U.S. Cl. 347-118

7 Claims



1. An imaging system for forming multiple image exposures on exposure frames of a photoconductive member including:

a photoreceptor belt having a plurality of image exposure frames along its circumference, said belt having at least a first and second hole on opposite sides of the belt width and outside of the exposure frames,

a plurality of ROS imagers, each ROS imager comprising a laser light source for clenerating a modulated coherent light beam output along an optical path.

a rotatable multifaceted polygon interposed in the optical path between the laser light source and the photoreceptor belt for scanning light beams directed onto the facets of said polygon in a fast scan direction across the photoreceptor belt.

a pre-polygon Optical system for focusing said modulated laser light output beams at the polygon facets.

a post polygon optical system to focus reflected light beams from said polygon in said fast scan direction

a first and second light source opposed from one surface of the photoreceptor belt for illuminating said first and second belt holes, said first and second light source located between the polygon and the post polygon optical system

first and second detecting means associated with each of said imagers, said detecting means opposed from the other surface of the photoreceptor for sensing the light from said first and second light sources through said belt holes and generating signals representing said detection, and circuit means to amplify said detecting means output signals and to generate image registration correction signals.

5,412,410

# INK JET PRINthead FOR CONTINUOUS TONE AND TEXT PRINTING

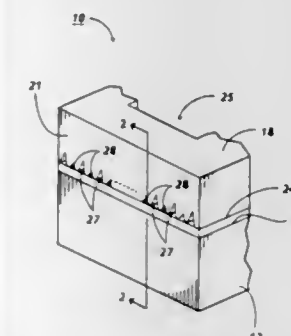
Ivan Rezanka, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 4, 1993, Ser. No. 375

Int. Cl.<sup>6</sup> B41J 2/05, 2/205

U.S. Cl. 347-15

5 Claims



1. An ink jet printhead for use in a printer to eject droplets of ink selectively from a plurality of nozzles therein onto a recording medium and to print selectively text images and continuous tone images, the printhead comprising:

at least a first group and a second group of different sized nozzles collinearly arranged in a face of the printhead, the nozzles from the first group of nozzles being equally and alternatively spaced with the nozzles from the second group of nozzles, the nozzle sizes in respective first and second nozzle groups being identical, either the nozzles from the first nozzle group or the nozzles from the first group and second group of nozzles in fixed combinations being used to print single pixels for text printing, and predetermined combinations of nozzles from each of the first and second groups of nozzles being used to compose and to print halftone cells comprising a plurality of pixels in a predetermined combination for continuous tone printing.

5,412,411

# CAPPING STATION FOR AN INK-JET PRINTER WITH IMMERSION OF PRINthead IN INK

David G. Anderson, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 26, 1993, Ser. No. 157,455

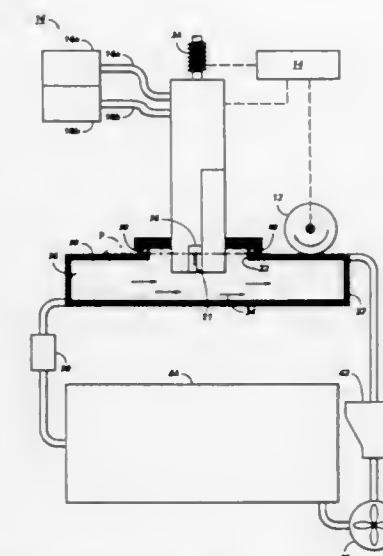
Int. Cl.<sup>6</sup> B41J 2/165

U.S. Cl. 347-28

13 Claims

1. An ink-jet printing apparatus, comprising:  
a printhead having a nozzle for emitting ink in imagewise fashion;  
a capping station having a supply of ink maintained therein;  
a pump adapted to continuously draw ink from the capping station and replenish ink into the capping station, with an effect of circulating the supply of ink maintained in the capping station, the circulation of ink removing particu-

lates from the printhead and conveying the particulates out of the capping station; and



means for selectively disposing the printhead in a position to immerse the nozzle of the printhead in the supply of ink in the capping station.

5,412,412

# INK JET PRINthead HAVING COMPENSATION FOR TOPOGRAPHICAL FORMATIONS DEVELOPED DURING FABRICATION

Donald J. Drake, Rochester, and Robert P. Altavella, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 28, 1992, Ser. No. 997,473

Int. Cl.<sup>6</sup> B41J 2/145, 2/05

U.S. Cl. 347-40

6 Claims



1. An improved ink jet printhead of the type having a silicon upper substrate which has one surface that is anisotropically etched to form a set of parallel grooves and an ink supply manifold therein, the set of parallel grooves being used as a linear array of ink channels for providing communication between the ink supply manifold and a set of droplet ejecting nozzles in said printhead, and further having a lower substrate which has one surface that has an array of heating elements and addressing electrodes formed thereon, the upper and lower substrates being aligned, mated, and bonded together to form the printhead with a thick film insulating layer sandwiched therebetween, the thick film insulating layer having been deposited on the surface of the lower substrate having the array of heating elements and addressing electrodes thereon and patterned to form recesses therethrough prior to alignment, mating and bonding of the upper and lower substrates, the recesses forming arrays of heater pits and channel bypass recesses to correspond in number and to align with the set of parallel grooves and array of heating elements, so that each heating element resides in a heater pit and each groove of said set of parallel grooves has a heating element in a heater pit therein and has a bypass recess interconnecting the groove with the ink supply manifold to provide communication therebetween, the patterning of the heater pits and bypass recesses



in the thick film insulating layer producing topographic formations, some of which cause standoff of the upper substrate, wherein the improvement comprises:

the thick film insulating layer having defined therein at least one additional nonfunctional heater pit and one additional nonfunctional bypass recess on opposite sides of the arrays of heater pits and bypass recesses, respectively, said additional nonfunctional heater pits and bypass recesses relocating the topographical formations in the thick film insulating layer which would cause standoff of the upper substrate away from the array of heater pits and bypass recesses to the additional nonfunctional heater pits and bypass recesses which have no other function; and the upper silicon substrate having formed therein at least one additional, nonfunctional, parallel groove on opposite sides of the set of parallel grooves, said additional nonfunctional grooves straddling the topographical formations formed proximate to said additional nonfunctional heater pits and bypass recesses formed in the thick film insulating layer on the lower substrate which would have caused the upper substrate to standoff, so that a standoff between the upper and lower substrates caused by said topographical formations in the thick film insulating layer is prevented, because the topographical formations which would cause the standoff is located in the additional nonfunctional grooves which have no other function.

5,412,413

# METHOD AND APPARATUS FOR MAKING LIQUID DROP FLY TO FORM IMAGE BY GENERATING BUBBLE IN LIQUID

Takuro Sekiya; Takashi Kimura; Masanori Horike, all of Yokohama; Yoshio Watanabe, Kawasaki; Shuji Motomura, Yokohama; Eiko Suzuki, Sagami-hara; Takayuki Yamaguchi, Mino, and Masami Kadonaga, Yokohama, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 630,321, Dec. 19, 1990, abandoned.

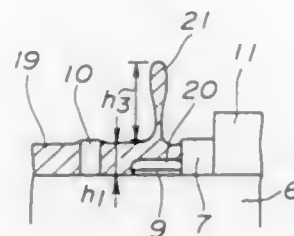
This application Nov. 4, 1992, Ser. No. 971,668

Claims priority, application Japan, Dec. 22, 1989, 1-334232; May 10, 1990, 2-120586; Aug. 30, 1990, 2-229140

Int. Cl. 6 B41J 2/05

U.S. Cl. 347-46

12 Claims



3. A liquid jet recording head for making a liquid drop fly onto a recording sheet so that a dot image is formed on said recording sheet, said liquid jet recording head comprising:

- a base member;
- a liquid layer maintained on said base member having a continuous, non-interrupted surface;
- a plurality of energy operation portions, arranged in a line on said base member, for supplying energy to liquid adjacent thereto, said energy operation portions being put under said liquid layer, and generating a bubble in the liquid when each of said energy operation portions supplies the energy to the liquid adjacent thereto;
- a plurality of walls, provided on said base member so as to surround the bubble, for preventing a pressure in the liquid generated by the bubble from dispersing in a direction parallel to the surface of the liquid layer, wherein a ratio  $h_1/h_2$  of an original depth  $h_1$  of said liquid layer and a height  $h_2$  of said bubble having the largest size is at least one but no greater than two and the original

depth  $h_1$  of said liquid layer is equal to or less than a length  $h_3$  of a column projecting from a surface of said liquid layer due to a growth of said bubble.

5,412,414

# SELF MONITORING/CALIBRATING PHASED ARRAY RADAR AND AN INTERCHANGEABLE, ADJUSTABLE TRANSMIT/RECEIVE SUB-ASSEMBLY

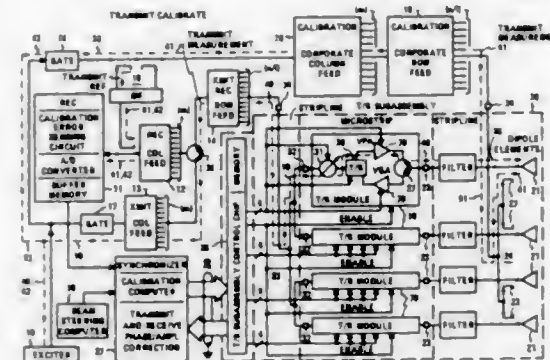
Harry C. Ast, Camillus; Albert H. Berical, Liverpool; Blake A. Carnahan, Cazenovia; James W. Krueger, Jr.; Donald P. Miller, both of Liverpool, and John D. Reale, Syracuse, all of N.Y., assignors to Martin Marietta Corporation, Syracuse, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,546

Int. Cl. 6 G01S 7/40

U.S. Cl. 342-174

24 Claims



1. A combination for maintaining an accurate phase response in the transmit path from the exciter to each antenna element and in the receive path from each antenna element to the receiver in an  $m \times n$  element phased array radar apparatus, comprising:

- A. an exciter providing a signal for calibration and transmission,
- B. a receiver including a calibration phase error sensing circuit having a reference port coupled to said exciter and a measurement port,
- C. beamforming means providing  $m \times n/j$  plural ports where  $j$  is a small integer including 1, disposed in the transmit/receive operating paths from exciter/receiver to antenna elements, said beamformer means having a singular port internally coupled to plural ports, said singular port leading to exciter/receiver, and each of said plural ports leading to a subset  $j$  of antenna elements, said beamforming means further including means for separating signals proceeding from the exciter to the antenna elements from signals proceeding from the antenna elements to the receiver, the respective transmit and receive operating paths being coincident at the beamformer plural ports,
- D. a corporate calibration feed network providing a singular port internally coupled to  $(m \times n/i)$  plural ports where  $i$  is a small integer not including 1, a power of 2 and greater than or equal to  $j$ , each path being of known electrical length to provide a calibrating path from each antenna element to the exciter/receiver,
- E. an  $(m \times n/i)$  fold plurality of phase adjustable transmit/receive sub-assemblies, each disposed in the transmit/receive operating paths for each subset of  $i$  antenna elements, each sub-assembly comprising:
  - (1) a stripline to microstrip divider network and transition having  $j$  stripline ports, each connected to a plural beamformer port, and  $i$  microstrip ports,
  - (2)  $i$  transmit/receive modules using microstrip transmission paths, each module containing the active electronics for processing the signals of one associated antenna element, each module having:

- (i) a bidirectional controllable phase shifter disposed in a transmit/receive operating path connected to one microstrip port of said divider network and transition having a control for setting the phase,
- (ii) a power amplifier disposed in the transmit operating path for amplifying the exciter signal,
- (iii) a low noise amplifier disposed in the receive operating path for amplifying signals from the associated antenna element,
- (iv) a pair of three port transmit/receive branching means for coupling signals from the exciter via the phase shifter, via the power amplifier to an associated antenna element during transmission and for coupling signals from the antenna via the low noise amplifier, via the phase shifter, to the receiver during reception, the transmit/receive port of the first branching means being coupled to said phase shifter,
- (3) i microstrip to stripline transitions coupled to the transmit/receive ports of said second branching means,
- (4) a stripline antenna circuit coupled said i stripline transitions comprising:
  - (i) i linearly aligned adjacent antenna elements,
  - (ii) i directional calibration couplers disposed between said transitions and said antenna elements, each having an antenna port coupled to an antenna element, a transmit/receive port coupled to the stripline port of one transition and a calibration port; signals received by said antenna being internally coupled to said transmit/receive port, signals coupled to said transmit/receive port being internally coupled to said antenna port and said calibration port, and signals coupled to said calibration port being internally coupled to said transmit/receive port, and
  - (iii) a corporate feed network having a singular port for connection to a calibration network internally coupled to i plural ports through paths of substantially equal electrical length, each plural port being connected to the calibration port of each calibration coupler for serially connecting each transmit/receive operating path with a path in said calibration network to facilitate transmit/receive operating path calibration, and
- F. means for switching the exciter output for transmit operating path measurement into a loop consisting initially of the transmit operating path, secondly of a calibrating path, and finally returning to the receiver measurement port and for switching the exciter output for receive operating path measurement into a loop consisting initially of a calibrating path, secondly of a receive operating path, and finally returning to the receiver measurement port.

5,412,415

# DISTRIBUTION OF DIGITIZED COMPOSITE AM FDM SIGNALS

Andrew R. J. Cook, Clacton-on-Sea, and David W. Faulkner, Ipswich, both of England, assignors to British Telecommunications public limited company, London, England

PCT No. PCT/GB91/00568, § 371 Date Oct. 13, 1992, § 102(e)

Date Oct. 13, 1992, PCT Pub. No. WO91/15927, PCT Pub. Date Oct. 17, 1991

PCT Filed Apr. 10, 1991, Ser. No. 941,066

Claims priority, application United Kingdom, Apr. 10, 1990, 9008162

Int. Cl. 6 H04N 7/16

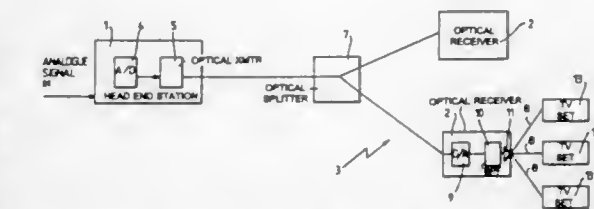
U.S. Cl. 348-6

18 Claims

1. A method of distributing signals from a head-end station via a network comprising:

combining a plurality of AM channels modulated on sub-carriers at different frequencies to form a composite ana-

logue signal, treating the composite analogue signal to reduce the peak-to-mean ratio, digitizing the composite analogue signal,



transmitting resulting digital data onto the network, and receiving the digital data at a receiver and reconstituting the composite analogue signal for reception at a termination.

5,412,416

# VIDEO MEDIA DISTRIBUTION NETWORK APPARATUS AND METHOD

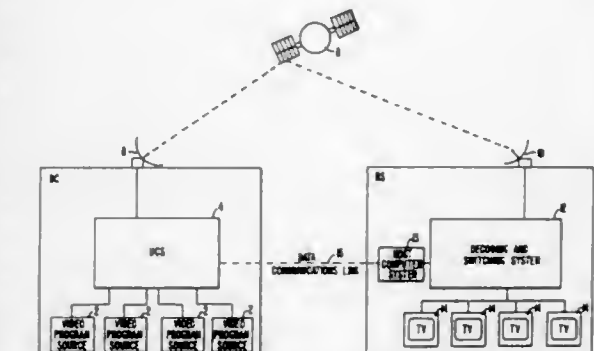
Frank R. Nemirofsky, Danville, Calif., assignor to NBL Communications, Inc., San Francisco, Calif.

Filed Aug. 7, 1992, Ser. No. 926,664

Int. Cl. 6 H04N 1/00

U.S. Cl. 348-10

49 Claims



1. A video media distribution network comprising:

- a central distribution center having means for transmitting a network-wide video program and market-specific segments to a plurality of receiving sites in stores each having an associated address, said market-specific segments including a destination address and a set of control data encoded therein, wherein the receiving sites comprise:
- means for receiving said network-wide video program and said market-specific segments;
- means for reading the destination address in said market-specific segments;
- means operative when the destination address matches the associated address of the receiving site for inserting the market-specific segments into the network-wide video program according to commands contained in the control data to produce a customized program; and
- means for displaying the customized program on television monitors in said stores.

5,412,417

# VIDEO TELEPHONE DEVICE WITH AUTOMATIC VIDEO CAMERA ANGLE ADJUSTMENT

Yukitaka Tozuka, Machida, Japan, assignor to Toshiba Corporation, Kanagawa, Japan

Filed Apr. 15, 1993, Ser. No. 46,306

Claims priority, application Japan, Apr. 17, 1992, 4-097593

Int. Cl. 6 H04N 7/14

U.S. Cl. 348-14

34 Claims

1. A video telephone device comprising:

- a base;







using said first up-sampled inverse-transformed color signal for orthogonally transforming said second color signal and producing a second transformed color signal; and variable-length encoding said second transformed color signal to produce a second encoded color signal.

5,412,429

# PICTURE DATA COMPRESSION CODER USING SUBBAND/TRANSFORM CODING WITH A LEMPEL-ZIV-BASED CODER

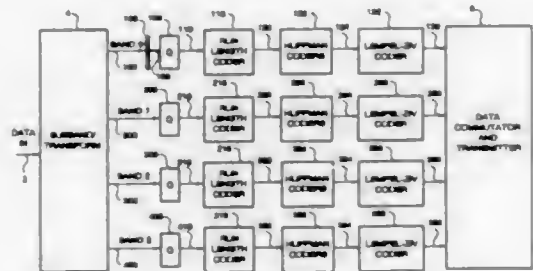
Daniel R. Glover, Bay Village, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 11, 1993, Ser. No. 29,520

Int. Cl.<sup>6</sup> H04N 7/12

U.S. Cl. 348—398

28 Claims



1. A subband/transform coding system comprising;
  - a subband coder including,
  - a subband unit for receiving a digital picture data signal and separating said signal into a plurality of subbands,
  - a plurality of quantizers for mapping said subbands into a bin thereby producing a plurality of quantized subbands,
  - a plurality of run length coders for grouping said quantized subbands thereby producing a plurality of grouped subbands,
  - a plurality of Lempel-Ziv coders for compressing said plurality of grouped subbands thereby producing a plurality of compressed subbands,
  - a data commutator/transmitter for recombining and transmitting said compressed subbands thereby producing a coded signal, and,
  - a subband decoder including,
  - a data receiver/commutator unit for receiving said coded signal and processing said coded signal thereby producing a plurality of encoded subbands,
  - a plurality of Lempel-Ziv decoders for decompressing said plurality of encoded subbands thereby producing a plurality of decompressed subbands,
  - a plurality of run length decoders for receiving said plurality of decompressed subbands and processing said plurality of decompressed subbands thereby producing a plurality of ungrouped subbands,
  - a plurality of range shifters for receiving said plurality of ungrouped subbands and processing said plurality of ungrouped subbands thereby producing a plurality of subbands, and
  - an inverse subband transform unit for receiving said plurality of subbands and processing said plurality of subbands thereby reconstructing said digital picture data signal.

## 5,412,430 IMAGE CODING METHOD AND IMAGE CODING APPARATUS

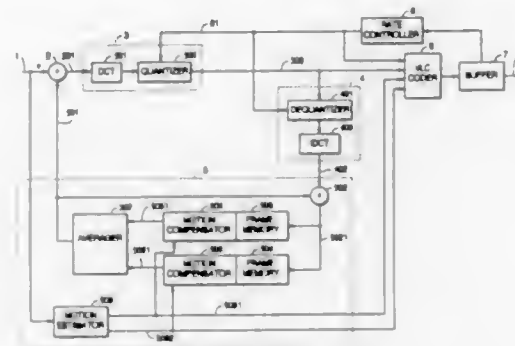
Atsushi Nagata, Katano, Japan, assignor to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Continuation of Ser. No. 922,772, Jul. 31, 1992, abandoned. This application May 4, 1994, Ser. No. 238,334

Claims priority, application Japan, Jul. 31, 1991, 3-191603  
Int. Cl.<sup>6</sup> H04N 7/137

U.S. Cl. 348—402

20 Claims



1. An image coding method comprising the steps of: compensating a motion of reproduction signals of N (N being an integer of 2 or more) frames positioned before a frame to be coded to obtain first to N-th prediction signals; determining a linear combination of the first to N-th prediction signals to obtain a corresponding derived prediction signal; and coding a difference between the frame to be coded and the derived prediction signal.

5,412,431

## DEVICE FOR CONTROLLING THE QUANTIZER OF A HYBRID CODER

Peter Vogel, Diepersdorf, Germany, assignor to U.S. Phillips Corporation, New York, N.Y.

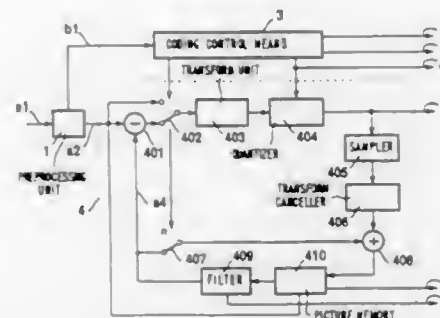
Continuation of Ser. No. 892,098, Jun. 2, 1992, abandoned. This application Jan. 21, 1994, Ser. No. 184,406

Claims priority, application Germany, Jun. 6, 1992, 41 18 571.4

Int. Cl.<sup>6</sup> H04N 7/133

U.S. Cl. 348—405

3 Claims



1. In a hybrid coder for coding and quantizing a plurality of data blocks of pictures of a video signal, wherein said hybrid coder comprises a buffer memory and a quantizer and assumes a stable first state (Z1) wherein the quantization of said quantizer is at a first quantization level which depends on the fill level of said buffer memory,
  - a device for further controlling the quantization of said quantizer by causing the coder to assume a second state (Z2) wherein said quantizer is subject to a second control, said device comprising:

- a) means coupled to the input of said hybrid coder, for sequentially determining the respective differences between consecutive pairs of data blocks of a sequence of equivalent data blocks and whereby an index L having an initial value is incremented by one, each time a respective difference between a pair of said consecutive pairs of data blocks of a sequence of equivalent data blocks is less than a predetermined value, and whereby said index L is set to said initial value each time the respective difference between a pair of said consecutive pairs of data blocks of a sequence of equivalent data blocks is more than said predetermined value;
- b) means coupled to said quantizer, for switching said coder into said second state and said quantizer from the first quantization level to a predetermined fine quantization level whenever the value of index L is greater than a threshold value  $L_{max}$  and a further system parameter satisfies a further system condition; and
- c) means coupled to said quantizer for setting said quantizer from said fine quantization level to a predetermined coarse quantization level when both said coder is in the second state and the value of index L is greater than said threshold level  $L_{max}$ .

5,412,432

## APPARATUS AND METHOD FOR ENHANCING TRANSIENT EDGE OF VIDEO SIGNAL

Sung H. Hong, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

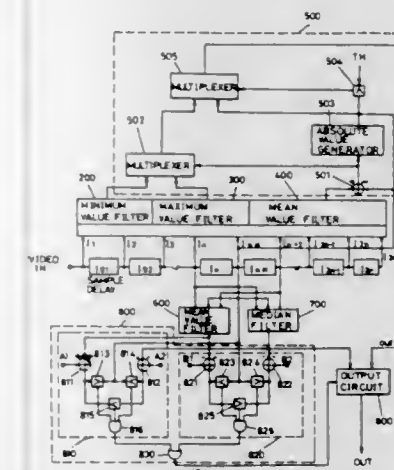
Filed Nov. 29, 1993, Ser. No. 160,042

Claims priority, application Rep. of Korea, Nov. 30, 1992, 23069/1992; Apr. 28, 1993, 7180/1993; Jul. 22, 1993, 13893/1993

Int. Cl.<sup>6</sup> H04N 5/21

U.S. Cl. 348—625

12 Claims



1. An apparatus for enhancing a transient edge of a video signal comprising:
  - sample delay means for sequentially delaying an original pixel value of the video signal inputted therein by one sample and outputting 2n pixel values of the video signal, where n is a positive number;
  - minimum value filtering means for obtaining the minimum value of the original pixel value and the 2n—1 pixel values from said sample delay means except the nth pixel value therefrom;
  - maximum value filtering means for obtaining the maximum value of the original pixel value and the 2n—1 pixel values from said sample delay means except the nth pixel value therefrom;
  - first mean value filtering means for obtaining the mean value of the original pixel value and the 2n—1 pixel values from

said sample delay means except the nth pixel value therefrom; and  
transient edge control means for obtaining a difference between the nth pixel value from said sample delay means and the mean value from said first mean value filtering means, generating an absolute value of the obtained difference, comparing the generated absolute value with a threshold value, discriminating the transient edge of the video signal in accordance with a compared result and enhancing the discriminated transient edge on the basis of the minimum value from said minimum value filtering means and the maximum value from said maximum value filtering means to reduce a width of the transient edge.

5,412,433

## SECONDARY COLOR CORRECTOR

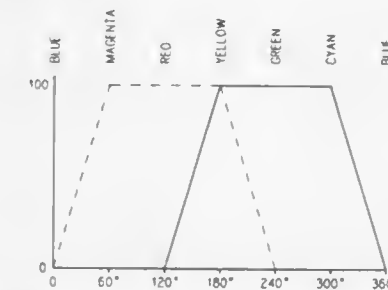
David E. Holland, Granada Hills, and Gavin W. Schutz, Glendale, both of Calif., assignors to Image Transform Inc., North Hollywood, Calif.

Filed Aug. 2, 1993, Ser. No. 101,352

Int. Cl.<sup>6</sup> H04N 9/64, 9/68, 9/69

U.S. Cl. 348—650

34 Claims



1. A method for color correction of a signal having saturation, luminance and hue values comprising the steps of:
  - a) receiving the saturation, luminance and hue values,
  - b) normalizing the saturation as a function of the hue value,
  - c) normalizing the luminance as a function of the hue value,
  - d) performing secondary color correction on the hue value, and the normalized saturation and luminance values,
  - e) denormalizing the secondary color corrected normalized luminance value, and
  - f) denormalizing the secondary color corrected normalized saturation value,
 wherein the color corrected hue value, the denormalized secondary color corrected normalized luminance value and the denormalized secondary color corrected normalized saturation value comprise a color corrected signal.

5,412,434

## LUMINANCE AND CHROMINANCE SIGNALS SEPARATING FILTER ADAPTIVE TO MOVEMENT OF IMAGE

Junko Taniguchi; Noriyuki Yamaguchi; Takuji Kurashita; Mitsuru Ishizuka, and Masaharu Yao, all of Nagakakyō, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 12, 1992, Ser. No. 850,488

Claims priority, application Japan, Mar. 14, 1991, 3-049548; Mar. 14, 1991, 3-049549; Mar. 18, 1991, 3-051974; Mar. 18, 1991, 3-052285; Apr. 12, 1991, 3-079603; Apr. 12, 1991, 3-079604; Feb. 7, 1992, 4-056746

Int. Cl.<sup>6</sup> H04N 9/78

U.S. Cl. 348—669

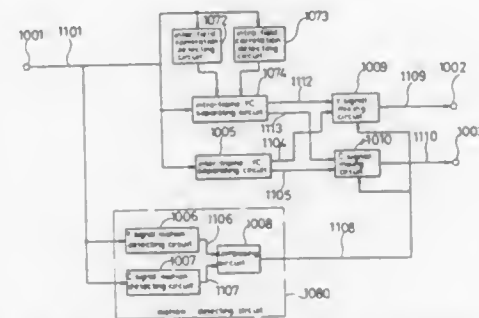
22 Claims

1. A luminance and chrominance signal separating filter adaptive to a movement of an image, which separates luminance signals (Y signals) and chrominance signals (C signals) from composite color television signals representing the image in which the chrominance signals are frequency-multiplexed



within a high frequency region of the luminance signals, comprising:

- a motion detecting circuit which detects movement of the image utilizing a correlation between frames;
- an inter-frame YC separating circuit which performs a first separation of Y and C signals utilizing the inter-frame correlation and outputs inter-frame YC separated C signals and inter-frame YC separated Y signals;
- an intra-frame YC separating circuit which partially detects a correlation between fields or between frames and a correlation in a field, and performs a second separation of Y and C signals within a said frame utilizing the correlations, and outputs intra-frame YC separated C signals and intra-frame YC separated Y signals, said intra-frame YC separating circuit including,
- a first intra-frame Y-C separating circuit portion separating the C signals from the composite signal in a first field by using the composite signals from a second field to develop a separated C signal,
- an intra-field correlation judge circuit monitoring the degree of correlation between a selected first field pixel and adjacent pixels in the same frame and extending in



- at least two dimensions to determine a higher degree of correlation,
- a two dimensional adaptive filter operatively connected to the first Y-C separating circuit portion and responsive to said intra-field correlation judge circuit, said two dimensional adaptive filter receiving the separated C signal for filtering in a dimension of higher correlation to produce a filtered C signal, and
- a brightness extraction circuit using the filtered C signal and the composite color television signal to produce said Y signals, thereby developing intra-frame Y-C separated C signals and intra-frame Y-C separated Y signals from said composite color television signal;
- a C signal mixing circuit which mixes said inter-frame YC separated C signals and said intra-frame YC separated C signals in accordance with an output of said motion detecting circuit and outputs motion adaptive YC separated C signals; and
- a Y signal mixing circuit which mixes said inter-frame YC separated Y signals and said intra-frame YC separated Y signals in accordance with the output of said motion detecting circuit and outputs motion adaptive YC separated Y signals.

5,412,435

#### INTERLACED VIDEO SIGNAL MOTION COMPENSATION PREDICTION SYSTEM

Yasuyuki Nakajima, Tokyo, Japan, assignor to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 25, 1993, Ser. No. 84,708

Claims priority, application Japan, Jul. 3, 1992, 4-199020; Nov. 27, 1992, 4-339520

Int. Cl.<sup>6</sup> H04N 7/133, 7/137

U.S. Cl. 348—699

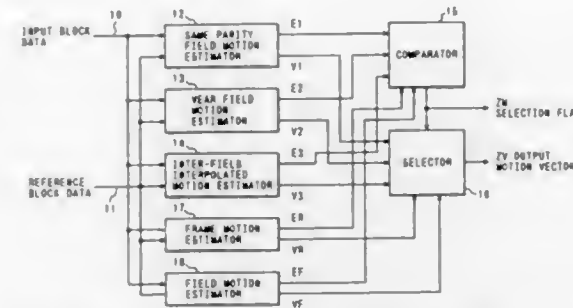
19 Claims

1. An interlaced video signal motion compensation prediction system for block-by-block motion compensation by using an input and a reference picture comprising:

means for storing the input and the reference pictures for each field block;

same parity field motion estimation means for performing motion estimation for each said field block between same parity field blocks of said input and reference pictures by using the same vectors for each input field block, thus obtaining motion vectors and obtaining the sum of field prediction errors from said motion estimation;

near field motion estimation means for performing motion estimation for each said field block with respect to the temporally nearest field block of said reference picture to said input picture by using the same vectors for each field, thus obtaining motion vectors and obtaining the sum of field prediction errors from said near field motion estimation;



inter-field interpolated motion estimation means for performing motion estimation for each said field block between a picture obtained by combining two field pictures of said reference picture and input picture by using the same vectors for each field, thus obtaining motion vectors and obtaining the sum of field prediction errors from said inter-field interpolated motion estimation; and

means for comparing the prediction errors output from each of said motion estimation means and selecting a selection flag indicative of the smallest prediction error and the motion vectors from said motion estimation means providing said smallest prediction error; and

means for transmitting a selection flag indicative of the selected motion estimation means and the motion vectors corresponding to said selection flag.

5,412,436

#### MOTION ADAPTIVE VIDEO PROCESSING SYSTEM

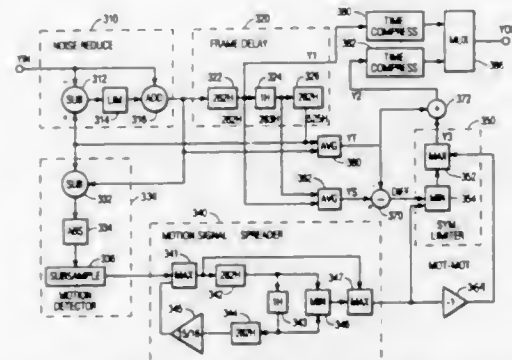
Todd J. Christopher, Indianapolis, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Apr. 22, 1993, Ser. No. 51,738

Int. Cl.<sup>6</sup> H04N 7/18

U.S. Cl. 348—700

13 Claims



1. A motion adaptive video signal processing system comprising:

a video source for providing a temporally interpolated video

signal (YT), a spatially interpolated video signal (YS) and a motion indicating signal (MOT); and

circuit means for forming a difference signal (DIFF) from said temporally and spatially interpolated signals, for symmetrically limiting the difference signal as a function of the motion signal (MOT) and for combining the resultant symmetrically limited difference signal (Y3) and the temporally interpolated signal (YT) to form a motion adapted video output signal (Y2);

said circuit means including a median filter for symmetrically limiting said difference signal; and

said median filter having a first input coupled for receiving said difference signal (DIFF), having a second input coupled for receiving said motion signal (MOT), having a third input coupled for receiving an inverted motion indicating signal (—MOT), and having an output for providing said resultant symmetrically limited difference signal (Y3).

5,412,437

#### PROJECTION TYPE DISPLAY DEVICE

Masanori Ogino, Yokohama; Yoshiaki Iwahara, Yokosuka, and Syuichi Sakamoto, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

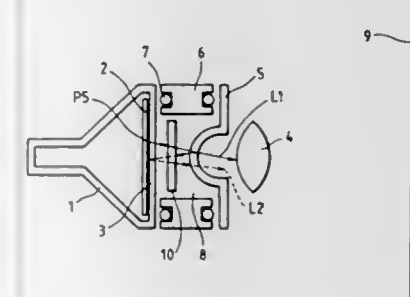
Filed Jul. 6, 1993, Ser. No. 86,095

Claims priority, application Japan, Jul. 6, 1992, 4-178425

Int. Cl.<sup>6</sup> H04N 5/74

U.S. Cl. 348—781

21 Claims



1. A projection type display device comprising a CRT with a fluorescent layer and a face glass, the CRT projecting an image formed on the fluorescent layer through the face glass, a transparent liquid, and at least one lens element to a screen, the transparent liquid being filled within a space between the face glass of the CRT and the at least one lens element and having a refractive index substantially the same as a reflective index of the face glass of the CRT and the at least one lens element, and a light attenuation filter having a transmittance no greater than 0.9 being disposed at a position from at least a part of the fluorescent layer to the at least one lens element, the CRT projecting the image through the light attenuation filter, the light attenuation filter being configured so as to be thicker at a center portion thereof than at a peripheral portion so that optical paths of the image projected therethrough are substantially equal.

5,412,438

#### SUNGLASSES WITH DETACHABLE PRESCRIPTION EYEGLASSES

Maurice Bolle', Oyonnax, France, assignor to Etablissements Bolle' S.N.C., Oyonnax, France

Continuation of Ser. No. 761,388, Sep. 18, 1991, abandoned. This application Oct. 27, 1993, Ser. No. 144,144

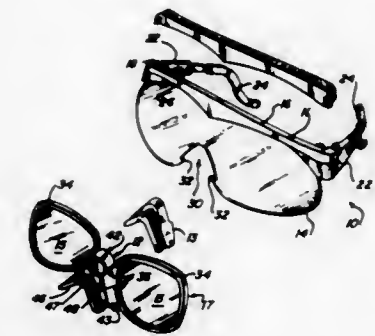
Int. Cl.<sup>6</sup> G02C 7/10

U.S. Cl. 351—44

6 Claims

1. Sport sunglasses comprising a bridge, a pair of temples hingably connected to said bridge at the ends thereof, a shield secured to and depending from said bridge and having a lower edge, a nose-piece notch defined in said lower edge, a nose-piece mounted on said shield in said notch, nose pads integrally

formed on said nose-piece, an upwardly directed hook on said nose-piece adjacent said nose pads, a frame mounting a pair of prescription lenses, and a central U-shaped bracket on said



frame releasably engaged with said hook and supporting said frame on said nose-piece with said prescription lenses in close juxtaposition to said shield and nose pads.

5,412,439

#### LASER VISOR HAVING OVERLYING PHOTOSENSORS

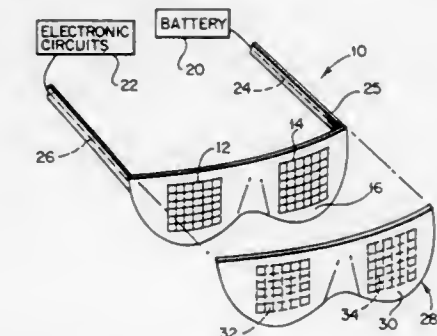
Michael Horn, So. Setauket, N.Y., assignor to Northrop Grumman Corporation, Los Angeles, Calif.

Filed Feb. 17, 1993, Ser. No. 18,539

Int. Cl.<sup>6</sup> G02C 7/10

U.S. Cl. 351—45

7 Claims



1. A shield for protecting eyes from potentially harmful coherent light, comprising:
- a transparent substrate upon which incident coherent light falls;
  - at least one matrix layer of transparent photosensor segments mounted to the substrate;
  - at least one matrix layer of electrically controlled and normally transparent segments mounted behind the photosensor segments;
  - the electrically controlled segments being in respective optical alignment with the photosensor segments and being selectively switched to block transmission of incident light, above a preselected threshold level, falling on corresponding photosensor segments.

5,412,440

#### RIMLESS SPECTACLES WITH ADJUSTABLE TEMPLES AND LENSES

Kinji Takeda, and Yukiko Kori, both of Fukui, Japan, assignors to Kabushiki Kaisha Takeda, Fukui, Japan

Filed Dec. 8, 1993, Ser. No. 163,056

Claims priority, application Japan, Dec. 8, 1992, 4-090381 U; Dec. 8, 1992, 4-090382 U; Jun. 25, 1993, 5-039720 U; Sep. 22, 1993, 5-056047 U

Int. Cl.<sup>6</sup> G02C 1/02

U.S. Cl. 351—110

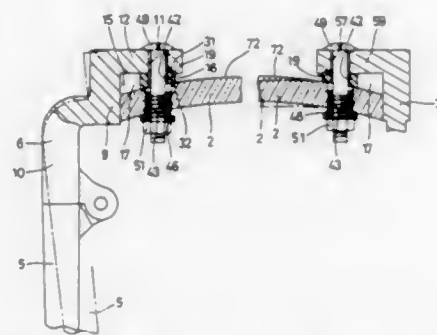
34 Claims

1. In rimless spectacles having a pair of lenses with inside

portions directly connected to each other by means of a bridge member at the inside portions of the lenses and a connecting member pivoted respectively to a forward end portion of a pair of temples, said connecting member being directly attached to the lenses,

each said connecting member has a contact portion with respect to the periphery of the lens and has a fix-projection projecting inwardly of a concave surface of the lens in a state that the contact portion is contacted with the periphery of the lens,

each said connecting member is constructed to form a V-letter clearance between the fix-projection and a concave surface of the lens to widen the clearance from an outer end to an inner end thereof,



a flexible packing is interposed in the V-letter clearance and has a thickness which increases from the outer end to the inner end of the V-letter clearance so as to fit a front surface of the flexible packing on the concave surface of the lens and a rear surface thereof on the fix-projection of the connecting member,

a bolt is inserted into each of the openings of the lens, the flexible packing and the fix-projection, and

a nut is screwed on a screw portion of the bolt which projects on a side of the fix-projection or the lens, said nut being screwed to vary a tightening amount of the nut for controlling the opening of the temples.

5,412,441

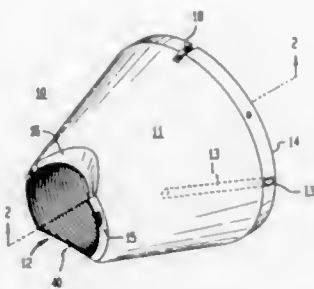
**KERATOMETER DEVICE HAVING PHOTOGRAPHICALLY PRODUCED BORE PATTERN**  
Lars Tibbling, RR3 952-A, Highland Lakes, Vernon Township, N.J. 07422, and Roy Maus, 2305 Garfield St., North Bellmore, N.Y. 11710

Filed Mar. 7, 1994, Ser. No. 206,948

Int. Cl.<sup>6</sup> A61B 3/00

U.S. Cl. 351-200

10 Claims

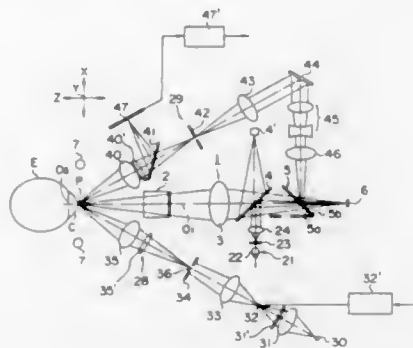


1. A keratometer having a transparent, substantially cylindrical bore of plastic material, said bore being capable of being illuminated, a photographic film slide having recorded thereon a predetermined pattern, said film slide being spindled and retained within and illuminated from said bore.

5,412,442  
**APPARATUS FOR PHOTOGRAPHING A CORNEAL ENDOTHELIUM**  
Kenjiro Katsuragi, and Yoshihiko Hanamura, both of Tokyo, Japan, assignors to Kabushiki Kaisha Topcon, Tokyo, Japan  
Filed Nov. 16, 1993, Ser. No. 152,232  
Claims priority, application Japan, Nov. 17, 1992, 4-306658  
Int. Cl.<sup>6</sup> A61B 3/14

U.S. Cl. 351-206

13 Claims



1. An apparatus for photographing an endothelium of a cornea of an eye to be tested having an apparatus optical system comprising:

an anterior portion observing optical system for observing an anterior portion of the eye to be tested;

said anterior portion observing system having an optical axis normal to a reference plane tangent to an apex of the cornea of the eye;

an illumination optical system for illuminating the cornea of the eye obliquely with respect to the optical axis of said anterior portion observing optical system;

an observing or photographic optical system for observing or photographing the endothelium of the cornea by receiving the light reflected on the endothelium of the cornea obliquely with respect to the optical axis of said anterior portion observing optical system, said observing or photographing optical system being disposed at a position opposite to said illumination optical system with respect to the optical axis of said anterior portion observing optical system placed therebetween; and

a fixation mark light projecting optical system capable of changing a position where a fixation mark is presented, in order to change a direction in which the eye is fixedly gazed.

5,412,443

**CAMERA HAVING A VARIABLE PHOTOGRAPHING APERTURE AND RETRACTABLE OPTICAL SYSTEM**  
Shinya Suzuka, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1993, Ser. No. 45,198

Claims priority, application Japan, Apr. 13, 1992, 4-092501  
Int. Cl.<sup>6</sup> G03B 37/00

U.S. Cl. 354-94

34 Claims

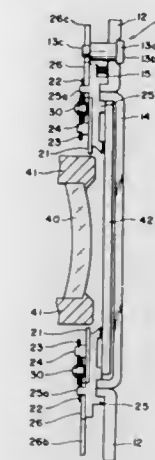
18. A camera capable of photographing with a plurality of photographing aperture sizes, said camera comprising:

means for defining a largest one of said plurality of photographing aperture sizes;

at least one plate member movable within a movement plane for converting a photographing aperture size to a photographing aperture size which is smaller than said largest one of said plurality of photographing aperture sizes;

a retractable optical system, wherein said retractable optical system is advanced when photographing is enabled, and is retracted inwardly when photographing is prohibited, said optical system intersecting with said movement plane of said at least one movable plate member, a rearmost surface of said optical system positioned inwardly of said

movement plane when said optical system is retracted; and



control means for moving said at least one movable plate member so as not to interfere with retraction of said optical system when photographing is prohibited.

5,412,444

**INFORMATION RECORDING CONTROL APPARATUS IN A CAMERA**

Kazuyuki Kazami, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan

Continuation of Ser. No. 91,750, Jul. 15, 1993, Pat. No.

5,302,986, which is a continuation of Ser. No. 921,044, Jul. 28, 1992, abandoned, which is a continuation-in-part of Ser. No. 745,287, Aug. 14, 1991, abandoned. This application Mar. 14, 1994, Ser. No. 209,623

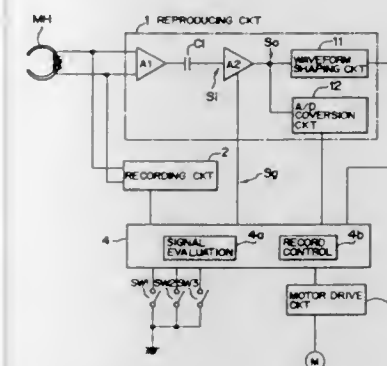
Claims priority, application Japan, Aug. 17, 1990, 2-217544; Aug. 16, 1991, 3-229615

The portion of the term of this patent subsequent to Apr. 12, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> G03B 17/24

U.S. Cl. 354-106

2 Claims



1. A method for recording information on a photographing film, comprising the steps of:

reproducing information pre-recorded on said film; evaluating a state in which a signal is recorded on said film on the basis of an output amplitude state of a reproduction signal reproduced by said information reproducing; setting a condition for recording information on said film in conformity with the result of the evaluating; and recording information on said film in the set condition.

5,412,445

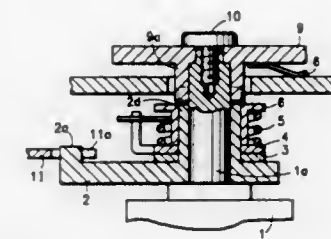
**POWER FOCUS DEVICE FOR A CAMERA**  
Ryuichi Mori, and Keiji Osawa, both of Tokyo, Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jan. 8, 1993, Ser. No. 2,475

Claims priority, application Japan, Jan. 10, 1992, 4-003107  
Int. Cl.<sup>6</sup> G03B 13/34

U.S. Cl. 354-195.1

8 Claims



1. A power focus device for a camera according comprising: a rotatable member;

means for biasing said rotatable member in a neutral position and for permitting rotation thereof from said neutral position a first and a second direction within fixed angular range;

means for outputting an electric signal related to an angle of said rotatable member with said fixed angular range;

means for driving said lens toward a nearest and an infinite extreme responsive to said rotatable member being rotated in said first direction and said second direction respectively;

means for varying a driving speed of said means for driving based upon said electrical signal;

a user accessible portion outside a camera cover effective for rotating said rotatable member inside said camera cover;

said user accessible portion includes a shaft passing through an aperture in said camera cover; and

said user accessible portion includes means for sealing against fluids entering said camera cover from outside said camera cover.

5,412,446

**FILM ASSEMBLY APPARATUS AND METHOD FOR SINGLE-USE CAMERA EMPLOYING FILM SECUREMENT WEB**

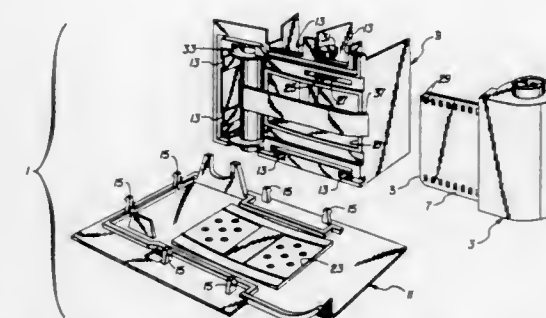
James G. Rydelek, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 17, 1994, Ser. No. 198,006

Int. Cl.<sup>6</sup> G03B 1/32

U.S. Cl. 354-212

5 Claims



1. A single-use camera comprising a main body portion having an exposure opening, a rotatable spool at one side of said exposure opening in said main body portion, a film cassette having a leading section of a filmstrip protruding from said cassette at another side of said exposure opening, and a rotatable sprocket wheel between said spool and said film cassette



for engaging said leading section of the filmstrip, is characterized in that:

an elongate web is attached to said spool to be wrapped about the spool, when the spool is rotated in a winding direction, and longitudinally extends from the spool to a location beyond said sprocket wheel to overlie said leading section of the filmstrip, when the leading section is engaged with the sprocket wheel, in order that rotation of the sprocket wheel will advance the leading section beneath said web onto the spool to make rotation of the spool in the winding direction secure the leading section to the spool by wrapping the web about the spool.

5,412,447

## PHOTOGRAPHIC PROCESSING APPARATUS

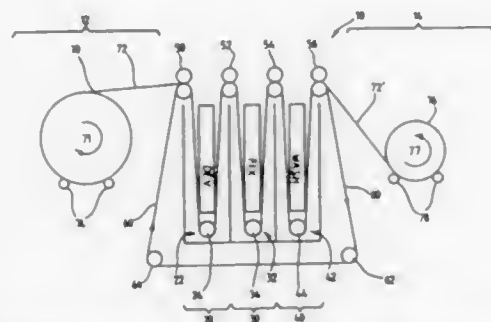
Anthony Earle, Harrow Weald, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 21, 1994, Ser. No. 184,158

Int. Cl.<sup>6</sup> G03D 3/08

U.S. Cl. 354—319

6 Claims



1. Photographic processing apparatus comprising a plurality of processing tanks, each tank containing processing solution, and a continuous transport belt for transporting material to be processed along a processing path through each of the processing tanks, characterized in that the continuous transport belt moves along the processing path and in that the continuous transport belt has a width which is substantially the same as the processing path.

5,412,448

## TEMPERATURE COMPENSATION APPARATUS FOR CAMERA

Keiji Kunishige, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 32,448, Mar. 16, 1993, abandoned, which is a continuation of Ser. No. 710,054, Jun. 4, 1991, abandoned. This application Apr. 8, 1994, Ser. No. 225,254

Claims priority, application Japan, Jun. 11, 1990, 2-152407

Int. Cl.<sup>6</sup> G03B 13/36

U.S. Cl. 354—400

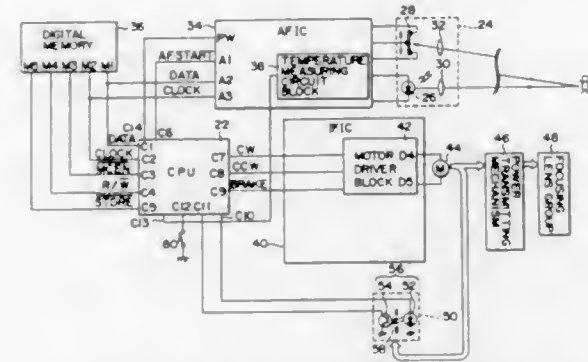
21 Claims

1. A camera having a temperature compensating function, comprising:

- a motor for performing a focus adjustment of a photographing lens;
- a first IC including:
  - a power transistor for driving said motor; and
  - a driver circuit, electrically connected to said power transistor, for driving said power transistor, said first IC generating heat while said power transistor is driven;
- a second IC including:
  - a distance measuring circuit for measuring a distance to an object to be photographed; and
  - a temperature measuring circuit for measuring a temperature of said second IC and for generating second IC temperature data corresponding to the measured temperature of said second IC;

power supply switching means for supplying power to said second IC;

wherein the temperature of said second IC is approximately equal to an internal ambient temperature of said camera during a first time period in which said power supply switching means initially supplies power to said second IC, said second IC conducts a distance measurement to measure a distance to said object during a second time period which follows said first time period, and said second IC generates heat during said distance measurement by said distance measuring circuit, whereby a temperature of said second IC rises above the internal ambient temperature of said camera during said second time period; calculating means for calculating, after said first time period,



a driven amount of said photographing lens based on an object distance data output from said distance measuring circuit;

a memory for storing second IC temperature data generated by said temperature measuring circuit during said first time period before said distance measuring circuit starts said distance measurement, and for retaining said second IC temperature data in storage;

correction operation means for correcting said object distance data and said driven amount of said photographing lens in accordance with said stored second IC temperature data; and

control means for controlling said motor via said driver circuit in accordance with said corrected driven amount of said photographing lens.

5,412,449

## SINGLE-STAGE 3D PHOTOGRAPHIC PRINTER WITH A KEY-SUBJECT ALIGNMENT METHOD

Nicholas L. Lam, Chai-Wan, Hong Kong, assignor to Image Technology International, Inc., Norcross, Ga.

Filed May 28, 1993, Ser. No. 68,746

Int. Cl.<sup>6</sup> G03B 27/32

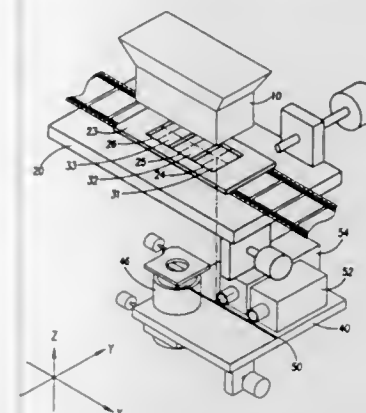
U.S. Cl. 355—22

27 Claims

1. In a printer for printing an image array on the photosensitive surface of lenticular print film from a set of 2-D views with a key subject image on each 2-D view, said printer having a negative carrier, and a projection lens mounted on a platform for printing said 2-D views onto lenticular print film, and means for moving said platform relative to said negative carrier and lenticular print film, an improvement comprising:

- (a) a printer being arranged as a single stage printer and having first optical means for editing the 2-D views and second optical means for locating the key subject image on each 2-D view, said first optical means for editing and second optical means for locating each being placed on said platform, and means for conveying the location of the key subject image to a computer which computes the

actual location of the key subject image and controls the relative movement of the platform for correct alignment



of the key subject image in each 2-D view in a set for printing.

5,412,450

## PHOTOGRAPHIC PRINTER

Masayuki Kojima, Wakayama, Japan, assignor to Noritsu Koki Co., Ltd., Wakayama, Japan

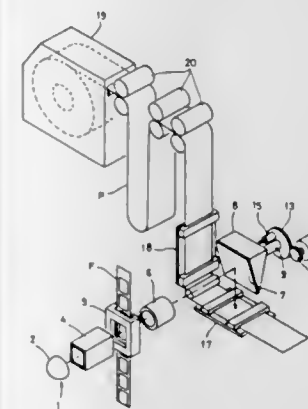
Filed Feb. 3, 1994, Ser. No. 191,205

Claims priority, application Japan, Feb. 5, 1993, 5-018612

Int. Cl.<sup>6</sup> G03B 27/52, 27/70

U.S. Cl. 355—43

1 Claim



1. A photographic printer comprising a light source unit for emitting light against a negative image surface on a negative film fed in one direction, a reflecting member aligned with the line connecting said light source unit and the negative image surface and inclined by a predetermined angle with respect to the optical axis of the light emitted from said light source unit, driving means for turning said reflecting member about said optical axis between a reference position and a second position, locking means for locking said reflecting member in one of said reference position and said second position, and exposure stages disposed on the optical axis of the light reflected by said reflecting member when it is in said reference position and in said second position, the negative film being fed to one of said exposure stages.

5,412,451  
PHOTOGRAPHIC PRINTING APPARATUS AND METHOD

Kenji Suzuki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

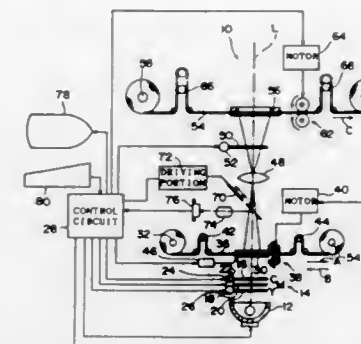
Filed Dec. 2, 1992, Ser. No. 984,475

Claims priority, application Japan, Dec. 3, 1991, 3-318850

Int. Cl.<sup>6</sup> G03B 27/80, 27/72

U.S. Cl. 355—68

14 Claims



1. A photographic printing apparatus comprising: conveying means for conveying a film on which images are recorded; measuring means for measuring image density; determining means for determining printing conditions for each image based on a measured image density; storing means for storing said printing conditions; display means for simulating an image to be printed onto a photographic printing paper based on results of measurement of said measuring means, and for displaying a simulated image; light reflecting means movable between a first position and a second position, such that at said first position said light reflecting means guides light, which is irradiated from a light source and which passes through said film disposed at a printing position, to said measuring means, and at said second position of said light reflecting means the image of said film at the printing position is printed onto the photographic printing paper; and control means for controlling said conveying means, said measuring means, said determining means, said storing means, and said light reflecting means so that densities of a plurality of images of said film at the printing position are measured with said light reflecting means being at said first position before said light reflecting means is moved to said second position from said first position, said printing conditions of said images are determined based on the results of said measurements of said densities and are stored as stored printing conditions, and said images of said film at the printing position are printed onto the photographic printing paper after said light reflecting means is moved to said second position from said first position, in accordance with said stored printing conditions.

5,412,452  
APPARATUS AND METHOD FOR CONTROLLING DIAGNOSTIC ROUTINES CONCURRENTLY IN A PRINTING SYSTEM

James M. Rego; Robert S. Hamilton; Patricia A. Hannaway, all of Webster, and James R. Reno, Walworth, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 20, 1993, Ser. No. 169,455

Int. Cl.<sup>6</sup> G03G 21/00

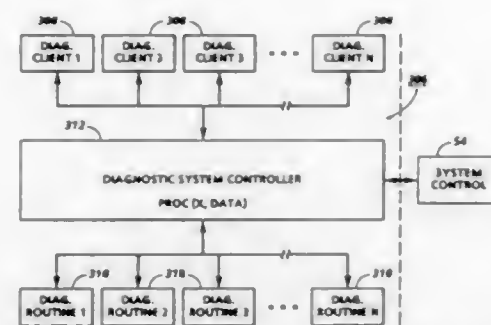
U.S. Cl. 355—203

23 Claims

1. A printing system with a first service and a second service, the first service and the second service being controlled by a

system controller, the first service and the second service being activated selectively by the system controller in a first mode, comprising:

a diagnostic subsystem including a first diagnostic routine for performing a diagnostic function relative to the first service and a second diagnostic routine for performing a diagnostic function relative to the second service; and



a diagnostic controller, communicating with the system controller and being activated selectively by the system controller in a second mode, the first diagnostic routine and the second diagnostic routine being activated, for concurrent operation thereof, when said diagnostic controller determines that a preselected condition has been met.

5,412,453

## TEMPERATURE CONTROLLER

Tetsushi Matsuo, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

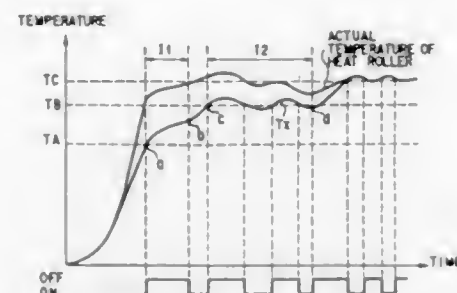
Continuation of Ser. No. 815,787, Jan. 2, 1992, abandoned. This application Sep. 23, 1994, Ser. No. 309,494

Claims priority, application Japan, Jan. 11, 1991, 3-002261

Int. Cl.<sup>6</sup> G03G 15/20

U.S. Cl. 355—208

19 Claims



1. A temperature controller for controlling a temperature of an object heated by heating means, comprising:

temperature detection means for detecting the temperature of the heated object;

temperature control means for controlling, from an initial temperature state of the heated object, the drive operation of said heating means;

said temperature control means deenergizing said heating means to interrupt the drive heating operation of said heating means and thereby slow down the rate of rise of the object temperature for a predetermined control period of time beginning when the temperature detected by said temperature detection means reaches a first control temperature lower than a target temperature; and

means for controlling the drive operation of said heating means according to a relationship between a second control temperature, corresponding to the target temperature, and the detected temperature after the predetermined control period of time elapses.

# 5,412,454 COMPACT LOW PROFILE ELECTROPHOTOGRAPHIC PRINTER

Masumi Asanae, Kumagaya, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

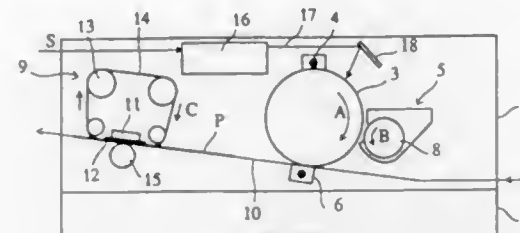
Filed Jul. 14, 1993, Ser. No. 91,062

Claims priority, application Japan, Jul. 15, 1992, 4-187992

Int. Cl.<sup>6</sup> G03G 15/00

U.S. Cl. 355—210

4 Claims



1. A vertically compact electrophotographic printer comprising an image-forming unit having a cylindrical electrostatic latent image-bearing member; an electrostatic latent image-forming means, a cleaning/developing means equipped with a magnet roll means onto which a magnetic developer containing a magnetic toner is attracted, and a transfer means for transferring the developed image on the surface of said electrostatic latent image-bearing member onto a recording medium, respectively disposed near said electrostatic latent image-bearing member; and fixing means, disposed downstream of said electrostatic latent image-bearing member, for heat-fixing said developed image onto said recording medium, said cleaning/developing means simultaneously performing two functions of cleaning the toner remaining on said electrostatic latent image-bearing member after the previous transfer of the developed image and developing said electrostatic latent image on said electrostatic latent image-bearing member, and the outer diameter of said electrostatic latent image-bearing member being 40 mm or less, the outer diameter of said magnet roll means being 30 mm or less, the height of said image-forming unit being 100 mm or less, and the peripheral speed of said electrostatic latent image-bearing member being 60 mm/sec or less.

5,412,455

# CHARGING DEVICE, IMAGE FORMING APPARATUS AND DETACHABLY MOUNTABLE PROCESS CARTRIDGE HAVING A CONSTANT VOLTAGE POWER SOURCE FEATURE

Kazuaki Ono; Koichi Tanigawa, both of Tokyo; Akihiko Takeuchi, Yokohama; Hajime Motoyama, Kawasaki, and Toshio Miyamoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

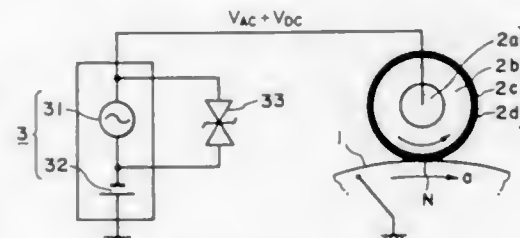
Filed Jan. 29, 1993, Ser. No. 10,848

Claims priority, application Japan, Jan. 30, 1992, 4-040143; Jan. 14, 1993, 5-005020

Int. Cl.<sup>6</sup> G03G 15/02

U.S. Cl. 355—219

13 Claims



1. A charging device comprising:  
a member to be charged;

a charging member, provided contactable to said member to be charged, for charging said member to be charged;  
a power source for supplying an oscillating voltage between said charging member and said member to be charged;  
a constant voltage element connected electrically in parallel with said power source for supplying the oscillating voltage.

5,412,456

## DEVELOPING APPARATUS

Chiaki Tanuma, Tokyo; Mitsunaga Saito, Ichikawa, and Yukihiro Osugi, Shizuoka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa and Tokyo Electric Co., Ltd., Tokyo, both of Japan

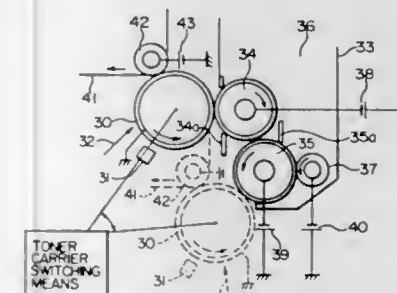
Filed Sep. 8, 1993, Ser. No. 117,595

Claims priority, application Japan, Sep. 9, 1992, 4-240662

Int. Cl.<sup>6</sup> G03G 15/06

U.S. Cl. 355—245

11 Claims



1. A developing apparatus for developing an electrostatic latent image formed on an electrostatic latent image holding member to a visible image with a single component toner, said apparatus comprising:

a first toner carrier having a peripheral surface for holding said single component toner on the peripheral surface;

a first regulating member in contact with said first toner carrier;

a second toner carrier having a peripheral surface for holding said single component toner and for relatively approaching to or coming in contact with said first toner carrier so as to transfer said single component toner to said first toner carrier; and

a second regulating member in contact with said second toner carrier,

wherein said second toner carrier is adapted to relatively approach to or come in contact with said electrostatic latent image holding member and transfer to said electrostatic latent image holding member a single component toner which resides on the peripheral surface of said second toner carrier after the single component toner has been transferred from said second toner carrier to said first toner carrier to develop the electrostatic latent image to the visible image with the single component toner.

5,412,457

# CONTROL OF TORQUE APPLICATION IN ELECTROPHOTOGRAPHIC COLOR IMAGING APPARATUS

Yuzo Kawano, Ogori, and Hirofumi Ihara, Fukuoka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 17, 1993, Ser. No. 153,508

Claims priority, application Japan, Jan. 18, 1993, 5-005891

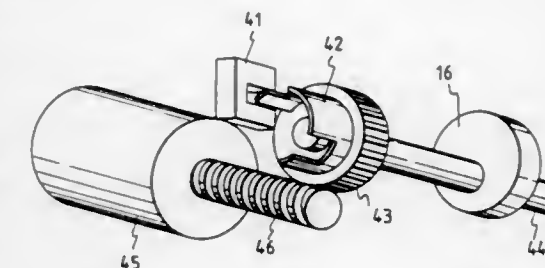
Int. Cl.<sup>6</sup> G03G 15/06

U.S. Cl. 355—245

20 Claims

1. An electrophotographic printing apparatus comprising:  
a photosensitive medium designed to form thereon an electrostatic latent image;

a developing roller designed to develop the electrostatic latent image formed on said photosensitive medium;  
a roller gear mounted coaxially with said developing roller;  
a transmission gear arranged to transmit torque supplied from a power source to said developing roller through said roller gear;  
moving means for moving said developing roller into engagement and disengagement with and from said photosensitive medium;  
means for meshing said transmission gear with said roller gear after separation of said moving means from said



developing roller so that the torque acts to displace said roller gear to contact said photosensitive medium; and  
controlling means for providing a first control signal which has said transmission gear rotate to rotate said developing roller during a time when said moving means is operating to move said developing roller toward said photosensitive medium, said controlling means also providing a second control signal which restricts the rotation of said transmission gear to stop said developing roller from rotating during a time when said moving means is operated to move said developing roller away from said photosensitive medium.

5,412,458

# DEVELOPING APPARATUS HAVING LEAF SPRING MEMBER FOR REGULATING MONO-COMPONENT DEVELOPER LAYER

Hideki Kamaji; Masae Ikeda; Kazunori Hirose, all of Kawasaki, and Yukio Nishio, Kurume, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

PCT No. PCT/JP92/00858, § 371 Date Mar. 5, 1993, § 102(e) Date Mar. 5, 1993, PCT Pub. No. WO93/01530, PCT Pub. Date Jan. 21, 1993

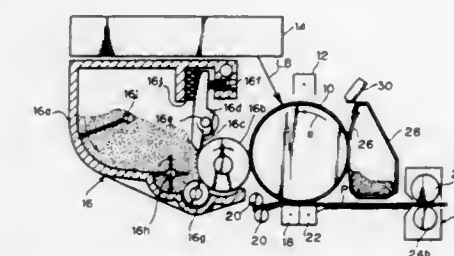
PCT Filed Jul. 6, 1992, Ser. No. 983,863

Claims priority, application Japan, Jul. 6, 1991, 3-166002; Jul. 6, 1991, 3-166003; Jul. 6, 1991, 3-166015

Int. Cl.<sup>6</sup> G03G 15/08

U.S. Cl. 355—259

31 Claims



1. A developing apparatus for developing an electrostatic latent image held on an image carrier by a mono-component developer, said apparatus comprising:  
a developer holding container for holding the mono-component developer;  
an electroconductive elastic development roller rotatably provided inside said container so that a portion of said development roller is exposed from said container and



launching a linearly-ramped FMCW optical carrier wave into the main line, modulating the carrier wave in each of the branch lines, passively returning the modulated signals along the branch lines to the main line, and monitoring the main line for changes in the modulation of the returned signals, wherein the carrier wave is modulated differently in each of the branch lines.

5,412,465

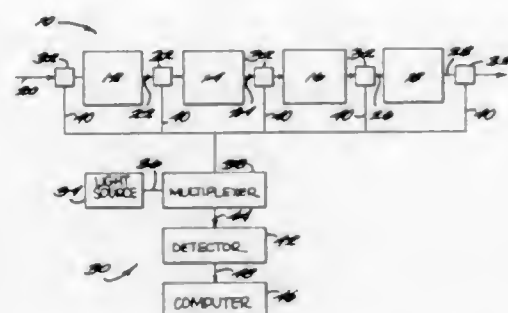
# METHOD FOR VERIFICATION OF CONSTITUENTS OF A PROCESS STREAM JUST AS THEY GO THROUGH AN INLET OF A REACTION VESSEL

Lewis C. Baylor, North Augusta; Bruce R. Buchanan, Alken, both of S.C., and Patrick E. O'Rourke, Martinez, Ga., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 2, 1993, Ser. No. 100,162  
Int. Cl.<sup>6</sup> G01J 3/44

U.S. Cl. 356—301

20 Claims



1. A method for validating a chemical process including reaction of a constituent compound in a reaction vessel, said reaction vessel having an interior and an inlet in communication with said interior, said constituent compound passing through said inlet to said reaction vessel, said constituent compound being altered chemically upon reacting in said reaction vessel, said method comprising the steps of:

- directing a light beam into said constituent compound in said inlet just as said constituent compound is entering said reaction vessel;
- measuring an optical spectrum of said constituent compound after interaction of said light beam with said constituent compound;
- comparing said optical spectrum to a reference spectrum of said constituent compound to determine if said optical spectrum of said constituent compound and said reference spectrum match; and
- emitting a first signal when said optical spectrum of said constituent compound matches said reference spectrum to confirm said constituent compound is entering said reaction vessel.

5,412,466

# APPARATUS FOR FORMING FLATTENED SAMPLE FLOW FOR ANALYZING PARTICLES

Shinichi Ogino, Kobe, Japan, assignor to Toa Medical Electronics Co., Ltd., Kobe, Japan

Filed May 22, 1992, Ser. No. 886,933

Claims priority, application Japan, Jul. 26, 1991, 3-210053; Jul. 26, 1991, 3-210054

Int. Cl.<sup>6</sup> G01N 33/48, 21/00

U.S. Cl. 356—246

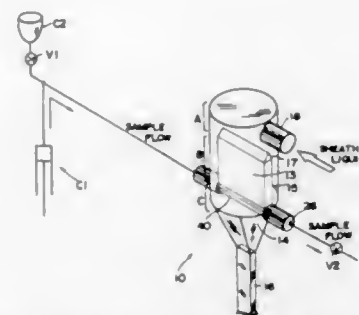
2 Claims

1. An apparatus for forming a flattened sample flow for analyzing particles, comprising:
- a flow cell having a lead-in passage, a measuring passage contiguous to said lead-in passage, a sheath liquid feed port disposed to supply sheath liquid to said lead-in passage, a sample nozzle for discharging a sample from a sample discharge portion to said measuring passage, disposed across the flow of the sheath liquid in said lead-in passage, and a liquid discharge port for discharging liquid from said measuring passage;
  - sheath liquid dividing means disposed at the upstream side of said sample nozzle in contact with the sample nozzle so as to divide the sheath liquid symmetrically into two flows, wherein:
  - the cross section of said measuring passage is rectangular, and the ratio of the width of the long axial direction of said

measuring passage to the width of the short axial direction of said measuring passage is in the range of 1 to 10;

said sample nozzle having an inner passage passing through said sample nozzle in the direction of said sample nozzle axis;

the sample discharge portion of the sample nozzle is composed of a plurality of discharge ports communicating with said inner passage;



the plurality of discharge ports are disposed midway of the sample nozzle and arranged in a row in the direction of the sample nozzle axis;

the direction at which said discharge ports are arranged coinciding with the long axial direction of said measuring passage; and

said sheath liquid dividing means is disposed so that the lateral projecting direction of said sheath liquid dividing means and the axial direction of the sample nozzle coincide.

5,412,467

# GAS EMISSION SPECTROMETER AND METHOD

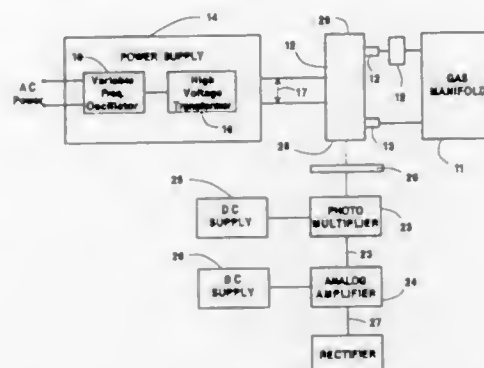
Mark L. Malczewski, North Tonawanda; Hollis C. Demmler, Tonawanda; David E. Brown, Lockport, and Donald R. Wiltse, Wilson, all of N.Y., assignors to Praxair Technology, Inc., Danbury, Conn.

Filed Mar. 24, 1993, Ser. No. 36,163

Int. Cl.<sup>6</sup> G01J 3/30

U.S. Cl. 356—316

12 Claims



1. A method for analyzing a continuously flowing gas stream using gas emission spectroscopy to detect a presence of at least one gas or vapor impurity in the gas stream at low concentration levels comprising steps as follows:
- directing a sample of the gas stream through an electric discharge source;
  - applying an alternating source of power across said electric discharge source and adjusting a variable frequency oscillator to provide a preselected excitation frequency with said alternating power source having a peak voltage sufficient to sustain an electric discharge and to generate a

wide radiation spectrum of emissive radiation from said gas stream;

filtering said radiation spectrum to form an optical signal having a narrow radiation emission bandwidth corresponding to a stronger emission wavelength(s) of a preselected impurity gas or vapor to be analyzed;

converting said optical signal into an electrical signal;

selectively amplifying said electrical signal within a narrow frequency range centered at substantially twice said excitation frequency; and

analyzing said selectively amplified electrical signal to determine the concentration level of the impurity gas or vapor under analysis.

5,412,468

# GROUPING OF SPECTRAL BANDS FOR DATA ACQUISITION IN A SPECTROPHOTOMETER

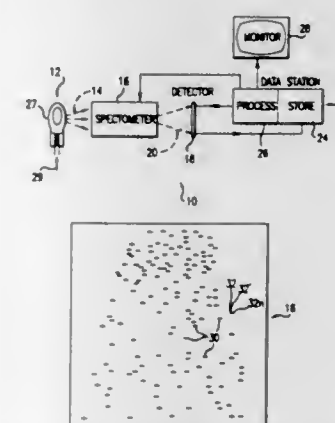
Peter L. Lundberg, Easton; Michael I. Crockett, Newtown, and David H. Tracy, Norwalk, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Mar. 9, 1993, Ser. No. 28,515

Int. Cl.<sup>6</sup> G01J 3/32

U.S. Cl. 356—326

44 Claims



25. A spectrometric apparatus comprising a spectral dispersion system receptive of radiation for effecting spectral bands therefrom, a detector with a plurality of zoned sensors receptive of time-integrated radiation representative of spectral intensities in selected spectral bands associated with corresponding sensors, a data station receptive of signal data from the detector representative of the time-integrated radiation, and program means in the data station for grouping the selected spectral bands for data acquisition, the program means including stored predetermined maximum amounts of the time-integrated radiation permitted for each corresponding sensor, wherein:

- the apparatus further comprises means for initially operating the spectrophotometer for a predetermined initial time sufficient for the sensors to collect time-integrated radiation so as to generate preliminary data representative of time-integrated radiation for all of the selected bands;
- the program means comprises:
- means for establishing from the preliminary data maximum exposure times permitted for corresponding sensors, so that each maximum exposure time effects the maximum amount of time-integrated radiation for the corresponding sensor;
- means for grouping the maximum exposures for the sensors into at least one group, each group including a highest maximum exposure time and a lowest maximum exposure time, wherein a ratio of the highest to the lowest is equal to or less than a predetermined range factor; and
- means for establishing a group run time for each group

equal to or nominally less than the lowest maximum exposure time in the group; and

the apparatus further comprises means for further operating the spectrophotometer on each group for the group run time to generate functional data representative of spectral intensities for associated spectral bands.

5,412,469

# OPTICAL SPECTRUM ANALYZER AND ENCODER USING A MODULATED PHASE GRATING WHEREIN SAID GRATING DIFFRACTS THE WAVELENGTH AS A FUNCTION OF THE MAGNETIC FIELD

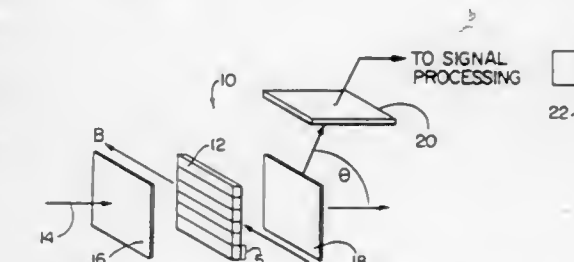
William B. Spillman, Jr., Charlotte, Vt., assignor to Simmonds Precision Products, Inc., Akron, Ohio

Filed Nov. 16, 1992, Ser. No. 976,605

Int. Cl.<sup>6</sup> G01J 3/28

U.S. Cl. 356—328

32 Claims



1. An optical wavelength detector for detecting multiple wavelengths of a spectral signal, said detector comprising:
- means for varying a magnetic field;
  - a diffraction grating having a grating period which is a function of said magnetic field; and
  - means for radiating said grating with the spectral signal as said magnetic field is varied, said grating diffracting respective wavelengths of the spectral signal as a function of said variable magnetic field.

5,412,470

# DISPERSION PHOTOMETER, IN PARTICULAR FOR THE KINETIC DETERMINATION OF TOTAL PROTEINS

Heinrich Plagge, Dransfeld; Hans-Joachim Krause, Göttingen; Dietmar Oberdorfer, Göttingen, and Ulrich Plüquet, Göttingen, all of Germany, assignors to Dosatec GmbH, Germany

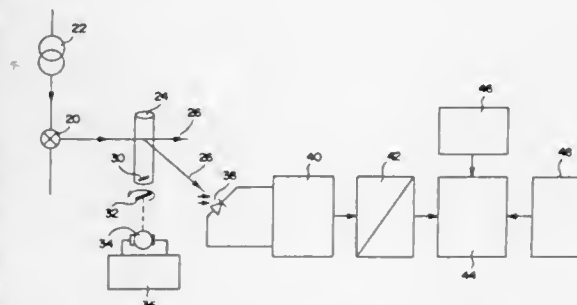
PCT No. PCT/DE91/00451, § 371 Date Dec. 21, 1992, § 102(e) Date Dec. 21, 1992, PCT Pub. No. WO91/19184, PCT Pub. Date Dec. 12, 1991

PCT Filed May 27, 1991, Ser. No. 952,712  
Claims priority, application Germany, May 30, 1990, 40 17 465.4

Int. Cl.<sup>6</sup> G01N 21/51

U.S. Cl. 356—338

11 Claims



1. A dispersion photometer (nephelometer) for kinetic determination of total proteins in a liquid, comprising: (a) a light source, (b) an optical system including means for projecting and focusing the image of the light source into a sample cham-



ber, (c) a removable optical cell in the sample chamber, into which the liquid can be given, (d) a photo-electric sensor for receiving light scattered in a forward angle, and (e) an electronic processing and display unit following the photo-electric sensor for processing and displaying the scattered light values including an A/D converter coupled to the photo-electric sensor for providing a digitized signal in response to an output signal from the photo-electric sensor and processing means for storing and evaluating  $n$  digitized signals according to their magnitude and for averaging no more than half of the  $n$  digitized signals having the smallest magnitudes for obtaining a displayed measured value, the dispersion photometer characterized in that between the light source and the optical cell and between the optical cell and the photo-electric sensor there are only such components, which in a spectral range (400 to 800 nm) exhibit a maximum transmission and a reflection without selective absorption or reflection, and in that a stirrer is provided for stirring the liquid during the determination.

5,412,471

# OPTICAL GYRO WITH EXPANDED DETECTABLE RANGE OF INPUT ROTATION ANGULAR VELOCITY AND OPTICAL WAVEGUIDE-TYPE PHASE MODULATOR USED IN THE SAME

Hirohiko Tada, and Kurokawa: Akihiro, both of Kamakura, Japan, assignors to Mitsubishi Precision Co., Ltd., Tokyo, Japan

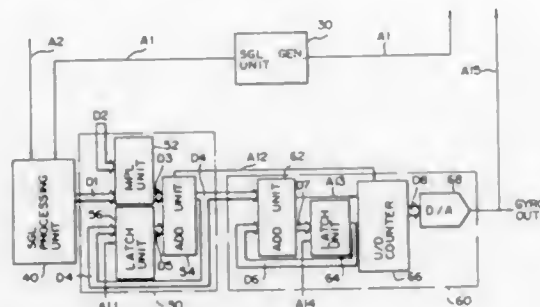
Filed Feb. 25, 1992, Ser. No. 840,535

Claims priority, application Japan, Mar. 12, 1991, 3-046827; May 16, 1991, 3-111483; May 17, 1991, 3-113244; Aug. 30, 1991, 3-220108

Int. Cl.<sup>6</sup> G01C 19/72

U.S. Cl. 356—350

25 Claims



## 1. An optical gyro comprising:

an optical propagation path in cooperation with a rotation axis, for propagating a pair of light beams therethrough simultaneously clockwise and counterclockwise, respectively;

an optical system, optically coupled to the optical propagation path, for giving a phase modulation by means of a signal of a constant frequency and a serrrodyne modulation by means of an analog sawtooth waveform signal of a variable frequency to the light beams propagated in opposite directions, detecting coherent lights from the respective modulated light beams propagated in opposite directions, and outputting a photoelectric output signal corresponding to the coherent light intensity;

a signal processing means, operatively connected to the optical system, for taking components in synchronization with the signal of the constant frequency from the photoelectric output signal and thereby outputting a digital error data corresponding to a phase difference of light between the light beams propagated in opposite directions;

a frequency setting means, operatively connected to the signal processing means, for digitally setting a frequency of the sawtooth waveform signal for serrrodyne modulation based on the error data, said frequency setting means comprising

a digital multiplication means for multiplying the digital error data by a digital data indicating a coefficient for

determining a feedback loop gain and thereby outputting a digital control data, and

an addition means for adding the digital control data to a previous last set frequency data of the sawtooth waveform signal to thereby output the digitally set frequency data; and

a sawtooth waveform signal generating means, operatively connected between the frequency setting means and the optical system, for generating the analog sawtooth waveform signal based on the digitally set frequency data, wherein the frequency of the sawtooth waveform signal for serrrodyne modulation is changed to thereby control the digital error data to be a value corresponding to the phase difference of light, said sawtooth waveform signal generating means comprising

an addition means for adding the digitally set frequency data output from the frequency setting means to a previous last added data, and outputting a carry signal where the added result produces an overflow,

a counter means for counting the number of the carry signal by an incremental or decremental operation to thereby output a digital sawtooth waveform signal, and

a D/A converter for converting the digital sawtooth waveform signal into the analog sawtooth waveform signal.

5,412,472

# OPTICAL-INTERFERENCE TYPE ANGULAR VELOCITY OR RATE SENSOR HAVING AN OUTPUT OF IMPROVED LINEARITY

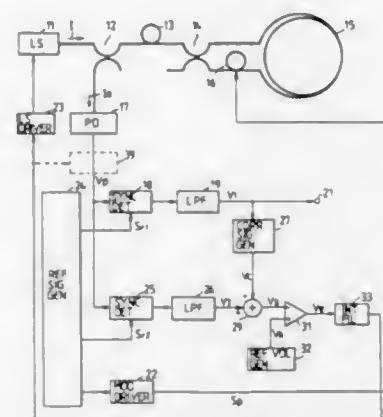
Kenichi Okada, and Ryuji Usui, both of Tokyo, Japan, assignors to Japan Aviation Electronics Industry Limited, Tokyo, Japan

Continuation of Ser. No. 59,665, May 12, 1993. This application Feb. 1, 1994, Ser. No. 190,354

Int. Cl.<sup>6</sup> G01C 19/72

U.S. Cl. 356—350

16 Claims



## 1. An optical-interference type angular velocity sensor comprising:

an optical path forming at least one loop;

branch means for splitting a light beam from light source means into two beams that propagate through said optical path as clockwise and counterclockwise light beams;

interference means for effecting an interference between the clockwise and the counterclockwise light beams that have propagated through said optical path;

phase modular means disposed in cascade between said branch means and one end of said optical path, for phase modulating the clockwise and the counterclockwise light beams;

photodetector means for detecting the intensity of the interfered light produced by said interference means and providing an electrical signal representative of said intensity; first demodulator means for demodulating, from said electrical signal, a sine component of a Sagnac phase difference  $\Delta\Phi$ , which is caused by an angular velocity applied to said

optical path around its axis to obtain an output of said angular velocity sensor, from which output said angular velocity is detected;

second demodulator means for demodulating a cosine component of said Sagnac phase difference  $\Delta\Phi$ , from said electrical signal;

means for generating a scale factor stabilizing signal on the basis of said cosine component from said second demodulator means;

correcting signal generating means for generating a correcting signal for use in improving the linearity of the output of said angular velocity sensor, said correcting signal being generated on the basis of an integral expression in which said sine component from said first demodulator means is used as a variable;

adder means for adding said correcting signal to said scale factor stabilizing signal;

reference signal generating means for generating a reference signal;

comparator means for comparing the output of said adder means with said reference signal and for generating an error signal; and

feedback loop means for controlling the level of said electrical signal applied to said first and second demodulator means so that said error signal is reduced to zero.

5,412,473

# MULTIPLE ANGLE SPECTROSCOPIC ANALYZER UTILIZING INTERFEROMETRIC AND ELLIPSOMETRIC DEVICES

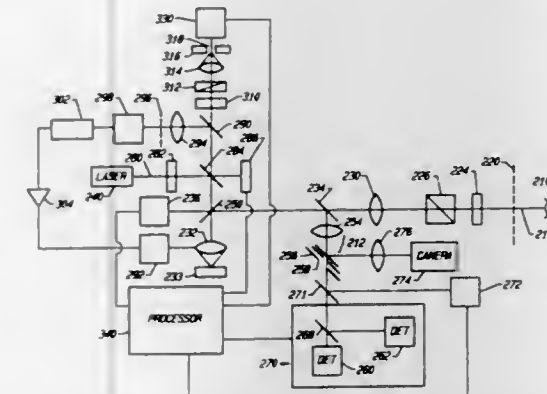
Allan Rosencwalg, Danville, and David L. Willenborg, Dublin, both of Calif., assignors to Thermo-Wave, Inc., Fremont, Calif.

Filed Jul. 16, 1993, Ser. No. 93,178

Int. Cl.<sup>6</sup> G01B 9/02

U.S. Cl. 356—351

34 Claims



## 1. A detection system for simultaneously measuring the intensity of rays within a polychromatic beam as function of the position within the beam and at a plurality of wavelengths, said detection system comprising:

filter means located in the path of the beam and including an elongated aperture for transmitting a portion of the beam; dispersion means for creating an angular spreading of the transmitted portion of the beam as a function of the wavelength of the light with the angular spreading being in a direction orthogonal to the orientation of the aperture in the filter means; and

detector means for receiving the transmitted portion of the beam after passing through the dispersion means, said detector means including a two dimensional array of individual elements and having at least one row of elements oriented to measure the intensity of individual rays as a function of the position within the beam and at least one column of elements for measuring the intensity of the individual rays of the beam as a function of wavelength.

5,412,474

# SYSTEM FOR MEASURING DISTANCE BETWEEN TWO POINTS USING A VARIABLE FREQUENCY COHERENT SOURCE

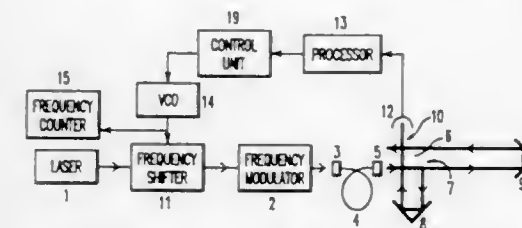
Robert D. Reasenber; James D. Phillips, both of Lexington, and Martin C. Noecker, Concord, all of Mass., assignors to Smithsonian Institution, Washington, D.C.

Filed May 8, 1992, Ser. No. 880,590

Int. Cl.<sup>6</sup> G01B 9/02

U.S. Cl. 356—349

28 Claims



## 1. A system for measuring a distance between two points, which comprises:

means for generating a coherent electromagnetic first beam having a first frequency which can be varied within a frequency range;

an interferometer coupled to said first beam and comprising plural reflective surfaces including first and second reflective surfaces separated by said distance, said interferometer providing an optical output signal which is a sum of coherent electromagnetic beams that travel different path lengths in said interferometer; and

first feedback means for producing a first feedback signal based on said optical output signal, and feeding back said first feedback signal to said means for generating to control the frequency of said first beam so as to maintain constant at least one value an optical phase difference between at least two of said different path lengths.

5,412,475

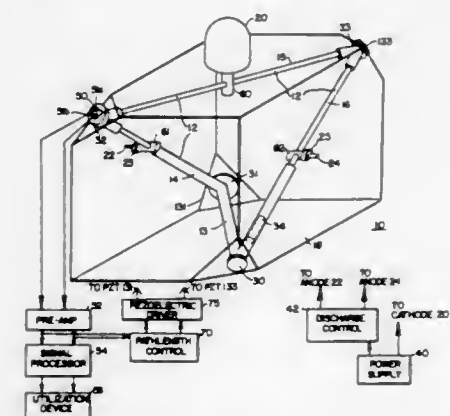
# DIAGONAL PATHLENGTH CONTROL

Irl W. Smith, Concord, and Terry A. Dorschner, Marlboro, both of Mass., assignors to Raytheon Company, Lexington, Mass. Continuation of Ser. No. 930,028, Nov. 10, 1986, abandoned, which is a continuation of Ser. No. 412,456, Aug. 27, 1982, abandoned. This application Feb. 23, 1989, Ser. No. 321,652

Int. Cl.<sup>6</sup> G02B 5/30; G01B 9/02

U.S. Cl. 356—350

7 Claims



## 1. In combination:

means for providing a ring resonator, such means comprising a plurality of mirrors arranged to provide a ring path having a predetermined optical pathlength;

means for producing at least one beam circulating in said

path, said beam being incident on said mirrors in predetermined incidence planes; and  
means for controlling said pathlength, said pathlength controlling means comprising means for modulating the position of two nonadjacent mirrors, said position modulating means producing a motion of said beam on each mirror substantially only in a plane perpendicular to said incidence planes.

5,412,476

## DRILL BIT POSITION SENSOR

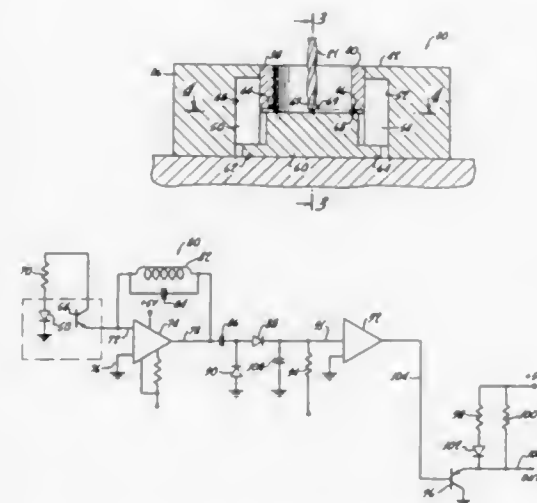
William F. Marantette, Torrance, Calif., assignor to Optima Industries, Inc., Torrance, Calif.

Filed Nov. 16, 1993, Ser. No. 153,305

Int. Cl. G01B 11/14; G01N 21/86

U.S. Cl. 356—375

9 Claims



1. A method of sensing the end of a drill point comprising the steps of:

- rotating the drill point at a known speed,
- projecting a light beam along a path of known position,
- moving the rotating drill point to cause it to penetrate the light beam,
- modulating the light beam at a predetermined frequency that is an integral multiple of said known speed when the end of the drill point begins to penetrate the path of said light beam while the drill point is rotating,
- detecting the beginning of penetration of the light beam by the drill point by detecting when the light beam begins to be modulated at said predetermined frequency, and
- employing a circuit resonant at a frequency that is an integral multiple of said known speed to indicate time of the initial penetration of the drill point into the light beam to indicate position of said drill point relative to said known position.

5,412,477

## APPARATUS FOR MEASURING BEND AMOUNT OF IC LEADS

Tomoyuki Kida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 17, 1993, Ser. No. 18,864

Claims priority, application Japan, Feb. 18, 1992, 4-029828

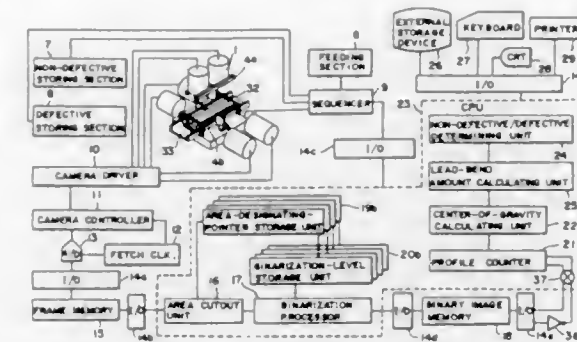
Int. Cl. G06K 9/00

U.S. Cl. 356—394

20 Claims

1. A lead-bend measuring apparatus comprising:  
illuminating means for projecting light onto leads projecting from a package of an integrated circuit device, said illuminating means including a reflecting mirror disposed substantially in a center of the integrated circuit device;

imaging means for imaging light reflected from and transmitted through the leads;  
cutout means for fetching an image of the imaged light and dividing the image into a plurality of sections;  
binarization processing means for processing gradations of the image with different binarization levels for each of the divided sections, said binarization processing means including binarization level storing means for storing a same number of binarization levels as a number of the divided sections;



profile counter means for preparing profiles of portions of the leads corresponding to the respective sections from binarized data subjected to processing by said binarization processing means;

calculating means for calculating a deviation of each of the prepared profiles from a reference profile and determining an amount of bend of each of the leads; and  
means for determining a non-defective or defective state by making a comparison between the amount of bend calculated and allowable values.

5,412,478

## ENDOSCOPE SYSTEM WHICH CHANGES OVER SWITCHES IN INTERLOCKING RELATION TO EACH OTHER WITHIN VIDEO PROCESSOR AND IMAGE DISPLAY APPARATUS TO PERFORM DISPLAY OF ENDOSCOPE IMAGE

Hideaki Ishihara, Hachioji; Kiyoshi Tsuji, Musashino, and Akihiro Miyashita, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

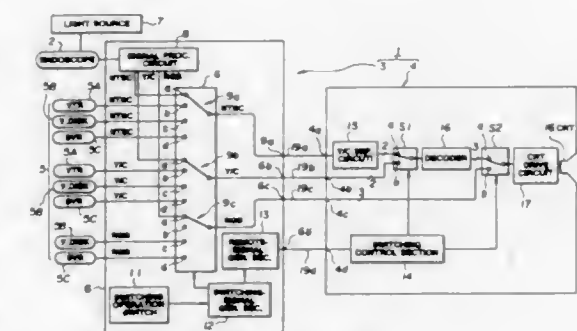
Filed Sep. 23, 1993, Ser. No. 125,162

Claims priority, application Japan, Sep. 30, 1992, 4-261730

Int. Cl. A61B 1/045

U.S. Cl. 348—72

31 Claims



1. An endoscope system comprising:  
an endoscope apparatus including:  
an endoscope having an elongated inserting section, illuminating-light outgoing means for outgoing illuminating light from the side of a forward end of said inserting section, and an image pickup element for photoelectrically

converting an optical image on the basis of an objective lens which is arranged on the forward end of said inserting section; and

a video processor having a signal processing device connected to said endoscope for performing signal processing with respect to said image pickup element to output a signal corresponding to an endoscope image image-picked-up by said image pickup element, and a plurality of output terminals for outputting a plurality of signals including said signal;

an image display apparatus including:  
image display means for displaying an endoscope image corresponding to an inputted input signal;

a plurality of input terminals connected to said plurality of output terminals;

image-signal processing means for performing a plurality of signal processings different in function/characteristic from each other, with respect to said plurality of signals inputted to said plurality of input terminals, to output said input signal to said image display means; and  
selecting means for selecting one of said plurality of signal processings which are different in function/characteristic from each other;

switching means provided on said endoscope apparatus for generating a switching signal for changing at least one signal outputted from said plurality of output terminals; and

control means provided on said image display apparatus for controlling selection of said selecting means correspondingly to said switching signal.

5,412,479

## COMPUTER GENERATED WIPES FOR VIDEO EDITING SYSTEMS

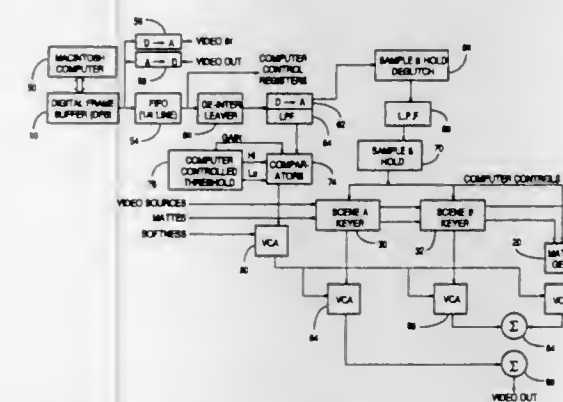
Robert J. Alig, Boulder Creek; Gerald A. Raitzer, Mountain View, and Michael Shinsky, Menlo Park, all of Calif., assignors to Digital F/X, Inc., Mountain View, Calif.

Continuation of Ser. No. 595,452, Oct. 1, 1990. This application Aug. 28, 1992, Ser. No. 938,313

Int. Cl. H04N 5/262, 5/272

U.S. Cl. 348—594

18 Claims



1. A wipe generator comprising:  
means for storing a wipe pattern;  
means for generating a threshold level;  
means for comparing a portion of the wipe pattern to the threshold level and providing a first control signal in response thereto;  
means for determining a resulting video signal from a number representing a ratio of a first video signal to a second video signal, as determined by said wipe pattern, and providing a second control signal in response thereto; and  
means for switching between at least the first and second video signal in response to the first and second control signals;

wherein the means for generating provides both a high threshold and a low threshold, and  
wherein the means for comparing comprises two comparators each of which is provided with one of the high threshold and the low threshold, and each comparator receives the wipe pattern.

5,412,480

## IMAGE FORMING APPARATUS WITH FIXER TEMPERATURE CONTROL

Yoichi Serizawa, Yokohama; Akio Noguchi, Ebina; Yukihide Ushio; Shimpei Matsuo, both of Tokyo; Kazuro Yamada, Machida; Seiji Uchiyama, Tokyo; Makoto Takeuchi, Yokohama; Koichi Suwa, Yokohama; Koichi Hiroshima, Yokohama; Shinichi Tsukida, Okegawa; Manabu Takano, Machida; Masahiro Goto, Yokohama; Takahiro Inoue, Yokohama; Hiromichi Yamada, Yokohama; Junichi Kato, Sagami, and Masaki Ojima, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 974,503, Nov. 12, 1992, which is a division of Ser. No. 703,298, May 20, 1991, Pat. No. 5,274,402.

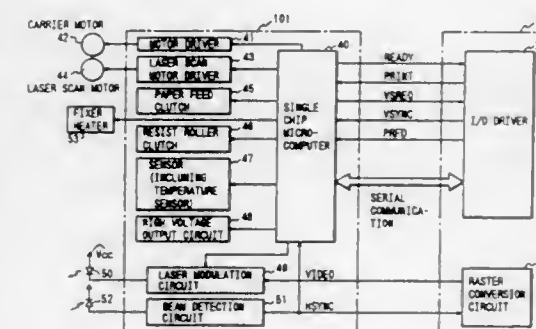
This application Feb. 4, 1994, Ser. No. 191,548

Claims priority, application Japan, May 21, 1990, 2-129183; May 21, 1990, 2-129184; Jul. 18, 1990, 2-191022

Int. Cl. H04N 1/23; G03G 15/20, 21/00; G01D 15/06

U.S. Cl. 358—296

20 Claims



1. An image forming apparatus comprising:  
pixel conversion means for converting coded information into pixel information;  
image forming means for forming an image on a recording medium based on the pixel information converted by said pixel conversion means;  
feeder means for feeding the recording medium to said image forming means, said feeder means having a first mode in which the recording medium is fed from a recording medium stacking means for stacking recording medice prior to an end of a pixel conversion process of one page performed by said pixel conversion means, and a second mode in which the recording medium is fed from the recording medium stacking means after the end of said pixel conversion process of one page;  
fixer means for fixing the image formed by said image forming means on the recording medium; and  
control means for controlling a temperature of said fixer means,  
wherein said control means executes a different control either in the first mode or in the second mode, when a predetermined time has passed after one page of an image forming operation without starting a next page of the image forming operation.



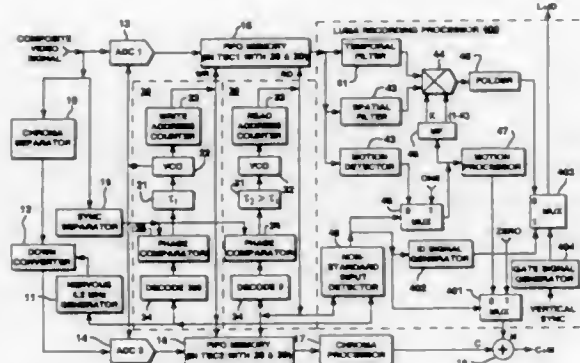
5,412,481

## TIME-BASE CORRECTION IN A VIDEO RECORDING/PLAYBACK SYSTEM

Jung W. Ko, Lawrenceville; Alvin R. Balaban, Lebanon, and Christopher H. Strolle, Lawrenceville, all of N.J., assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea  
Filed Feb. 24, 1992, Ser. No. 839,542  
Int. Cl.<sup>6</sup> H04N 9/79

U.S. Cl. 358—320

73 Claims



1. A video recorder including means for digitizing a composite video signal supplied as an input signal for recording; means responding to said composite video signal for generating a motion signal identifying which picture elements of said composite video signal exhibit substantial change from a previous field and which picture elements of said composite video signal exhibit no substantial change from a previous field; adaptive digital filtering circuitry, being for use during recording and responding to said motion signal at least at times other than specified times for implementing filtering of the picture elements of said digitized composite video signal that exhibit substantial change from a previous field and for implementing filtering of the picture elements of said digitized composite video signal that exhibit no substantial change from a previous field in the temporal dimension; and an improvement comprising: a non-standard input detector connected for detecting time-base error or jitter in said composite video signal, classifying any said composite video signal which exhibits less than a specified amount of time-base error or jitter as a "standard input signal", classifying any said composite video signal which exhibits more than a specified amount of time-base error or jitter as a "non-standard input signal", and furnishing an electrical signal indicative of the classification result; means for conditioning said adaptive digital filtering circuitry to be responsive to said motion signal when said electrical signal indicative of the classification result indicates a standard input signal being received for recording at times other than specified times; means for conditioning said adaptive digital filtering circuitry for implementing filtering of all picture elements of said digitized composite video signal in the two-dimensional spatial domain, when said electrical signal indicative of the classification result indicates a non-standard input signal being received for recording thus defining ones of said specified times; and means for inserting into the recorded signal said electrical signal indicative of the classification result.

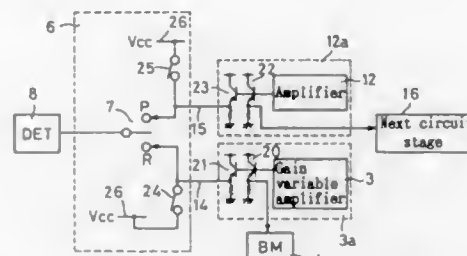
5,412,482

## SIGNAL LINE CHANGEOVER CIRCUIT WITH EMITTER FOLLOWERS

Shinji Kamei, Kyoto, and Yasunori Kawamura, Funai, both of Japan, assignors to Rohm Co., Ltd., Kyoto, Japan  
Filed Feb. 25, 1992, Ser. No. 841,164  
Claims priority, application Japan, Feb. 26, 1991, 3-056029  
The portion of the term of this patent subsequent to Dec. 27, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> H04N 5/782, 5/262

U.S. Cl. 358—335

5 Claims



1. A signal line changeover circuit for a video playback/recording device having a recording system and a playback system, said circuit comprising: a first signal processing circuit for processing a playback signal applied thereto, said first signal processing circuit including a first emitter follower for outputting a first signal therefrom; a second signal processing circuit for processing a recording signal applied thereto, said second signal processing circuit including a second emitter follower for outputting a second signal therefrom; a changeover switch including a first terminal connected to an emitter of said first emitter follower through a first signal line, a second terminal connected to an emitter of said second emitter follower through a second signal line and a third terminal connected to a third signal processing circuit, said changeover switch connecting said first and third terminals during a playback operation and connecting the second and third terminals during a recording operation; a first switch connected between said first terminal and a power line and switched to connect said first terminal and said power line during the recording operation; and a second switch connected between said second terminal and said power line and switched to connect said second terminal and said power line during the playback operation, wherein said first switch and said second switch are selectively actuated in synchronism with a switching of said changeover switch.

5,412,483

## APPARATUS AND METHOD FOR MANAGING STORAGE OF PRINT-RELATED INFORMATION IN A PRINT FILE

M. John Ludlow, Geneseo; Arlene J. Buck, Webster; Joy L. Lynd, Penfield; Dragana Pavlovic, and Jeffrey A. Smith, both of Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 16, 1993, Ser. No. 168,836

Int. Cl.<sup>6</sup> H04N 1/21

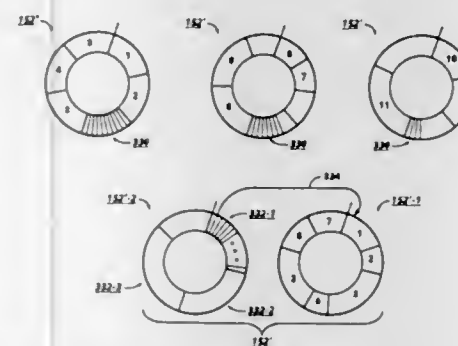
U.S. Cl. 358—401

28 Claims

17. A printing system for producing a set of prints from a job with a plurality of pages, each page being represented by image data stored at selected locations in one or more memory files, comprising: a print file including, a first buffer filled with a first portion of a first type of print related information, the first type of print related information including references to the selected loca-

tions of the image data in the one or more memory files, and a second buffer filled with a first portion of a second type of print related information; a marking service facilitating the production of the set of prints with both the first type of print related information and the second type of print related information; said marking service reading the first portion of the set of the first type of print-related information from the first buffer and the first portion of the set of the second type of print-related information from the second buffer; and said first buffer being filled with a second portion of the set of the first type of print-related information when all of the first portion of the set of the first type of print-related information has been read by said marking service.

23. A printing system for producing a set of prints from a job with a plurality of pages, each print of the job being disposed respectively on a print media sheet and including a representation of an image, comprising:



a print file including, a first buffer filled with a first portion of a first type of print related information, and a second buffer filled with a first portion of a second type of print related information, the second type of print related information indicating how each image is to be disposed on a corresponding one of the print media sheets; a marking service facilitating the production of the set of prints with both the first type of print related information and the second type of print related information; said marking service reading the first portion of the set of the first type of print-related information from the first buffer and the first portion of the set of the second type of print-related information from the second buffer; and said first buffer being filled with a second portion of the set of the first type of print-related information when all of the first portion of the set of the first type of print-related information has been read by said marking service.

5,412,484

## VARIABLE RATE CODER/DECODER SYSTEM

Hidetaka Yoshikawa, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 22, 1993, Ser. No. 94,867

Claims priority, application Japan, Jul. 23, 1992, 4-197091

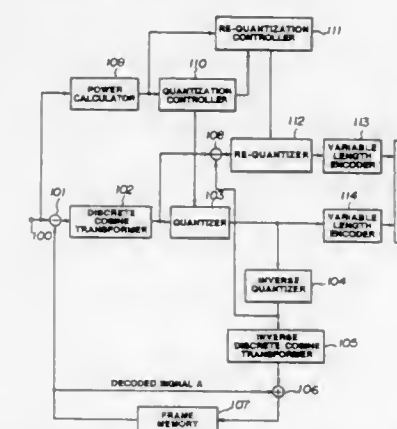
Int. Cl.<sup>6</sup> H04N 1/415

U.S. Cl. 358—433

7 Claims

1. A variable rate coding system including a variable rate coder comprising: power calculation means for calculating an average power for each frame unit of an inputted digital video signal series; first difference calculation means for calculating a difference between one frame of the inputted digital video series and a frame immediately previous to said one frame of the digital video signal series; coordinate transformation means for subjecting the differ-

ence calculated by the first difference calculation means to a coordinate transformation; quantization means for quantizing an output of the coordinate transformation means; quantization control means for controlling a quantization step width of the quantization means on the basis of an output of the power calculation means; first variable length encoder means for subjecting an output of the quantization means to a variable length encoding; decoded signal generating means for subjecting the output of the quantization means to an inverse quantization and an inverse coordinate transformation, adding the output being subjected to the inverse coordinate transformation to the digital video signal series of said frame immediately previous to said one frame, and outputting an added signal to the first difference calculation means; second difference calculation means for calculating a differ-



ence between an inversely quantized signal generated by the decoded signal generating means and an output of the coordinate transformation means; re-quantization means for re-quantizing the difference calculated by the second difference calculation means; re-quantization control means for controlling a re-quantization step width of the re-quantization means on the basis of the output of the power calculation means; second variable length encoding means for subjecting an output of the re-quantization means to a variable length encoding; and multiplexing means for combining the outputs of the first and second variable length encoder means to output a combined signal, the combined signal being added with discard priorities in a manner such that the output of the second variable length encoder means is added with a higher discard priority than the discard priority added to the output of the first variable length encoder means.

5,412,485

## IMAGE PROCESSING APPARATUS CAPABLE OF PROCESSING IMAGES ON BOTH SIDE ORIGINAL

Kazuo Kashiwagi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 857,952, Mar. 26, 1992, abandoned.

This application Jun. 13, 1994, Ser. No. 259,126

Claims priority, application Japan, Apr. 3, 1991, 3-098155

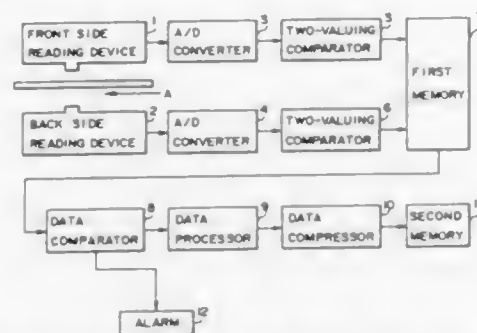
Int. Cl.<sup>6</sup> H04N 1/00

U.S. Cl. 358—441

21 Claims

1. An image processing apparatus comprising: reading means for reading images on one side and the other side of an original; mode selecting means for selecting one of a one side processing mode and a two sided processing mode, the one side processing mode being adapted to process an image on only one side of an original, and the two side processing

mode being adapted to process images on both sides of an original;  
discriminating means for discriminating whether the original from which the images are read by said reading means is a one side original having an image on only one side thereof or a both side original having images on both sides thereof; and



alarm means for generating an alarm when the one side processing mode is selected by said mode selecting means and said discriminating means discriminates that the original from which the images are read by said reading means is a both side original.

5,412,486

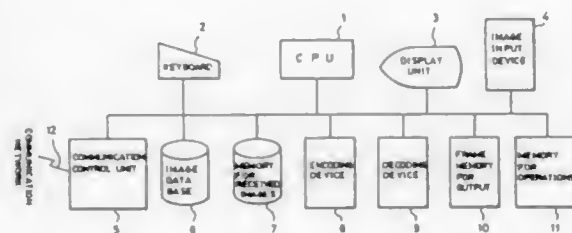
**IMAGE PROCESSING APPARATUS AND METHOD WITH DUAL MODE ENCODING**  
Yuulchi Bannai, Koganei; Tadashi Yoshida, Ichikawa; Yasuji Hirabayashi, Kawasaki, and Hideo Oosawa, Kawaguchi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 673,411, Mar. 22, 1991, Pat. No. 5,267,052.  
This application Aug. 26, 1993, Ser. No. 112,141  
Claims priority, application Japan, Mar. 24, 1990, 2-074201; May 31, 1990, 2-143728

Int. Cl.<sup>6</sup> H04N 1/00

U.S. Cl. 358—444

10 Claims



1. An image processing apparatus comprising:  
input means for inputting first image data representing an original image;  
first memory means for storing the first image data input by said input means;  
reduction means for hierarchically reducing a size of the image represented by the first image data to output second image data;  
second memory means for storing the second image data; and  
encoding means for encoding image data and generating encoded image data,  
wherein said encoding means has a first encoding mode in which encoding is performed on the second image data read out from said second memory means and a second encoding mode in which encoding is performed on the first image data read out from said first memory means without using the second image data output from said reduction means.

# 5,412,487 VIDEO CAMERA AND APPARATUS FOR EXTRACTING AN OBJECT

Ryuji Nishimura, Yokohama; Mayuko Yamamoto, Kawasaki, and Takuya Imaide, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

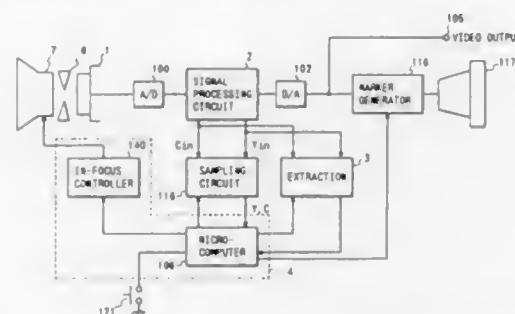
Continuation-in-part of Ser. No. 940,348, Sep. 3, 1992, Pat. No. 5,347,391, which is a continuation-in-part of Ser. No. 798,892, Nov. 27, 1991, Pat. No. 5,293,255. This application Nov. 30, 1993, Ser. No. 159,132

Claims priority, application Japan, Nov. 30, 1992, 4-320336; Jan. 27, 1993, 5-011732

Int. Cl.<sup>6</sup> H04N 1/387

U.S. Cl. 358—452

32 Claims



1. A video camera for automatically controlling an operation of the video camera and for generating a video signal utilizing imaging means, comprising:  
means for indicating an area of a specific portion of an object viewed by a camera operator;  
means for sampling the video signal in the region of the indicated area;  
means for setting at least one parameter of the specific portion of the object in accordance with the sampled video signal;  
means for extracting at least the specific portion of the object from the video signal in accordance with the set parameter; and  
means for controlling the operation of the video camera in accordance with the extracted portion of the object of the video signal.

5,412,488

# DATA PROCESSING APPARATUS DUAL-BUS DATA PROCESSING WITH REDUCED CPU AND MEMORY REQUIREMENTS

Yukihiko Ogata, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

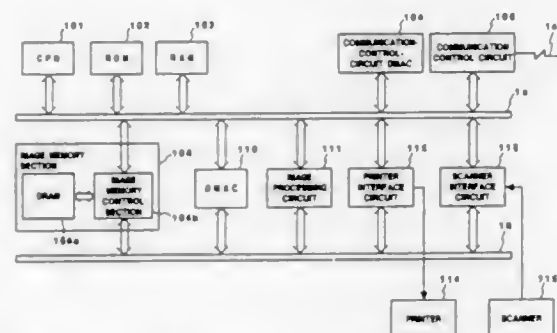
Filed May 22, 1992, Ser. No. 886,874

Claims priority, application Japan, May 24, 1991, 3-119757

Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 358—455

15 Claims



1. A data processing apparatus comprising:  
a microprocessor for controlling the entire apparatus;

a first bus connected to said microprocessor;  
at least one second bus which is not connected to said microprocessor;  
a memory connected to both said first and second buses and allowing access from each of said buses;  
at least one processing circuit connected to said second bus and adapted to perform a predetermined process with respect to given data under the control of said microprocessor; and  
DMA means connected to said first and second buses and adapted to perform a data transfer process on said second bus to or from at least one of said processing circuit and said memory on the basis of an instruction through said first bus from said microprocessor.

5,412,489

# SHADING CORRECTION HAVING A LINE MEMORY READ WHICH GENERATES AN AVERAGE REFERENCE LEVEL FROM A PLURALITY OF LINES OF A REFERENCE PLATE

Yoshitaka Hirota, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

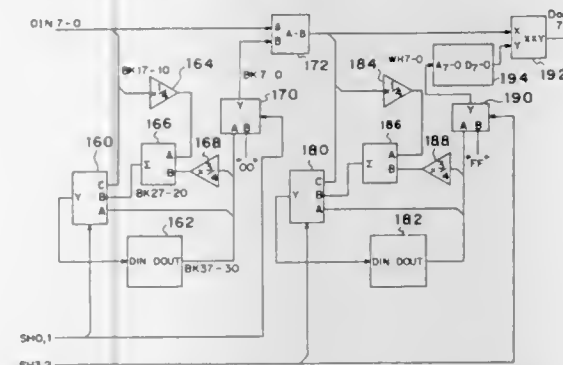
Filed Jun. 26, 1992, Ser. No. 905,109

Claims priority, application Japan, Jun. 29, 1991, 3-159260; Jun. 29, 1991, 3-185444

Int. Cl.<sup>6</sup> H04N 1/40

U.S. Cl. 358—461

15 Claims



1. An image reading apparatus, wherein a document image is scanned for each line and the signal obtained by the photoelectric conversion is converted to digital data, comprising:  
a read means including a plurality of image reading elements arranged linearly;  
a standard image read means for reading one or more standard images for each line by using said read means;  
a division means for dividing the standard image data obtained by said standard image read means by a predetermined number;  
a memory device which can store standard image data of one line;  
an adder means for adding the standard image data obtained by said division means to the standard image data stored in said memory device when an image data of one line is received from said standard image read means and for storing the sums in said memory device again;  
an output means for outputting the standard image data stored in said memory device as correction data after image data of the prescribed number of lines are processed by said adder means; and  
a correction means for correcting the image data of a document read by said read means according to the correction data.

5,412,490

**PRINTER PROVIDED WITH AN IMAGE READING UNIT**  
Tetsuji Kojima; Hiromi Miyashita; Shigemi Hagiwara, and Naoki Sunaga, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

PCT No. PCT/JP92/00866, § 371 Date Mar. 8, 1993, § 102(e) Date Mar. 8, 1993, PCT Pub. No. WO93/01679, PCT Pub. Date Jan. 21, 1993

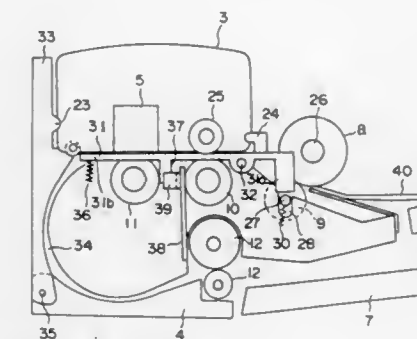
PCT Filed Jul. 7, 1992, Ser. No. 30,156

Claims priority, application Japan, Jul. 9, 1991, 3-052909 U; Aug. 14, 1991, 3-064456 U

Int. Cl.<sup>6</sup> H04N 1/024

U.S. Cl. 358—473

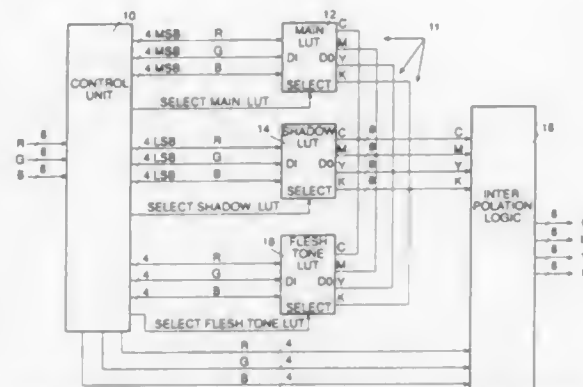
5 Claims





first and second portions of the color space to the first and second LUTs respectively;

a ratio of the number of memory cells in the first LUT and the number of possible input values channeled thereto differs from a corresponding ratio for the second LUT; and



at least one more LUT for transforming a corresponding one of at least one more portion of the input color space into a corresponding portion of the output color space, the control unit also being operative to channel input values included in each of the at least one more portion of the input color space to a corresponding one of the at least one more LUTs.

5,412,492

## ELECTRO-OPTICAL LENS ASSEMBLY

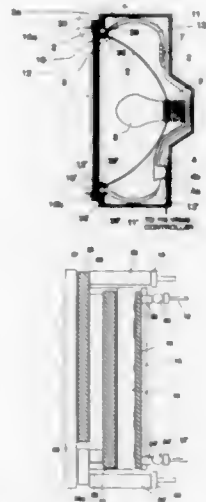
Theodore Zammit, Ambler, and Niel Mazurek, Huntingdon Valley, both of Pa., assignors to Magnascreen Corporation, Pittsburgh, Pa.

Filed Nov. 5, 1991, Ser. No. 788,029

Int. Cl.<sup>6</sup> G02F 1/13; G08G 1/095

U.S. Cl. 359—48

19 Claims



2. A traffic signal comprising:

a housing including a front opening and a gasket surrounding said front opening;

a light source disposed in the housing; and

a lens assembly positioned at the front opening of the housing, the lens assembly including in successive order:

a rear transparent plate;

a translector including transparent color means for transmitting through the translector as colored light any light originating from behind the translector, and reflection

means for reflecting forward any light incident to the translector from the front of the assembly;

a first transparent substrate positioned forward of the translector;

a first transparent electrode positioned on the front surface of the first substrate;

a layer of dichroic liquid crystal material positioned forward of the first electrode, the liquid crystal layer being substantially light absorbing when in a first state and transmitting incident light when in a second state;

a second electrode positioned forward of the liquid crystal layer;

a second transparent substrate, wherein the second electrode is positioned on a rear surface of the second substrate;

means for changing the liquid crystal layer from the first state to the second state by selectively applying power from a power source to the first electrode and the second electrode; and

a front transparent plate positioned forward of the second substrate, wherein the entire lens assembly from the rear plate to the front plate is held to the housing by said gasket.

5,412,493

## LIQUID CRYSTAL DISPLAY DEVICE HAVING LDD STRUCTURE TYPE THIN FILM TRANSISTORS CONNECTED IN SERIES

Masafumi Kunii, and Yuji Hayashi, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

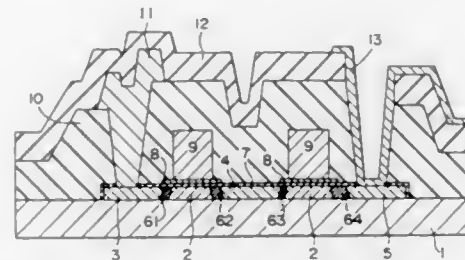
Filed Sep. 24, 1993, Ser. No. 125,802

Claims priority, application Japan, Sep. 25, 1992, 4-280462; Jan. 14, 1993, 5-021996

Int. Cl.<sup>6</sup> G02F 1/136; H01L 29/76

U.S. Cl. 359—59

19 Claims



1. A liquid crystal display device, comprising:

a first substrate;

a plurality of picture element electrodes arranged in a matrix on the first substrate, each picture element electrode being associated with a switching element which comprises a plurality of thin film transistors connected in series, gate electrodes of the plurality of thin film transistors being electrically connected to each other, the thin film transistors having lightly doped regions between a source/drain region and a channel region, the lightly doped region being of the same conductivity type to that of the source/drain region, each of the thin film transistors having a channel length no longer than 5 μm;

a second substrate opposed to the first substrate and having an electrode on an inner surface thereof; and

a liquid crystal layer disposed between the first and second substrates.

5,412,494

## LIQUID CRYSTAL DEVICE WITH METAL OXIDE MASKING FILMS WITH BREAKS BETWEEN FILMS UNDER METAL LEAD ELECTRODES

Kazuya Ishiwata, Yokosuka; Takashi Enomoto, Zama, and Toshifumi Yoshioka, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

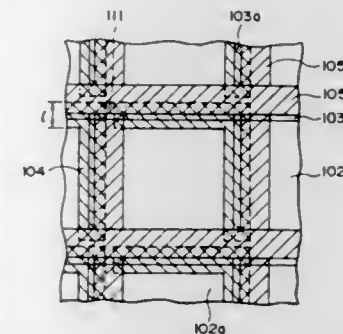
Filed Aug. 27, 1991, Ser. No. 750,246

Claims priority, application Japan, Aug. 30, 1990, 2-226588

Int. Cl.<sup>6</sup> G02F 1/1335, 1/1343

U.S. Cl. 359—67

4 Claims



1. A liquid crystal device, comprising:

a first substrate having thereon a metal oxide light-shielding mask, a plurality of elongated first display electrodes each having a first metal lead electrode disposed along and in electrical contact therewith, and an insulating layer disposed between the metal oxide light-shielding mask and the first display electrodes;

a second substrate having thereon a plurality of elongated second display electrodes each having a second metal lead electrode disposed along and in electrical contact therewith, the elongated second display electrodes being disposed to intersect with the elongated first display electrodes; and

a liquid crystal disposed between the first and second substrates so as to form a pixel at each intersection of the first display electrodes and the second display electrodes, wherein the metal oxide light shielding mask is separated into a plurality of discrete metal oxide masking films each allotted to a pixel so as to mask substantially all the spacings between the pixels, the place of the separation between the masking films being disposed in alignment with at least one of the first and second metal lead electrodes.

5,412,495

## LIQUID CRYSTAL DISPLAY SYSTEM HAVING AN ANTI-STATIC ELECTRICITY STRUCTURE

Kwang-su Kim, Kyunggi-do, Rep. of Korea, assignor to Samsung Display Devices Co., Ltd., Kyunggi-do, Japan

Filed Mar. 15, 1994, Ser. No. 213,100

Claims priority, application Rep. of Korea, Jul. 22, 1993, 93-13723 U; Jul. 22, 1993, 93-13724 U; Jul. 22, 1993, 93-13725 U; Jul. 22, 1993, 93-13726 U

Int. Cl.<sup>6</sup> G02F 1/343

U.S. Cl. 359—88

10 Claims

1. A portion of a liquid crystal display system comprising:

a panel;

electrodes formed on the panel;

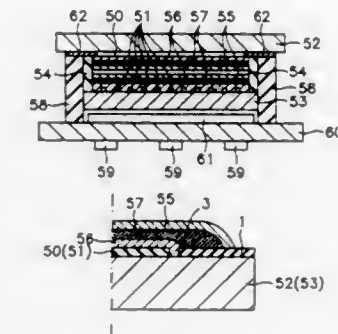
an insulating layer covering the electrodes;

an anti-electrical charge layer covering the insulating layer;

an orientation layer covering the anti-electrical charge layer;

a first earth pattern formed on the panel, wherein the first earth pattern is electrically isolated from the electrodes by the insulating layer, and wherein the first earth pattern is

in contact with the anti-electrical charge layer and the orientation layer; and



a second earth pattern connected with the first earth pattern to earth a static electricity in a liquid crystal.

5,412,496

## TRANSMITTER/RECEIVER FOR FREQUENCY-MODULATED OPTICAL SIGNALS AND OPTICAL LINK CORRESPONDING THERETO

Hisao Nakajima, Bagneux, and Radhouane Derouiche, Paris, both of France, assignors to France Telecom Etablissement Autonome de Droit Public, Paris, France

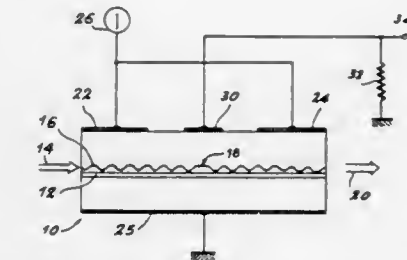
Filed Jan. 15, 1993, Ser. No. 5,056

Claims priority, application France, Jan. 24, 1992, 92 00753

Int. Cl.<sup>6</sup> H04B 10/00

U.S. Cl. 359—152

6 Claims



1. A transmitter/receiver for frequency-modulated optical signals, comprising:

a distributed feedback semiconductor structure having terminals and a stack of layers which includes an active layer and a diffraction grating optically coupled to at least a portion of said active layer, said diffraction grating having a central region which introduces an optical phase shift to received optical signals;

a center electrode formed on said distributed feedback semiconductor structure and positioned above said central region of said diffraction grating for tapping a voltage at said terminals of said distributed feedback semiconductor structure, variations of said voltage reflecting a frequency modulation of said optical signals propagating within said active layer; and

a pair of supply electrodes formed on said distributed feedback semiconductor structure positioned on either side of said central electrode and electrically insulated therefrom, each of said supply electrodes being connected to a power supply to receive current therefrom.

5,412,497

## OPTICAL COMMUNICATION DEVICE WITH OPTICAL MODULES AND OPTICAL FIBER SUPPORTING PLATES

Mitsuo Kaetsu; Noboru Nakama, and Kazuaki Kashiwada, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

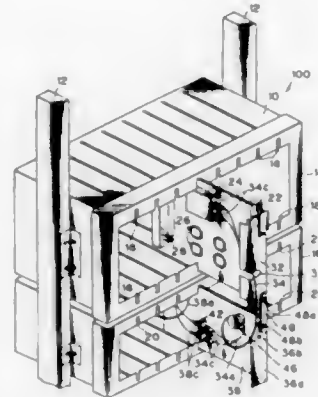
Filed Feb. 22, 1993, Ser. No. 20,406

Claims priority, application Japan, Feb. 24, 1992, 4-036289; Feb. 24, 1992, 4-036295

Int. Cl.<sup>6</sup> H04B 10/00

U.S. Cl. 359—163

12 Claims



1. An optical communication device comprising:

- a housing having a horizontal line, a first shelf having a plurality of guide rails extending parallel to each other and to the horizontal line, and a second shelf arranged in a vertically overlapping relationship with the first shelf and having a plurality of guide rails extending parallel to each other and to the horizontal line in register with the guide rails of the first shelf;
- a first set of unit plates comprising wiring circuit boards having optical modules, respectively; the unit plates being inserted in the first shelf in upright positions for drawable engagement with the respective guide rails; and
- a second set of optical fiber supporting plates inserted in the second shelf in upright positions for drawable engagement with each of the respective guide rails in a one-to-one correspondence; each of the optical fiber supporting plates having a means for supporting at least one optical fiber having a surplus length portion coiled in a freely extendable manner for connection to the optical module of each of the unit plates.

5,412,498

## MULTI-RC TIME CONSTANT RECEIVER

David M. Arstein, Scotts Valley; William L. Geller, Foster City; Thomas E. Gles, Union, and Mark S. Thomas, Sunnyvale, all of Calif., assignors to Raynet Corporation, Menlo Park, Calif.

Filed Mar. 29, 1991, Ser. No. 677,044

The portion of the term of this patent subsequent to May 4, 2010, has been disclaimed.

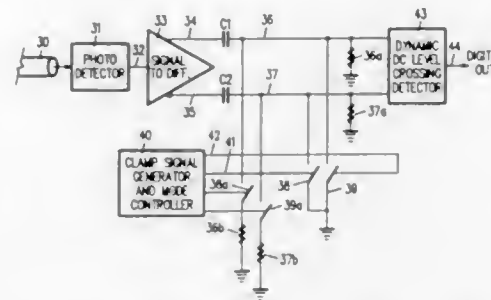
Int. Cl.<sup>6</sup> H04J 14/08

U.S. Cl. 359—189

31 Claims

1. A multi-RC time constant receiver for receiving an input signal, comprising:

means for AC coupling the input signal to a detector, the AC coupling means comprising means for generating one of a



plurality of available resistance-capacitance (RC) time constant states in dynamic response to the input signal.

5,412,499

## SPATIAL LIGHT MODULATOR USING QUANTUM WELL MATERIAL

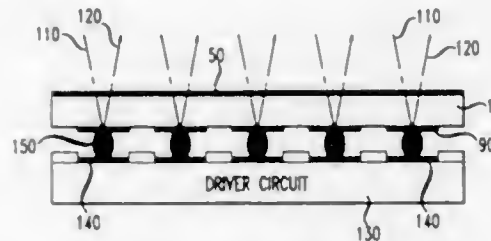
Tien-Heng Chiu, Spotswood; Alastair M. Glass, Rumson, and Afshin Partovi, Edison, all of N.J., assignors to AT&amp;T Corp., Murray Hill, N.J.

Filed Mar. 29, 1993, Ser. No. 38,405

Int. Cl.<sup>6</sup> H01L 27/14, 29/205; G02F 1/01

U.S. Cl. 359—248

13 Claims



1. An optical modulator, comprising:

- a) an integral, slab-like, optical medium that comprises a multiple quantum well structure (to be referred to as a "MQW" structure) and is subdivided into a plurality of picture elements;
- b) an array of pixel electrodes formed on a principal surface of the medium, each of said electrodes corresponding to a respective picture element; and
- c) an electronic driver circuit for applying a separately controllable voltage to each of the pixel electrodes such that the optical absorption or refractive index of the corresponding picture element is changed relative to at least one wavelength of light to be modulated, characterized in that
- d) the medium is semi-insulating;
- e) at least two of the pixel electrodes are formed on a portion of the principal surface that is continuous, planar, and uniformly doped;
- f) the array of pixel electrodes has a pitch of 100  $\mu\text{m}$  or less; and
- g) each picture element forms a semiconductor-metal junction with its respective pixel electrode.

5,412,500

## SYSTEM FOR CONTINUOUSLY ROTATING PLANE OF POLARIZED LIGHT AND APPARATUS USING THE SAME

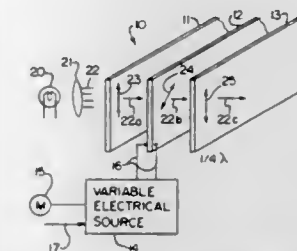
James L. Ferguson, 92 Adam Way, Atherton, Calif. 94025

Continuation of Ser. No. 879,072, May 1, 1992, abandoned, which is a continuation of Ser. No. 707,296, May 28, 1991, abandoned, which is a continuation of Ser. No. 541,095, Jun. 20, 1990, abandoned, which is a continuation of Ser. No. 230,789, Aug. 10, 1988, abandoned. This application Jan. 19, 1993, Ser. No. 6,675

Int. Cl.<sup>6</sup> G02F 1/03

U.S. Cl. 359—253

14 Claims



1. Apparatus for continuously rotating polarization of polarized light, comprising:

- input means for furnishing linearly polarized input light which has a plane of polarization in substantially only one direction,
- variable retarder means for retarding the phase of one quadrature component of such linearly polarized input light an amount relative to the phase of the other quadrature component, said variable retarder means comprising a liquid crystal cell operative to respond to a continuously varying electric field thereby continuously to vary the amount of relative retardation, said variable retarder means having an optical axis, and
- analyzing means for converting such quadrature components to linearly polarized light having a plane of polarization that is dependent on the amount of such phase retardation, said analyzing means comprising a quarter wave plate, said quarter wave plate being tunable to provide quarter wave function with respect to the wavelength of light incident thereon, said quarter wave plate having an optical axis, and said optical axis of said quarter wave plate being oriented substantially in parallel with the direction of polarization of said linearly polarized light and at substantially 45 degrees relative to the optical axis of said variable retarder means.

5,412,501

## SYSTEM FOR CONTROLLING SPOT POWER IN A RASTER OUTPUT SCANNER

Tibor Fisl, Los Altos Hills, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 17, 1993, Ser. No. 153,693

Int. Cl.<sup>6</sup> G02F 1/11

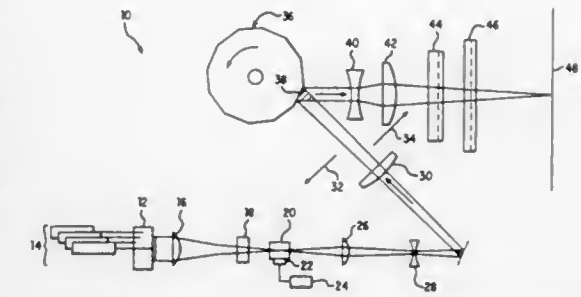
U.S. Cl. 359—286

8 Claims

1. A scanning system that provides spot power of a desired value, said system comprising:

- an input light source for emitting a light beam;
- an acousto-optic cell having an input and output side through which said light beam from said source propagates;
- a transducer coupled to said acousto-optic cell, said transducer generating an acoustic wave that propagates through said cell, said acoustic wave interacting with said light beam such that said light beam is diffracted through a varying angle and with varying efficiency determined according to the frequency of said acoustic wave; and
- a driver providing energy to said light source, the power of said light beam being responsive to the amount of said energy provided by said driver, wherein the amount of

energy provided to said light source is varied according to the varying efficiency of said acousto-optic cell to pro-



duce a beam on the output side of said acousto-optic cell of said desired value.

5,412,502

## SECOND HARMONIC GENERATING ELEMENT AND THE PRODUCTION METHOD THEREOF

Satoshi Makio, Kumagaya; Fumio Nitanda, Fukaya; Yasuhiro Furukawa, Fukaya; Kohei Ito, Fukaya; Masazumi Sato, Fukaya; Kazutami Kawamoto, Kanagawa, and Kenchi Ito, Kokubunji, all of Japan, assignors to Hitachi Metals, Ltd. and Hitachi Ltd., both of Tokyo, Japan

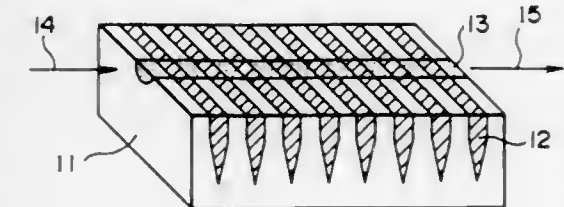
Filed Jan. 25, 1993, Ser. No. 8,310

Claims priority, application Japan, Jan. 24, 1992, 4-34372; Feb. 28, 1992, 4-078480; Feb. 28, 1992, 4-078481; Feb. 28, 1992, 4-078482; Feb. 28, 1992, 4-078483; May 8, 1992, 4-115749; Jun. 2, 1992, 4-167021; Jun. 18, 1992, 4-184473

Int. Cl.<sup>6</sup> G02F 1/37

U.S. Cl. 359—332

17 Claims



1. A second harmonic generating element comprising:

- a substrate;
- sprout areas of polarization inversion periodically formed on said substrate; and
- polarization inverted grids with top ends extending from said sprout areas of polarization inversion, wherein a depth/width ratio of said polarization inverted grids formed of said sprout areas of polarization inversion and said polarization inverted areas exceeds 1.

5,412,503

## SPECIMEN HOLDER FOR A PARTICLE BEAM OPTICAL APPARATUS

Frank Nederlof, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 23, 1993, Ser. No. 110,597

Claims priority, application European Pat. Off., Aug. 27, 1992, 92202609

Int. Cl.<sup>6</sup> G02B 21/26; G21K 5/10

U.S. Cl. 359—393

3 Claims

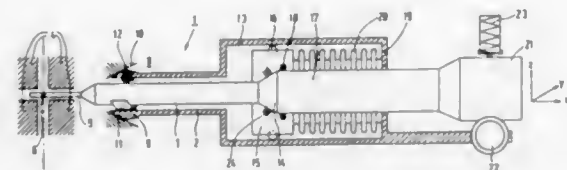
1. A specimen holder for supporting and positioning a specimen in a beam path of a particle beam apparatus, comprising: a housing which is movable relative to the beam path in both



a first and a second mutually perpendicular direction, a first end of said housing facing the beam path and a second end thereof facing away from the beam path;

a rod-shaped support for said specimen extending within said housing in a third direction perpendicular to said first and second directions and which is movable in said third direction;

said specimen support having (i) a first end portion which extends into the beam path, (ii) a first intermediate portion adjoining the first end portion and which extends through the first end of said housing and is supported in a V-groove therein, (iii) a second intermediate portion which extends through the second end of said housing, and (iv) a conical transition portion between said first and second intermediate portions;



a cylindrical member which is internally flanged to engage said conical transition portion of said specimen support, and which is supported within said housing so as to be movable therein in said third direction; and

an airtight bellows within said housing, one end thereof being affixed to said cylindrical member and an opposite end thereof being affixed to the second end of said housing, said bellows enveloping the second intermediate portion of said specimen support between said cylindrical member and the second end of said housing;

whereby movement of said cylindrical member in said third direction causes movement of said specimen support in such direction, without affecting airtight sealing provided by said bellows between said housing and the second intermediate portion of said specimen support.

5,412,504

## OPTICAL SYSTEM FOR AN ENDOSCOPE

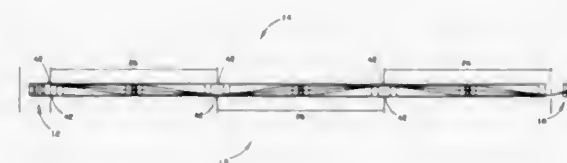
Dennis C. Leiner, Dublin, N.H., and William G. Peck, Rochester, N.Y., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Oct. 5, 1993, Ser. No. 132,007

Int. Cl.<sup>6</sup> G02B 23/00

U.S. Cl. 359—434

14 Claims



1. An optical system for an endoscope, which comprises: objective lens means for producing an image of an object at a first image plane;

relay lens means comprising at least one relay lens module for relaying an image between successive image planes; and

eye lens means for viewing an image formed at an exit image plane;

wherein said at least one relay lens module is characterized by the following data:

SUR-FACE	RADIUS	THICK-NESS	MEDIUM	IN-DEX	ABBE NO.
A	Image Plane	3.0	Air	1.000	
B	13.688	3.0 ± .03	Acrylic	1.492	57.4
C	Plano	44.0 ± .10	F2	1.620	36.4
D	Plano	3.0 ± .03	Acrylic	1.492	57.4
E	-10.653	1.0 ± .03	Polystyrene	1.590	30.9
F	-15.828	1.0 ± .03	Air	1.000	
G	15.828	1.0 ± .03	Polystyrene	1.590	30.9
H	10.653	3.0 ± .03	Acrylic	1.492	57.4
I	Plano	44.0 ± .10	F2	1.620	36.4
J	Plano	3.0 ± .03	Acrylic	1.492	57.4
K	13.688	3.0	Air	1.000	
L	Image Plane				

\*dimensions are in millimeters

5,412,505

## LIGHT POLARIZING SPECTACLE LENS

Raoul F. van Ligten, 5420 Northwest, 86 Terrace, Coral Springs, Fla. 33067, and Mark G. Asmus, Lauderhill, Fla., assignors to Raoul F. van Ligten, Coral Springs, Fla.

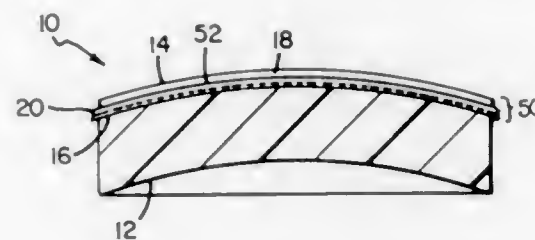
Division of Ser. No. 839,146, Feb. 20, 1992, Pat. No. 5,286,419.

This application Nov. 24, 1993, Ser. No. 157,608

Int. Cl.<sup>6</sup> G02B 5/30; G02C 7/12

U.S. Cl. 359—483

9 Claims



1. A light polarizing spectacle lens comprising:

a lens body comprising an allyl diglycol carbonate material and having a front lens body and a rear lens body with each respective lens body having a front convex surface and a rear concave surface; and

a polarizing film wafer embedded within the lens body and having a front convex surface and a rear concave surface, the front convex surface of the film wafer being in contact with the rear concave surface of the front lens body and the rear concave surface of the film wafer being in contact with the front convex surface of the rear lens body,

wherein the spectacle lens has a minimum uniform thickness of approximately 2 millimeters over the entire cross section of the spectacle lens with a distance between the front convex surface of the front lens body and the front convex surface of the film wafer being approximately 0.20 to 0.30 millimeters and a distance between the front convex surface of the front lens body and the rear concave surface of the film wafer being approximately 1.45 to 1.70 millimeters.

# 5,412,506 FREE-SPACE OPTICAL INTERCONNECTION ARRANGEMENT

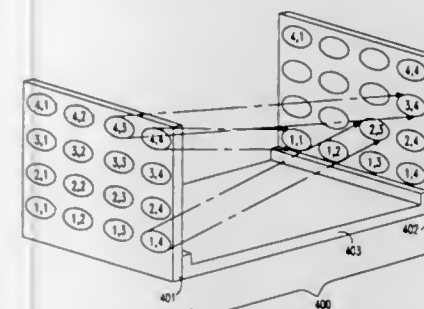
Avi Y. Feldblum, Highland Park; Jurgen Jahns, Shrewsbury; Casimir R. Nijander, Lawrenceville; Frank Sauer, Clarksburg, and Wesley P. Townsend, Princeton, all of N.J., assignors to AT&T Corp., Murray Hill, N.J.

Filed Mar. 9, 1992, Ser. No. 848,456

Int. Cl.<sup>6</sup> G02B 6/32, 6/34, 5/18; G02F 1/03

U.S. Cl. 359—569

23 Claims



1. A single substrate monolithic optical structure comprising a plurality of optical microlenses formed on surfaces of said monolithic structure, at least one microlens including refractive means located on a first surface of said structure for substantially collimating light rays impinging on said first surface of said structure and diffractive means located on a second surface of said structure for deflecting said substantially collimated light rays at a predetermined angle to said second surface.

5,412,507

## GREAT APERTURE ZOOM LENS

Haruo Sato, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan

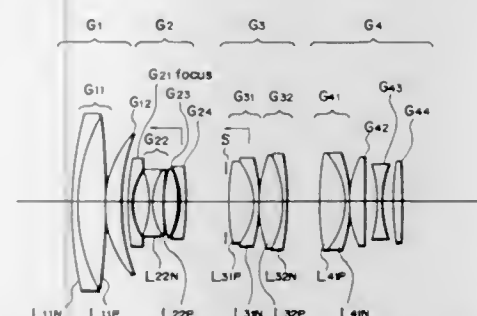
Continuation of Ser. No. 73,710, Jun. 9, 1993, abandoned. This application Jul. 19, 1994, Ser. No. 277,946

Claims priority, application Japan, Jun. 17, 1992, 4-158055

Int. Cl.<sup>6</sup> G02B 15/00

U.S. Cl. 359—687

25 Claims



1. A great aperture zoom lens including, in succession from the object side, a first lens unit having positive refractive power, a second lens unit having a negative first lens component, a negative second lens component, a positive third lens component and a negative fourth lens component and having negative refractive power as a whole, a third lens unit having positive refractive power, and a fourth lens unit having positive refractive power, and wherein during the magnification change from the wide angle end to the telephoto end, said second lens unit having negative refractive power is moved toward the image side and said first lens unit, said third lens unit and said fourth lens unit each having positive refractive power are moved toward the object side, said zoom lens being designed to satisfy the following conditions:

$$-3 \leq f_{G2} \cdot h_{G2R} / f_T \leq -1.5$$

$$6 \leq f_{G3} \cdot h_{G3R} / f_T \leq 14$$

$$6 \leq f_{G4} \cdot h_{G4F} / f_T \leq 16,$$

where

 $f_{G2}$ : the focal length of the second lens unit; $f_{G3}$ : the focal length of the third lens unit; $f_{G4}$ : the focal length of the fourth lens unit;

$h_{G2R}$ : the height of rays at the telephoto end from a position at which Rand rays, being rays determining the F number and being rays from the on-axis infinity object point, pass through the outermost margin of a lens surface of the second lens unit which is most adjacent to the image side, to the optical axis;

$h_{G3R}$ : the height of rays at the telephoto end from a position at which Rand rays, being rays determining the F number and being rays from the on-axis infinity object point, pass through the outermost margin of a lens surface of the third lens unit which is most adjacent to the image side, to the optical axis;

$h_{G4F}$ : the height of rays at the telephoto end from a position at which Rand rays, being rays determining the F number and being rays from the on-axis infinity object point, pass through the outermost margin of a lens surface of the fourth lens unit which is most adjacent to the object side, to the optical axis;

$f_T$ : the focal length of the whole system at the telephoto end.

5,412,508

## COMPACT ZOOM LENS SYSTEM

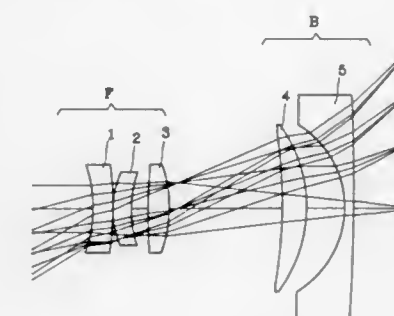
Chieh-Yu Lin, Chung-Ho City, Taiwan, Prov. of China, assignor to Industrial Technology Research Institute, Chutung, Taiwan, Prov. of China

Filed Jul. 13, 1993, Ser. No. 90,509

Int. Cl.<sup>6</sup> G02B 15/14, 13/18

U.S. Cl. 359—692

9 Claims



1. A zoom lens system consisting of:

a front lens group with positive refracting power and a rear lens group with negative refracting power, counting from the object side of the lens system; and

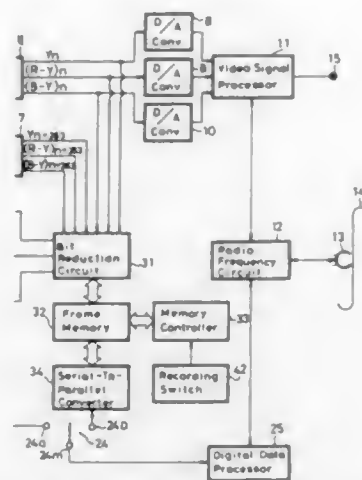
airspace between said front and rear lens groups being made variable to effect zooming;

wherein said front lens group consisting of in order from the object side, a negative lens element and two positive lens elements arranged at the image side of said negative lens element, and the rear lens group consisting of a positive lens element and a negative lens element.

1. A video signal recording apparatus, comprising: means for providing still image data representing a respective high resolution still image; memory means for storing said still image data for at least two said high resolution still images and which are sequentially derived from said means for providing still image data at arbitrary times; memory control means for con-



trolling read out of said stored still image data from said memory means; and means for sequentially digitally recording on a



record medium the still image data read out from said memory means for said at least two high resolution still images.

5,412,515

# APPARATUS FOR RECORDING AND/OR REPRODUCING AN ELECTRIC SIGNAL ON/FROM A MAGNETIC RECORD CARRIER

Albert M. A. Rijckaert, and Joannes A. E. Van Der Kop, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

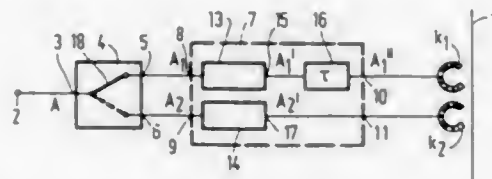
Filed May 1, 1989, Ser. No. 345,396

Claims priority, application Netherlands, Jun. 14, 1988, 8801513

Int. Cl.<sup>6</sup> G11B 5/09, 15/14

U.S. Cl. 360—48

8 Claims



1. An apparatus for recording an electric signal on a magnetic record carrier in tracks which are inclined relative to the longitudinal direction of said record carrier, comprising:

- an input terminal for receiving the electric signal;
- a signal separator, having an input coupled to the input terminal, for dividing the electric signal into consecutive blocks having a specific length of time, and for applying the consecutive blocks to a first and a second output in such a way that blocks having odd sequence numbers are applied to the first output and blocks having even sequence numbers are applied to the second output;
- a time-base correction circuit having a first and a second input coupled, respectively, to the first and second outputs of said signal separator, said time-base correction circuit providing time compression or time expansion of the consecutive blocks, delaying blocks having odd sequence numbers relative to those having even sequence numbers, and supplying the two signals thus processed to a first and a second output, respectively; and
- at least one pair of write heads having different azimuth angles and arranged on a rotatable head drum, one write head of a pair being arranged to be coupled to the first output of the time-base correction circuit and the other write head of the same pair being arranged to be coupled to the second output of the time-base correction circuit; characterized in that the write heads of one pair of write heads

are arranged close to each other and have a mechanically rigid coupling to each other, and the time-base correction circuit provides a time expansion or time compression of the signal blocks by a factor of  $\alpha \cdot n / (180 \cdot (M + 1))$ , where  $\alpha$  is the wrapping angle of the record carrier around the head drum and differs from  $180^\circ$ ,  $n$  is the number of head pairs, and  $M$  is the number of times within a specific time interval that a head pair which comes in contact with the record carrier during said time interval does not record a signal on the record carrier, said time interval being defined by those instants at which two consecutive track pairs are recorded by one or two head pairs.

5,412,516

# DATA STORAGE SYSTEM WITH A DUAL-GAP HEAD USING A DUAL-MODE FLEXIBLE DISK CONTROLLER

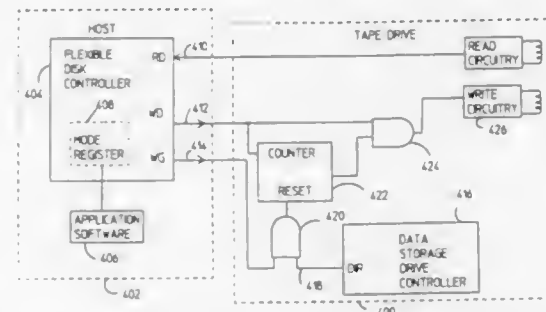
Ronald R. Kennedy, and Daniel J. Curran, both of Fort Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 23,257, Feb. 25, 1993, abandoned. This application Nov. 12, 1993, Ser. No. 151,598

Int. Cl.<sup>6</sup> G11B 15/12

U.S. Cl. 360—62

8 Claims



1. A data storage system comprising:
  - a magnetic head having a first gap adapted for writing data and a second gap adapted for reading data;
  - a controller, connected to the magnetic head, having a first mode for a first density and a second mode for a second density; and
  - wherein the controller uses the first mode to write data to a magnetic medium using the first gap and uses the second mode to read the data that was written in the first mode from the magnetic medium using the second gap.

5,412,517

# MAGNETIC TAPE RECORDING/PLAYBACK DEVICE WITH PLAYBACK MONITORING

Motoyoshi Fujimori, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan

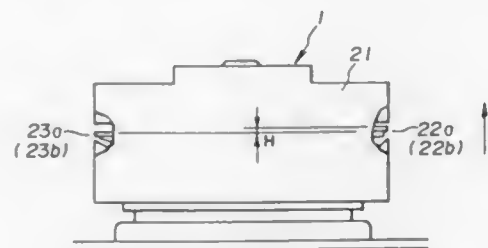
Filed Nov. 4, 1993, Ser. No. 145,562

Claims priority, application Japan, Nov. 11, 1992, 4-324637

Int. Cl.<sup>6</sup> G11B 15/14

U.S. Cl. 360—64

5 Claims



3. A recording/playback device for a magnetic tape, comprising:

a rotary drum having an axis of rotation and about which a magnetic tape is wrapped obliquely for a certain angular extent;

first and second recording heads arranged within said rotary drum at an angular distance of substantially  $180^\circ$  from each other for recording data in slanted tracks on said magnetic tape;

first and second playback heads arranged within said rotary drum at an angular distance of substantially  $180^\circ$  from each other for reproducing the data recorded on said magnetic tape;

said first and second recording heads and said first and second playback heads being arranged within said rotary drum so that a straight line interconnecting said first and second recording heads and another straight line interconnecting said first and second playback heads are normal to each other;

said first and second recording heads being mounted on said rotary drum as to be spaced above said first and second playback heads relative to said axis of rotation by a predetermined level difference  $H$  related to a track pitch of a recording format for a particular magnetic tape;

a signal processing circuit for recognizing readout timing of playback data sequentially reproduced by said first and second playback heads for monitoring the data recorded by the recording heads;

wherein said level difference  $H$  is given by

$$H = n \times tp + hw/2$$

where  $hw$  is the width of each of said first and second playback heads and a ratio of a track pitch  $tp$  of said particular magnetic tape to a track pitch  $tp'$  of another magnetic tape is an even number to even number ratio or an odd number to odd number ratio, and an even number or an odd number for said particular magnetic tape being a readout timing  $n$ , and wherein said processing circuit recognizes the readout timing of the playback data supplied from each of said first and second playback heads determined by said even number to even number ratio or said odd number to odd number ratio as the monitoring data for the magnetic tape; and

memory means for storing data recorded by each of the recording heads,

the data recorded by each of said recording heads being compared to the monitoring data read from each of said playback heads in association with the recorded data for finding an error rate.

5,412,518

# INDIVIDUAL MR TRANSDUCER HEAD/DISK/CHANNEL ADAPTIVE BIAS CURRENT SYSTEM

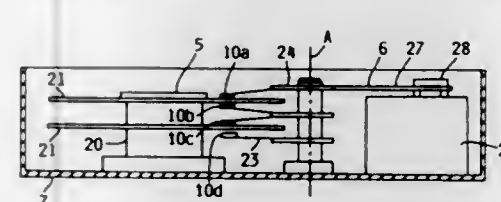
Jodie A. Christner, Earl A. Cunningham, Gregory J. Kerwin, and Joe M. Poss, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1993, Ser. No. 168,630

Int. Cl.<sup>6</sup> G11B 5/09

U.S. Cl. 360—66

13 Claims



1. In a magnetic data storage device having data recorded in tracks on a media surface and including at least one magnetoresistive (MR) transducer read heads, the method of adaptively controlling the read head bias current comprising

determining an optimized bias current value for each MR head;

storing said optimized bias current values;

supplying the active MR head with a bias current in accordance with the stored value;

periodically redetermining said optimized bias current value for each MR head; and

revising the stored bias current values to correspond with the redetermined optimized bias current values.

5,412,519

# OPTIMIZATION OF DISK DRIVE SPINDLE SPEED DURING LOW POWER MODE

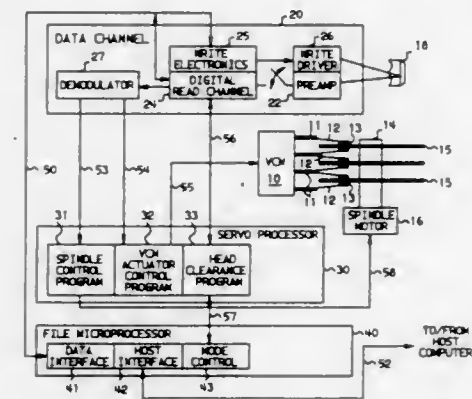
Donald C. Buettner, Wayne J. Rothschild, and Gordon J. Smith, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 26, 1993, Ser. No. 112,407

Int. Cl.<sup>6</sup> G11B 15/46

U.S. Cl. 360—73.03

22 Claims



1. In a disk storage device including at least one disk and a plurality of transducer heads mounted for writing data on and reading data from the surface of the disk when the disk is rotated at an operational rotational velocity causing the transducer heads to fly above the surface of the disk separated therefrom by a film of fluid and wherein said transducer heads rest on the confronting disk surface when the disk is not rotated, an energy saving reduced speed operating mode comprising

means for identifying which one of said plurality of transducer heads has the highest transition speed at which it flies above the confronting disk surface with a predetermined minimum clearance therebetween;

means for measuring the clearance between said one transducer head and said confronting disk surface; and

a feedback control system effective to control the disk rotational velocity to maintain at least said highest transition speed during said energy saving reduced speed operating mode.

5,412,520

# TRACKING CONTROL WHICH AVOIDS LOCK-UP FOR ROTARY HEAD REPRODUCING APPARATUS AND WHICH SENSES WHETHER A TRACKING CONTROL SIGNAL IS ABSENT FOR A PREDETERMINED TIME

Isao Saito, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 29,583, Mar. 11, 1993. This application Oct. 6, 1993, Ser. No. 132,358

Claims priority, application Japan, Oct. 6, 1992, 4-267559

Int. Cl.<sup>6</sup> G11B 5/58, 5/584, 15/14, 15/46

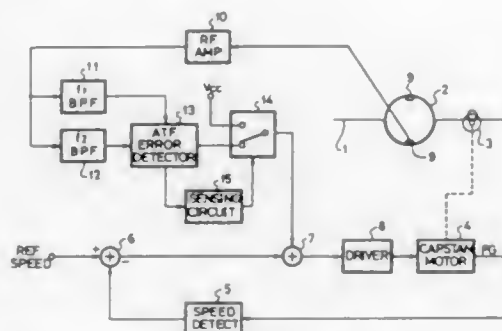
U.S. Cl. 360—77.15

16 Claims

1. Rotary head reproducing apparatus having at least first and second rotary heads for scanning successive tracks on a record medium movable at a controllable speed, which tracks contain a pattern of tracking control signals recorded therein

and used for determining tracking errors to obtain tracking control of said heads with respect to said tracks, said apparatus comprising:

- servo control means responsive to said tracking control signals for carrying out a tracking control operation;
- tracking control signal detecting means for detecting at least one tracking control signal reproduced from a track by a rotary head;



sense means for sensing if said at least one tracking control signal is not detected for a predetermined time interval; and  
speed changing means responsive to said sense means for changing the speed of said record medium to a predetermined speed to cause tracking errors when said at least one tracking control signal is not detected for said predetermined time interval.

5,412,521

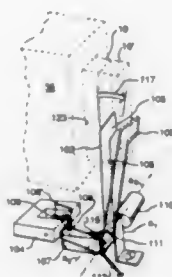
# GATE MECHANISM FOR A DATA CARTRIDGE LIBRARY SYSTEM

Warren L. Dalziel, Monte Sereno, Calif., assignor to Applied Kinetics Corporation, Monte Sereno, Calif.  
Continuation-in-part of Ser. No. 210,790, Mar. 18, 1994. This application Apr. 5, 1994, Ser. No. 223,205

Int. Cl.<sup>6</sup> G11B 15/68

U.S. Cl. 360-92

9 Claims



1. A gate mechanism for use in association with a drive unit used to record/play back information contained in a cartridge insertable therein, comprising:

- pivot means;
- spring means;
- actuator means;
- optical switch means having an interruptable light path and operative to generate an electrical signal when said light path is interrupted; and
- means forming an elongated upstanding lever arm having a flag arm extending therefrom, said lever arm being pivotally attached to said pivot means and rotatable about orthogonal first and second axes passing through said pivot means, said lever arm being normally held in a first position by said spring means, said lever arm being rotatable about said first axis by said actuator means to a second position in which said flag arm is caused to interrupt said light path, said lever arm being engageable by a cartridge ejected from the drive unit and rotatable about said sec-

ond axis to a third position in which said flag arm is caused to interrupt said light path.

5,412,522

# PORTABLE LOW PROFILE INFORMATION STORAGE SYSTEM

Wayne C. Lockhart, 561 Torwood La., Los Altos, Calif. 94022, and Ted T.-M. Lin, 12307 Crayside La., Saratoga, Calif. 95070

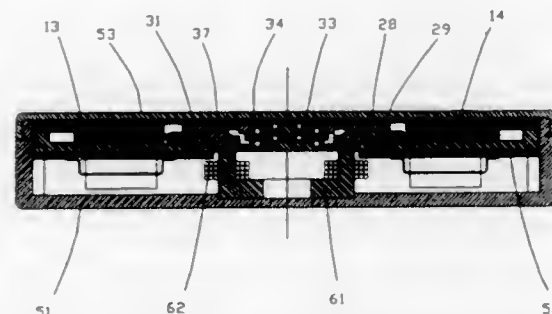
Continuation of Ser. No. 993,120, Dec. 18, 1992, abandoned.

This application Aug. 23, 1994, Ser. No. 294,607

Int. Cl.<sup>6</sup> G11B 5/012, 17/04

U.S. Cl. 360-97.01

16 Claims



1. A low profile information storage system comprising:

A. a cartridge including:

- (1) a housing having a base and cover;
- (2) an information storage disk mounted in said housing;
- (3) a rotor rotatably mounted on the base within said housing;
- (4) means for mounting said disk on said rotor;
- (5) means for mounting a plurality of permanent magnet pole pieces having radially extending poles on said rotor in a ring configuration;
- (6) low reluctance L-shaped stator poles mounted on the base of said housing, said stator poles having a portion which extends axially with respect to said rotor and a portion which extends radially outwardly from the axis of the rotor with their ends in radial cooperative magnetic relationship with said radially extending magnet poles;
- (7) transducers in said housing for communicating information to and from said disk; and
- (8) means for positioning the transducers to cooperate with selected locations of said disk; and

B. a cartridge receiving assembly including:

- (1) means for removably receiving and positioning said cartridge;
- (2) a stator in said assembly providing rotating magnetic fields which are magnetically coupled to the axially extending portion of said cartridge stator poles when the cartridge is positioned in said cartridge receiving assembly to couple the rotating magnetic fields to the rotor permanent magnetic poles and thereby rotate the rotor and mounted disk.

5,412,523

# HOLDING AND ADJUSTING APPARATUS FOR A ROTATING MAGNETIC HEAD ARRANGEMENT

Manfred Hesch, Weiterstadt, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

PCT No. PCT/DE88/00045, § 371 Date Oct. 6, 1988, § 102(e)

Date Oct. 6, 1988, PCT Pub. No. WO88/06333, PCT Pub.

Date Aug. 25, 1988

PCT Filed Feb. 2, 1988, Ser. No. 276,318

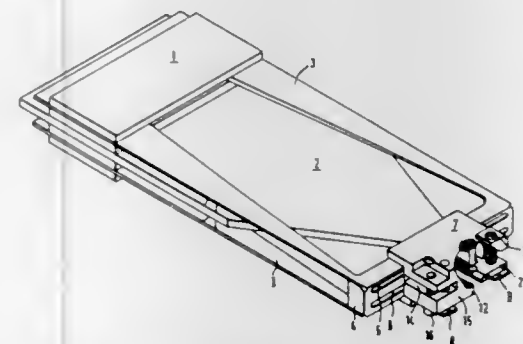
Claims priority, application Germany, Feb. 10, 1987, 37 03

988.1

Int. Cl.<sup>6</sup> G11B 5/56, 21/24

U.S. Cl. 360-109

4 Claims



1. A holding and adjusting apparatus for a rotating magnetic head arrangement having tracking means for supporting a head carrier at a free end of said tracking means, the head carrier comprising two carrying parts (12, 13) for supporting first and second magnetic heads (8, 9), respectively, one of the carrying parts (12) having a slot (14) extending parallel to a tracking direction of the first magnetic head (8), the carrying part (12) including a first screw (16) for adjusting the width of the slot (14) to change an azimuth angle of the first magnetic head (8), the other of said carrying parts (13) having a central cut-out portion (17) and two side bars (19, 20) defined thereby, and further comprising a cover plate (21) and a first pressure screw (22) extending in said cover plate (21) for deforming said side bars (19, 20) in an S-shaped manner to adjust a distance between the two magnetic heads (8, 9).

5,412,524

# MAGNETO-RESISTIVE HEAD

Yuji Nagata, Yao; Satoru Mitani, Hirakata, and Kazuo Nakamura, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

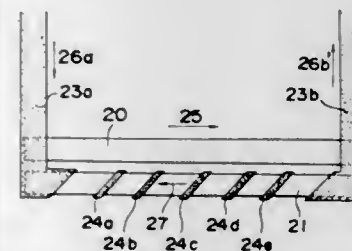
Filed Dec. 3, 1992, Ser. No. 985,219

Claims priority, application Japan, Dec. 5, 1991, 3-321640

Int. Cl.<sup>6</sup> G11B 5/127; G01R 33/02

U.S. Cl. 360-113

2 Claims



1. A magneto-resistive head comprising: a base plate; a substantially rectangular magneto-resistive element extending longitudinally along a surface of the base plate; terminal electrodes having first ends connected to said magneto-resistive element and second ends remote from said magneto-resistive element; a plurality of electrodes disposed over said magneto-resistive element and extending longitudinally in a direction that is oblique to the lengthwise direction of said substantially

rectangular magneto-resistive element; and a film of a hard magnetic material applying a magnetic field in the longitudinal direction of the magneto-resistive element, said film of a hard magnetic material being disposed along said surface of the base plate and spaced from said magneto-resistive element toward the second ends of said terminal electrodes.

5,412,525

# TAPE CASSETTE HAVING A ROCKABLE FINGER FOR LATCHING A SLIDABLE SHUTTER

Shuichi Ota, Kanagawa; Akihiro Uetake, Tokyo; Takashi Sawada, Kanagawa, and Kazuyoshi Suzuki, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

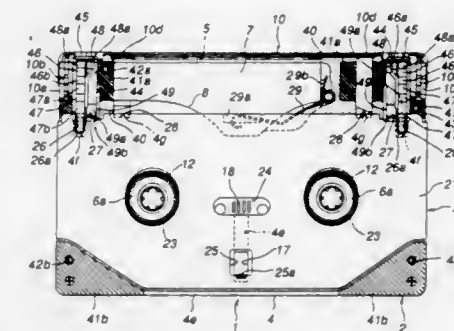
Filed Jun. 3, 1993, Ser. No. 79,255

Claims priority, application Japan, Jun. 19, 1992, 4-160523; Nov. 17, 1992, 4-305778

Int. Cl.<sup>6</sup> G11B 23/087

U.S. Cl. 360-132

4 Claims



1. A tape cassette, comprising:

- a substantially rectangular box-shaped casing including top and bottom walls, peripheral walls extending between said top and bottom walls at the back and sides of the casing and a partition defining a recess located in a front portion of said casing and which has openings facing forwardly and downwardly from the recess;
- a lid pivotally mounted on said casing for movements between a closed position extending across said opening facing forwardly from the recess and a raised opened position uncovering the forwardly facing opening;
- a pair of reels rotatable within said casing;
- a tape wound about said reels and extending therebetween in a path including a run extending across said forwardly facing opening so as to be disposed in back of said lid in said closed position of the latter;
- a shutter extending across an undersurface of said bottom wall and being slidably movable relative to the latter between a closed position in which said shutter closes said opening facing downwardly from said recess and an opened position uncovering said opening facing downwardly from the recess;
- retaining means for holding said shutter in each of said opened and closed positions including upstanding abutments at a front edge of said shutter and latching fingers integral with said bottom wall and extending generally parallel to a direction in which said shutter is slidably movable, said latching fingers having stop surfaces facing forwardly and rearwardly, respectively, for selective engagement with said abutments on the shutter so as to hold the shutter in said closed position or said opened position, respectively, said latching fingers being resiliently rockable in opposite directions relative to said bottom wall for selectively freeing said forwardly and rearwardly facing stop surfaces from said abutments on the shutter, each of said latching fingers including first and second elongated elements extending side-by-side and joined to each other at one end, the other end of said first element being joined to said bottom wall and the other end of said second element projecting beyond said other end



of said first element and terminating in a laterally offset portion, and said stop surfaces being respectively situated on said laterally offset portion at said other end of the second element and on said one end of said first element; and

means integral with said latching fingers for rocking the latter in said opposite directions upon insertion and removal of the cassette into and from a holder therefor so that the shutter is freed to be moved to said opened position upon insertion of the cassette in said holder and the shutter is freed to be returned to said closed position upon removal of the cassette from said holder, said means for rocking the latching fingers in opposite directions including cam formations on said second element of each of the latching fingers.

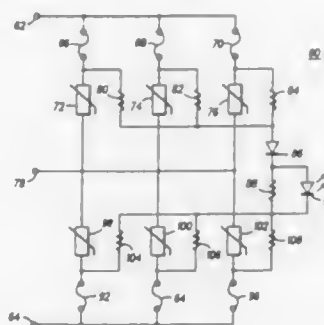
#### 5,412,526 SURGE ARRESTER CIRCUIT AND HOUSING THEREFOR

Wilhelm H. Kapp, Goleta; Derek J. Foster, Santa Barbara, and Wayne R. Derosssett, Goleta, all of Calif., assignors to Square D Company, Palatine, Ill.

Filed Feb. 10, 1993, Ser. No. 15,764  
Int. Cl.<sup>6</sup> H02H 3/20, 9/06

U.S. Cl. 361—56

28 Claims



10. A circuit for limiting voltage surges across a service line in a multiphase load center, panelboard or the like, the circuit comprising:

- at least two high potential terminals being adapted for connecting to at least two corresponding high potential lines;
- a low potential terminal being adapted for connecting to a low potential means;
- a first plurality of varistors connecting in parallel to one another between the first high potential terminal and the low potential terminal;
- a first plurality of fuses having a number of fuses equal to the number of varistors in the first plurality of varistors, each fuse connecting in series to a different varistor of the first plurality of varistors to form a one to one correspondence, each fuse opening the circuit therethrough upon failure of the varistor connecting in series therewith;
- a second plurality of varistors connecting in parallel to one another between the second high potential terminal and the low potential terminal;
- a second plurality of fuses having a number of fuses equal to the number of varistors in the second plurality of varistors, each fuse of the second plurality of fuses connecting in series to a different varistor of the second plurality of varistors to form a one to one correspondence, each fuse opening the circuit therethrough upon failure of the varistor connecting in series therewith; and
- means for monitoring the status condition of the fuses, the monitoring means electrically connecting to the fuses.

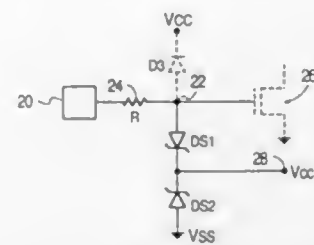
#### 5,412,527 ELECTROSTATIC DISCHARGE PROTECTION CIRCUIT

John D. Husher, Los Altos, Calif., assignor to Micrel, Incorporated, San Jose, Calif.

Filed Jun. 2, 1993, Ser. No. 71,149  
Int. Cl.<sup>6</sup> H02H 9/04

U.S. Cl. 361—56

6 Claims



1. A circuit formed in a semiconductor substrate for protecting against electrostatic discharge comprising:
  - a resistive element having a first terminal and second terminal, said first terminal being connected to an input pad of an integrated circuit;
  - a first Schottky diode having an anode and a cathode, said cathode for being connected to a supply voltage, said anode for being connected to said second terminal of said resistive element; and
  - a second Schottky diode having an anode and a cathode, said cathode of said second Schottky diode being connected to said cathode of said first Schottky diode, said anode of said second Schottky diode for being connected to a reference voltage.

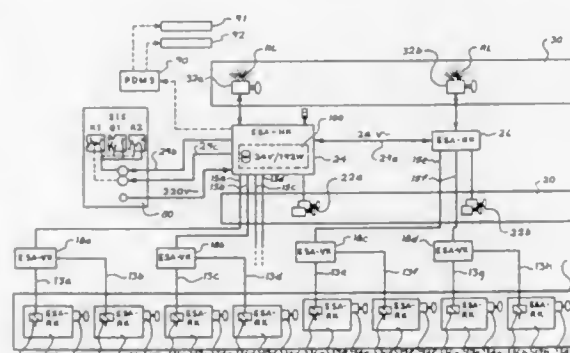
#### 5,412,528 SAFETY DISCONNECT SYSTEM

Carl C. Mäder, Hinwil; Giorgio Bovenzi, Jona, and Robert Emmenegger, Lucerne, all of Switzerland, assignors to Ferag AG, Hinwil, Switzerland

Filed May 21, 1993, Ser. No. 65,596  
Claims priority, application Switzerland, May 22, 1992, 01 660/92; Jul. 15, 1992, 02 257/92  
Int. Cl.<sup>6</sup> H02J 13/00

U.S. Cl. 361—62

17 Claims



1. A safety disconnect system for an installation having a plurality of machines which are designed to interact, the safety disconnect system comprising:
  - a machine disconnect level including a dedicated disconnect circuit allocated to each machine;
  - an area disconnect level, which is superior to the machine disconnect level, in which areas which comprise machines or groups of associated machines can be disconnected;
  - each disconnect circuit having at least one electrically operable switching element, the electrically operable switching elements being connected via safety circuits to a main

box for central control of the safety disconnect system and through the main box to a power supply; operable tripping elements at the area disconnect level being allocated to the safety circuits; the main box having a mechanical switching matrix by means of which the safety circuits can be optionally linked to one another such that predetermined areas or groups of machines can be disconnected by operating one of the tripping elements at the area disconnect level.

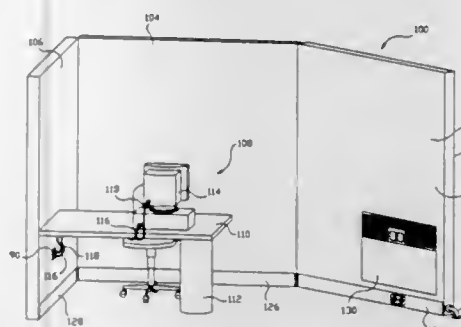
#### 5,412,529 MODULAR WALL PANEL ASSEMBLY COMPRISING POWER SURGE PROTECTOR AND/OR UNINTERRUPTABLE POWER SUPPLY COMPONENTS, AND CONNECTOR ADAPTER UNIT THEREFOR

Winston W. Eaton; Thomas H. Patchel; James T. Asaki, all of Raleigh, N.C., and Donald L. Bentley, Franklinville, N.Y., assignors to Network Power Systems, Inc., Raleigh, N.C.

Filed Jul. 2, 1992, Ser. No. 907,839  
Int. Cl.<sup>6</sup> H02H 3/20

U.S. Cl. 361—90

16 Claims



15. A modular wall panel assembly comprising a space-dividing modular wall panel member having a concealed pre-wired electrical system associated therewith comprising a multiwire powerway defining a multiplicity of power circuits, and including means for connecting the powerway to an external power supply means and means for connecting the powerway to output circuit(s) or device(s) disposed exteriorly of the wall panel member, with the powerway coupled to at least one power protection means interiorly disposed in the wall panel member and providing power protection to at least one power circuit thereof, wherein the at least one power protection means comprises (i) power surge protector (PSP) means, and (ii) uninterruptible power supply (UPS) means, in a multiloop power protection circuit coupled to at least one power circuit of the modular wall panel assembly, wherein the power protection circuit comprises a power surge suppressor unit, a rectifier unit, and an inverter unit, respectively, connected by a main power protection circuit line in series relationship with one another between the power circuit(s) and the output circuit(s) or device(s) connection means, with a first branch loop of the power protection circuit being joined at a first end thereof to the main power protection circuit line between the surge suppressor unit and the rectifier unit, and containing a battery charger in series relationship with a battery chargeable thereby, the first branch loop at a second end thereof being joined to the inverter unit, so that the battery is coupled to the inverter unit, and a second branch loop of the power protection circuit being joined at a first end thereof to the main power protection circuit line between the surge suppressor unit and the rectifier unit, and being joined at a second end thereof to a bypass switch selectively coupleable to the main power protection circuit line between the inverter unit and the output circuit(s) or device(s) connection means, to thereby bypass the rectifier unit and the inverter unit, wherein the power protection circuit is constructed and arranged to direct (i) a portion of the power entering the main power protection circuit line into the first branch loop of the circuit for charging of the battery during normal operation, so that the battery is maintained in a

charge state, (ii) the power entering the main power protection circuit line, upon overload or inverter unit failure, into the second branch loop of the circuit, (iii) power from the battery to the inverter unit in the event of a deficit in the power entering the main power protection circuit line from the external power supply means, (iv) charging of the battery upon return of desired power entering the main power protection circuit line from the external power supply means subsequent to condition (iii), and (v) shut-off of power to the output circuit(s) or device(s) upon discharging of the battery to a predetermined low level of charge subsequent to extended occurrence of condition (iii), wherein the power protection circuit comprises power input filtering means, and wherein the powerway comprises a flag connector having quick-disconnect terminals at extremities thereof, with the flag connector being constructed and arranged to effect panel-to-panel connection when the wall panel assembly is utilized in an array comprising a multiplicity of such wall panel assemblies.

#### 5,412,530 PHASE DETECTING ACTUATOR

Motoharu Shimizu, Kumagaya, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

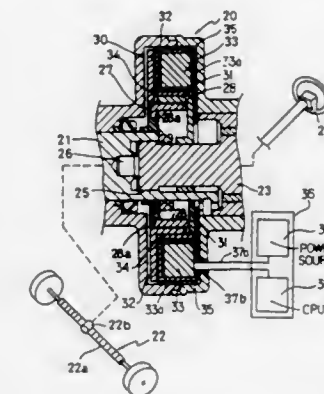
Filed Jul. 29, 1992, Ser. No. 920,333

Claims priority, application Japan, Jul. 30, 1991, 3-214395

Int. Cl.<sup>6</sup> B62D 5/04, 5/22

U.S. Cl. 361—185

5 Claims



1. A phase detecting actuator for a steering system having a rotatable steering shaft and a rotatable output shaft coupled to the steering shaft so that the output shaft is rotatable relative to the steering shaft, the actuator comprising:
  - a cylindrical magnet attached to and rotatable with one of the steering shaft and the output shaft of the steering system, the cylindrical magnet having inner and outer peripheral surfaces;
  - an electromagnetic system including a magnetic coil and first and second cylindrical poles having opposite polarities and communicating with the magnetic coil, the first and second poles attached to and rotatable with the other of the steering shaft and the output shaft of the steering system, wherein the first pole faces the inner peripheral surface of the cylindrical magnet and the second pole faces the outer peripheral surface of the cylindrical magnet, the magnetic coil generating an input signal corresponding to a magnetic flux generated by relative rotation between the cylindrical magnet and the first and second poles; and
  - control means for receiving the input signal from the magnetic coil and generating an output signal that energizes the magnetic coil to create a magnetic positioning force between the cylindrical magnet and the first and second poles to position the output shaft relative to the steering shaft.

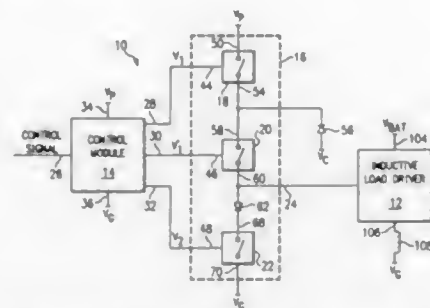
5,412,531

**APPARATUS AND METHOD FOR EXTENDING THE BREAKDOWN CAPABILITY OF A SWITCHING CIRCUIT**  
John S. Clapp, III, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 5, 1993, Ser. No. 843  
Int. Cl.<sup>6</sup> H01H 47/00

U.S. Cl. 361—190

19 Claims



1. A circuit, having an extended breakdown capability, for switching an inductive load driver, the circuit comprising:
  - a first switch for providing a first drive voltage when said first switch is closed;
  - a second switch for receiving said first drive voltage from said first switch and delivering said first drive voltage to the inductive load driver when said second switch is closed and for limiting the voltage across said first switch to a predetermined level when said first switch is open; and
  - a third switch for providing a second drive voltage to the inductive load driver when said third switch is closed.

5,412,532

**POLYGONAL CAPACITOR**

Toshiyuki Nishimori, Toyama, and Akinori Asahara, Tonami, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

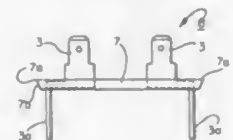
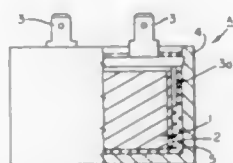
Filed Sep. 3, 1993, Ser. No. 116,497

Claims priority, application Japan, Nov. 24, 1992, 4-313057

Int. Cl.<sup>6</sup> H01G 1/14, 4/00

U.S. Cl. 361—306.1

7 Claims



1. A polygonal capacitor, comprising:
  - a polygonal capacitor case having an engaging groove at an inner surface thereof;
  - a capacitor element accommodated in the polygonal capacitor case;
  - a plurality of terminals respectively connected to a plurality of electrodes of the capacitor element through a base portion of each terminal;
  - an insulating terminal base to which the terminals are fixed; and
  - a resin filled in the polygonal capacitor case, wherein the terminals and the insulating terminal base are

integrally molded in a state where the terminals are inserted into the insulating terminal base; wherein an engaging projection is formed at the insulating terminal base, the engaging projection being tapered along a direction in which the insulating terminal base is inserted into the case; and wherein the engaging projection is in pressure contact with the engaging groove of the polygonal capacitor case.

5,412,533

**SOLID ELECTROLYTIC CAPACITOR AND MANUFACTURING METHOD THEREOF**

Tomohiro Murayama, Fukuoka, and Yasuo Kanetake, Kyoto, both of Japan, assignors to Rohm Co., Ltd., Kyoto, Japan

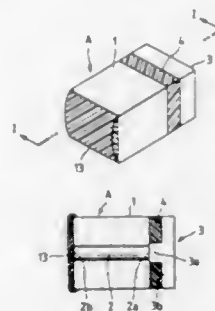
Filed Jun. 21, 1994, Ser. No. 262,956

Claims priority, application Japan, Jun. 22, 1993, 5-176005; Jul. 20, 1993, 5-179082

Int. Cl.<sup>6</sup> H01G 1/005, 9/04

U.S. Cl. 361—528

11 Claims



1. A solid electrolytic capacitor comprising:
  - a capacitor element body consisting of a chip-like porous solid formed by shaping and sintering rectifying metal particles, said porous solid having a dielectric layer formed thereon and a solid electrolytic layer formed on said dielectric layer;
  - a metal rod extended through the central part of said element body having one end face at one end surface of the element body and another end face at an opposite end surface of the element body;
  - an anode member including a protruded part and a flange part, the end face of the protruded part being brought into contact and connected with one of the end faces of said metal rod; and
  - an insulating layer placed between the flange part of said anode member and one end surface of said element body.

5,412,534

**MODULAR HOUSING**

Stanley J. Cutts, Winchester; David Gaunt, Southampton; Ian Gollidge, Romsey; Albert Hamper, Fareham, all of England; Eric Johnson, Greene, N.Y.; David Newmarch, Romsey, and John Veal, Southampton, both of England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 17, 1994, Ser. No. 214,719

Claims priority, application United Kingdom, Mar. 20, 1993, 9305834

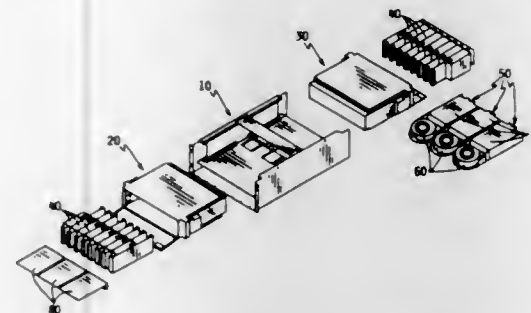
Int. Cl.<sup>6</sup> H05K 7/20

U.S. Cl. 361—695

12 Claims

1. A modular housing for supporting first and second groups of replaceable heat-generating functional units, comprising:
  - a chassis in the form of a rectangular tube having first and second openings at opposite ends thereof;
  - a shelf extending longitudinally at least part way along the length of the chassis to form first and second ducts to accommodate the first and second group of functional units within the first duct on opposite sides of the chassis, the first duct having a front region to accommodate the first group of functional units and a rear region to accom-

modate the second group of functional units, so the first and second groups of functional units are respectively removable via the first and second openings; and a plurality of replaceable cooling units, which are removable via one of the chassis openings without removing either



the first or second groups of functional units, the cooling units being arranged within the second duct in such a position that in operation they serve to draw air through the front region of the first duct, through the cooling units and through the rear region of the first duct.

5,412,535

**APPARATUS AND METHOD FOR COOLING ELECTRONIC DEVICES**

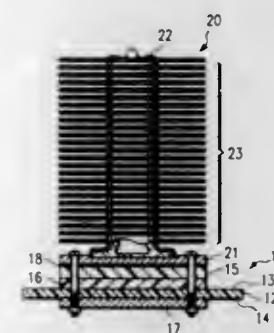
Shun-Lung Chao, and Louis W. McEwin, Jr., both of Plano, Tex., assignors to Convex Computer Corporation, Richardson, Tex.

Filed Aug. 24, 1993, Ser. No. 111,106

Int. Cl.<sup>6</sup> H05K 7/20

U.S. Cl. 361—700

40 Claims



1. A heat transfer device, said device mountable to a heat generating electrical device, said transfer device comprising:
  - a heat pipe having a proximal end for mating with the electrical device and a sealed distal end;
  - fin means retained to said heat pipe by an outward pressure exerted on said fin means by said heat pipe; and
  - means for mounting said heat pipe such that said distal end is on an axis perpendicular to the plane of said electrical device.

5,412,536

**LOCAL CONDENSATION CONTROL FOR LIQUID IMPINGEMENT TWO-PHASE COOLING**

Timothy M. Anderson; Gregory M. Chrysler; Richard C. Chu, and Robert E. Simons, all of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 28, 1994, Ser. No. 218,534

Int. Cl.<sup>6</sup> H05T 7/20

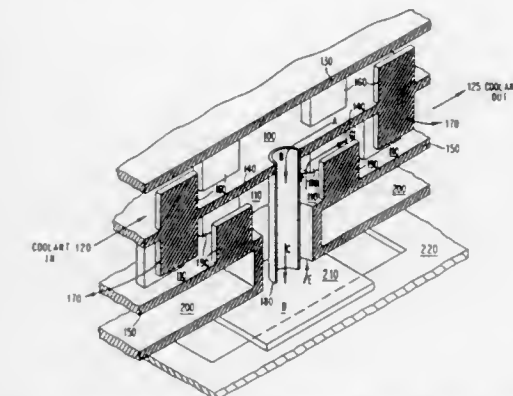
U.S. Cl. 361—700

9 Claims

1. A cooling device for a module having a substrate with at least one electric circuit chip utilizing direct liquid impinge-

ment two-phase cooling with local condensation of vapor, said cooling device comprising:

- a coolant supply plenum for receiving a first coolant;
- an outer housing placed on one side of said plenum;
- a separator plate placed on an opposing side of said plenum so that said plenum is disposed between said outer housing and said separator plate;
- at least one heat transfer surface structure disposed upon an upper surface of said separator plate and extending into said coolant supply plenum;
- a condenser structure placed on one side of said separator plate opposing said outer housing, so that said separator plate is at least partially disposed between said supply plenum and said condenser structure;
- said condenser structure having at least one externally disposed surface extending into said exhaust plenum;



- an exhaust plenum disposed between said separator plate and said condenser structure for receiving said first coolant liquid returning from said substrate with chip after impingement;
- said condenser plate also having an internal passage for receiving a second coolant;
- nozzle means disposed between said supply plenum and said chip for causing the impingement of said first coolant liquid from said supply plenum directly on said chip;
- at least one coolant return passage, through said condenser, and connected to said exhaust plenum for receiving said first coolant after impingement on said chip; and
- at least one heat transfer surface structure disposed upon a surface of said separator plate and extending into said exhaust plenum.

5,412,537

**ELECTRICAL CONNECTOR INCLUDING VARIABLY SPACED CONNECTOR CONTACTS**

Paul A. Magill, Chapel Hill; Nicholas G. Koopman, Raleigh, and Glenn A. Rinne, Cary, all of N.C., assignors to MCNC, Research Triangle Park, N.C. and Northern Telecom Limited, Quebec, Canada

Division of Ser. No. 953,564, Sep. 29, 1992, Pat. No. 5,315,485. This application Feb. 28, 1994, Ser. No. 202,348

Int. Cl.<sup>6</sup> H05K 1/02

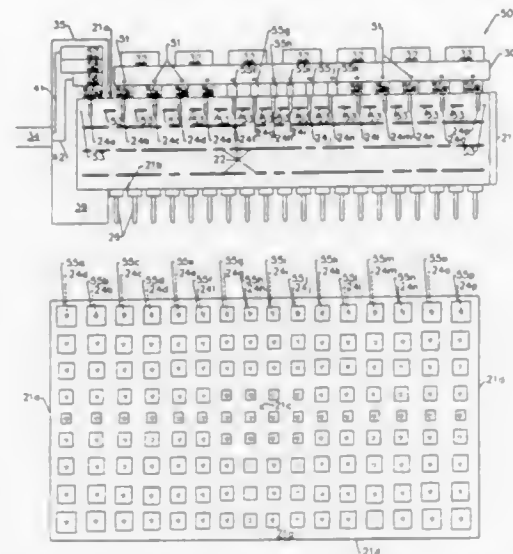
U.S. Cl. 361—777

21 Claims

1. An electrical connector comprising:
  - a housing;
  - a row of connector contacts coupled to said housing, said row of connector contacts having predetermined center-to-center spacing between adjacent contacts, said predetermined center-to-center spacing being relatively large relatively far from an imaginary reference point in said row of connector contacts and being relatively small relatively near the imaginary reference point in said row of connector contacts; and
  - a ground plane coupled to said housing, and extending paral-



led to said row of connector contacts, said ground plane including a plurality of ground plane regions of same



predetermined size, a respective one of which is adjacent a respective one of said connector contacts.

5,412,538

## SPACE-AVING MEMORY MODULE

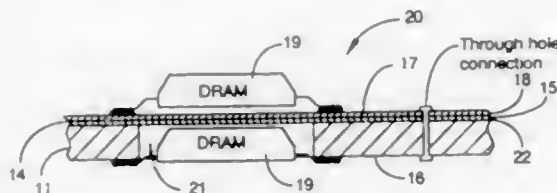
Dan Kilkinis, Saratoga, and William J. Seller, Scotts Valley, both of Calif., assignors to Cordata, Inc., Roadtown, Virgin Islands (Br.)

Filed Jul. 19, 1993, Ser. No. 93,774

Int. Cl.<sup>6</sup> H05K 1/14

U.S. Cl. 361—792

8 Claims



1. A multi-layer primed circuit board comprising:
  - a first flexible substrate formed of a polymer film and having first and second sides for supporting circuitry and discrete components, the discrete components each having a maximum overall height H;
  - first and second connection circuitry for providing electrical connection to leads of the discrete components, the first and second connection circuitry arrayed on the first and second sides of the first substrate, the first connection circuitry comprising first mounting pads for connecting to electrical leads of the discrete components;
  - a second substrate having third and fourth sides for supporting circuitry and the discrete components and thickness T equal to or greater than H, the second substrate having openings therethrough from the third side to the fourth side, providing spaces wherein the discrete components may be completely enclosed within the third and fourth sides;
  - third and fourth connection circuitry for providing electrical connection to the discrete components, the third and fourth connection circuitry arrayed on the third and fourth sides of the second substrate and comprising second mounting pads arrayed around the openings for connecting to the electrical leads of the discrete components;
  - an insulator layer fixedly mounted between the second and the third connection circuitry thereby spacing apart the

first and the second substrates and forming a four layer printed circuit board; and through-hole connections for providing electrical communication between the first, second, third, and fourth connection circuitry.

5,412,539

## MULTICHIP MODULE WITH A MANDREL-PRODUCED INTERCONNECTING DECAL

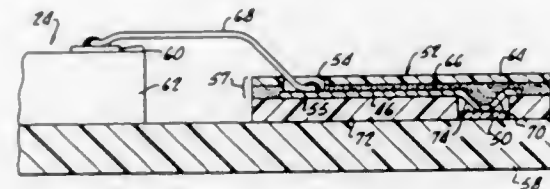
Dennis F. Elwell, San Clemente; William R. Crumly, Anaheim, and Harold C. Bowers, Rancho Palos Verdes, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 18, 1993, Ser. No. 136,844

Int. Cl.<sup>6</sup> H05K 1/11

U.S. Cl. 361—792

23 Claims



7. A multichip module comprising:
  - a multilayer interconnection module having a plurality of module pads thereon, said module pads being spaced from one another by a first distance,
  - an integrated circuit chip configured and arranged to be connected to the module and having a plurality of chip pads spaced from one another by a second distance that is smaller than said first distance, and
  - an independently formed interconnection circuit including a plurality of conductors, said circuit being located on said module in proximity to said chip such that each conductor has a first connection to a pad on said chip and a second connection to a pad on said module, wherein said interconnection circuit comprises a decal having a substrate and electrical conductors formed on a side of said substrate adjacent said module, each of said conductors having a primary decal pad that is exposed for said first connection to said chip through a via in said substrate and a secondary decal pad, at least some of said secondary decal pads comprising bumps protruding from said conductors into contact with said interconnection module pads.

5,412,540

## APPARATUS FOR REMOVABLY APPLYING A FLAT-PACK TO A SOCKET

Arkadij Y. Golubchik; Donald K. Harper, Jr., both of Harrisburg; Michael F. Laub, Etters, and David W. McMullen, Hershey, all of Pa., assignors to The Whitaker Corporation, Wilmington, Del.

Filed Jul. 20, 1993, Ser. No. 95,133

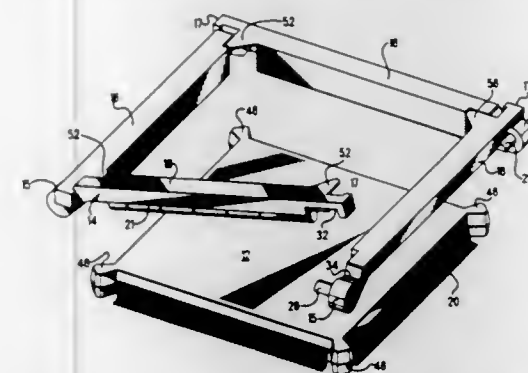
Int. Cl.<sup>6</sup> H05K 7/02; H01R 9/09

U.S. Cl. 361—807

5 Claims

1. An assembly of an electronic package, a socket therefor, and a cover, comprising:
  - a electronic package of substantially rectangular shape, having two major faces and four sides bounding said faces, and having electrical contacts extending outward along said four sides;
  - a socket for receiving said electronic package and having electrical contacts extending from its sides, said socket having a shape congruent with the substantially rectangular shape of said electronic package so that corresponding contacts from said electronic package and from said socket are positioned adjacent to each other, said socket also comprising four pivot means, one near each of its corners;
  - a cover comprising four independently pivotable arms each

mounted on a corresponding one of said pivot means so as to be pivotable along one of said socket edges from a raised position in which said each arm extends upwardly



out of contact with said contacts of said package, to a lowered position in which it presses against said spring contacts of said package to force them into positive contact with said contacts of said socket.

5,412,541

## SPECIFICALLY CONFIGURED SHEET MEMBERS OR ARTICLES FOR USE IN IMPROVING SOUND OR IMAGE QUALITY

Tatsuo Tanaka, 2072-294, Kamitsu-machi, Kurume-shi, Fukuoka-ken, Japan

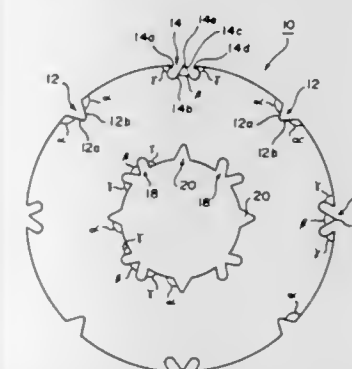
Filed Dec. 14, 1993, Ser. No. 165,896

Claims priority, application Japan, Dec. 18, 1992, 4-356099; Jul. 14, 1993, 5-197870; Sep. 10, 1993, 5-250134; Nov. 4, 1993, 5-301250

Int. Cl.<sup>6</sup> H05K 9/00

U.S. Cl. 361—818

28 Claims



1. A sheet member adapted for attachment to an acoustic or imaging instrument to improve the acoustic or imaging performance thereof, said sheet member being generally circular or polygonal in shape and including:
  - a plurality of generally W-shaped cut-outs formed in the outer circumference of said sheet member; and
  - a like plurality of generally V-shaped cut-outs formed in the outer circumference of said sheet member;
 said generally W-shaped cut-outs and said generally V-shaped cut-outs being arranged alternately and equi-angularly in the outer circumference of said sheet member.

5,412,542

## DOWN LIGHTING SYSTEMS AND FIXTURES THEREFOR

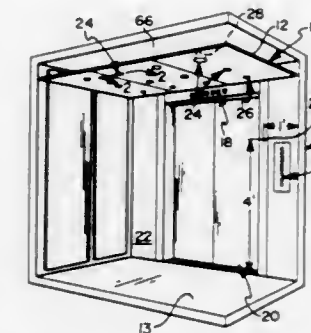
Robert R. Mandy, Bingham Farms, Mich., assignor to Man-D-Tec, Inc., Scottsdale, Ariz.

Division of Ser. No. 940,672, Sep. 4, 1992, which is a continuation-in-part of Ser. No. 672,415, Mar. 20, 1991, Pat. No. 5,145,247. This application Sep. 16, 1993, Ser. No. 122,899

Int. Cl.<sup>6</sup> F21V 33/00

U.S. Cl. 362—20

11 Claims



9. In a lighting system having a primary lighting means and an emergency lighting means for an elevator having a ceiling, a side wall having a control panel with emergency equipment on or adjacent the control panel and a test point at which the illumination of the emergency lighting means is measured when the primary lighting means has failed the improvement comprising:
  - a main power supply;
  - the test point being located below the ceiling and spaced from the side wall;
  - the emergency lighting means comprising a downlighting fixture located substantially at the ceiling and including plural in line lamps including a lens end thereon, and a battery for energizing said plural in line lamps only when said main power supply fails whereby said plural in line lamps direct light energy downwardly from said downlighting fixture for providing light energy on the test point to an illumination level sufficient to meet minimum lighting standards for operating the emergency equipment while providing general illumination to the elevator cab.

5,412,543

## VARIABLE LIGHT DISTRIBUTION TYPE HEADLAMP

Shoji Kobayashi; Hirohiko Ohshio; Masaaki Ishikawa, and Hideki Uchida, all of Shizuoka, Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo, Japan

Filed Feb. 25, 1993, Ser. No. 22,536

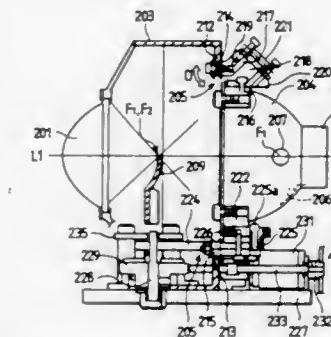
Claims priority, application Japan, Feb. 28, 1992, 4-018169

U; Jun. 29, 1992, 4-192696; Feb. 22, 1993, 5-056471

Int. Cl.<sup>6</sup> B60Q 1/06

U.S. Cl. 362—66

5 Claims



1. A reflector drive mechanism for use in a projection lamp

including a reflector disposed at the rear of a collimator lens, a bulb as a light source for emitting light and a shade fixedly interposed between the collimator lens and bulb for obstructing some of said light, said reflector drive mechanism comprising:

- means for pivotally mounting said reflector to said collimator lens and for deflecting an optical axis of said reflector with respect to an optical axis of said collimator lens; and
- a controllable actuator for causing said pivotally mounting means to deflect said reflector.

5,412,544

# METHOD OF ILLUMINATING AND PROVIDING EMERGENCY EGRESS GUIDANCE FOR HAZARDOUS AREAS

Donald E. Derrick, Hanover, N.H.; Hollis A. Harris, Sonoma, Calif.; Robert H. Marion, Etna; William A. Tower, Canaan, both of N.H., and L. Christopher Towle, Maulden, England, assignors to Loctite Luminescent Systems, Inc., Lebanon, N.H. and The MTL Instruments Group plc, Bedfordshire, England

Continuation-in-part of Ser. No. 752,752, Aug. 30, 1991, abandoned. This application Aug. 24, 1993, Ser. No. 111,247  
Int. Cl.<sup>6</sup> F21V 25/00; F21S 5/00

U.S. Cl. 362—84

24 Claims

1. A method of illuminating an environment which is potentially explosive and flammable without generating spark or thermal effect sufficient to cause ignition of a flammable or explosive atmosphere, said method comprising the steps of installing at least one electroluminescent light ("EL Light") in said environment, connecting said EL Light to a power supply, and providing power to said EL Light so as to cause its illumination wherein the EL Light is characterized in that its capacitance, in operation, is from about two to about ten nanofarads per square inch and its brightness is at least about one footlambert when subjected to an alternating current with a peak voltage of at most about 50 volts and a frequency of between 400 and 1500 Hertz and when drawing a maximum amperage of about 200 milliamps.

5,412,545

# HEAD AND HIP MOUNTED FLASHLIGHT HOLDING DEVICE

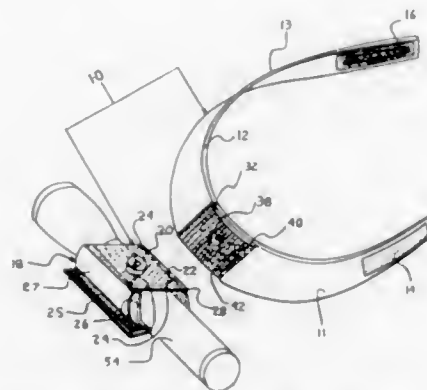
Brett R. Rising, 491 E. 319 St., Willowick, Ohio 44095, assignor to Brett R. Rising, Willowick, Ohio

Filed Feb. 16, 1993, Ser. No. 18,153

Int. Cl.<sup>6</sup> F21L 15/14

U.S. Cl. 362—105

8 Claims



1. A device to hold a flashlight on the head of a person for hands-free use and the same device folded into a sheath to hold the flashlight on the waist of a person comprising:

- a.) a flexible main strap to fit around the person's head having a major and minor axis, and an inside and outside part,
- b.) a first means to adjust said main strap to firmly hold said

main strap horizontally around the person's head above the person's eyes,

- c.) a holder assembly comprising a holder top and holder bottom material joined together to form a sleeve for the flashlight, with a holder top inside surface and a holder bottom inside surface touching said flashlight, and a holder top outside surface and a holder bottom outside surface facing away from said flashlight, said holder bottom having a first fastening element attached to said holder bottom outside surface,
- d.) a holder base assembly having a second fastening element attached to said main strap for securing said holder assembly to said main strap and distributing the weight of the flashlight over a larger area on said main strap keeping said flexible main strap from twisting, wherein said holder base assembly is positioned along the major axis of center, defining a long end main strap which extends from said holder base assembly's center to one end of said main strap, and a short end main strap which extends from said holder base assembly's center to the other end of said main strap,
- e.) a pivot means for adjusting said holder assembly 360 degrees in angular position of the vertical plane, and said first and second fastening elements having surfaces abutting each other for securing said holder assembly in any chosen angular position in the vertical plane with respect to said main strap,
- f.) said holder assembly is attached to said holder base assembly in any angular position within the vertical plane via said pivot means and said first and second fastening elements,
- g.) first and second holder tab ends, being lengths of material continuing from said holder top, with a set of fastening elements for folding said main strap tightly into said sheath for holding the flashlight on a belt,
- h.) said holder assembly and said holder base assembly are positioned off center of the major axis of said main strap to coordinate dimensionally the folding of said main strap into said sheath.

5,412,546

# POWER WRENCH

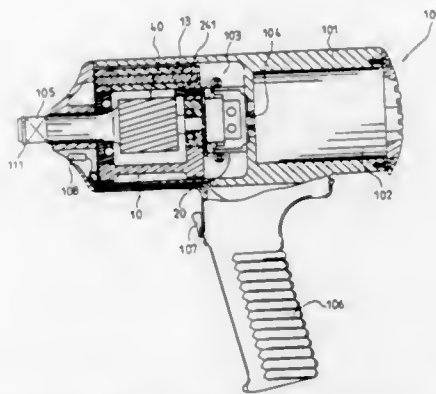
Chen S. Huang, 4F, No. 5, Alley 2, Lane 105, Min-An Road, Hsin-Chuang City, Taipei Hsien, Taiwan, Prov. of China

Filed Jul. 20, 1994, Ser. No. 277,845

Int. Cl.<sup>6</sup> B25B 13/00

U.S. Cl. 362—119

7 Claims



1. A wrench comprising a housing inside which a torque source is disposed to drive a driving tip extending out of a front end of the housing via a torque/rotation transmission mechanism, said torque/rotation transmission mechanism comprising:

- a hollow cylindrical main body having a closed end and an open end connected by a cylindrical circumferential side wall, the closed end having a projection co-axially

mounted thereto to be drivingly coupled to the torque source, the main body further comprising a radial notch formed on the side wall thereof to rotatably receive and secure therein a coupling member of complementary shape and size by means of a pivot pin, the coupling member having two wings, each wing having a remote end extending laterally from a central portion of the coupling member through which the pivot pin extends so that the wings are rotatable relative to the main body about the pivot pin between a neutral position where the remote ends of the wings are maintained flush with the side wall of the main body and a working position where the remote end of one of the wings is moved further into the notch;

an output shaft having an expanded end on which two toothed portions are formed, each tooth portion comprising a flat surface extending substantially along a radial direction of the expanded end and facing in a circumferential direction of the expanded end toward each other, the expanded end of the output shaft being rotatably received within the hollow main body to be freely rotatable therein when the coupling member is in the neutral position and contactingly engageable by the remote end of the one of the wings with one of the flat surfaces thereof when the coupling member is in the working position, the output shaft further comprising an opposite end extending out of the front end of the housing with the driving tip formed thereon;

a centrifugal clutch comprising a disk axially movably fit over the projection of the main body with at least one control pin integrally mounted to a first surface of the disk to be movably received within a corresponding through hole formed on the closed end of the main body so as to be moveable relative to the closed end between an engaging position where a free end of the control pin extends out of the through hole and enters the notch thus contactingly engaging the coupling member to prevent the coupling member from rotation and a withdrawal position where the free end of the control pin is withdrawn into the through hole and thus disengaged from the coupling member, the centrifugal clutch further comprising a base member secured to the projection of the closed end of the main body to be rotatable in unison therewith, a pair of weights being pivotally mounted to the base member and spring-biased toward a concentrated position where the weights are close to each other, rotation of the main body generating centrifugal force on the weights which overcomes the biasing force of the spring and moves the weights to a separated position where the weights are away from each other, mechanical coupling means being provided between the weights and the disk so that when the weights move from the concentrated position to the separated position, the control pin is driven from the engaging position to the withdrawal position so as to allow the coupling member to rotate relative to the main body and thus the wings are allowed to move from the neutral position to the working position to be engageable by the toothed portions of the output shaft and when the weights are moved from the separated position back to the concentrated position, the control pin is driven from the withdrawal position to the engaging position to fix the coupling member in the neutral position; and

lighting means mounted in the front end of the housing.

5,412,547

# ILLUMINATABLE RECHARGEABLE DISPLAY DEVICE

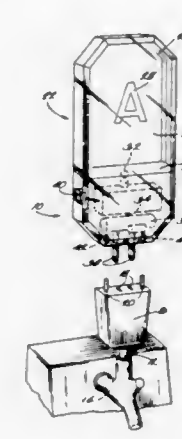
Richard P. Hornblad, Shorewood; Kenneth J. Rabas, Waukesha; Michael R. Sturm, Grafton, and Jerome A. Zakrajsek, Fredonia, all of Wis., assignors to DCI Marketing, Milwaukee, Wis.

Filed Dec. 21, 1993, Ser. No. 170,693

Int. Cl.<sup>6</sup> F21L 7/00

U.S. Cl. 362—183

6 Claims



1. A lightable knob for a tap valve comprising:

- a base adapted to be attached to a tap valve, wherein said base includes a pair of slots;
- a handle including a light source for illuminating said handle, a rechargeable battery coupled to said light source for energizing said light source, and recharger means coupled to said rechargeable battery for effecting the recharging of said rechargeable battery in a conventional electrical outlet, said recharger means including a pair of male prongs which are insertable into and compatible with the conventional electrical outlet; and
- means for removably securing said handle to said base wherein said securing means includes said slots and said pair of male prongs which are insertable into said slots.

5,412,548

# MULTI-FUNCTION LIGHTING DEVICE

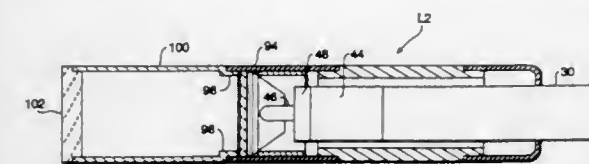
Vincent M. Yee, 14122 D. Marquesas Way, Marina Del Rey, Calif. 90292

Filed Jun. 21, 1993, Ser. No. 79,043

Int. Cl.<sup>6</sup> F21L 7/00

U.S. Cl. 362—202

15 Claims



1. A miniature hand-holdable multi-function lighting device which is capable of operation as a flashlight and as a lantern, said lighting device comprising:

- a) an elongate housing;
- b) a head mounted on and extended axially outwardly from said housing and being shiftable with respect to said housing;
- c) a reflector in said head and having a convex outwardly presented surface;
- d) a sleeve capable of transmitting light radiation located intermediate said housing and said head and being shiftable with said head and with respect to said housing;
- e) a light source mounted on said housing and being located



so that said light source can project through said reflector and bounce light off of said reflector to provide a generally colimated beam of light from said head, said sleeve and head being shiftable axially forwardly so that said light source is retracted from said reflector and shifted rearwardly from said reflector by a substantial distance so that said light source is locatable intermediate said sleeve and projects substantially all of the available light transversely through the sleeve when said sleeve and head are shifted axially forwardly so that the device is capable of operation as a lantern; and

- f) an additional sleeve is provided for connection to said head to extend outwardly from said head.

5,412,549

## ELECTRICAL LIGHTING DEVICE

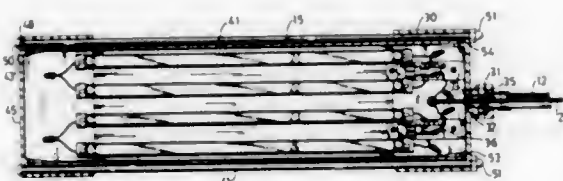
Mark K. Blakely, 2612 Genesee Rd., Avon, N.Y. 14414

Filed Aug. 4, 1993, Ser. No. 101,650

Int. Cl.<sup>6</sup> F21V 31/02

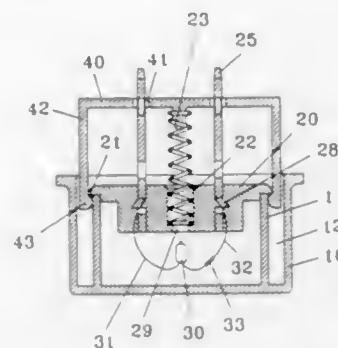
U.S. Cl. 362-218

7 Claims



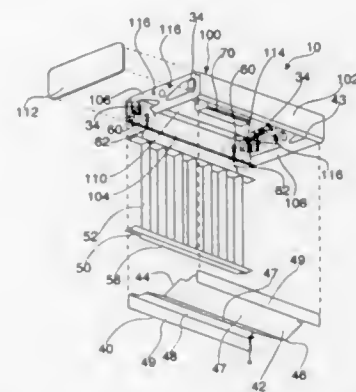
7. A water-submersible lighting device comprising:
- a waterproof housing in the form of a flattened tube of elongated transverse cross section that is uniform throughout the length thereof; within said housing a plurality of elongated tubular fluorescent lamps positioned lengthwise in the housing in parallel relationship to each other; said housing comprising two substantially parallel face walls of relatively large area, at least one of said face walls being transparent, and two connecting walls of relatively small area, each of said connecting walls being indented to form a groove extending the length of the housing on the outside of each of said connecting walls; said housing further comprising a watertight closed end and an open end having a rim that corresponds to the transverse cross section of said housing at said open end;
  - a watertight cap positioned on the rim of said housing, said cap being in the form of an inverted cup having a depending circumferential wall of elongated cross section, the inner circumference thereof being sufficiently large to enclose the open end of said housing, within and on the under surface of said cap a continuous channel, resilient gasket material positioned in said channel and coextensive with the rim of said housing;
  - a connecting rod positioned longitudinally in each said groove, each rod being fixed to the closed end of the housing and being of length sufficient to extend beyond the rim of said housing and through the cap positioned on said rim;
  - means attached to the end of each said rod for pressing said cap and gasket material into watertight engagement with the rim of said housing, said means being positioned outside of said continuous channel; and
  - a watertight flexible tube sealably attached to an opening in said cap and enclosing an electrical conductor connected at one end to circuitry that drives said fluorescent lamps in said housing and at its other end to a source of low voltage direct current.

5,412,550  
NIGHT LAMP HAVING A SAFETY DEVICE  
Kuang Nan Hsieh, and Wen Bin Hsieh, both of No. 1058 Jian Cheng Road, Taichung, Taiwan, Prov. of China  
Filed Oct. 14, 1994, Ser. No. 323,016  
Int. Cl.<sup>6</sup> H01R 33/00  
U.S. Cl. 362-226 2 Claims



1. A night lamp comprising:
- a body including a cylindrical member provided therein so as to define an annular slot,
  - a board secured on top of said cylindrical member and including a peripheral portion laterally extended beyond said cylindrical member so as to define flange means,
  - two prongs secured to said board,
  - a light bulb connected to said prongs,
  - a cap including two orifices formed therein for slidably engaging with said prongs, said cap including a peripheral wall member extended downward therefrom for slidably engaging in said annular slot, said wall member including a bottom portion having projection means formed thereon for engaging with said flange means so as to prevent said cap from disengaging from said body, and
  - means for biasing said cap away from said body so as to shield and protect said prongs and in order to prevent users from getting electric shocks.

5,412,551  
LUMINAIRE FIXTURE  
Alan A. Newell, Sussex, N.J., assignor to Mark Lighting Co., Inc., Moonachie, N.J.  
Filed Nov. 15, 1993, Ser. No. 153,818  
Int. Cl.<sup>6</sup> F21V 7/12  
U.S. Cl. 362-241 15 Claims



1. A reflector for a luminaire fixture comprising:
- a metal sheet having a top side and a bottom side, the top and bottom sides having a reflective material thereon, the sheet formed into a V-shape having:
  - a point formed along the center of the sheet;
  - first angled walls extending up from the point;
  - horizontal walls extending from the first angled walls, the

first angled walls extending for a relatively long distance with respect to the horizontal walls which extend for a relatively short distance;

second angled walls extending from the horizontal walls;

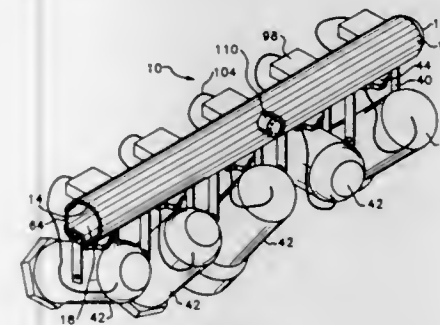
second horizontal walls extending from the second angled walls;

third angled walls extending from the second horizontal walls;

and

vertical end walls depending from the third angled walls.

5,412,552  
LIGHTING LAMP BAR  
Mark Fernandes, P.O. Box 197164, Louisville, Ky. 40259  
Continuation-in-part of Ser. No. 6,366, Mar. 25, 1993. This application Mar. 24, 1994, Ser. No. 217,486  
Int. Cl.<sup>6</sup> F21V 21/14  
U.S. Cl. 362-250 4 Claims

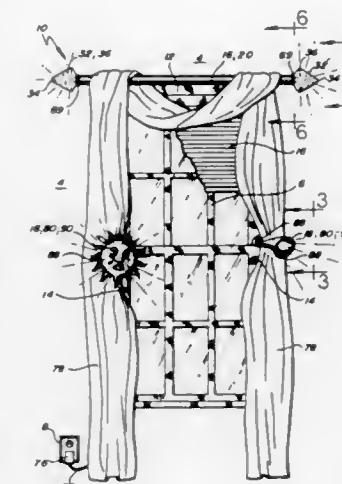


1. A lighting lamp bar, comprising:
- a "C-shaped" tubular main body support member having a longitudinal recessed conduit therein, an inverted trough formed integrally therein extending inwardly into said recessed conduit and extending longitudinally along the bottom of said tubular main body support member, said inverted trough having a pair of aligned opposing flanges extending normal to the longitudinal axis formed integrally therein and extending longitudinally along the bottom of the main body support member forming a "C-shaped" channel therealong, said "C-shaped" channel being complementary sized and shaped to slidably support and secure a light holding means, and a generally flat longitudinal strip connector in sliding communication with said tubular main body support.

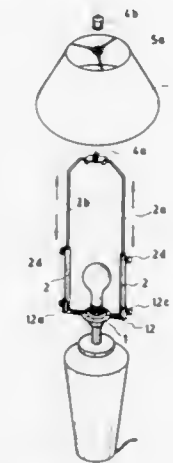
5,412,553  
LIGHTED CURTAIN HARDWARE ASSEMBLY FOR WINDOWS  
Wesley G. Wojski, Mahtomedi, Minn., assignor to Studio Soleil, Inc., White Bear Lake, Minn.  
Filed Mar. 16, 1993, Ser. No. 33,148  
Int. Cl.<sup>6</sup> F21V 33/00  
U.S. Cl. 362-253 16 Claims

1. A lighted curtain hardware assembly for a wall having an opening therein comprising:
- a rod mountable adjacent the opening for supporting a curtain in front of, adjacent and away from the opening as to not obstruct a view through the opening having two opposing ends, wherein the rod is hollow with the two ends being open, the rod being adapted for suspending a curtain therefrom;
  - first and second lights mounted on the ends of the rod;
  - electrical means for providing electricity to the lights;
  - two decorative glass globes each adapted to be received and held at one open end; and

e) two connectors, each adapted to be slidably mounted in one of the open ends, to clamp onto a mounting neck of



5,412,554  
COMPOUND LAMP SHADE FRAME  
Deng-Ran Lee, 2nd Fl., No. 31, Lane 354, Chung Yang N. Rd., Sec. 4, Taipei, Taiwan, Prov. of China  
Filed Apr. 21, 1994, Ser. No. 230,986  
Int. Cl.<sup>6</sup> F21V 17/02  
U.S. Cl. 362-449 2 Claims



being adapted to be fastened into said sleeve by screw via said screw hole;  
said finial being provided with a finial screw so as to allow a lamp shade to be mounted thereto via a screw cap.

5,412,555

# SELF-OSCILLATING DC-DC CONVERTER WITH ZERO VOLTAGE SWITCHING

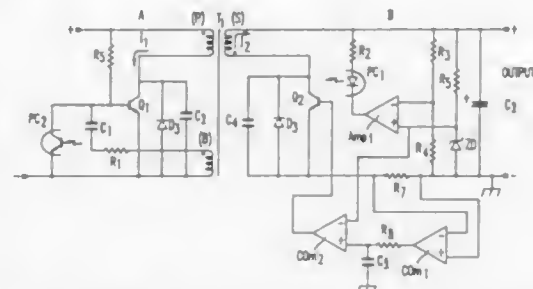
Hiroshi Uramoto, Hadano, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 857,437, Mar. 25, 1992. This application Oct. 15, 1993, Ser. No. 136,198

Claims priority, application Japan, Mar. 26, 1991, 3-086076 Int. Cl.<sup>6</sup> H02M 3/335

U.S. Cl. 363—18

7 Claims



7. A self-oscillating D.C.—D.C. converter with zero voltage switching, comprising:

- a transformer (T1) with a first winding (P) having a first terminal connected to a first input terminal on a primary side;
- a first transistor (Q1) having a collector terminal connected to a second terminal of the first winding (P) and an emitter terminal connected to a second input terminal on the primary side;
- a first diode (D2) having an anode connected to the second terminal of the first winding (P) and a cathode connected to the second input terminal;
- a first capacitor (C1) having a first terminal connected to a base terminal of the transistor (T1);
- a first resistor (R1) having a first terminal connected to a second terminal of the first capacitor (C1);
- a second winding (B) of the transformer (T1) having a first terminal connected to a second terminal of the first resistor (R1) and a second terminal connected to the second input terminal;
- a third winding (S) having a first terminal connected to a first output terminal on a secondary side of the transformer (T1);
- a second transistor (Q2) having a collector terminal connected to a second terminal of the third winding (S);
- a second diode (D3) having an anode connected to the second terminal of the third winding (S) and a cathode connected to an emitter terminal of the second transistor (Q2);
- a second resistor (R2) having a first terminal connected to the first output terminal;
- a first photocoupler (PC1) having a cathode connected to a second terminal of said second resistor (R2);
- a first amplifier (Amp1) having an output terminal connected to an anode of the first photocoupler (PC1);
- a third resistor (R3) having a first terminal connected to the first output terminal and a second terminal connected to a negative input terminal of the first amplifier (Amp1);
- a fourth resistor (R4) having a first input terminal connected to the negative input terminal of the first amplifier (Amp1) and a second output terminal connected to a second output terminal;
- a fifth resistor (R5) having a first terminal connected to the first output terminal;
- a zener diode (ZD) having an anode connected to a second

- terminal of the fifth resistor (R5) and connected to a positive input terminal of the first amplifier (Amp1);
- a second capacitor (C2) having a first terminal connected to the first output terminal and a second terminal connected to the second output terminal;
- a third capacitor having a first terminal connected to the second terminal of the first winding (P) and a second terminal connected to the second input terminal;
- a second photocoupler (PC2) having a collector terminal connected to the first terminal of the first capacitor (C1) and an emitter terminal connected to the second input terminal;
- a sixth resistor (R6) having a first terminal connected to the first input terminal and a second terminal connected to the base terminal of the first transistor (Q1);
- a seventh transistor (R7) having a first terminal connected to the emitter terminal of the second transistor (Q2) and a second terminal connected to the second output terminal;
- a fourth capacitor having a first terminal connected to the second terminal of the third winding (S) and a second terminal connected to the first terminal of the seventh resistor (R7);
- a first comparator (Com1) having a negative input connected to the first terminal of the seventh resistor (R7) and a positive input terminal connected to the second terminal of the seventh resistor (R7);
- an eighth resistor (R8) having a first terminal connected to an output terminal of the first comparator (Com1);
- a fifth capacitor (C5) having a first terminal connected to a second terminal of the eighth resistor (R8) and a second terminal connected to ground; and
- a second comparator (Com2) having a positive input terminal connected to the second terminal of the eighth resistor (R8), a negative input terminal connected to the positive input terminal of the first amplifier (Amp1) and an output terminal connected to a base terminal of the second transistor (Q2).

5,412,556

# SWITCHED MODE POWER SUPPLY CIRCUIT INCLUDING A CONTROL CIRCUIT HAVING TWO MODES OF OPERATION EACH MODE SELECTED IN DEPENDENCE ON THE POWER TO BE SUPPLIED AT THE OUTPUT

Antonius A. M. Marinus, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

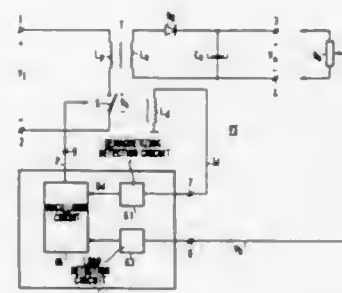
Filed Dec. 28, 1993, Ser. No. 174,089

Claims priority, application Netherlands, Dec. 30, 1992, 9202295

Int. Cl.<sup>6</sup> H02M 3/335

U.S. Cl. 363—21

9 Claims



5. A switched-mode power supply circuit, comprising:
- input terminals for receiving an input voltage;
  - output terminals for supplying power to a load;
  - a series arrangement of a primary winding of a transformer and a switch, coupled in parallel to the input terminals;
  - a secondary winding of the transformer coupled to the output terminals;
  - a further winding of the transformer, coupled to as control

circuit, for generating a demagnetizing signal indicating when the transformer is demagnetized;

the control circuit having (i) an input, (ii) an oscillator for generating a control signal, (iii) an output coupled to the oscillator for supplying the control signal to the switch), (iv) a demagnetization detection circuit coupled to the further winding for detecting when the transformer is demagnetized, and (v) load detection circuitry for detecting the power supplied to a load at the output terminals;

means for generating a feedback signal coupled to both the load and the load detection circuitry which feedback signal is dependent on the power supplied to the load;

the control circuit having, during operation (i) a first mode wherein the control signal has a predetermined fixed frequency and the duration of the pulses of the control signal is determined by the feedback signal, and (ii) a second mode wherein the frequency of the pulses of the control signal is variable and dependent on the feedback signal and wherein the control signal is delayed if the transformer is not fully demagnetized, the control circuit further including means for selecting one of the modes depending on the power supplied at the output terminals indicated by the feedback signal.

5,412,557

# UNIPOLAR SERIES RESONANT CONVERTER

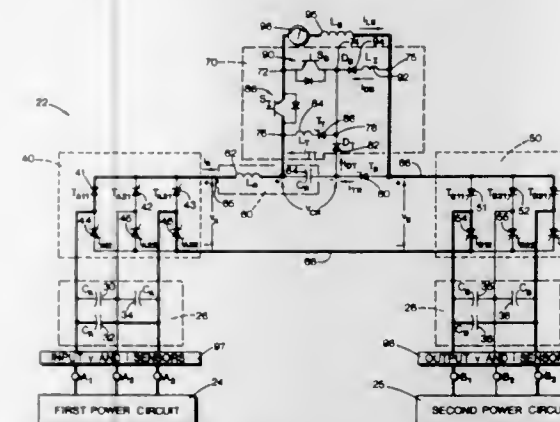
Hian K. Lauw, Corvallis, Oreg., assignor to Electronic Power Conditioning, Inc., Corvallis, Oreg.

Filed Oct. 14, 1992, Ser. No. 963,386

Int. Cl.<sup>6</sup> H02M 5/458, 7/5387

U.S. Cl. 363—37

71 Claims



1. A unipolar series resonant converter for exchanging energy between first and second circuits, comprising:
- first and second switch assemblies for coupling to the respective first and second circuits;
  - a resonant tank coupled between the first and second switch assemblies, the resonant tank having a resonant capacitor and a resonant inductor in series; and
  - a link current synthesizer coupled to the resonant capacitor, the synthesizer responsive to a synthesizer control signal for generating a link current as a train of unipolar link current pulses, each pulse having a zero current segment and a nonzero segment of adjustable durations which are controlled by said synthesizer, with the synthesizer having a blocking switch coupled in series with the resonant capacitor for deactivating oscillation of the resonant tank in initiating each unipolar link current pulse.

5,412,558

# SEMICONDUCTOR INTEGRATED CIRCUIT UNIT

Naoki Sakurai; Mutsuhiro Mori, both of Hitachi; Hidetoshi Arakawa, Kitaibaraki; Kenichi Onda, Hitachi; Hideki Miyazaki, Hitachi, and Akihiko Kanouda, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Harmanachi Semiconductor, Ltd., both of Tokyo, Japan

Continuation of Ser. No. 647,415, Jan. 29, 1991, Pat. No.

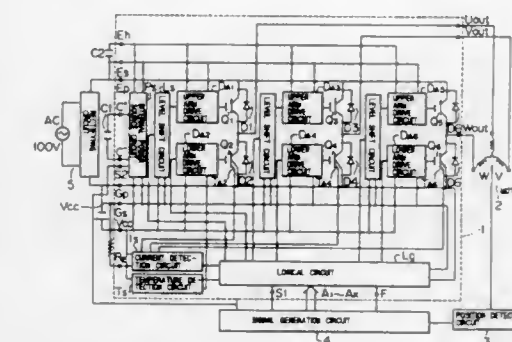
5,253,156. This application Sep. 7, 1993, Ser. No. 117,935

Claims priority, application Japan, Jan. 31, 1990, 2-19070

Int. Cl.<sup>6</sup> H02M 3/335, 7/521

U.S. Cl. 363—98

26 Claims





5,412,559

## FULL WAVE RECTIFYING CIRCUIT

Kunihiko Karasawa, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

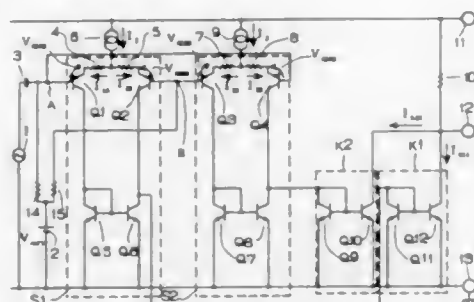
Filed Jun. 2, 1993, Ser. No. 70,290

Claims priority, application Japan, Jun. 15, 1992, 4-155064

Int. Cl.<sup>6</sup> H02M 7/217; H03K 5/00

U.S. Cl. 363-127

13 Claims



1. A full wave rectifying circuit comprising: signal applying means having a first output terminal for applying d.c. bias voltage and a second output terminal for applying an a.c. signal with a reference of the d.c. bias voltage;

a first differential gain stage having a positive phase input terminal connected to said first output terminal of said signal applying means, a negative phase input terminal connected to said second output terminal of said signal applying means, and an output terminal, for rectifying said a.c. signal on the half wave basis to output it from said output terminal;

a second differential gain stage having a negative phase input terminal connected to said first output terminal of said signal applying means, a positive phase input terminal connected to said second output terminal of said signal applying means, and an output terminal, for rectifying said a.c. signal on the half wave basis to output it from said output terminal; and

an output circuit connected to said output terminals of said first and second differential gain stages for synthesizing output from said first and second differential gain stages; wherein said first differential gain stage includes

a first differential element having a power terminal connected to a first d.c. current source for supplying specified current, a first voltage input terminal for receiving said d.c. bias voltage from said positive phase input terminal of said first differential gain stage, a second voltage input terminal for receiving said a.c. signal from said negative phase input terminal of said first differential gain stage, and first and second current output terminals for outputting the specified current received from said power terminal, said specified current being branched depending upon a potential difference between said first and second voltage input terminals so as to output them from said first and second current output terminals, and

a first active load having first and second current input terminals connected to said first and second current output terminals of said first differential element, and a current output terminal for outputting output current produced in accordance with a difference between currents received from said first and second current input terminals of said first active load, and wherein said second differential gain stage includes

a second differential element having a power terminal connected to a second d.c. current source for supplying specified current, a first voltage input terminal for receiving said d.c. bias voltage from said positive phase input terminal of said second differential gain stage, a second voltage input terminal for receiving said a.c. signal from said negative phase input terminal of said second differential gain stage, and first and second current output terminals

for outputting the specified current received from said power terminal of said second differential element, said specified current being branched depending upon a potential difference between said first and second voltage input terminals of said second differential element so as to output them from said first and second current output terminals of said second differential element, and a second active load having first and second current input terminals connected to said first and second current output terminals of said second differential element, and a current output terminal for outputting output current produced in accordance with a difference between currents received from said first and second current input terminals of said second active load.

5,412,560

## METHOD FOR EVALUATING AND ANALYZING FOOD CHOICES

Darwin Dennison, Amherst, N.Y., assignor to Dine Systems, Inc., Amherst, N.Y.

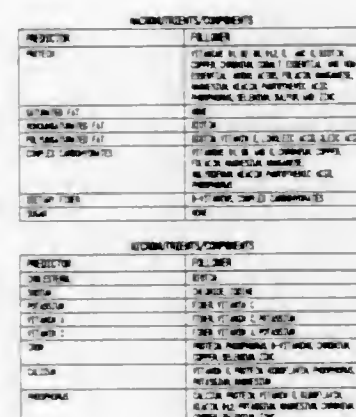
Continuation-in-part of Ser. No. 671,146, Aug. 27, 1991,

abandoned. This application Oct. 20, 1992, Ser. No. 964,531

Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 364-413.01

10 Claims



1. A computer system for evaluating and analyzing a user's diet, comprising:

- a computing device having a memory;
- an input device for entering information regarding the user's actual dietary intake into the memory;
- a data base in the memory for storing the information;
- a nutrient base in the memory for storing consensus dietary guidelines relative to nutrients consumed by the user;
- a knowledge base in the memory having rules for manipulating the information in the data base to provide an organized historical record of the user's dietary intake and a recommended future diet for the user;
- an application program, for execution in the computing device, for applying the rules in the knowledge base to the information in the data base and the guidelines in the nutrient base and for generating the organized historical record and the recommended future diet;
- a result base in the memory for storage of the organized historical record and the recommended future diet by the application program; and
- means for presenting the contents of the result base to the user, under the direction of the application program;
- the organized historical record including an analysis of the user's actual dietary intake categorized according to predictor nutrients; and
- the recommended future diet including a listing of particular foods suggested for consumption by the user.

5,412,561

## METHOD OF ANALYSIS OF SERIAL VISUAL FIELDS

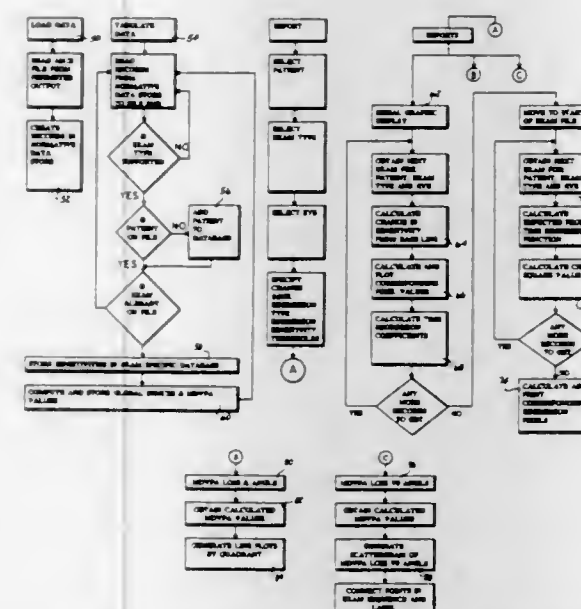
Joseph S. Rosenschein, 1027 Barton Dr., #101, Ann Arbor, Mich. 48105, and Marshall N. Cyrlin, 6200 Northfield Rd., West Bloomfield, Mich. 48322

Filed Jan. 28, 1992, Ser. No. 826,629

Int. Cl.<sup>6</sup> G06F 15/42

U.S. Cl. 364-413.02

8 Claims



1. A method of analyzing serial visual field data representative of multi-point eye sensitivity to detect visual field changes, the method comprising the steps of:

- successively generating a plurality of time spaced, multi-point visual fields from a visual field analyzer, the visual fields representative of eye point sensitivity for a given patient, each visual field including data indicative of the sensitivity of each of a plurality of eye points in each visual field;
- calculating a total field vector (TFV) representative of the overall state of each visual field;
- calculating an age normal field vector (NFV) representative of the overall state of an age normal visual field for a given patient;
- calculating a multi-dimensional visual field analysis loss (MDVFA LOSS) according to the equation:

$$MDVFA\ LOSS = 100 \times (|NFV| - |TFV|) \div |NFV|;$$

graphically plotting the MDVFA LOSS for each visual field over the total number of visual fields to display the progression of visual field changes in a single plot; calculating the vector angle (VA) between the TFV and the NFV;

calculating an MDVFA ANGLE according to the equation:

$$MDVFA\ ANGLE = 100 \times VA \div (\pi/2);$$

graphically plotting the MDVFA ANGLE for each visual field over the total number of visual fields to display the progression of visual field changes in a single plot; and comparing the plotted MDVFA loss and the plotted MDVFA ANGLE over the total number of visual fields to determine the progression of visual field changes.

5,412,562

## COMPUTERIZED TOMOGRAPHIC IMAGING METHOD AND SYSTEM FOR ACQUIRING CT IMAGE DATA BY HELICAL DYNAMIC SCANNING

Kyojiro Nambu, and Tatsuya Ban, both of Tochigiken, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Apr. 2, 1993, Ser. No. 42,274

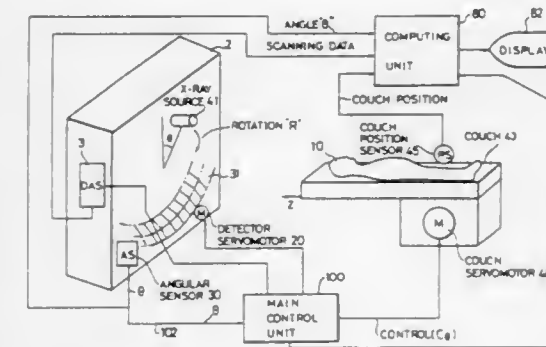
Claims priority, application Japan, Apr. 2, 1992, 4-080858;

Jul. 16, 1992, 4-189340

Int. Cl.<sup>6</sup> G06F 15/00; G01N 23/00; A61B 5/02

U.S. Cl. 364-413.15

8 Claims



5. A CT imaging system comprising:

- a radiation source for producing radiation;
- helical scanning means for scanning a biological body under medical examination in a helical form during at least first and second helical scanning periods by driving said radiation source to project the radiation to said biological body, while said biological body is translated along a preselected direction and simultaneously said radiation source is relatively moved around said biological body, so that the first and second helical scanings are performed over a same location of the biological body;
- angle detecting means for detecting a radiation angle of said radiation source to produce a radiation angle signal;
- couch-position detecting means for detecting a position of a couch, on which the biological body lies, that continuously changes during the helical scanning periods; and
- controlling means for controlling said helical scanning means to carry out the helical scanning operation based upon the radiation angle signal and the couch position detected by the couch-position detecting means in such a manner that helically-moved orbits of said radiation source are identical to each other during said first and second scanning periods.

5,412,563

## GRADIENT IMAGE SEGMENTATION METHOD

Harvey E. Cline, Schenectady, and William E. Lorensen, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 16, 1993, Ser. No. 121,628

The portion of the term of this patent subsequent to Feb. 16, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> G06F 15/00, 15/42

U.S. Cl. 364-413.22

14 Claims

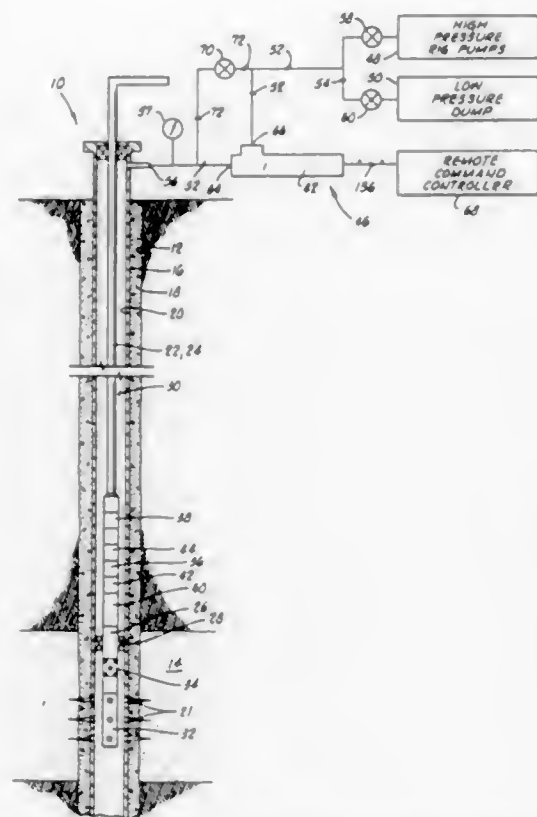
- A method of three-dimensional (3D) modeling internal physical structures of a subject comprising the steps of:
  - acquiring and storing a three-dimensional (3D) data set of data values from a solid subject by non-intrusive data gathering means, each data value being a measure of a physical parameter of a volume element "voxel" centered at a location within the subject;
  - creating a gradient data set of data values from the 3D data set, each data value of the gradient data set representing the spatial change in the 3D data set data values;
  - storing the gradient data set;





5,412,568

**REMOTE PROGRAMMING OF A DOWNHOLE TOOL**  
 Roger L. Schultz, Richardson, Tex., assignor to Halliburton Company, Houston, Tex.  
 Filed Dec. 18, 1992, Ser. No. 993,949  
 Int. Cl.<sup>6</sup> G01V 1/00; E21B 34/08  
 U.S. Cl. 364—422 27 Claims



1. A method of remote control of a downhole tool in a well, comprising:

- placing said downhole tool at a downhole location within said well, said downhole tool including a receiver for receiving remote command signals transmitted into said well and including a controller having memory;
- introducing into said well an original programming command signal, said original programming command signal being distorted into a distorted programming command signal as said original programming command signal travels through said well to said receiver;
- receiving said distorted programming command signal with said receiver;
- storing said distorted programming command signal in said memory of said controller;
- introducing into said well an original operating command signal, said original operating command signal being distorted into a distorted operating command signal as said original operating command signal travels through said well to said receiver;
- receiving said distorted operating command signal with said receiver;
- comparing said distorted operating command signal to said distorted programming command signal stored in said memory of said controller and verifying that said original operating command signal is directed to said downhole tool; and
- in response to said verifying of said step (g), performing an operation of said downhole tool commanded by said original operating command signal.

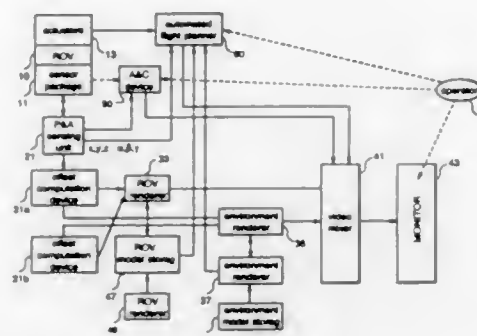
5,412,569

**AUGMENTED REALITY MAINTENANCE SYSTEM WITH ARCHIVE AND COMPARISON DEVICE**  
 Nelson R. Corby, Jr.; Peter M. Meenan, both of Scotia, N.Y.; Claude H. Solanas, III, Morgan Hill; David C. Vickerman, Pleasanton, both of Calif., and Christopher A. Nafis, Rexford, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 29, 1994, Ser. No. 219,562  
 Int. Cl.<sup>6</sup> G06F 15/50; G08C 9/06

U.S. Cl. 364—424.01

5 Claims



1. A remote maintenance system for inspection and identifying differences in structures in a predetermined region over time comprising:

- a remotely operated vehicle (ROV) having
  - a sensor package, for inspecting said structures according to selected acquisition settings, and for creating a present sensor package signal indicating the sensor package inspection
  - actuators capable of maneuvering the ROV;
- environmental model storage device capable of retaining computer graphic information regarding said structures;
- a position and attitude (P&A) sensing unit for measuring a position and orientation of the ROV;
- environment modeler for receiving the computer graphic information defining said structures and producing a conventional computer generated model of said structures and storing the model in the environment model storage device;
- environment renderer coupled to the environment model storage device for generating an image of said structures from the environment model as viewed from at least one viewpoint;
- ROV renderer coupled to the P&A sensing unit for generating a conventional computer generated image of the ROV at a position and orientation corresponding to that of the ROV, generated from a prestored model of the ROV as viewed from at least one viewpoint;
- monitor for displaying images provided to it;
- video mixer coupled to the environment renderer and the ROV renderer for displaying the images on the monitor, thereby allowing an operator to visualize the position of the ROV relative to its environment; and
- an archive and comparison (A&C) device coupled to the video mixer and the P&A sensing unit and sensor package, for
  - archiving the present sensor package signal from the sensor package along with its acquisition settings,
  - retrieving a previously archived signal and its acquisition settings,
  - rectifying the present and archived sensor package signals to have the same acquisition settings,
  - comparing the rectified signals to identify and characterize differences, and
  - displaying differences and archived signals on the monitor.

5,412,570

**APPARATUS FOR RECORDING DRIVING DATA WITH A TEMPORAL RESOLUTION ADAPTED TO THE SIGNAL SHAPE OF ANALOG MEASUREMENT SIGNALS**

Martin Gruler, Aixheim; Helmut Bacic, Königsfeld, and Hartmut Schultze, Villingen-Schwenningen, all of Germany, assignors to Mannesmann Kienzle GmbH, Villingen, Germany  
 PCT No. PCT/EP92/02529, § 371 Date Jun. 29, 1993, § 102(e)  
 Date Jun. 29, 1993, PCT Pub. No. WO93/10510, PCT Pub. Date May 27, 1993

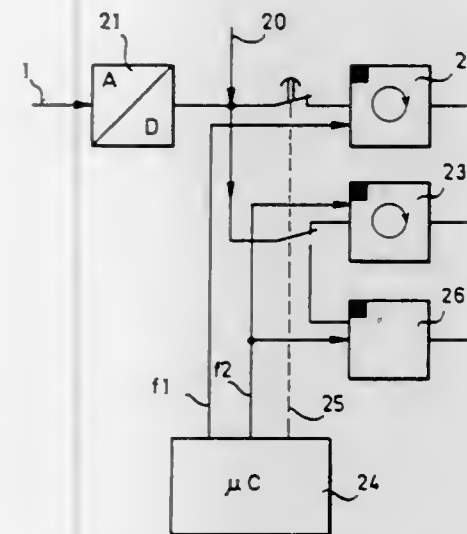
PCT Filed Nov. 4, 1992, Ser. No. 81,347

Claims priority, application Germany, Nov. 11, 1991, 41 36 968.8

Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 364—424.04

12 Claims



1. An apparatus for recording driving data with a temporal resolution which corresponds to the signal shape of analog measurement signals, which comprises:

- a data gathering device, which further comprises:
- a sensory measuring device, wherein said sensory measuring device continuously detects analog measurement signals for recording a vehicle movement;
  - an A/D converter for digitizing said analog measurement signals into digital measurement signals;
  - a control unit, wherein said control unit continuously senses said digital measurement signals;
  - a plurality of parallel ring storage devices, wherein said digital signals are stored in said plurality of parallel ring storage devices with clock frequencies; and
  - a semiconductor storage device,

wherein, upon a detection of an accident, a trigger signal causes said control unit to stop storing said digital measurement signals in a first of said plurality of parallel ring storage devices with a lower clock frequency after a delay so that a storing of measurement data in said first of said plurality of parallel ring storage devices terminates after an after-running period or as a result of a stopping of the vehicle;

wherein said control unit interrupts a further storage of said digital measurement signals in a second of said plurality of parallel ring storage devices with a higher clock frequency at the occurrence of said trigger signal and causes said digital measurement signals to be stored in said semiconductor storage device, wherein said semiconductor storage device is arranged in parallel with said second of said plurality of ring storage devices and has said higher clock frequency for the duration of said trigger signal.

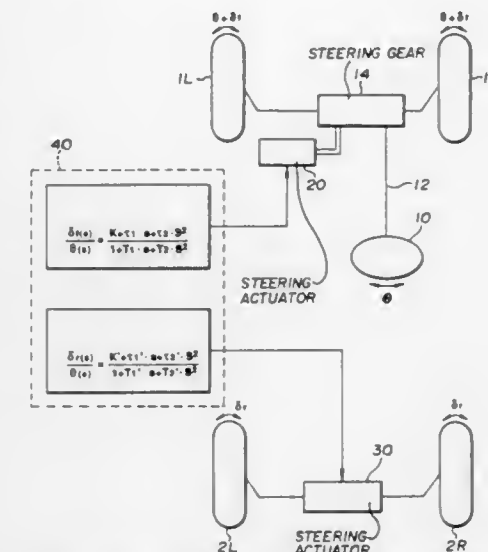
5,412,571

**FOUR-WHEEL STEERING APPARATUS FOR MOTOR VEHICLE**

Takaaki Eguchi, and Hiroshi Mouri, both of Kanagawa, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
 Continuation of Ser. No. 795,331, Nov. 20, 1991, abandoned.  
 This application Jul. 28, 1994, Ser. No. 281,114  
 Claims priority, application Japan, Nov. 28, 1990, 2-332011  
 Int. Cl.<sup>6</sup> B60G 17/06; B62D 5/06

U.S. Cl. 364—424.05

1 Claim



1. A four-wheel steering apparatus for use with a motor vehicle supported on a pair of front wheels and a pair of rear wheels, the apparatus comprising:

- means sensitive to a front wheel steer angle for producing a signal indicative of a sensed front wheel steer angle;
- means for steering the front wheels to provide a front wheel auxiliary steer angle for actuating movement of the front wheels satisfying the following equation:

$$\frac{\delta_{R(s)}}{\theta(s)} = \frac{K + \tau_1 \cdot S + \tau_2 \cdot S^2}{1 + T_1 \cdot S + T_2 \cdot S^2}$$

where  $\theta(s)$  is a Laplace transform of the front wheel steer angle and  $\delta_{R(s)}$  is a Laplace transform of the front wheel auxiliary steer angle,  $S$  is a Laplacian, and  $K$ ,  $\tau_1$ ,  $\tau_2$ ,  $T_1$  and  $T_2$  are constants inherent on the motor vehicle, thereby providing a first order delay to the steering frequency response characteristic of the lateral acceleration applied to the motor vehicle; and means for steering the rear wheels to provide a rear wheel auxiliary steer angle for actuating movement of the rear wheels satisfying the following equation:

$$\frac{\delta_{R'(s)}}{\theta(s)} = \frac{K' + \tau_1' \cdot S + \tau_2' \cdot S^2}{1 + T_1' \cdot S + T_2' \cdot S^2}$$

where  $\theta(s)$  is a Laplace transform of the front wheel steer angle,  $\delta_{R'(s)}$  is a Laplace transform of the rear wheel auxiliary steer angle, and  $K'$ ,  $\tau_1'$ ,  $\tau_2'$ ,  $T_1'$  and  $T_2'$  are constants inherent on the motor vehicle, thereby providing a first order delay to the steering frequency response characteristic of the yaw rate applied to the motor vehicle;

whereby the first order delays to the steering frequency response characteristics of the lateral acceleration and the yaw rate provide an optimum lateral slip angle characteristic.

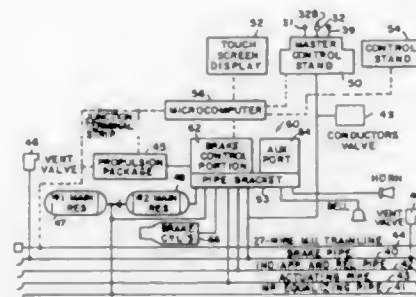
# 5,412,572 COMPUTER CONTROLLED RAILWAY BRAKE EQUIPMENT

Kevin B. Root, Black River; John J. Allen, Jr., Watertown, and Ronald O. Newton, Adams, all of N.Y., assignors to Knorr Brake Holding Corp., Westminster, Md.

Continuation of Ser. No. 984,100, Dec. 1, 1992, abandoned, which is a continuation of Ser. No. 447,816, Dec. 8, 1989, Pat. No. 5,172,316. This application Feb. 7, 1994, Ser. No. 204,450 Int. Cl.<sup>6</sup> B60T 13/68

U.S. Cl. 364—426.01

8 Claims



1. A computerized locomotive control system for a locomotive having a brake pipe, a main reservoir equalization pipe, independent application and release pipe, an actuating pipe, a brake pipe valve with equalization reservoir and a brake cylinder vane with control reservoir and a brake cylinder, said system comprising:

input means for receiving electrical signals representing automatic and independent braking control signals and representing pipe pressure signal of at least one of said brake pipe, independent application and release pipe and actuating pipe;

output means for transmitting electrical signals representing desired equalization reservoir pressure, desired independent application and release pressure, desired actuating pressure and desired control reservoir pressure;

first electro-pneumatic means for controlling pressure in said equalization reservoir in response to said desired equalization reservoir pressure signal;

second electro-pneumatic means for controlling pressure on said independent application and release pipe in response to said desired independent application and release pressure signal;

third electro-pneumatic means for controlling pressure on said actuating pipe in response to said desired actuating pressure signal;

fourth electro-pneumatic means for controlling pressure in said control reservoir in response to said desired control reservoir pressure signal; and

computer means for determining said desired equalization reservoir pressure, independent application and release pressure and actuating pipe pressure signals transmitted by said output means in response to said automatic and independent braking control signals from said input means and determining said desired control reservoir pressure signal transmitted by said output means in response to said at least one pipe pressure signal from said input means.

# 5,412,573 MULTI-MODE ROUTE GUIDANCE SYSTEM AND METHOD THEREFOR

Michael Barnea, and Allan Kirson, both of Highland Park, Ill., assignors to Motorola Inc., Schaumburg, Ill.

Filed May 20, 1993, Ser. No. 64,312

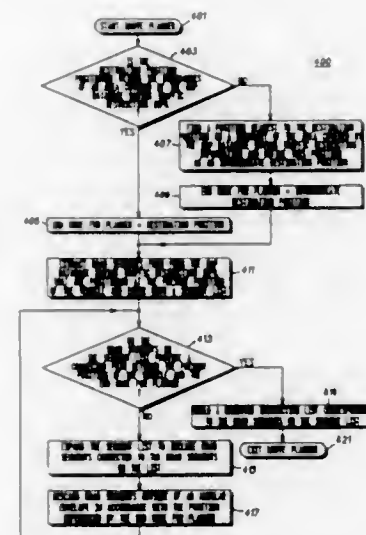
Int. Cl.<sup>6</sup> G06F 165/00

U.S. Cl. 364—449

15 Claims

6. A route guidance system comprising: input means for receiving information specifying a destination position for a traveler;

position determining means for providing information indicative of a present position of the traveler; map database means for storing a first type of record representing road segments having topology and connectivity information and for storing a second type of record representing road segments having topology, connectivity, and traffic flow restriction information; and route guidance means coupled to said input means, said position determining means, and said map database means, wherein said route guidance means retrieves selected records from said map database means, the selected records being determined by the specified destination position and the determined present position of the traveler, wherein said route guidance means equates an end node for planner position to the destination position of the traveler if the selected records allow for connecting a path, having traffic flow restriction attributes, between



the provided present position and the destination position of the traveler, said route guidance means equates an end node for planner position to an intermediate position nearest to the destination position of the traveler if the set of records retrieved do not allow for connecting a path, having said traffic flow restriction attributes, between the provided present position and the destination position of the traveler and allow for connecting a path, having traffic flow restriction attributes, between the provided present position of the traveler and the intermediate position, wherein said route guidance means connects a planned route between the provided present position of the traveler to the end node for planner position using the road segments extracted from the selected records, and wherein said route guidance means generates a maneuver list including maneuver instructions, the maneuver list determined from the planned route.

# 5,412,574 METHOD OF ATTITUDE DETERMINATION USING EARTH AND STAR SENSORS

Douglas J. Bender; Thomas R. Parks, both of Redondo Beach, and Thomas F. Brozenec, El Segundo, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 14, 1993, Ser. No. 61,095

Int. Cl.<sup>6</sup> G06F 15/50; B64G 1/24

U.S. Cl. 364—455

31 Claims

1. A system for determining the 3-axis attitude of a spacecraft in a preselected orbit, comprising:

star sensing means on said spacecraft for sensing the positions of stars relative to said sensing means, and for producing first signals representing said star positions, said star sensing means including star trackers each having a

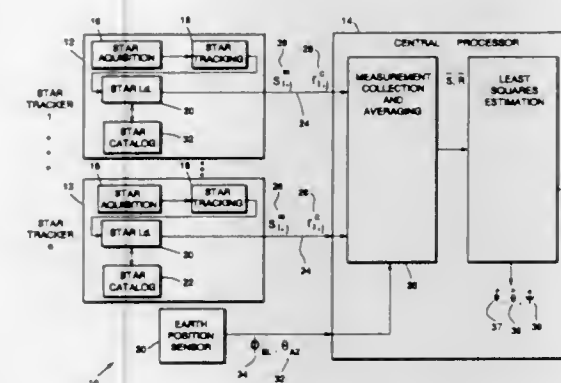
field of vision aligned in a preselected direction and position with respect to said spacecraft, each of said star trackers including

(1) acquiring means for acquiring star position information describing stars within said field of vision.

(2) tracking means for tracking said stars within said field of vision.

(3) a star catalog.

(4) means for identifying said stars within said field of vision using said star position information and said star catalog, and



(5) digitizing means for digitizing said star position information into digitized representations of the positions of said stars relative to said spacecraft and said spacecraft orbit, respectively;

terrestrial body sensing means on said spacecraft for sensing the position of a terrestrial body relative to said spacecraft, and for producing second signals representing said terrestrial body position; and

processing means for processing said first and second signals and for determining said 3-axis attitude of said spacecraft.

# 5,412,575 PAY-PER-USE ACCESS TO MULTIPLE ELECTRONIC TEST CAPABILITIES

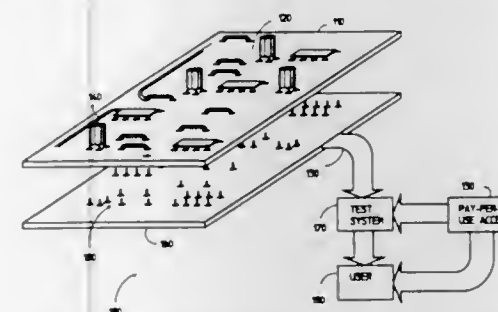
Amanda L. Constant; David W. Webb; Katherine Z. Withers-Miklos; Kay C. Lannen, all of Fort Collins; Ted T. Turner, Loveland, all of Colo., and Amos Hong-Kiat Leong, Singapore, Singapore, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 7, 1993, Ser. No. 132,987

Int. Cl.<sup>6</sup> G06F 15/20

U.S. Cl. 364—464.01

26 Claims



1. A system for testing an electronic circuit, comprising: (a) a circuit board test platform having multiple electronic test capabilities; and

(b) a pay-per-use module, coupled to said circuit board test platform, for monitoring use of said multiple electronic test capabilities of said circuit board test platform, and for debiting a number of usage credits from a usage credit

pool based on said use of said multiple electronic test capabilities.

# 5,412,576 SELECTIVE ASSEMBLY OF COMPONENT KITS

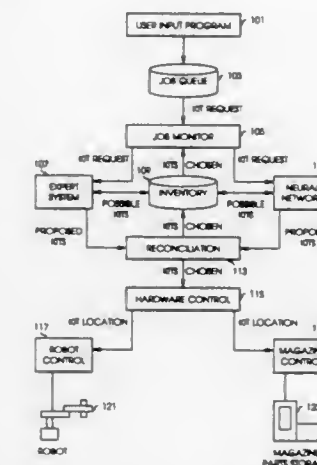
Gary L. Hansen, Savage, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 17, 1992, Ser. No. 991,970

Int. Cl.<sup>6</sup> G06F 15/46

U.S. Cl. 364—468

22 Claims



1. A computerized method for the automatic selection of component kits from an inventory of component parts comprising the steps of:

forming a list of component parts using a list of rules from a rule-based expert system;

forming a second list of component parts using weights assigned by a previously trained node-based network; and reconciling said first list and said second list.

# 5,412,577 COLOR REGISTRATION SYSTEM FOR A PRINTING PRESS

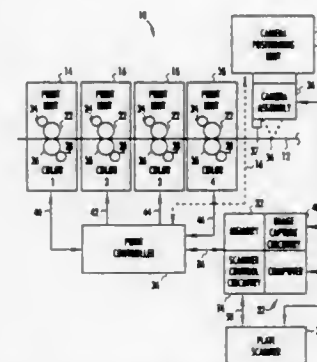
Jeffrey W. Sainio, Hartland, and John C. Seymour, Jefferson, both of Wis., assignors to Quad/Tech International, Sussex, Wis.

Filed Oct. 28, 1992, Ser. No. 967,978

Int. Cl.<sup>6</sup> G06F 15/46

U.S. Cl. 364—469

33 Claims



1. A system for generating a signal representative of color registration offset between at least first and second colors of an image printed on a web, where a first printing unit prints the first color of the image and a second printing unit prints the second color of the image, the system comprising:

a memory disposed to store a first reference array of digital data representative of a predetermined color density of



the first color of at least a portion of the image and a second reference array of digital data representative of a predetermined color density of the second color of the portion;

an imaging device in optical communication with the web to produce a first analog signal representative of the first color of the portion of the image and a second analog signal representative of the second color of the portion;

a converter circuit, operatively associated with the imaging device and memory, which converts the first analog signal to a first color array of digital data, and converts the second analog signal to a second color array of digital data, where the first and second color arrays are stored in the memory; and

a processing circuit in communication with the converter circuit and the memory, the processing circuit further comprising a density conversion circuit which converts the first color array of digital data into a first density array of digital data representative of the color density of the first color and converts the second color array of digital data into a second density array of digital data representative of the color density of the second color, where the processing circuit compares the first reference array with the first density array to determine a registration offset between the first and second colors and produces a signal representative of the registration offset between the colors.

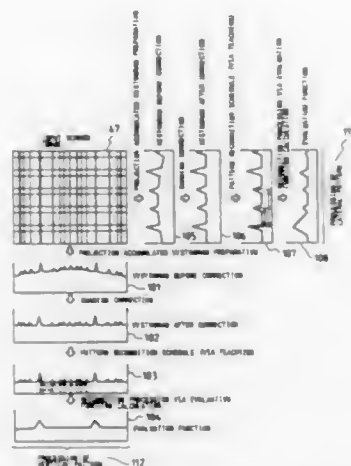
5,412,578

# METHOD AND DEVICE FOR PATTERN FORM RECOGNITION AND AUTOMATIC PATTERN MATCH CUTTING DEVICE

Yoshiaki Takagi, Hitachi, and Kazunori Fujiwara, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Oct. 22, 1993, Ser. No. 142,556  
Claims priority, application Japan, Oct. 30, 1992, 4-292419  
Int. Cl.<sup>6</sup> G06F 15/46

U.S. Cl. 364—474.34

19 Claims



1. A pattern recognition method for a substance having a regularly repeating pattern form on the surface thereof comprising the steps of:

- inputting the pattern form image for displaying the same on a display screen for teaching;
- generating at least one of an X axis concentration accumulated projection histogram and a Y axis concentration accumulated projection histogram from the input screen image at least over one pitch of the regularly repeating pattern form for the teaching;
- performing a shading correction on the generated concentration accumulated projection histogram for the teaching;
- determining a characteristic quantity and an evaluation

function of the shading corrected concentration accumulated projection histogram for the pattern form based on the input screen image and the shading corrected concentration accumulated projection histogram for the teaching;

storing the determined characteristic quantity and the evaluation function for subsequent actual pattern recognition of the pattern form;

further inputting the pattern form image for displaying the same on a display screen for actual pattern recognition;

further generating at least one of an X axis concentration accumulated projection histogram and a Y axis concentration accumulated projection histogram from the input screen image at least over one pitch of the regularly repeating pattern form for the actual pattern recognition;

performing a shading correction on the generated concentration accumulated projection histogram for the actual pattern recognition;

further generating an evaluation function diagram of the shading corrected concentration accumulated projection histogram based on the stored characteristic quantity and the evaluation function during the teaching;

determining a key pattern position on the input screen image of the pattern form based on the generated evaluation function diagram; and

applying a predetermined processing on the substance with reference to the determined key pattern position on the input screen image of the pattern form.

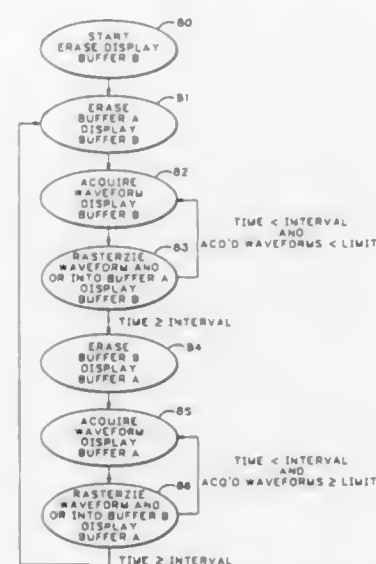
5,412,579

# SLOW DISPLAY METHOD FOR DIGITAL OSCILLOSCOPE WITH FAST ACQUISITION SYSTEM

R. David Meadows, Portland; David H. Price, Hillsboro, and Joseph H. Hubert, Portland, all of Oreg., assignors to Tektronix, Inc., Wilsonville, Oreg.  
Filed Apr. 5, 1993, Ser. No. 43,079  
Int. Cl.<sup>6</sup> G01R 23/16

U.S. Cl. 364—487

7 Claims



1. A method for accumulating and displaying digital waveform data, the data representing the behavior over time of an electrical waveform, the method comprising the steps of:

repeatedly acquiring and digitizing waveform data during a time interval;

ORing each acquired and digitized waveform together to produce a composite waveform;

qualifying the occurrence of the ORing step with a probability function on a pixel-by-pixel basis; and

displaying the composite waveform using a display means having at least some persistence.

5,412,580

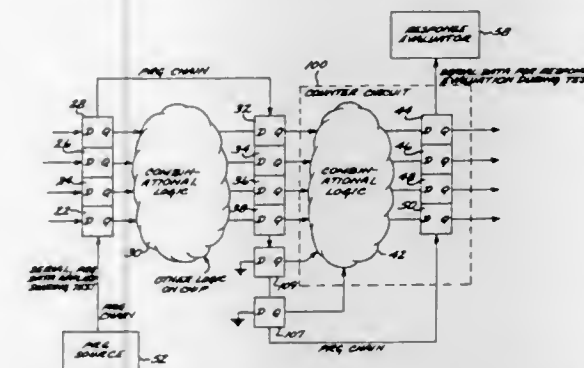
# PSEUDO-RANDOM VECTOR GENERATED TESTABLE COUNTER

James L. Fulcomer, Redondo Beach, and William D. Farwell, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

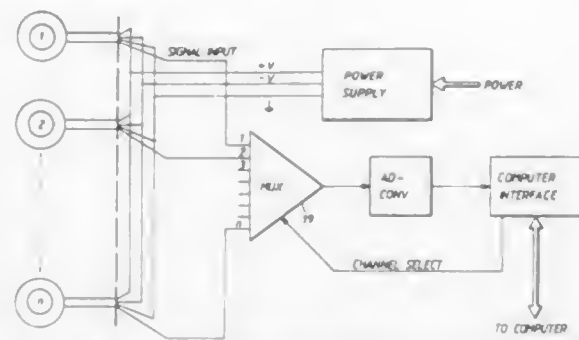
Filed Jul. 3, 1991, Ser. No. 725,124  
Int. Cl.<sup>6</sup> G01R 31/28

U.S. Cl. 364—489

18 Claims



an electronic system for monitoring loads sensed by said sensor and to a common computing system;



wherein the magnetoelastic material is excited with a frequency of at least 300 kHz.

5,412,583

## COMPUTER IMPLEMENTED BALANCER

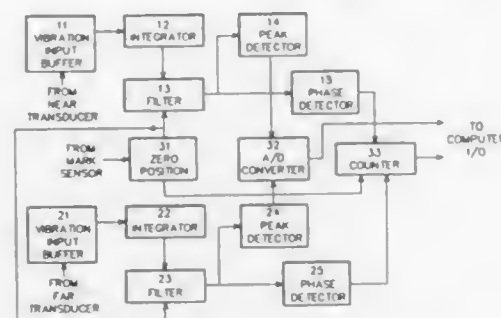
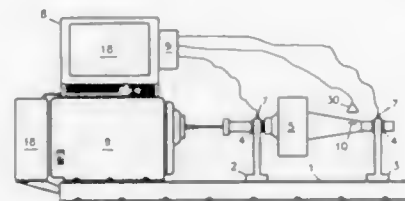
Wayne B. Cameron, Verde, Fla.; Roger J. Morella, Jr., East Aurora, and Donald W. Davis, Tonawanda, both of N.Y., assignors to Dynamics Research Corp., Tonawanda, N.Y.

Filed Jun. 10, 1993, Ser. No. 75,178

Int. Cl.<sup>6</sup> G01M 1/38

U.S. Cl. 364—508

25 Claims



1. A centrifugal balancing apparatus, comprising:  
means for rotating a work piece to be balanced at an angular velocity predetermined to be within an optimum range for centrifugally balancing said work piece;  
mark sensing means for determining when said work piece is rotated to a predetermined orientation;  
vibration sensing means for providing signals representing a magnitude of vibration of the work piece at supporting bearing planes;  
an electronic interface means for converting outputs of said mark sensing means and said vibration sensing means into digital data representing vibration magnitude and phase;  
a computer for calculating a trial balance weight and weight location on said work piece based on said digital data and work piece mass; and  
said electronic interface comprises:  
an automatic multi-gain amplifier for amplifying signals from said vibration sensing means as a function of their amplitude;

means for integrating an output of said multi-gain amplifier;  
a variable bandpass filter for filtering an output of said integrator;  
a zero crossing detector responsive to an output from said mark sensing means for producing a signal indicating when said work piece has rotated to a predetermined position;  
said zero crossing detector providing an input signal to said variable bandpass filter for setting said variable bandpass filter's center frequency to said work piece's frequency of rotation;  
a peak detector for determining when an analog output of said variable bandpass filter is maximum;  
said peak detector providing a feedback signal to synchronize said integrator;  
a phase detector for determining zero crossing of an output of said variable bandpass filter;  
an analog-to-digital converter for converting a DC level detected by said peak detector into an equivalent digital signal;  
a counter;  
means for incrementing said counter;  
means responsive to an output of said phase detector for stopping said counter; and  
means for resetting said counter in response to an output of said zero crossing detector.

5,412,584

## DYNAMIC SYSTEM DIAGNOSING APPARATUS, TIRE AIR PRESSURE DIAGNOSING APPARATUS AND VEHICLE BODY WEIGHT CHANGE DETECTING APPARATUS USING SAME

Takaji Umeno, Aichi; Katsuhiko Asano, Toyooka, and Norio Iwama, Aichi, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

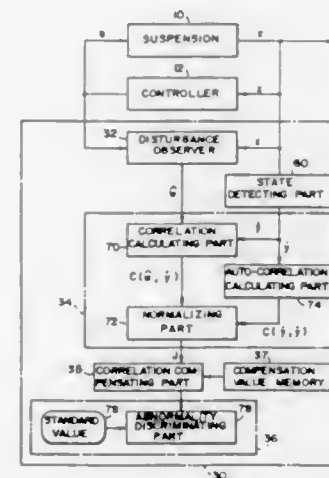
Filed Nov. 30, 1993, Ser. No. 159,196

Claims priority, application Japan, Nov. 30, 1992, 4-345362; Jul. 15, 1993, 5-197828

Int. Cl.<sup>6</sup> G06F 15/20

U.S. Cl. 364—558

30 Claims



1. A diagnosing apparatus for diagnosing a dynamic system by detecting a fault of the dynamic system, comprising:  
(a) disturbance estimating means for estimating an integrated disturbance vector, which is the sum of external and internal disturbance vectors of the dynamic system, based on an internal state vector of the dynamic system;  
(b) correlation calculating means, coupled to said disturbance estimating means for receiving outputs thereof, and for calculating a cross-correlation between the estimated integrated disturbance vector and the internal state vector

and for separating from the integrated disturbance vector a component relating to the internal disturbance; and  
(c) diagnosing means, coupled to said correlation calculating means for receiving an output thereof, and for specifying and diagnosing a corresponding fault portion of the dynamic system from the separated component relating to the internal disturbance.

5,412,585

## ULTRASONIC CONTROL DISK DRIVE SYSTEM

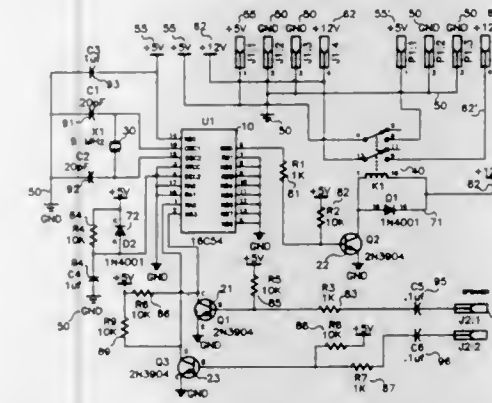
Scott L. Hamilton, 3069 Mill Run Ct., Duluth, Ga. 30136, and David J. Naddor, 10540 Branham Fields Rd., Duluth, Ga. 30136

Filed Oct. 25, 1993, Ser. No. 140,836

Int. Cl.<sup>6</sup> G04F 1/00, 3/00

U.S. Cl. 364—569

18 Claims



1. An ultrasonic control hard disk drive system having a plurality of memory devices including a non-volatile hard disk drive memory and plurality of input and output devices comprising:

- a microprocessor;
- an electrical energy ultrasonic speaker connected to said microprocessor for generating an ultrasonic electrical energy signal; and
- a means response to said electrical energy ultrasonic signal for turning the power to said non-volatile hard disk drive memory off, connected to said ultrasonic control hard disk drive system.

5,412,586

## METHOD AND SYSTEM FOR INTERFACING A COMPUTER PROCESSOR WITH A CALCULATOR KEYBOARD AND CALCULATOR

William R. Oldfather, St. Louis, Mo., assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 1, 1993, Ser. No. 24,073

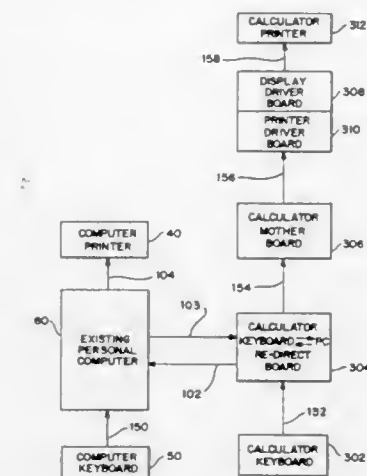
Int. Cl.<sup>6</sup> G06F 3/02

U.S. Cl. 364—709.12

11 Claims

1. A system for interfacing a calculator with a processing device external to the calculator, the calculator including a plurality of calculator function keys in excess of standard computer keys associated with the processing device, comprising:  
connecting means for connecting the calculator to the processing device;  
switching means connected to the calculator for disconnecting a keyboard of the calculator from a processor of the calculator; and  
interfacing means connected to the processing device via the connecting means for transmitting a disconnect signal sent from the processing device to said switching means so that said switching means disconnects said keyboard of the

calculator from said processor of the calculator for allowing the processing device to separately control said key-



board of the calculator and said processor of the calculator.

5,412,587

## PSEUDORANDOM STOCHASTIC DATA PROCESSING

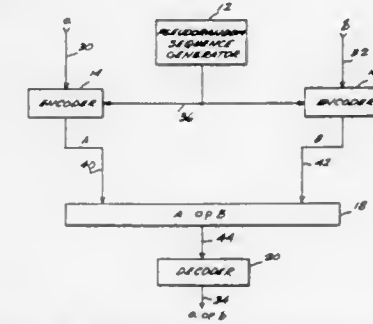
Frederick B. Holt, Seattle, and Dzlem D. Nguyen, Redmond, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 28, 1988, Ser. No. 291,655

Int. Cl.<sup>6</sup> G06F 1/02

U.S. Cl. 364—717

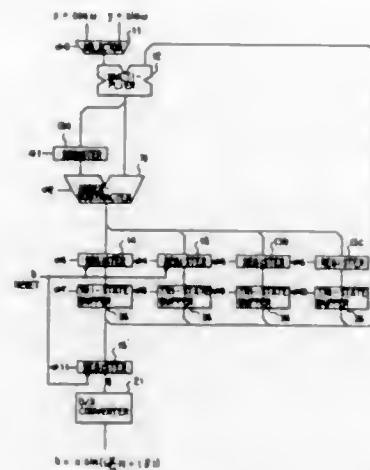
8 Claims



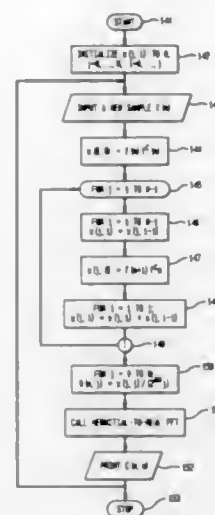
1. A method of performing a primitive data processing operation in which first and second input signals are combined to produce an output signal, the method comprising:  
generating a conversion signal representing a pseudorandom sequence of numbers;  
using the conversion signal to convert the first input signal into a first stochastic signal and to convert the second input signal into a second stochastic signal; and  
performing a primitive data processing operation on the first and second stochastic signals to produce the output signal, wherein the primitive data processing operation comprises a maximum operation wherein the output signal corresponds to the larger of the two input signals, and wherein the maximum operation is carried out by performing a nonexclusive OR operation on the first and second stochastic input signals to produce the output signal.



## 22 Claims

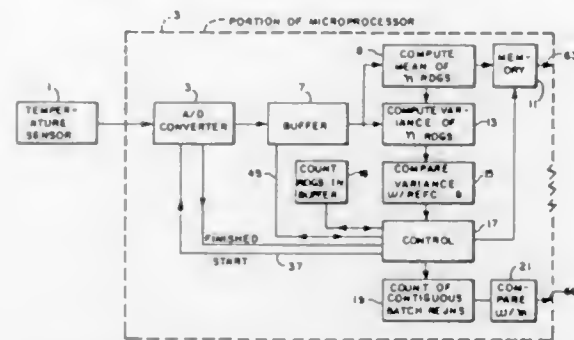


multiplier means coupled to said shift means for performing a multiplication operation on respective ones of said suc-



cessive delayed samples, whereby the binomial kernel is produced.

5,412,590  
APPLIANCE TEMPERATURE SENSOR HAVING NOISE  
FILTERING  
Marvin F. Gaudette, Rockton; Bruce R. Weatherhead, Wil-  
mette, and Joseph J. Cacciato, Westmont, all of Ill., assign-  
ors to Eaton Corporation, Cleveland, Ohio  
Filed Apr. 1, 1993, Ser. No. 41,369  
Int. Cl.<sup>6</sup> G06F 15/31, 15/336; G01K 1/02  
U.S. Cl. 364—728.07 10 Claims



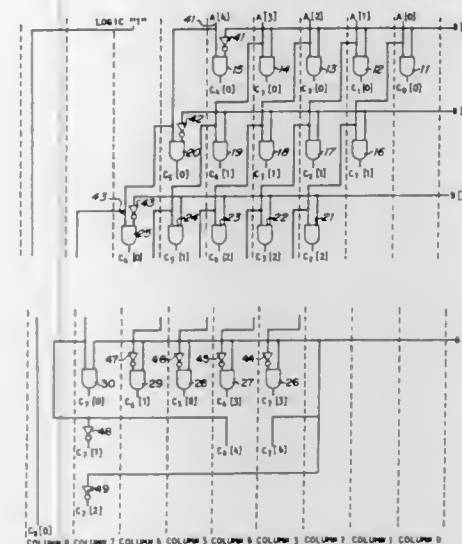
1. In apparatus for use in an appliance having a temperature sensor, wherein the temperature readings made by the sensor are corruptible by noise, the improvement comprising: means (5, 17) for sequentially taking a batch of said temperature readings with said temperature sensor (1); variance means (13) receiving said readings for determining the statistical variance of said batch of readings; comparator means (15) for comparing said variance with a predetermined variance reference value (k) and providing a batch-acceptance signal when said variance is less than said variance reference value and providing a batch-rejection signal when said variance is greater than said variance reference value; storage means (11) responsive to said batch acceptance signal for storing information regarding said batch of readings only when said variance is less than said variance reference value.

41 Claims

1. A system for generating a binomial kernel responsive to a signal to be analyzed, the system comprising:

- shift means formed of a plurality of delay elements for producing successive delayed samples of a digital signal corresponding to the signal to be analyzed;
- adder means coupled to said shift means for performing an addition operation on respective ones of said successive delayed samples; and

5,412,591  
SCHEMATIC COMPILER FOR A MULTI-FORMAT  
HIGH SPEED MULTIPLIER  
Mark V. Bapst, Coral Springs, Fla., assignor to VLSI Technol-  
ogy, Inc., San Jose, Calif.  
Filed Aug. 9, 1990, Ser. No. 564,926  
Int. Cl.<sup>6</sup> G06F 7/52  
U.S. Cl. 364—757  
6 Claims



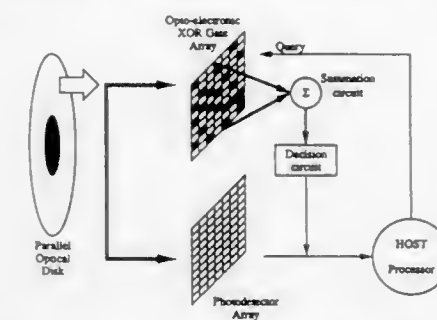
1. An integrated circuit which implements the multiplication of a multiplicand and a multiplier in two's complement format, the integrated circuit comprising:
  - a plurality of logical gates, arranged to receive the multiplicand and the multiplier and to generate summands for two's complement multiplication, the summands arranged in columns;
  - a reduction means, coupled to the plurality of logical gates, for reducing the summands generated by the plurality of logical gates so there is a maximum of two summands in each column, the reduction means including a plurality of adders arranged in rows so that each row of adders reduces a maximum number of summands in each column to a next lower predetermined number stage; and,
  - a final adder row which performs a final addition on summands remaining after the summands have been reduced by the reduction means.

5,412,592  
OPTOELECTRONIC ASSOCIATIVE MEMORY USING  
PARALLEL-READOUT OPTICAL DISK STORAGE  
Ashok V. Krishnamoorthy, San Diego; Philippe J. Marchand,  
San Clemente; Gokce Yayla, San Diego, and Sadik C. Esener,  
Solana Beach, all of Calif., assignors to The Regents of the  
University of California, Oakland, Calif.  
Filed Oct. 31, 1991, Ser. No. 785,408  
Int. Cl.<sup>6</sup> G11C 15/00

**U.S. Cl. 365—49** **41 Claims**

1. An optoelectronic associative memory comprising:  
an optical storage means for producing an optically-encoded first word having a multiplicity of bits encoded in parallel upon a light beam;  
a multiplicity of light detector means, responsive to the light beam, operative in parallel for producing a first multiplicity of electrical signals corresponding to the multiplicity of parallel-encoded bits in the optically-encoded first word;  
an electrical query means for producing a second word having a multiplicity of bits electrically-encoded as a second multiplicity of electrical signals;  
comparator means, receiving the first and the second multiplicities of electrical signals, for comparing the first and

the second multiplicities of electrical signals in order to determine the correspondence between the optically-



encoded first word and the electrically-encoded second word.

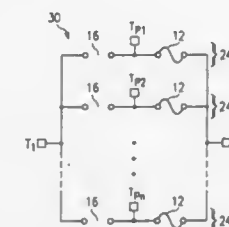
5,412,593

**FUSE AND ANTIFUSE REPROGRAMMABLE LINK FOR  
INTEGRATED CIRCUITS**

Gregory A. Magel, Dallas, and Richard A. Stoltz, Plano, both of  
Tex., assignors to Texas Instruments Incorporated, Dallas,  
Tex.

Filed Jan. 12, 1994, Ser. No. 180,581  
Int. Cl.<sup>6</sup> H03K 19/173

U.S. Cl. 365—96 23 Claims



1. A reprogrammable electrical circuit comprising:
  - a first terminal;
  - a second terminal;
  - a link, connected between said first terminal and said second terminal, wherein said link includes at least one fuse and at least one antifuse, said fuse and said antifuse being connected together in series, whereby the circuit is reprogrammable so as to alternatively open and close an electrically conductive path between said first terminal and said second terminal;
  - a first fuse and a first antifuse connected in series to form a first series sublink, said first series sublink connected on one end to said first terminal and on the other end to said second terminal;
  - a second fuse, connected in parallel with said first series sublink, wherein said link comprises said first sublink and said second fuse, whereby allowing reprogramming of said semiconductor device more than once; and
  - a second antifuse and a third fuse connected in series to form a second series sublink, said second series sublink connected in parallel with said first fuse, whereby allowing programming of said semiconductor device more than once.

5,412,594

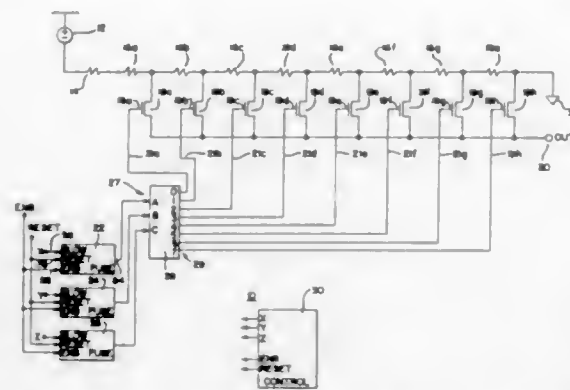
**FUSE TRIMMING IN PLASTIC PACKAGE DEVICES**  
Miki Moyal; Thomas Brennan, and Gene Vance, all of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Division of Ser. No. 149,191, Nov. 8, 1993, Pat. No. 5,384,727.  
This application Aug. 8, 1994, Ser. No. 287,214

Int. Cl.<sup>6</sup> G11C 13/00

U.S. Cl. 365—96

7 Claims



1. A method for selectively coupling at least one of a plurality of circuit branches with an output node, each respective circuit branch of said plurality of circuit branches including a respective switching element of a plurality of switching elements, said respective switching element being responsive to a respective activation signal of a plurality of activation signals to electrically couple said each respective circuit branch with said output node, each said respective switching element coupling said respective circuit branch with said output node when said respective activation signal has a first value and each said respective switching element decoupling said respective circuit branch from said output node when said respective activation signal has a second value, the method comprising the steps of:

providing an electrically interruptible circuit element, said interruptible circuit element establishing a potential at a locus, said potential being at a first potential level when said interruptible circuit element is in an interrupted state, said potential being at a second potential level when said interruptible circuit element is in a noninterrupted state; detecting said potential at one of said first potential level or said second potential level; generating a code at one value of a first value and a second value when said potential is at said first potential level, and generating said code at the other value of said first value and said second value when said potential is at said second potential level; decoding said code to generate said plurality of activation signals; and applying a test signal to said electrically interruptible circuit element, generating said code at a first test value, applying an operational signal to said interruptible circuit element, generating said code at a second test value, and comparing said first test value and said second test value.

5,412,595

**OPTO-ELECTRONIC MEMORY SYSTEM**

John M. Shannon, Whyteleaf, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 19, 1994, Ser. No. 277,447

Claims priority, application United Kingdom, Jul. 21, 1993, 9315125

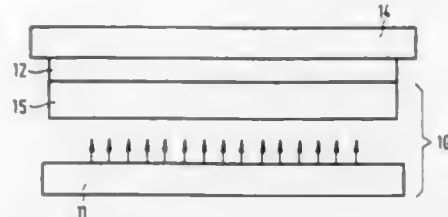
Int. Cl.<sup>6</sup> G11C 13/04, 11/42

U.S. Cl. 365—108

12 Claims

1. An opto-electronic memory system comprising a planar memory element in which information is stored in a two dimensional array of optically readable memory locations and

reading means for optically reading information in the memory element and providing an electrical output in accordance therewith, the reading means comprising an electro-optic shutter arrangement which is operable to address memory locations of the memory element with reading light and to scan the array with said reading light along in a first direction of the array, and a light sensing arrangement comprising a planar array of linear light sensitive elements disposed adjacent to the



memory element with the linear light sensitive elements extending parallel to one another in said first direction for sensing light from the memory element, characterised in that the light sensing arrangement is disposed adjacent to the output side of the electro-optic shutter arrangement and has a surface remote from the electro-optic shutter arrangement over which the memory element is disposed in close proximity to the light sensitive elements thereof, the light sensing arrangement being operable in a contact sensing mode.

5,412,596

**SEMICONDUCTOR STORAGE DEVICE WITH A FERROELECTRIC TRANSISTOR STORAGE CELL**  
Kazuhiko Hoshiba, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 961,955, Oct. 16, 1992, abandoned.

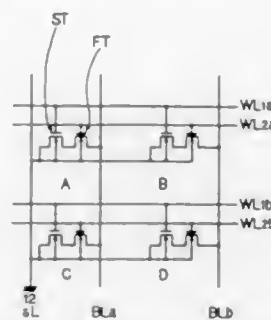
This application Apr. 28, 1994, Ser. No. 235,149

Claims priority, application Japan, Oct. 25, 1991, 3-279632

Int. Cl.<sup>6</sup> G11C 11/22

U.S. Cl. 365—145

2 Claims



1. A semiconductor storage device having a memory array composed of storage cells arranged in a matrix on a semiconductor substrate, said storage cells each comprising:

a ferroelectric transistor having source and drain regions provided in said semiconductor substrate, a ferroelectric film provided directly on a surface of said semiconductor substrate between said source and drain regions, and a first gate electrode provided on said ferroelectric film, said ferroelectric transistor to store information by utilizing residual polarization of said ferroelectric film; and a switching transistor having a channel region provided in said semiconductor substrate and adjacent to said ferroelectric transistor, and a second gate electrode provided over both the channel region and said first gate electrode; wherein a source electrode of one of the two transistors is connected to a drain electrode of the other transistor.

5,412,597

**SLOPE DETECTION METHOD, AND INFORMATION DETECTION/WRITING APPARATUS USING THE METHOD**

Toshihiko Miyazaki, Hiratsuka; Hiroshi Matsuda, Isehara; Hisaaki Kawade, Yokohama; Ken Eguchi, Yokohama; Haruki Kawada, Yokohama; Hideyuki Kawagishi, Ayase; Yoshihiro Yanagisawa, Isehara; Keisuke Yamamoto, Yamato; Toshimitsu Kawase, Atsugi; Takahiro Oguchi, Atsugi; Toshihiko Takeda, Atsugi, and Masahiro Tagawa, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

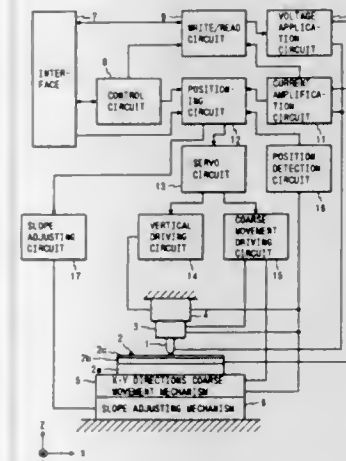
Continuation of Ser. No. 975,115, Nov. 12, 1992, abandoned, which is a continuation of Ser. No. 794,463, Nov. 19, 1991, abandoned. This application Oct. 15, 1993, Ser. No. 155,375

Claims priority, application Japan, Nov. 20, 1990, 2-317030; Jul. 17, 1991, 3-201151

Int. Cl.<sup>6</sup> G11C 13/00

U.S. Cl. 365—174

23 Claims



1. A method of detecting a slope of a surface of an information record medium in an apparatus for detecting/writing information using a probe from/in the recording medium, said method comprising the steps of:

scanning the surface of said information record medium in a two-dimensional direction using said probe; detecting information from the surface of said information record medium through said probe when the scanning step is executed; detecting a slope of the surface of said information record medium to a scan plane of said probe on the basis of the information detection result; and adjusting a relative slope between the surface of said information record medium and said scan plane of said probe on the basis of the detection result of said slope detecting step.

5,412,598

**BISTABLE FOUR LAYER DEVICE, MEMORY CELL, AND METHOD FOR STORING AND RETRIEVING BINARY INFORMATION**

David D. Shulman, Ocean Township, Ocean County, N.J., assignor to The University of British Columbia, Vancouver, Canada

Continuation-in-part of Ser. No. 874,467, Apr. 27, 1992, Pat. No. 5,285,083. This application Feb. 4, 1994, Ser. No. 192,047

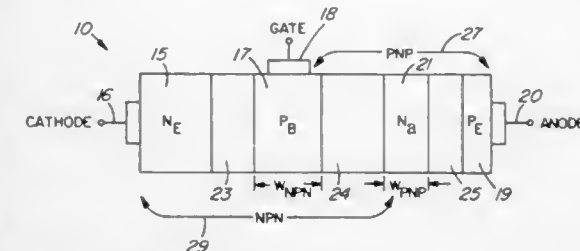
Int. Cl.<sup>6</sup> H01L 29/74, 29/80

U.S. Cl. 365—174

7 Claims

1. A memory cell comprising:  
a. a four layer semiconductor device comprising a n-type cathode region; a p-type gate region; a third semiconductor region adjacent said gate region, and an anode region adjacent said third semiconductor region;  
b. bias means for applying a bias voltage between said anode and cathode regions, said bias voltage such that a junction

between said third semiconductor region and said gate region is reversed biased, said device is in a high impedance "off" state and a gate current-voltage curve of said semiconductor device comprises a negative resistance region;  
c. a data line; and



d. a gate load element in series electrical connection between said gate region and said data line; wherein, when said bias voltage is applied to said device, said memory cell has first and second stable states characterized by gate-cathode voltages  $V_{G1}$  and  $V_{G2}$  respectively.

5,412,599

**NULL CONSUMPTION, NONVOLATILE, PROGRAMMABLE SWITCH**

Vincenzo Daniele, Brugherio; Mirella Benedetti, Vimercate, and Nuccio Villa, Roncello, all of Italy, assignors to SGS-Thomson Microelectronics, s.r.l., Milan, Italy

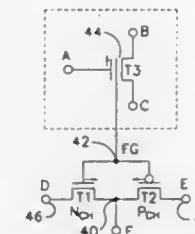
Continuation-in-part of Ser. No. 816,885, Dec. 31, 1991, Pat. No. 5,282,161. This application Sep. 25, 1992, Ser. No. 951,274

Claims priority, application Italy, Sep. 26, 1991, VA91A0035

Int. Cl.<sup>6</sup> G11C 7/02; H03K 19/096

U.S. Cl. 365—185

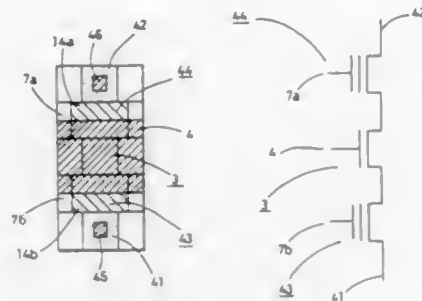
23 Claims



1. A null consumption integrated switch settable by programming in a nonvolatile manner, which comprises a pair of complementary transistors having a common drain and a common gate, a source of a transistor of said pair being functionally connected to a first voltage node and a source of the other transistor of said pair being functionally connected to a different voltage node of the integrated switch;  
a programmable and erasable memory cell having a chargeable and dischargeable floating gate which is directly connected to said common gate of said transistors; the state of charge of said floating gate, imposed by programming or erasing said memory cell, determining one or the other state of an output node of the switch which coincides with the common drain of said transistors.



5,412,600  
**NON-VOLATILE SEMICONDUCTOR DEVICE WITH  
 SELECTING TRANSISTOR FORMED BETWEEN  
 ADJACENT MEMORY TRANSISTORS**  
 Moriyoshi Nakajima, Hyogo, Japan, assignor to Mitsubishi  
 Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Oct. 8, 1992, Ser. No. 958,060  
 Claims priority, application Japan, Oct. 9, 1991, 3-261869;  
 Oct. 2, 1992, 4-263984  
 Int. Cl.<sup>6</sup> G11C 11/40  
 U.S. Cl. 365—185 22 Claims

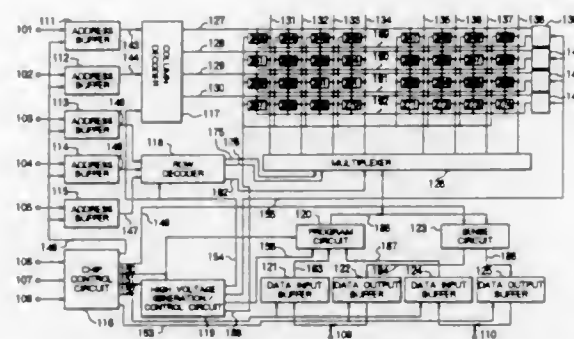


14. An EEPROM comprising:  
 a semiconductor substrate;  
 a plurality of first and second control lines arranged in rows  
 and columns, said first control lines including control gate  
 signal lines and word lines and said second control lines  
 including bit lines; and  
 a plurality of memory cells, each memory cell including a  
 gate electrode structure and first and second source/drain  
 regions formed on opposite sides of said gate electrode  
 structure in said substrate, said gate electrode structure  
 including a selected gate electrode formed on said substrate  
 and a pair of stacked gate electrodes formed on opposite  
 sides of said select gate, said stacked gate electrodes in-  
 cluding a floating gate electrode formed on said substrate  
 and a control gate electrode, independently provided  
 from said floating gate, formed on said floating gate elec-  
 trode,  
 said select gate electrode formed parallel to the control gates  
 of said stacked gate electrodes and operating in synchroni-  
 zation with the control gates, said source/drain regions  
 connected to said bit lines, said select gate electrodes  
 connected to said control gate signal lines and said control  
 gate electrodes connected to said word lines.

5,412,601  
**NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE  
 CAPABLE OF STORING MULTI-VALUE DATA IN EACH  
 MEMORY CELL**  
 Kikuzo Sawada, and Toshio Wada, both of Tokyo, Japan, assign-  
 ors to Nippon Steel Corporation, Tokyo, Japan  
 Filed Aug. 30, 1993, Ser. No. 112,997  
 Claims priority, application Japan, Aug. 31, 1992, 4-255608;  
 Aug. 31, 1992, 4-255609; Aug. 31, 1992, 4-255610  
 Int. Cl.<sup>6</sup> G11C 11/56  
 U.S. Cl. 365—185 21 Claims

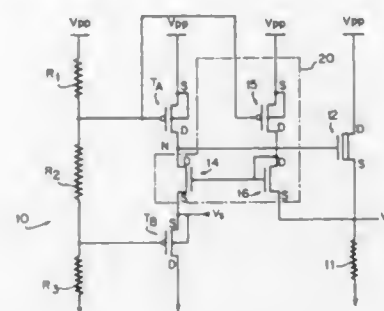
1. An electrically erasable non-volatile semiconductor mem-  
 ory device comprising:  
 a plurality of row lines and column lines;  
 a plurality of memory cells connected in a matrix to said  
 plurality of row lines and column lines;  
 selection means for selecting a desired one of said plurality  
 of memory cells;  
 write-control means for writing data into said plurality of  
 memory cells, said write-control means including means  
 for presetting at least four voltage signals having different  
 voltage values, and means for selecting one of said four  
 voltage signals according to a data signal externally ap-

plied thereto and for applying said selected voltage signal  
 to said selected memory cell; and



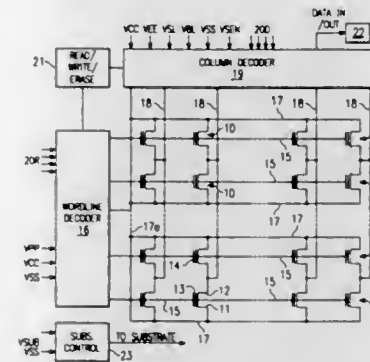
read-control means for reading out data written into said  
 selected memory cell and converting the data read-out  
 from said selected memory cell into a data signal corre-  
 sponding to one of said four voltage signals.

5,412,602  
**DEVICE FOR GENERATING A VOLTAGE FOR  
 PROGRAMMING A PROGRAMMABLE PERMANENT  
 MEMORY, ESPECIALLY OF EPROM TYPE, METHOD  
 AND MEMORY RELATING THERETO**  
 Emilio Yero, Aix-En-Provence, France, assignor to SGS-Thom-  
 son Microelectronics S.A., Gentilly, France  
 PCT No. PCT/FR92/00967, § 371 Date Nov. 3, 1993, § 102(e)  
 Date Nov. 3, 1993, PCT Pub. No. WO93/08573, PCT Pub.  
 Date Apr. 29, 1993  
 PCT Filed Oct. 14, 1992, Ser. No. 75,563  
 Claims priority, application France, Oct. 18, 1991, 91 12888  
 Int. Cl.<sup>6</sup> G11C 13/00  
 U.S. Cl. 365—189.01 15 Claims



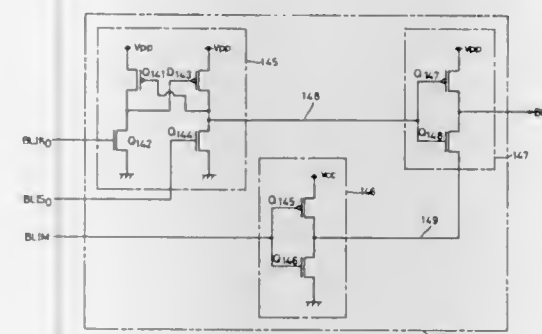
1. A device for generating a voltage for programming a  
 programmable permanent memory, especially of EPROM  
 type, from an external DC voltage source, comprising means  
 for generating a reference voltage, which furthermore com-  
 prises means for duplicating said reference voltage, arranged as  
 a current and voltage mirror structure and generating the  
 programming voltage as output, and a follower MOS transistor  
 whose drain and source are connected respectively to the  
 external DC voltage source and to the output of said duplicat-  
 ing means and whose gate is connected to a predetermined  
 internal node of said means for generating a reference voltage.

5,412,603  
**METHOD AND CIRCUITRY FOR PROGRAMMING  
 FLOATING-GATE MEMORY CELL USING A SINGLE  
 LOW-VOLTAGE SUPPLY**  
 John F. Schreck, Lucas; Cetin Kaya, Dallas, and David J. McEl-  
 roy, Allen, all of Tex., assignors to Texas Instruments Incor-  
 porated, Dallas, Tex.  
 Filed May 6, 1994, Ser. No. 239,008  
 Int. Cl.<sup>6</sup> G11C 7/00  
 U.S. Cl. 365—189.01 22 Claims



21. Circuitry for programming a floating-gate memory cell  
 in a nonvolatile integrated-circuit memory having a reference-  
 voltage terminal and a supply-voltage terminal, said cell hav-  
 ing a drain, a source and a control gate, said circuitry compris-  
 ing:  
 means for applying a first voltage to said source of said  
 memory cell, said first voltage less than the voltage at said  
 reference-voltage terminal;  
 means for applying a second voltage to said drain of said  
 memory cell, said second voltage greater than the voltage  
 at said supply-voltage terminal;  
 means for applying a third voltage greater than the voltage  
 at said reference-voltage terminal to said control gate.

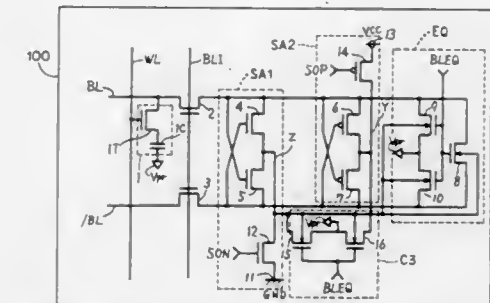
5,412,604  
**SEMICONDUCTOR DEVICE USING BOOSTED SIGNAL**  
 Tatsuya Fukuda, and Takeshi Kajimoto, both of Hyogo, Japan,  
 assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo,  
 Japan  
 Filed May 26, 1994, Ser. No. 249,607  
 Claims priority, application Japan, May 31, 1993, 5-129214;  
 Mar. 25, 1994, 6-055350  
 Int. Cl.<sup>6</sup> G11C 7/00  
 U.S. Cl. 365—189.11 16 Claims



1. A semiconductor device carrying out a predetermined  
 operation in response to a timing at which a third control signal  
 provided in response to first and second control signals  
 changes from a first voltage level to a boosted second voltage  
 level, comprising:  
 output means for providing said second control signal de-  
 layed from said first control signal; and  
 control signal output means for providing said third control

signal rising from said first voltage level to said second  
 voltage level, wherein said third control signal is pulled up  
 to a third voltage level which is intermediate between said  
 first voltage level and said second voltage level in re-  
 sponse to said first control signal, and then pulled up to  
 said second voltage level in response to said second control  
 signal.

5,412,605  
**SEMICONDUCTOR MEMORY DEVICE**  
 Tsukasa Ooishi, Hyogo, Japan, assignor to Mitsubishi Denki  
 Kabushiki Kaisha, Tokyo, Japan  
 Filed Feb. 24, 1994, Ser. No. 201,498  
 Claims priority, application Japan, Feb. 25, 1993, 5-036311  
 Int. Cl.<sup>6</sup> G11C 7/00  
 U.S. Cl. 365—203 5 Claims

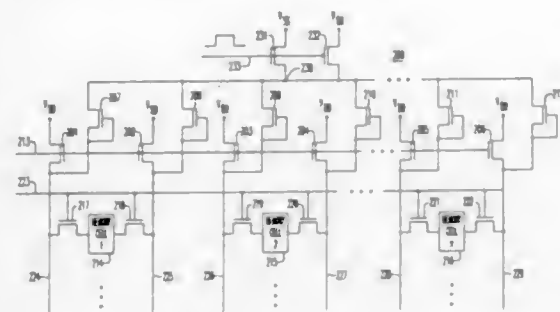


1. A semiconductor memory device formed on a semicon-  
 ductor substrate, comprising:  
 a memory cell storing charge representing data,  
 a pair of bit lines connected to said memory cell, and from  
 which a potential difference is generated therebetween  
 according to said charge,  
 precharge means including an MOS transistor connected  
 between said pair of bit lines for precharging said pair of  
 bit lines to a predetermined precharge potential prior to  
 generation of a potential difference according to said  
 charge by operation of said MOS transistor,  
 differential amplify means including a pair of MOS transis-  
 tors connected in series between said pair of bit lines for  
 differential-amplifying the potential difference between  
 said pair of bit lines by bringing the potentials of the  
 sources of said pair of MOS transistors to said precharge  
 potential in said precharging and then changing the poten-  
 tials therefrom,  
 potential control means for controlling the substrate poten-  
 tial of the MOS transistor of said precharge means so as to  
 commensurate with change in the potentials of sources of  
 said pair of MOS transistors of said differential amplify  
 means.

5,412,606  
**MEMORY PRECHARGE TECHNIQUE**  
 Kang W. Lee, Allentown, Pa., assignor to AT&T Corp., Murray  
 Hill, N.J.  
 Filed Mar. 29, 1994, Ser. No. 219,059  
 Int. Cl.<sup>6</sup> G11C 7/00

21 Claims  
 1. An integrated circuit comprising a memory array having  
 memory cells arranged in rows and columns, with the memory  
 cells in each column being accessed by one or more column  
 conductors; and  
 wherein said column conductors are precharged to a first  
 voltage level during a precharge period prior to the mem-  
 ory access portion of a memory cycle;  
 Characterized in that said integrated circuit further com-  
 prises load resistors that are connected between said col-  
 umn conductors and a source of a second voltage level

that is lower than said first voltage level during a discharge period wherein said discharge period occurs entirely within said precharge period;



and wherein said load resistors are not connected between said column conductors and said source of a second voltage level during at least a portion of said memory cycle.

5,412,607

## SEMICONDUCTOR MEMORY DEVICE

Susumu Kusaba, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

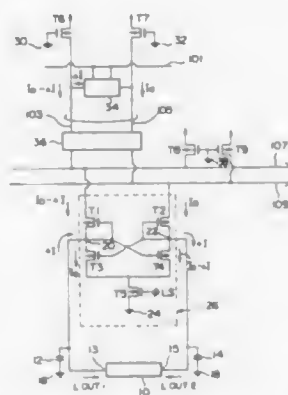
Filed May 25, 1994, Ser. No. 248,880

Claims priority, application Japan, May 28, 1993, 5-127566

Int. Cl.<sup>6</sup> G11C 11/40

U.S. Cl. 365—208

4 Claims



1. A semiconductor memory device comprising:
  - a first and second bit lines;
  - a word line;
  - a memory cell electrically connected to said first and second bit lines and said word line;
  - a first current sense amplifier for reducing a potential level of a current flowing in said first and second bit lines and comprising first and second P-type transistors each having first and second main electrodes and a control electrode and third, fourth and fifth N-type transistors each having first and second main electrodes and a control electrode, said first main electrode of said first P-type transistor being connected electrically to said first bit line, said second main electrode of said first P-type transistor being connected to said second main electrode of said third N-type transistor through a first node and said control electrode of said first P-type transistor being connected to said second main electrode of said third N-type transistor through the first node and connected to said control electrode of said fourth N-type transistor, said first main electrode of said second P-type transistor being connected to said second bit line, said second main electrode of said second P-type transistor being connected to said second main electrode of said fifth N-type transistor through a second node and said control electrode of said second P-type transistor being connected to said second main electrode of said fifth N-type transistor through the second node;

second node and said control electrode of said second P-type transistor being connected to said second main electrode of said fourth N-type transistor through the second node and connected to said control electrode of said third N-type transistor, said first main electrodes of said third and fourth N-type transistors being connected to said second main electrode of said fifth N-type transistor, and said first main electrode of said fifth N-type transistor being connected to an earth; and

a second sense amplifier electrically connected to an output of said first sense amplifier, for amplifying the amplitude of a potential applied between said first and second bit lines.

5,412,608

## METHOD OF ERASING DATA ON NON-VOLATILE SEMI-CONDUCTOR MEMORY

Ken-ichi Oyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

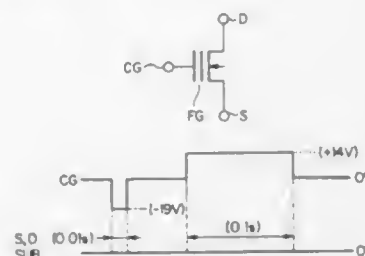
Filed Nov. 12, 1993, Ser. No. 150,809

Claims priority, application Japan, Nov. 13, 1992, 4-303431

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—218

7 Claims



7. A method of erasing data on a n-type non-volatile semiconductor memory with a plurality of cells each having a control gate, a floating gate, a tunnel insulation film, a source and drain area, and data are written by storing electrons in said floating gate through said tunnel insulation film and erased by taking out electrons stored in the floating gate through the tunnel insulation film, wherein said method of erasing data comprising the steps of:

- applying a first data erasing voltage to said control gate until a voltage that a threshold voltage of a cell having lowest data erasing operation speed in said non-volatile semiconductor memory becomes highest threshold voltage within the threshold voltages of data erasing state allowing a least Fowler-Nordheim current to pass the tunnel insulation film; and
- applying a second erasing data voltage to said control gate for storing electrons in said floating gate until a voltage that a threshold voltage of a non-volatile memory cell having highest data erasing operation speed becomes highest threshold voltage within the threshold voltage of data erasing state allowing a greatest Fowler-Nordheim current to pass said tunnel insulation film.

5,412,609

## NONVOLATILE SEMICONDUCTOR MEMORY DEVICE

Nobuaki Ohtsuka, Kawasaki, and Junichi Miyamoto, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 21, 1994, Ser. No. 215,483

Claims priority, application Japan, Apr. 30, 1993, 5-104406

Int. Cl.<sup>6</sup> G11C 7/00

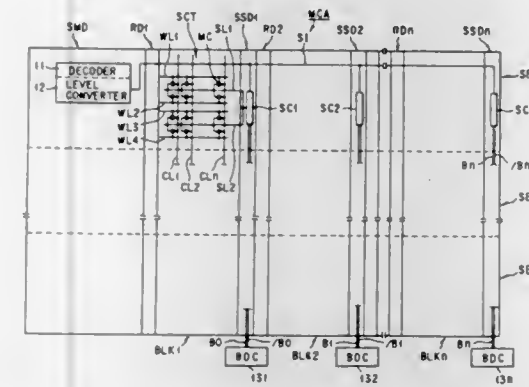
U.S. Cl. 365—218

20 Claims

1. A nonvolatile semiconductor memory device, comprising:
  - a memory cell array having a plurality of blocks arranged in a column direction, a plurality of sections arranged in a

row direction, and a plurality of sectors, said sectors being formed in areas where said sections and said blocks cross, each of said sectors including a plurality of word lines, a plurality of bit lines arranged to cross said word lines, source lines, and a plurality of memory cells, each of said memory cells including a transistor having a gate connected to one of said word lines, a drain connected to one of said bit lines, and a source connected to one of said source lines;

first selecting means, provided in each of said sections, for selecting at least one section in accordance with an address signal so as to output a signal for selecting said section;



second selecting means, provided in each of said blocks, for selecting at least one block in accordance with the address signal;

supplying means, each provided in a corresponding one of said sectors, and selected by said first and second selecting means, for supplying an output signal of said first selecting means as an erase voltage to the source lines included in the corresponding sector; and

third selecting means, each provided in a corresponding one of said sectors, for selecting word lines of the corresponding sector in accordance with the output signal of said first selecting means.

5,412,610

## SERIAL DATA TRANSFER DEVICE

Katsunori Suzuki, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

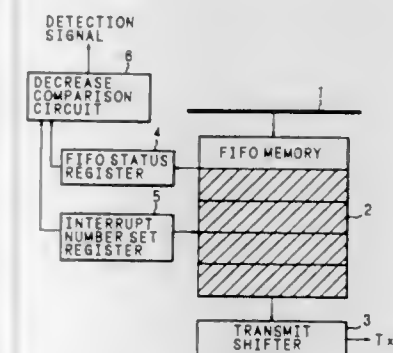
Filed Jun. 28, 1994, Ser. No. 267,179

Claims priority, application Japan, Jun. 29, 1993, 5-158830

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—219

6 Claims



1. A serial data transfer device for transferring serial data, comprising:
  - first storage means for storing a parallel data, for converting the stored parallel data into a serial data, and for moving one bit which is a part of the serial data, for each bit;
  - second storage means for storing plural parallel data, and for

outputting the stored plural parallel data to said first storage means, in the order in which the parallel data are stored in said second storage means;

indication means for indicating the number of plural parallel data stored in said second storage means;

third storage means for storing a predetermined number of parallel data to be stored in said second storage means; and

comparison means for comparing an indication value of said indication means with a stored value of said third storage means, and for, when the indication value of said indication means is decreased and coincides with the stored value of said third storage means, outputting a coincidence detection signal.

5,412,611

## FIFO MEMORY DEVICE CAPABLE OF WRITING CONTIGUOUS DATA INTO ROWS

Hiroshi Hattori, and Junichi Sugiyama, both of Kawasaki, Japan, assignors to Fujitsu, Limited, Kawasaki, Japan

Filed Mar. 12, 1993, Ser. No. 31,121

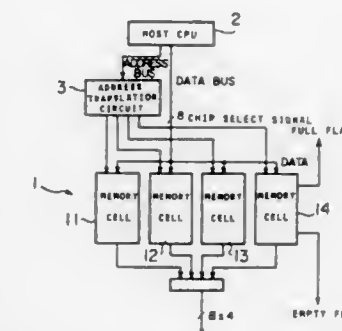
Claims priority, application Japan, Mar. 17, 1992, 4-060113;

Oct. 15, 1992, 4-277434; Oct. 16, 1992, 4-278664

Int. Cl.<sup>6</sup> G11C 8/00

U.S. Cl. 365—221

1 Claim



1. A FIFO memory device, comprising:
  - storage means containing a plurality of FIFO storage unit cells connected in parallel, wherein data is input to and output from each of said FIFO storage unit cells one word at a time, and data is input to said storage means one word at a time and output from said storage means in units of a plurality of words; and
  - address translation means being disposed between a central processing unit and an input side of said storage means for translating an address specified by said central processing unit into an address specifying one of the storage unit cells of said storage means, said address translation means including,
    - (a) count enable signal output means responsive to addressing from said central processing unit for outputting a count enable signal,
    - (b) count means responsive to said count enable signal from said count enable signal output means for counting up, and
    - (c) selection means responsive to a count value of said count means for selecting one of said storage unit cells.

5,412,612

## SEMICONDUCTOR STORAGE APPARATUS

Yukihiko Oyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 8, 1993, Ser. No. 87,282

Claims priority, application Japan, Jul. 8, 1992, 4-180215

Int. Cl.<sup>6</sup> G11C 14/00

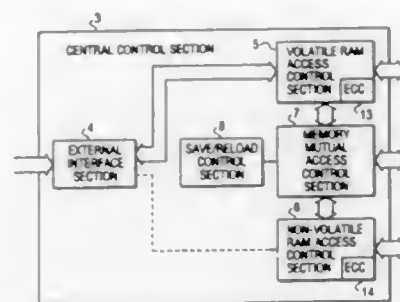
U.S. Cl. 365—228

5 Claims

5. A semiconductor storage apparatus, comprising:
  - a volatile RAM section;



a non-volatile RAM section;  
volatile RAM access control means for controlling read/write access to said volatile RAM section;  
non-volatile RAM access control means for controlling read/write access to said non-volatile RAM section, said non-volatile RAM access control means including count-

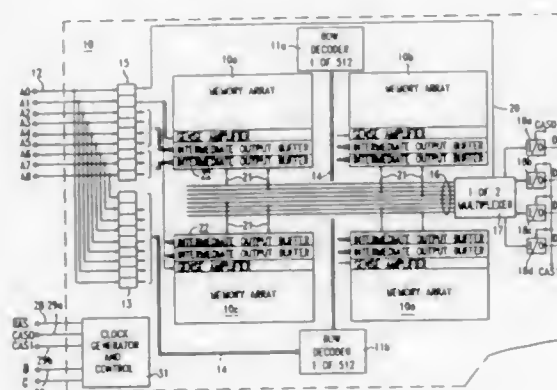


ers for counting a number of write accesses to each memory area of said non-volatile RAM section; and control means for determining a memory area in which the number of write accesses is a minimum, based on values of said counters, so that writes to said non-volatile RAM are to said memory area.

5,412,613  
MEMORY DEVICE HAVING ASYMMETRICAL CAS TO  
DATA INPUT/OUTPUT MAPPING AND APPLICATIONS  
THEREOF

Duane E. Galbi, Jericho; Michael P. Clinton, and Mark W. Kellogg, both of Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Dec. 6, 1993, Ser. No. 161,279

U.S. Cl. 365—230.03 15 Claims

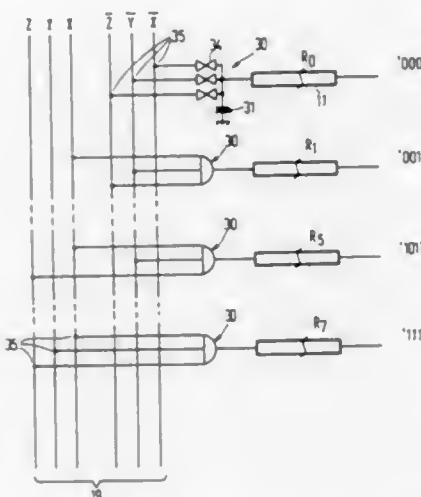


1. A semiconductor memory system comprising:  
at least one array of addressable memory cells;  
means to address a plurality of memory cells within a single  
memory access cycle;  
a first and a second clocking signal;  
circuit means for enabling a first odd number of said ad-  
dressed cells to be accessed and for enabling a second odd  
number of said addressed cells to be accessed;  
said circuit means responsive to said first clocking signal for  
enabling said first odd number of said addressed cells to be  
accessed; and  
said circuit means responsive to said second clocking signal  
for enabling said second odd number of said addressed  
cells to be accessed;  
wherein one of said first and second odd numbers is greater  
than 1.

5,412,614  
ELECTRONIC MATRIX ARRAY DEVICES AND  
SYSTEMS INCORPORATING SUCH DEVICES  
Neil C. Bird, Redhill, England, assignor to U.S. Phillips Corpora-  
tion, New York, N.Y.

Filed Aug. 11, 1992, Ser. No. 928,926  
Claims priority, application United Kingdom, Aug. 16, 1991,  
9117680

Int. Cl.<sup>6</sup> G11C 8/02  
U.S. Cl. 365—230.06 15 Claims



1. An electronic matrix device comprising:

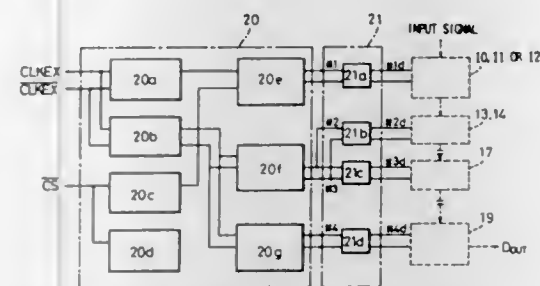
- a) an electronic matrix array formed by a set of row conductors crossing a set of column conductors, a matrix cell being at each intersection of the crossing conductors, a plurality of the matrix cells respectively comprising two-terminal thin film non-linear impedance elements;
- a) a row address decoder having outputs respectively coupled to the respective conductors of the set of row conductors for supplying row selection signals thereto corresponding to row address signals supplied to inputs of said row address decoder;
- a) a column address decoder having outputs respectively coupled to respective conductors of the set of column conductors for supplying column selection signals thereto corresponding to column address signals supplied to inputs of said column address decoder; and
- at least one of said decoders comprising a series of multi-input single-output logic gates, the output of each gate being a respective output of the decoder, the inputs of each gate being coupled to an address bus which is common to all gates and which supplies address signals from which each gate produces at its output a selection signal for the conductor connected to said output;

characterized in that each logic gate comprises:

- (i) a charge storage capacitance at the output of said gate; and
- (ii) a plurality of two-terminal thin-film non-linear impedance elements of the same kind as said impedance elements in said matrix array, the impedance elements of each gate being respectively connected between a respective input of said gate and the output thereof so as to charge said storage capacitance to a charge voltage determined by the address signals supplied to the inputs of said gate, said charge voltage being stored by said capacitance so that the gate operates as a latch circuit, the stored voltage being indicative of the logic operation performed by said gate and constituting the selection signal produced at the output of said gate and applied to the conductor connected thereto.

5,412,615  
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE  
Hiromi Noro; Shinnosuke Kamata, and Yoshinori Okajima, all  
of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki,  
Japan

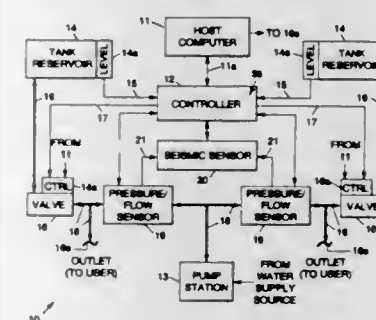
Filed Dec. 14, 1993, Ser. No. 166,099  
Claims priority, application Japan, Dec. 28, 1992, 4-349071  
Int. Cl.<sup>6</sup> G11C 8/00



4. A pipeline semiconductor memory comprising:  
input buffers inputting external clock signals;  
a plurality of clock generation portions generating a plurality of internal clock signals synchronized with said external clock signal;  
a plurality of delay portions outputting internal clock signals for each of a plurality of pipeline stages by delaying said internal clock signals by a predetermined time; and  
internal circuits forming each stage of a plurality of said pipeline stages, the operation timings of said internal circuits being restricted by said internal clock signals.

5,412,616  
SAFETY MONITORING AND CONTROL SYSTEM  
Earnest R. Gonzalez, 33761 The Street of the Blue Lantern,  
Dana Point, Calif. 92629

U.S. Cl. 367-13 14 Claims



1. A closed loop safety monitoring and control system comprising:
  - a switching device;
  - a sensor coupled to the switching device for sensing a predetermined condition thereof and for providing sensor output signals indicative of the predetermined condition;
  - a programmable controller comprising a seismic sensor for detecting a seismic disturbance and providing seismic output signals indicative of the seismic disturbance, wherein the controller is coupled between the sensor and the switching device and forms a closed loop control system for monitoring and controlling the switching device, and wherein the controller is responsive to the sensor output signals and the seismic output signals, and provides first control signals that are applied to the switching device in the absence of a seismic disturbance to provide for closed loop control of the switching device under normal operating conditions, and provides second

5,412,617  
HIGH RESOLUTION MEASURING METHOD AND  
APPARATUS

Hideharu Morimatsu, Kobe, and Toyoki Sasakura, Ashiya, both of Japan, assignors to Furuno Electric Company, Limited, Hyogo, Japan

PCT No. PCT/JP92/00817, § 371 Date Apr. 22, 1993, § 102(e) Date Apr. 22, 1993

PCT Filed Jun. 26, 1992, Ser. No. 39,298  
Claims priority, application Japan, Jun. 26, 1991, 3-154503  
Int. Cl.<sup>6</sup> G01S 15/89, 13/90, 7/52

U.S. Cl. 367-88 4 Claims

1. In a sonar method using a synthetic aperture technique for radiating ultrasonic signals in beam form to objects by means of a transmission transducer unit, receiving echo signals at a plurality of points by means of a moving reception transducer unit, adjusting the phase of a plurality of the received and transduced echo signals, and combining the resultant phase-shifted signals, the improvement comprising the steps of:  
radiating ultrasonic signals by means of a transmission transducer unit having the length "L";  
moving the reception transducer unit over a distance less than the length "L" of the transmission transducer unit during the time period for an ultrasonic signal going to and returning from an object while receiving echo signals by means of said reception transducer unit at a plurality of points;  
adjusting the phase of a plurality of said received and transduced echo signals; and  
combining the phase-adjusted signals so that grating lobes on both sides of the main lobe are eliminated.

5,412,618  
SPOTLIGHT-MODE SYNTHETIC APERTURE  
SIDE-LOOK SONAR  
George A. Gilmour, Severna Park, Md., assignor to Westing-  
house Electric Corporation, Pittsburgh, Pa.

U.S. Cl. 367—88 26 Claims

U.S. Cl. 367-88 26 Claims



1. A synthetic aperture side-look sonar system for mounting to a carrier vehicle having a forward and rearward end in the direction of travel of the vehicle, the system comprising:

- at least one sonar transducer for rotatably mounting to the vehicle, the at least one transducer having a receiving surface for receiving acoustic energy reflected from a target area;
- a mechanical drive connected to the at least one transducer for rotating said receiving surface to receive energy reflected from a target area extending from a location forward of the forward end of the carrier vehicle to a location rearwardly of the carrier vehicle; and
- a control circuit for controlling the rotation of said at least one transducer by said mechanical drive to direct said receiving surface to receive the reflected energy from a corresponding geographical area during a change in the relative position of said target area and the carrier vehicle





5,412,624

## REAL-LIFE TIMER INTERVAL ADJUSTMENT

Thomas M. Yocom, Ft. Lauderdale, Fla., assignor to ABB Power T & D Company, Inc., Blue Bell, Pa.

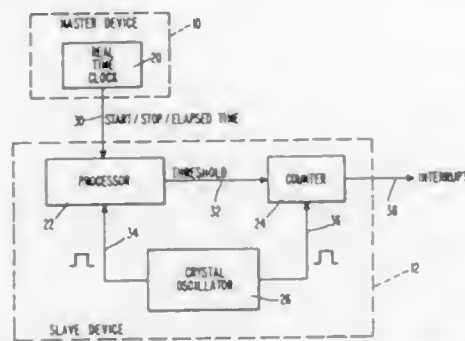
Continuation of Ser. No. 807,989, Dec. 16, 1991, abandoned.

This application Oct. 13, 1993, Ser. No. 135,853

Int. Cl.<sup>6</sup> G04B 5/00, 17/12; H03L 7/00; G06F 15/20

U.S. Cl. 368—156

20 Claims



1. A method of controlling time critical functions comprising the steps of:
  - generating interrupts at a predetermined interval, the reciprocal of the interval defining an interrupt frequency;
  - performing the time-critical functions in response to the interrupts;
  - determining a shift in the interrupt frequency using timing data from a substantially accurate source;
  - defining a new interval to compensate for the frequency shift; and
  - altering the interrupt frequency by increasing the time between a first number of interrupts and by decreasing the time between a second number of interrupts, the average of the time between interrupts of the first and second numbers of interrupts being indicative of the new interval.

5,412,625

## STRUCTURAL GRAPHIC DISPLAY

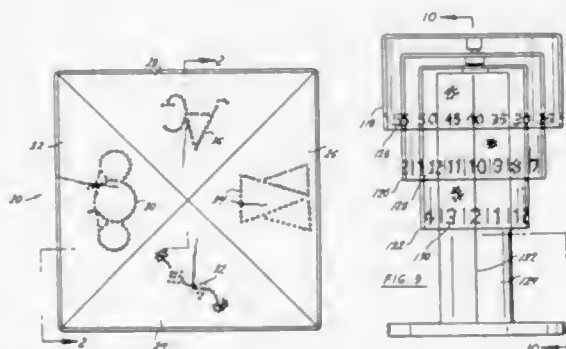
Donna Duchek, 625 Highway Circle Dr., Manchester, Mo. 63021

Filed Feb. 5, 1990, Ser. No. 475,233

Int. Cl.<sup>6</sup> G04B 19/00

U.S. Cl. 368—223

18 Claims



1. A structural graphic display, said display comprising a first surface, said first surface being substantially transparent, an image superposed on said first surface, said image being reversed when viewed directly and thus tending to be unrecognizable, a second surface, said second surface being substantially reflective, the first surface being juxtaposed to the second surface so that the reflection of said reversed image in the second surface is viewable through the first surface, the image being thereby discernible by an observer looking through the

transparent first surface and reversed image and recognizing the image as a reflection in the reflective second surface.

5,412,626

## METHOD OF RECORDING OPTICAL INFORMATION WITH SELECTIVE CORRECTION IN PULSE WAVEFORM AND A RECORDING SYSTEM THEREFOR

Eiji Ohno; Kenichi Nishiuchi, both of Osaka; Kenichi Nagata, Nishinomiyu; Noboru Yamada, Osaka, and Nobuo Akahira, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

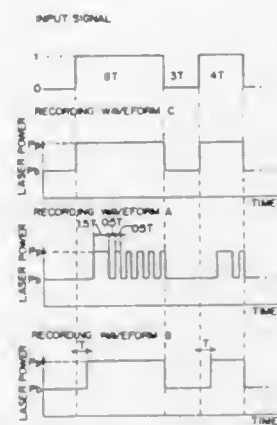
Filed Mar. 23, 1993, Ser. No. 36,198

Claims priority, application Japan, Mar. 23, 1992, 4-064524

Int. Cl.<sup>6</sup> G11B 11/00, 7/00

U.S. Cl. 369—13

17 Claims



1. A method of recording optical information in which a digital signal corrected by modulation in pulse width is overwritten onto an optical information recording medium having its optically discriminatable states reversibly changed by irradiation with a single laser beam spot to form recording marks corresponding to the input signal, comprising the steps of:
  - selecting one of correcting ways for correcting the pulse waveform of the input signal to be recorded, depending on change in relative velocity between the optical information recording medium and the laser beam spot; and
  - modulating the laser beam output power in a range between an erasing level and a recording level in accordance with the corrected pulse waveform of the modulated input signal,
 wherein when the relative velocity is lower than a predetermined value, a recording pulse for forming one recording mark is corrected in waveform into a pulse string having a plurality of short-width pulses before modulating the laser output power, while when the relative velocity is higher than the predetermined value, the laser output power is modulated directly in accordance with the original input signal.

5,412,627

## A MAGNETO-OPTICAL RECORDING SYSTEM INCLUDING A RECORDING MEDIUM HAVING A REVERSAL PREVENTIVE LAYER FOR PREVENTING A MAGNETIZATION REVERSAL OF A BIAS LAYER WHICH IS MAGNETOSTATICALLY COUPLED TO A RECORDING LAYER

Katsutaro Ichihara, Yokohama; Sumio Ashida, Tokyo; Akira Kikitsu, Yokohama, and Yumi Mizusawa, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

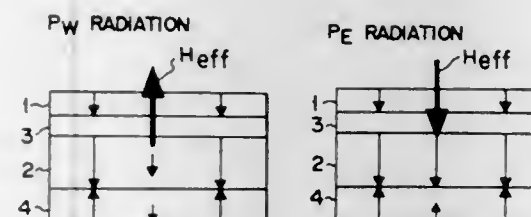
Continuation of Ser. No. 648,821, Jan. 31, 1991, abandoned. This application May 14, 1993, Ser. No. 61,538

Claims priority, application Japan, Jan. 31, 1990, 2-19277; Mar. 8, 1990, 2-54874

Int. Cl.<sup>6</sup> G11B 13/04

U.S. Cl. 369—13

6 Claims



1. A magneto-optical recording system, comprising:
  - a magneto-optical medium including a recording layer for magneto-optically recording information and a bias layer magnetostatically coupled to the recording layer wherein said medium further comprises a reversal preventive layer for preventing magnetization reversal of said bias layer;
  - means for radiating a light beam of a recording power level onto a portion of said medium including a portion of said recording layer and a portion of said bias layer to heat said portion of said recording layer and said portion of said bias layer wherein the value of said recording power level is selected so that said portion of the recording layer is heated to a first magnetization reversal temperature and so that said heating causes a direction of magnetization of said portion of said recording layer irradiated with said light beam to be aligned with a direction of a first leakage field generated from said bias layer based on a magnetic distribution formed in said bias layer by said irradiation with said light beam of said recording power level on said portion of said bias layer, and which thereby causes said portion of said recording layer irradiated with said light beam having said recorded power level to be in an information recorded state;
  - means for irradiating a light beam of an erasure power level onto a portion of said medium including a portion of said recording layer and a portion of said bias layer to heat said recording layer portion and said bias layer portion wherein the value of said erasure power level is selected so that said portion of said recording layer is heated to a second magnetization reversal temperature and so that said portion of said bias layer generates a second leakage field as a function of a magnetic distribution formed in said bias layer due to irradiation of said portion of said bias layer with said light beam of said erasure power level, a magnitude of said second leakage field being different from that of said first leakage field and wherein the direction of magnetization of said portion of said recording layer irradiated with said light beam having an erasure power level is directed so that said direction is opposite to that of said first leakage field, thereby causing said portion of said recording layer irradiated with said light beam having said erasure power level to be in an information erased state,
  - wherein magnetization directions of said bias layer are the same before and after the radiation of the light beam of the recording power level and before and after the radiation of the light beam of the erasure power level, and a magnetization direction of said bias layer is not reversed by a leakage field generated from said recording layer.

ization direction of said bias layer is not reversed by a leakage field generated from said recording layer.

4. A magneto-optical recording system comprising:
  - a magneto-optical medium including a recording layer for magneto-optically recording information and a bias layer magnetostatically coupled to the recording layer wherein said medium further comprises a reversal preventive layer for preventing magnetization reversal of said bias layer;
  - means for radiating a light beam of erasure power level onto a portion of said medium and including a portion of said recording layer and a portion of said bias layer wherein the value of said erasure power level is selected so that said portion of said recording layer is heated to a first magnetization reversal temperature and so that a direction of magnetization of said portion of said recording level irradiated with said light beam having said erasure power level is aligned with a direction of a first leakage field generated from said bias level based on a magnetic distribution formed in said bias level resulting from said irradiation of said portion of said bias level by said light beam of said erasure power level to thereby cause said portion of said recording level irradiated with said light beam having said erasure power level to be in an information erased state;
  - means for radiating a light beam at a recording power level onto a portion of said medium including a portion of said recording layer and a portion of said bias layer wherein the value of said recording power level is selected so that said portion of said recording layer is heated to a second magnetization reversal temperature and whereby said portion of said bias layer irradiated with said beam at said recording power level generates a second leakage field based on a magnetic distribution formed in said bias layer due to said irradiation with said light beam of said recording power level with a magnitude of said second leakage field being different from that of said first leakage field and wherein said portion of said recording layer irradiated with said light beam having said recording power level has a direction of magnetization opposite to the direction of said first leakage field thereby causing said portion of said recording layer irradiated with said light beam having a recording power level to be in an information recorded state,
  - wherein magnetization directions of said bias layer are the same before and after the irradiation of the light beam of the erasure power level and before and after the irradiation of the light beam of the recording power level, and a magnetization direction of said bias layer is not reversed by a leakage field generated from said recording layer.

5,412,628

## APPARATUS FOR INTERMITTENTLY RECORDING AND REPRODUCING A SIGNAL ON A DISC TYPE RECORDING MEDIUM

Shohei Yamazaki; Kazuhiko Honda, and Sadayuki Narusawa, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan

Filed Oct. 1, 1993, Ser. No. 131,406

Claims priority, application Japan, Oct. 5, 1992, 4-290769; Nov. 4, 1992, 4-319504; Dec. 18, 1992, 4-356119; Dec. 24, 1992, 4-357533

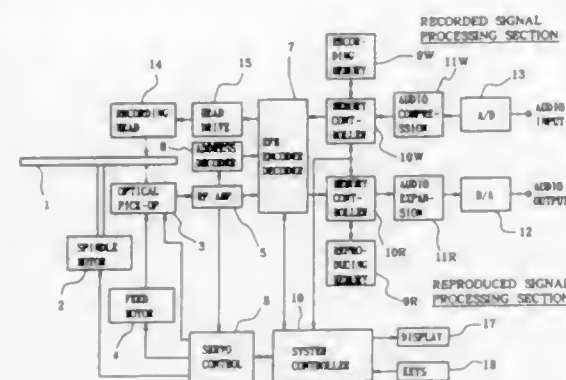
Int. Cl.<sup>6</sup> G11B 17/22

U.S. Cl. 369—32

9 Claims

1. An apparatus for recording and reproducing a signal on a disc type recording medium comprising:
  - recording means for intermittently writing on a disc data to be recorded during a recording mode whose average bit rate is  $\frac{1}{2}$  or less of a rate of recording data on the disc;
  - reproduction means for intermittently reading from the disc during a reproduction mode reproduced data whose average bit rate is  $\frac{1}{2}$  or less of a rate of reproducing data from the disc; and

write and/or read means for performing writing and/or reading on the disc during waiting time between said



intermittent writing and/or reading in the recording and/or reproduction mode.

5,412,629

# METHOD AND APPARATUS FOR RECORDING AND/OR REPRODUCING DATA ON A DISK FORMATTED IN ACCORDANCE WITH A CONSTANT LINEAR VELOCITY (CLV) SYSTEM

Kyoichi Shirane, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

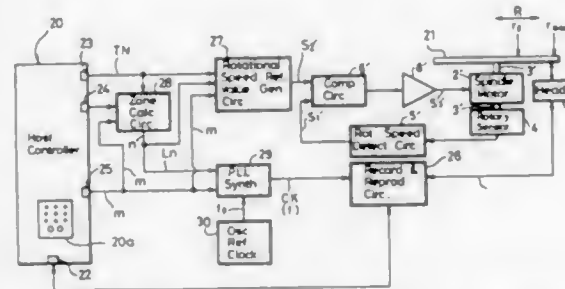
Filed Nov. 23, 1993, Ser. No. 155,799

Claims priority, application Japan, Nov. 26, 1992, 4-317223

Int. Cl.<sup>6</sup> G11B 17/22

U.S. Cl. 369—32

38 Claims



1. In an apparatus for processing data on a disk formatted in accordance with a constant linear velocity (CLV) system and which comprises drive means for rotating said disk, head means movable in a radial direction relative to said disk for scanning radially successive substantially circular tracks on the disk, and circuit means connected with said head means and operable in response to a data transfer clock for causing said head means to selectively record or reproduce data in the tracks scanned thereby, the combination of:

means for dividing said disk into a plurality of virtual zones arranged successively in said radial direction and each comprised of a respective plurality of said tracks;

means for determining the frequency of said data transfer clock during a recording or reproducing operation in dependence on the one of said virtual zones in which the tracks being scanned are situated at least during the initiation of said recording or reproducing operation, with said frequency determined at said initiation of the recording or reproducing operation being increased stepwise for each of the successive zones considered in the radially outward direction and being maintained substantially constant at least so long as the tracks being scanned are in the one of said zones at which said recording or reproducing operation was initiated; and

means for controlling an angular velocity at which said drive means rotates said disk including means operative at

said initiation of each said recording or reproducing operation for establishing a predetermined value of said angular velocity and for decreasing said angular velocity so long as successive tracks, considered in said radially outward direction, are scanned during said recording or reproducing operation in which said frequency of the data transfer clock is maintained substantially constant.

5,412,630

# TRACKING SYSTEM FOR OPTICAL DISC MEMORY USING TRACKING ERROR SIGNALS FROM MAIN BEAM AND AUXILIARY BEAMS

Toshihisa Deguchi; Tetsuya Inui; Kenji Ohta, all of Nara, and Shohichi Katoh, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

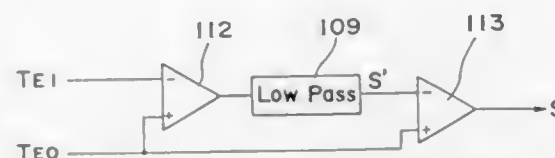
Division of Ser. No. 74,147, Jun. 9, 1993, which is a continuation of Ser. No. 804,639, Dec. 11, 1991, abandoned, which is a continuation of Ser. No. 569,748, Aug. 21, 1990, abandoned, which is a continuation of Ser. No. 232,850, Aug. 16, 1988, abandoned, which is a division of Ser. No. 911,410, Sep. 25, 1986, Pat. No. 4,787,076. This application Aug. 12, 1994, Ser. No. 289,565

Claims priority, application Japan, Sep. 27, 1985, 60-215695; Oct. 30, 1985, 60-245095

Int. Cl.<sup>6</sup> G11B 7/095

U.S. Cl. 369—44.32

2 Claims



1. A tracking system for an optical memory disc having a plurality of recording tracks thereon including track address regions and track information regions, comprising:

an optical head assembly including light beam producing means for producing a main light beam and two auxiliary light beams, said main and auxiliary light beams being scanned over said plurality of tracks;

detector means for detecting light beams reflected from said tracks as a result of the scanning and producing a first tracking error signal in response to the light reflected from said main beam and a second tracking error signal in response to the light reflected from said two auxiliary beams; and

tracking control means for performing tracking control of said main beam on one of said tracks in response to a first difference signal equal to a difference between said first tracking error signal and a second difference signal, said second difference signal representative of a difference between said first and second tracking error signal.

5,412,631

# OPTICAL HEAD APPARATUS FOR STORING, READING OR ERASING INFORMATION, AND OPTICAL INFORMATION REPRODUCING METHOD AND OPTICAL INFORMATION APPARATUS FOR OPTICALLY READING INFORMATION STORED IN AN OPTICAL MEMORY

Yoshiaki Komma, Kyoto; Seiji Nishino, Osaka, and Makoto Kato, Nishinomiya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 8, 1993, Ser. No. 87,439

Claims priority, application Japan, Jul. 10, 1992, 4-183353

Int. Cl.<sup>6</sup> G11B 7/135

U.S. Cl. 369—44.37

57 Claims

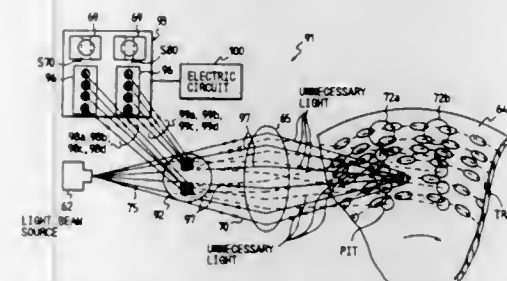
1. An optical head apparatus for reading pieces of original information from an information medium in which a series of

patterned track pits indicating the original information is formed, comprising:

a light beam source for radiating a light beam;

a hologram having a hologram pattern for mainly changing the light beam radiated from the light beam source to zero-order diffraction light and secondarily diffracting the light beam radiated from the light beam source to produce unnecessary light, the hologram functioning as a lens for the unnecessary light and functioning as a flat plate for the zero-order diffraction light;

an optical converging instrument for optically converging the zero-order diffraction light mainly occurring in the hologram at a patterned track pit of the information medium in a focus condition and optically defocusing the unnecessary light diffracted in the hologram on the information medium,



the hologram diffracting and changing the zero-order diffraction light converged at the patterned track pit of the information medium to first-order diffraction light, and diffracting the unnecessary light defocused on the information medium; and

a photo detecting instrument for detecting main intensity of the first-order diffraction light diffracted in the hologram and detecting secondary intensity of the unnecessary light diffracted in the hologram, the original information stored in the information medium being reproduced by the main intensity of the first-order diffraction light, and the secondary intensity of the unnecessary light being changed to a piece of averaged information functioning as noise which does not adversely influence the original information reproduced by the main intensity of the first-order diffraction light.

5,412,632

# INFORMATION REPRODUCING APPARATUS WITH A DC LEVEL CORRECTING CAPABILITY

Seiichi Mita, Kanagawa; Toru Kawashima, Chigasaki, and Toshimitsu Kaku, Sagami, all of Japan, assignors to Hitachi Ltd. and Hitachi Video & Information System, Inc., both of Tokyo, Japan

Filed Mar. 9, 1993, Ser. No. 28,224

Claims priority, application Japan, Mar. 13, 1992, 4-054773

Int. Cl.<sup>6</sup> G11B 7/00

U.S. Cl. 369—48

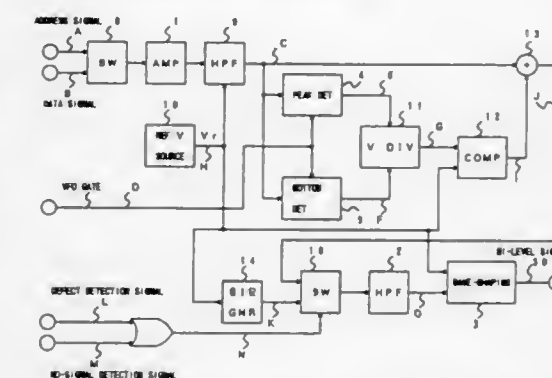
4 Claims

1. An information reproducing apparatus for reproducing recorded information from a recording medium in which a plurality of preformat areas and data areas are alternately provided along a track, in such a manner that an address signal and a synchronizing signal for phase-locking a clock signal for demodulation of the address signal are preformatted in the form of a change of reflectance in each of the preformat areas, while data and a synchronizing signal for phase-locking a clock signal for demodulation of the data are recorded in the form of a change of magnetization in each of the data areas; comprising:

reproduction means for projecting a light beam on said recording medium and then detecting an intensity change of resulting reflected light and a Kerr rotation of the reflected light, thereby obtaining parts of a reproduced

signal that correspond respectively to said preformat area and said data area;

DC level detection means for detecting DC levels of parts of said reproduced signal corresponding to the synchronizing signals which are respectively derived from said preformat area and said data area; and



correction means for correcting a DC level of said reproduced signal so that said DC levels detected for the preformat and data areas by said DC level detection means are brought into agreement.

5,412,633

# OPTICAL DISK APPARATUS WITH GALVANOMIRROR HAVING MOVABLE REFLECTING SURFACES COOPERATING WITH FIXED REFLECTING SURFACES

Atsushi Ichikawa, Tsukuba; Yoshiaki Yamauchi, Ibaraki, and Akira Saito, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

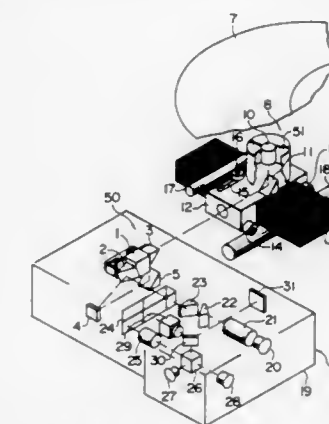
Continuation of Ser. No. 765,978, Sep. 26, 1991, abandoned. This application Dec. 10, 1993, Ser. No. 164,785

Claims priority, application Japan, Sep. 26, 1990, 2-256095

Int. Cl.<sup>6</sup> G11B 7/00

U.S. Cl. 369—44.14

12 Claims



1. An optical disk apparatus comprising:

a spindle motor for rotating a disk-shaped medium having a data recording surface;

a movable head assembly having an objective lens provided opposite to said data recording surface, means for moving said objective lens in a direction normal to said disk recording surface of said medium, and means for moving said objective lens along a predetermined length in a radial direction of said medium;

a fixed optical system having a laser beam source, a galvanomirror for deflecting a flux of light emitted from said laser beam source and incident thereon so as to reflect said flux of incident light in said radial direction; and

two movable reflecting surfaces provided on said galvanomirror, which galvanomirror has a rotational axis in



a direction of said flux of incident light and being selectively rotatable on a plane intersecting said rotational axis at right angles to change an angle of each of said two movable reflecting surfaces with respect to said flux of incident light, a first movable reflecting surface of said two movable reflecting surfaces reflecting said flux of incident light to said plane and to plural fixed reflecting surfaces on said plane, said plural fixed reflecting surfaces intersecting said plane at right angles, and a second movable reflecting surface of said two reflecting surfaces directing the flux of incident light reflected from said plural fixed reflecting surfaces to said plane and to cause said directed flux of incident light to be directed in a radial direction of said medium, an arrangement of said first and second movable reflecting surfaces and said plural fixed reflecting surfaces being mutually cooperative with one another with respect to angular reflections of said flux of incident light so as to direct said flux of light substantially through a predetermined focal point referenced to said objective lens, when said galvanomirror is selectively rotated.

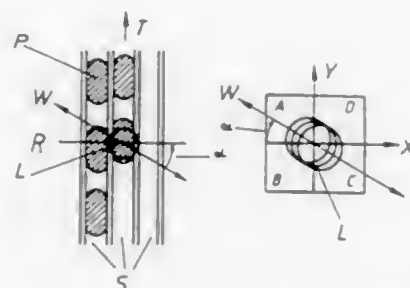
5,412,634

**OPTICAL SCANNING DEVICE FOR A DISC PLAYER INCLUDING IMPROVED FOCUSING APPARATUS**  
Christian Büchler, Marbach, Germany, and Yasuaki Morimoto, Sakura, Japan, assignors to Deutsche Thomson-Brandt GmbH, Villeggen-Schwenningen, Germany  
Continuation of Ser. No. 946,059, Sep. 18, 1992, abandoned. This application Mar. 28, 1994, Ser. No. 218,446  
Claims priority, application Germany, Feb. 16, 1990, 40 04 858.6

Int. Cl.<sup>6</sup> G11B 7/00

U.S. Cl. 369—44.23

2 Claims



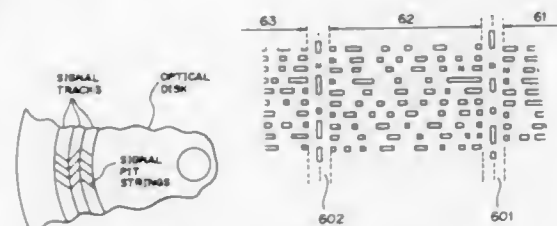
1. A scanning device for reading data in the data tracks of a recording medium, said scanning device including:  
a light source supported by a tracking head for guiding a light beam along said data tracks;  
means for rotating said recording medium;  
means for focusing said beam onto said data tracks;  
means for moving said light beam radially across said data tracks and in a direction which is at an acute angle  $\alpha$  with respect to a line normal to a longitudinal direction of said data tracks;  
means including a four quadrant detector in which respective detectors are separated by orthogonal axes, and one of said orthogonal axes is aligned parallel with a longitudinal direction of said data tracks, said means including a four quadrant detector, providing a control signal for controlling said means for focusing said beam;  
means for directing said light beam to said recording medium and for directing light reflected from said recording medium to said four quadrant detector; and  
a convex cylindrical lens arranged between said means for directing and said four quadrant detector, said convex cylindrical lens having a longitudinal axis arranged at said acute angle  $\alpha$  with respect to said line normal to a longitudinal direction of said data tracks.

5,412,635  
**OPTICAL DISK WITH SIGNAL PIT RECORDING FORMAT, METHOD OF RECORDING SAME AND OPTICAL PICKUP**

Takanori Maeda, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan  
Continuation of Ser. No. 927,807, Aug. 10, 1992, abandoned.  
This application May 5, 1994, Ser. No. 238,973  
Claims priority, application Japan, Sep. 27, 1991, 3-249186  
Int. Cl.<sup>6</sup> G11B 7/095

U.S. Cl. 369—44.26

14 Claims



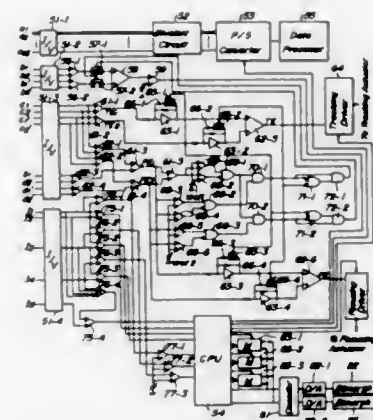
1. An optical disk comprising:  
a recording medium having a disk shape;  
a plurality of signal pit strings formed on said recording medium arranged in a circumferential direction of said optical disk, each of said signal pit strings including a plurality of signal pits arranged in a line in a radial direction of said optical disk, each of said signal pits having a length in the radial direction corresponding to an integer multiple of a length of one information clock which is a unit information piece,  
wherein each of said signal pit strings has a predetermined length in said radial direction,  
said signal pit strings are spirally arranged in said circumferential direction to form a spiral signal track, and  
said signal pit strings are obliquely arranged such that said signal pit strings adjacent to each other with respect to said radial direction are obliquely arranged at different angles with each other.

5,412,636

**APPARATUS FOR SERVO-CONTROLLING OBJECTIVE LENS IN RECORDING AND/OR REPRODUCING APPARATUS USING OPTICAL RECORD MEDIUM**  
Keitaro Hashimoto, and Takashi Aoki, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 673,817, Mar. 22, 1991, abandoned.  
This application Jun. 4, 1993, Ser. No. 72,869  
Int. Cl.<sup>6</sup> G11B 7/09

U.S. Cl. 369—44.32

16 Claims



1. A servo-control apparatus for correcting a positional deviation between an optical record medium including guide lines and data lines and an objective lens in an optical head of

a data recording and/or reproducing apparatus, said optical head including a light source which emits a light beam which is projected by said objective lens onto the record medium to illuminate a portion of the record medium and an optical system which receives reflected light from said record medium resulting from said light beam and forms an image of said portion of said record medium, said servo-control apparatus comprising:

sensing means receiving said image of said portion of said record medium and including a plurality of error detecting systems for generating, in response to said image, a plurality of focusing error signals each independently indicating a first aspect of said positional deviation and a plurality of tracking error signals each independently indicating a second aspect of said positional deviation;  
signal processing means for receiving said plurality of focusing error signals and said plurality of tracking error signals and producing a focusing servo-control signal on the basis of said plurality of focusing error signals and a tracking servo-control signal on the basis of the plurality of tracking error signals; and  
actuator means for correcting a relative position between the optical record medium and the objective lens to eliminate said positional deviation in accordance with the focusing servo-control signal and the tracking servo-control signal, wherein said plurality of error detecting systems produce said plurality of focusing error signals and said plurality of tracking error signals at a plurality of guide lines simultaneously.

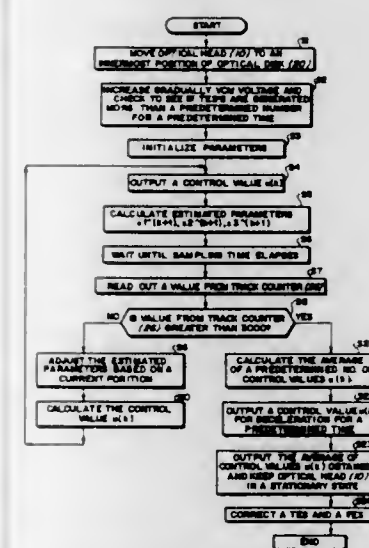
5,412,637

**METHOD FOR PUTTING AN OPTICAL HEAD IN A STATIONARY STATE AND OPTICAL DISK DRIVE APPARATUS**

Naoyuki Kagami, Fujisawa; Kohji Nakase, Yokohama, and Hiroaki Kubo, Atsugi, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 47,338, Apr. 19, 1993, abandoned, which is a continuation of Ser. No. 819,734, Jan. 13, 1992, abandoned. This application May 6, 1994, Ser. No. 239,263  
Claims priority, application Japan, Jan. 13, 1992, 3-044575  
Int. Cl.<sup>6</sup> G11B 7/00

U.S. Cl. 369—44.32

10 Claims



1. A method for obtaining a control value during a seek operation and applying the control value to place and maintain an optical head of an optical disk drive apparatus in a stationary state, comprising machine-executed steps of:  
applying a velocity signal to a drive means, the velocity signal representative of a first force required to move said

optical head at a constant velocity in the absence of external second forces acting on said optical head;  
obtaining a control value representative of a third force required to supplement the first force to maintain movement of said optical head at the constant velocity in the radial direction of an optical disk despite the presence of the external second forces of said step of obtaining a control value comprising the steps of:  
detecting positional information on said optical head at a predetermined interval;  
estimating a velocity of said optical head based on the detected positional information;  
calculating said control value based upon a predetermined constant value and the positional information; and  
applying said velocity signal and said control value to said drive means so that the estimated velocity converges to the predetermined constant value; placing said optical head in a stationary state; and  
applying said control value to maintain said optical head in the stationary state despite the presence of the external second forces.

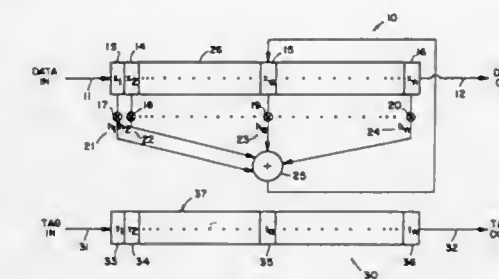
5,412,638

**METHOD FOR CORRECTING ERRORS IN DIGITAL AUDIO DATA**

Michael A. Koulopoulos, Andover; Praduman Jain, Lowell, both of Mass., and Sriram Jayasimha, Hyderabad, India, assignors to Vimak Corporation, Woburn, Mass.  
Filed Jun. 2, 1993, Ser. No. 71,505  
Int. Cl.<sup>6</sup> G11B 5/035

U.S. Cl. 369—59

5 Claims



1. A method for correcting errors in a sequence of digital audio data, where the sequence of digital audio data comprises a series of digitized samples of audio information read from a compact disc for use in a system having:

a compact disc player device which reads a compact disc, outputs the sequence of digital audio data samples, detects whether a sample in the sequence is erroneous and provides an indication of which samples are detected as erroneous;  
an error correction apparatus implementing a finite impulse response filter having a digital data sample buffer containing a plurality of samples, a plurality of filter taps and filter coefficients associated with a corresponding number of samples stored within the sample buffer,  
the method for correcting errors comprising the steps of:  
a. creating a sequence of filter coefficients with periodic zero-values, the period of the zero-valued coefficients corresponding to likely positions of additional erroneous digital audio data samples surrounding a digital audio data sample detected as erroneous;  
b. locating an erroneous digital audio data sample;  
c. applying the sequence of sampled digital audio data stored within the digital data sample buffer to the finite impulse response filter upon the erroneous digital audio data sample being centered within the finite impulse response filter toward reconstructing the correct value for the erroneous digital audio data sample; and  
d. replacing said erroneous digital audio data sample in the

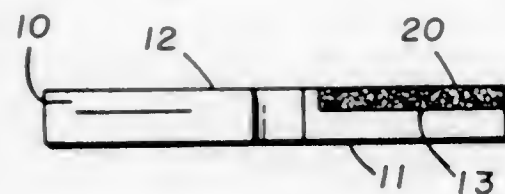
digital data sample buffer with the correct value from the finite impulse response filter.

amplitude demodulating the output signal representing said data signal to generate a demodulated signal M;

5,412,639  
COMPACT DISC FOCUSING AND POSITIONING  
CORRECTION PROCESS  
Clare L. Mengel, 750 Lily Flagg Rd., Huntsville, Ala. 35802  
Filed Apr. 28, 1994, Ser. No. 234,718  
Int. Cl.<sup>6</sup> G11B 3/58, 7/00

U.S. Cl. 369—72

5 Claims



1. A process for providing improved read out of information on a metallic sheet encapsulated in a transparent dielectric disc, in combination comprising the steps of:

- constructing said metallic sheet having said information impressed thereon a series of rows;
- generating an optical beam and directing said beam through said dielectric material onto said metallic sheet;
- coupling said optical beam to apparatus for detecting reflections of said beam from said row wherein said beam is continuously positioned over said row and focused on said information in said row responsive to said reflections, and further wherein said beam impinging on said metallic sheet frees electrons, induces a charge in said metallic sheet and a charged surrounding dielectric with an associated electric field through which said beam passes, producing an anomalous polarization shift of said beam and said reflections which interferes with positioning and focusing of said beam;
- neutralizes said charge on readout side of metallic sheet and associated electric field, allowing said beam to be positioned and focused without interference from said electric charge and associated electric field.

5,412,640  
METHOD FOR MEASURING AND REGULATING THE  
RADIAL AND TANGENTIAL ANGLES OF A LIGHT  
BEAM

Friedrich Földner, Villingen-Schwenningen; Hans-Robert Kühn, St. Georgen, and Dieter Storz, Lauterbach, all of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Germany

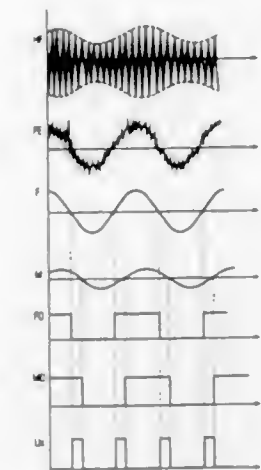
Filed Apr. 15, 1993, Ser. No. 46,968  
Claims priority, application Germany, Sep. 10, 1990, 40 28 703.3; WIPO, Sep. 6, 1991, PCT/EP91/01699  
Int. Cl.<sup>6</sup> G11B 7/00

U.S. Cl. 369—100

13 Claims

1. In a rotating disc data recovery apparatus, an improved method for generating a regulating signal to control at least one of a tangential angle (TT) and a radial angle (RR) of a substantially constant intensity light beam directed onto said rotating disc for reading the data on said disc, whereby the light beam is reflected from said rotating disc onto a photodetector from which an output signal representing a data signal is derived, and wherein the average intensity of said reflected light beam is modulated by light beam tracking errors and excursions of the disc in the direction of the optical axis of said light beam, said improved method comprising:

- An information recording and/or reproducing apparatus which performs at least one of recording and reproduction of information on an information record medium with a plurality of probes, said apparatus comprising:
  - a plurality of blocks each of which supports a plurality of probes;
  - a support plate supporting said plurality of blocks; and
  - driving means for driving said plurality of blocks independently of one another.



generating said regulating signal from amplitude and phase components of the demodulated signal M.

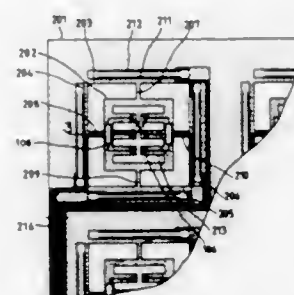
5,412,641  
INFORMATION RECORDING/REPRODUCING  
APPARATUS FOR RECORDING/REPRODUCING  
INFORMATION WITH PROBES

Katsuhiko Shinjo, Isehara; Toshihiko Miyazaki, Hiratsuka; Ryo Kuroda, Machida; Keisuke Yamamoto, Yamato, and Toshimitsu Kawase, Ayase, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1993, Ser. No. 55,088  
Claims priority, application Japan, May 7, 1992, 4-114959  
Int. Cl.<sup>6</sup> G11B 9/00

U.S. Cl. 369—126

7 Claims



5,412,642  
METHOD OF ABSORBING DELAY FLUCTUATION IN  
CELL TRANSMISSION SYSTEM AND EXCHANGE  
UTILIZING THE METHOD

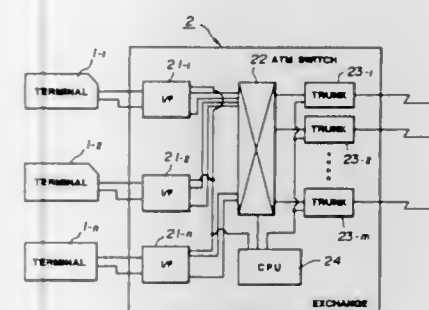
Masakatsu Nunokawa, Asaka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 21, 1993, Ser. No. 94,229

Claims priority, application Japan, Jul. 22, 1992, 4-195558  
Int. Cl.<sup>6</sup> H04J 3/14; H04L 12/56

U.S. Cl. 370—17

20 Claims



16. An exchange comprising:

- cell processing/transmitting means for encoding voice data, converting the encoded data into cells, adding to each of the cells a control header including a sequence data, and transmitting the cells to a network;
- cell receiving/processing means having a buffer, for receiving and storing the transmitted cells in the buffer, reproducing the stored cells into coded data according to the sequence data of the cells, and decoding the coded data into the voice data;
- heading-cell decoding time detecting means for detecting a decoding time of a heading cell of the transmitted cells;
- delay fluctuation absorbing base time calculating means for calculating a delay fluctuation absorbing base time based on a predetermined delay fluctuation absorbing time and the decoding time of the heading cell;
- stored-cells decoding time detecting means for detecting the number of cells stored in the buffer for a predetermined time after receiving the heading cell so as to detect decoding time of the stored cells;
- correcting means for correcting the delay fluctuation absorbing time based on the decoding time of the cells stored in the buffer; and
- control means for controlling the cell receiving/processing means to start reproducing of the heading cell and subsequent cells after elapse of the corrected fluctuation absorbing time after receiving the heading cell.

5,412,643  
DUPLEX FIELD BUS SYSTEM

Makoto Kogure, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 30, 1992, Ser. No. 860,079

Claims priority, application Japan, Mar. 29, 1991, 3-065948  
Int. Cl.<sup>6</sup> H04B 1/56

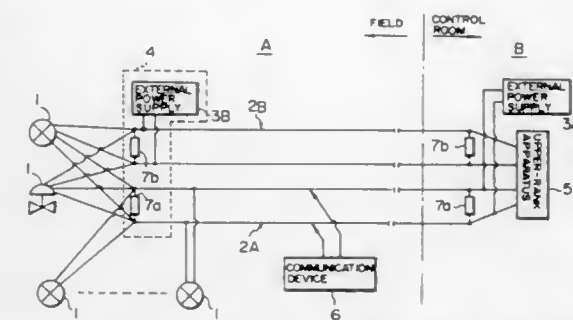
U.S. Cl. 370—24

13 Claims

- A duplex field bus system having at least one field device provided in a field and at least one upper-rank apparatus for transmitting signals to said field device and receiving signals from said device, said duplex field bus system comprising:
  - a first transmission line connected between said at least one upper-rank apparatus and said at least one field device, for providing communication between said at least one upper-rank apparatus and said at least one field device;
  - a first power supply connected to said first transmission line for supplying electric power to said at least one field device;
  - a second transmission line connected between said at least one upper-rank apparatus and said at least one field device

for also providing communication between said at least one upper-rank apparatus and said at least one field device;

a second power supply connected to said second transmission line for supplying electric power to said at least one field device; and





coder to be transmitted, and, upon completion of said transmission of said number of pulses, to cause said transmitting means to operate in said second mode and thereby to apply said second voltage level on said single-wire line; and

said transmitting means further including

an output terminal coupled to said single-wire line for outputting said pulses;

switching means coupled to said output terminal for switching said output terminal between said first voltage level and said second voltage level;

output control circuit coupled to said switching means for controlling switching thereof, said output control circuit further including sensing means coupled to said output terminal for sensing of said first voltage level and said second voltage level.

5,412,645

# DISTRIBUTED PROCESSING TELECOMMUNICATION SWITCH WITH STANDARDIZED SWITCH UNITS

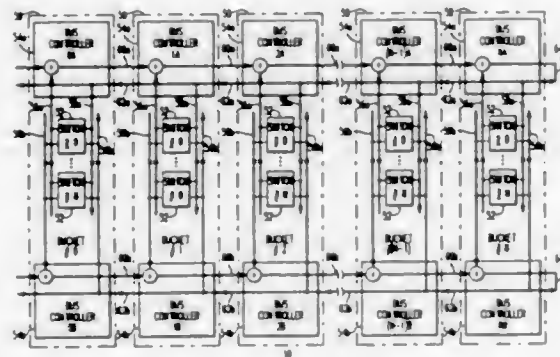
Chester R. Younklin, Ellicott City, and Stephen R. Wigler, Columbia, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 9, 1991, Ser. No. 743,476

Int. Cl.<sup>6</sup> H04Q 11/04

U.S. Cl. 370—58.3

6 Claims



1. A system for interconnecting telecommunication terminal equipment, comprising:

- first and second bus controllers, first and second module collection buses, first and second module distribution buses, and a plurality of switch units for controlling the connection of said telecommunication terminal equipment, each of said switch units being connected to said first and second module collection buses and being connected to said first and second module distribution buses, and each of said switch units including an interface for connection to the telecommunication terminal equipment supported by said system and a processor to control access to said system by the telecommunication terminal equipment connected thereto;
- said first bus controller being connected to said first module collection bus and said first module distribution bus;
- said second bus controller being connected to said second module collection bus and said second module distribution bus;
- a first clock means in said first bus controller for providing timing on said first module collection bus and said first module distribution bus;
- a second clock means in said second bus controller for providing timing on said second module collection bus and said second module distribution bus, and
- wherein said first and second module collection buses and said first and second module distribution buses are unidirectional circulating time division multiplex buses and each interface in each switch unit transmits telecommunication data and control signals in an assigned time slot via

said first and second module collection buses and said first and second module distribution buses to all other ones of said interfaces in all of said switch units.

5,412,646

# ASYNCHRONOUS TRANSFER MODE SWITCH ARCHITECTURE

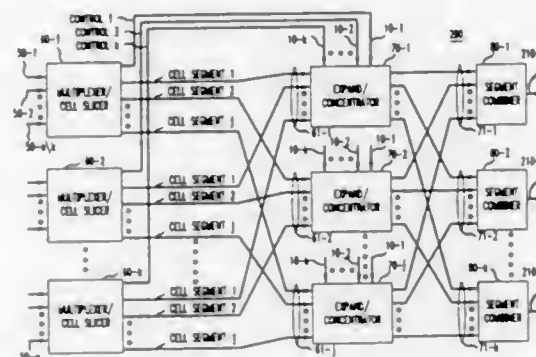
Gregory J. Cyr, Winfield; Kurt A. Hedlund, Oak Park, both of Ill.; Lawrence J. Noccolo, Fair Haven, N.J.; Mark A. Pashan, Wheaton, Ill., and Albert Kai-sun Wong, Edison, N.J., assignors to AT&T Corp., Murray Hill, N.J.

Filed May 13, 1994, Ser. No. 242,217

Int. Cl.<sup>6</sup> H04L 12/56

U.S. Cl. 370—56

8 Claims



1. An expansion module for use in a packet switch, said expansion module comprising:
  - means for receiving a data cell via one of  $n$  inputs and for dividing said data cell into  $j$  sequential segments as it is being received, where  $j > 1$  and  $n > 1$ ;
  - means for supplying said segments to respective ones of a plurality of concentrator units based on the sequential order of said segments, each of said concentrator units including  $k$  concentrator logic units and means for supplying a received segment to each of said  $k$  concentrator logic units, one of said concentrator logic units accepting the segment for storage therein based on routing information contained in the associated data cell, where  $k > 1$ , and
  - means for unloading, in a prescribed order, the segments forming said cell from the concentrator logic units in which said segments are stored and recombining said segments to form said cell and then supplying the formed cell to an associated one of  $k$  outputs selected as a function of said routing information.

5,412,647

# RATE ENFORCEMENT FOR FRAME RELAY NETWORKS

Nathalie Giroux, Hull; Marianne J. Morin, Ottawa; Marcel Lemay, Hull; Rungroj Kositpalboon, and Osama S. Aboul-Magd, both of Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Mar. 25, 1993, Ser. No. 37,151

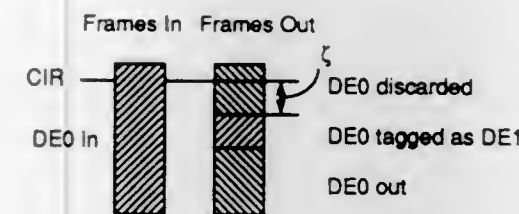
Int. Cl.<sup>6</sup> H04L 12/54

U.S. Cl. 370—60

8 Claims

1. In a Frame Relay network system for exchanging information in high priority or low priority frames, a method of enforcing the rate at which a terminal is permitted to access the system, comprising steps of:
  - receiving frames from the terminal in a first leaky bucket having a leakage rate  $L_1$  and a bucket size  $V_1$ , a portion of which bucket size is set aside for receiving the high priority frames only;
  - accessing the network by the first leaky bucket at the leakage rate  $L_1$ ;
  - receiving frames from the terminal in a second leaky bucket having a leakage rate  $L_2$ ;

accessing the network by the second leaky bucket at the leakage rate  $L_2$ ; and



sending overflowing frames from one of the two buckets to the other.

5,412,648

# PACKET SWITCHING SYSTEM FOR FORWARDING PACKETS FROM INPUT BUFFERS USING IDLE/BUSY STATUS OF OUTPUT BUFFERS

Ruixue Fan, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

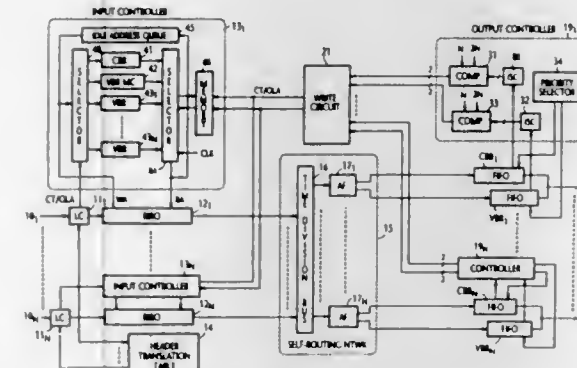
Filed Dec. 27, 1993, Ser. No. 173,214

Claims priority, application Japan, Dec. 25, 1992, 4-345020

Int. Cl.<sup>6</sup> H04L 12/56

U.S. Cl. 370—60

8 Claims



1. A packet switching system comprising:
  - a plurality of input buffers connected respectively to a plurality of incoming links;
  - a plurality of output buffers connected respectively to a plurality of outgoing links;
  - a routing network connected between said input buffers and said output buffers for routing packets from the input buffers to the output buffers according to routing information contained in the packets;
  - a plurality of output controllers associated respectively with said output buffers, each of the output controllers determining an idle space of the associated output buffer which is available for storing additional packets and determining whether the idle space is greater than a predetermined value, and generating an idle status bit if the idle space is determined to be greater than said predetermined value or a busy status bit if the idle space is determined to be smaller than said predetermined value; and
  - a plurality of input controllers associated respectively with said input buffers, each of the input controllers including memory means for storing said idle status bit and said busy status bit from said output controllers, and means for writing an incoming packet into the associated input buffer and reading the incoming packet therefrom onto the routing network if an idle status bit is stored in said memory means corresponding to the routing information of said incoming packet.

5,412,649

# METHOD FOR MULTI-ADDRESS TRANSMISSION OF CELLS IN A COMMUNICATION NETWORK OPERATING IN THE ASYNCHRONOUS TRANSFER MODE

Heinrich Hummel, Bergkirchen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

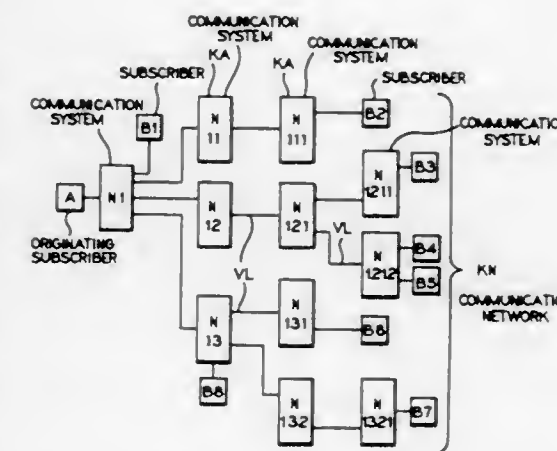
Filed Sep. 14, 1993, Ser. No. 121,355

Claims priority, application Germany, Sep. 14, 1992, 42 30 744.9; Feb. 11, 1993, 43 04 120.5

Int. Cl.<sup>6</sup> H04Q 11/04

U.S. Cl. 370—60.1

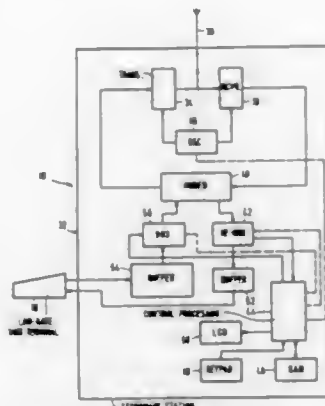
13 Claims



1. A method for multi-addressed transmission of cells in a communication network operating in asynchronous transfer mode and formed by communication systems, comprising the steps of:

- providing a cell header having routing information in every cell for cell self-control through the communication network, the routing information controlling a respective cell over a single path through the communication network;
- forming multi-addressing information and further routing information, that is specifically associated to a respective communication system for each additional multi-addressed path in each of the communication systems of the communication network for self-control of multi-addressed cells through the communication network, the multi-addressing information effecting a transmission of the multi-addressed cells in each branching point of said respective communication system, the routing information allocated to multi-addressing information respectively indicating a path of a retransmittable cell through respectively remaining communication systems of the communication network to a prescribed multi-addressing destination subscriber;
- interpreting the multi-addressing information and the routing information, that are communicated together with the cell, in every communication system and switching said multi-addressing cells and the multi-addressing information recited in said cell header of said cells including the routing information via connecting lines or trunk lines identified by the routing information to a respectively following communication system or to said prescribed multi-addressing destination subscriber; and
- removing the multi-addressing information, including the routing information, pertaining to the respective communication system.

5,412,650  
METHOD OF, AND SYSTEM FOR, TRANSMITTING  
DATA OVER A COMMUNICATIONS CHANNEL  
Robert J. Davies, Redhill, England, assignor to U.S. Phillips  
Corporation, New York, N.Y.  
Filed Aug. 31, 1993, Ser. No. 114,525  
Claims priority, application United Kingdom, Sep. 5, 1992,  
9218864  
Int. Cl.<sup>6</sup> H04J 3/16, 3/22  
U.S. Cl. 370—2  
7 Claims



1. A communications system comprising:  
a system control terminal for controlling the operation of the system, a primary station coupled to the system control terminal, at least a first low rate data terminal, and a data link between said first low rate data terminal and said primary station;  
said data link being a time slot channel assigned by the system control terminal in each of successive frames of a series of time division multiplexed time slot channels, each time slot channel being capable of data transmission at a predetermined binary rate of  $X$  bits/sec such that  $X \geq 8$ ;  
characterized in that:  
said low first rate data terminal comprises means for generating data at a rate of  $N$  bits/sec, where  $N$  is a binary sub-multiple of  $X$ ; means for accumulating  $X$  bits of the generated data during every successive number  $X/N$  of frames; and means for transmitting the accumulated data in said assigned time slot channel during each  $X/N$  th frame.

5,412,651  
STRUCTURE AND METHOD FOR COMBINING PCM  
AND COMMON CONTROL DATA ON A BACKPLANE  
BUS  
Steven S. Gorshe, Beaverton, Oreg., assignor to NEC America,  
Inc., Hillsboro, Oreg.  
Filed Feb. 11, 1993, Ser. No. 16,403  
Int. Cl.<sup>6</sup> H04L 12/407

U.S. Cl. 370—85.9 19 Claims

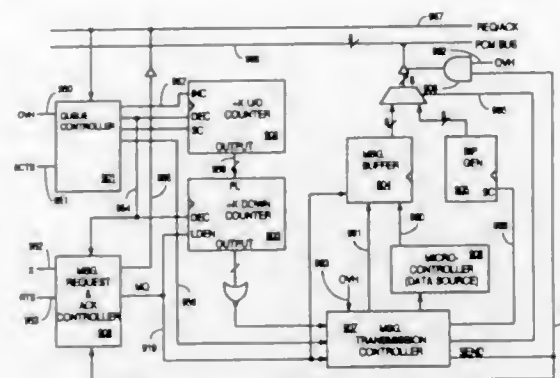
I. A synchronous communication method for use in a computational unit having access to a synchronous bus and a request/acknowledge line, comprising the steps of:

providing a queue counter and a count-down counter;

monitoring said request/acknowledge line for packet request signals and packet acknowledge signals asserted on said request/acknowledge line and (i) incrementing a count in said queue counter, whenever a packet request is signalled on said request/acknowledge line and (ii) decrementing said count in said queue counter and a count in said count-down counter, whenever a packet acknowledge signal is asserted on said request/acknowledge line;

asserting on said request/acknowledge line, during one of a first plurality of predetermined time slots, a request to send data, said predetermined time slot being uniquely assigned to said computational unit, and transferring said

count in said queue counter to said count-down counter;  
and



transmitting a data packet on said synchronous bus during a second plurality of predetermined time slots when said count in said count-down counter reaches zero.

5,412,652  
SONET RING SUBNETWORK MANAGEMENT METHOD  
Tsu-Kai Lu, Sterling, Va., assignor to NEC America, Inc., Melville, N.Y.  
Filed Sep. 24, 1993, Ser. No. 126,394  
Int. Cl.<sup>6</sup> H04L 12/24  
U.S. Cl. 370—85.12  
29 Claims

MODES/ CHANNELS	MODE A		MODE B		MODE C		MODE D	
	DROP	ADD	DROP	ADD	DROP	ADD	DROP	ADD
STS # 1		ACI-1	ACI-1	ACI-0	ACI-1			
STS # 3		ADD-2		ADD-0		ADD-0	ADD-1	
STS # 3		AB3-3	AB3-2					
STS # 4				BA4-3		CD6-2	CD6-2	
STS # 5						CD7-1	CD7-5	
STS # 6	BA4-4				BA4-0	BA4-4		BA4-0

1. A method of managing a synchronous optical subnetwork (SONET) ring composed of a plurality of network elements coupled together through an optical fiber medium in which a plurality of channels are defined, each of said network elements comprising a first and a second high-speed interface module for interfacing said network elements to one another through said optical fiber medium, and a low-speed interface module selectively coupled to said first and second high-speed interface modules, said method comprising the steps of:

generating a ring table comprising data representing ring characteristics for each of the network elements of the SONET ring, said ring characteristics including, for each of the network elements of the SONET ring, ring provisioning information for defining channel connectivities between the first and second high-speed interface modules and for defining channel connectivities between the low-speed interface module and each of the first and second high-speed modules of said SONET ring;

downloading said ring table to each of the network elements;

storing said ring table in each of said network elements; and

managing each of said network elements of said SONET ring according to said ring table.

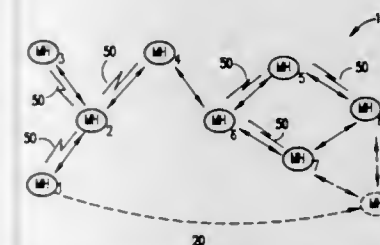
MAY 2, 1995

5,412,653  
**DYNAMIC SWITCH CASCADING SYSTEM**  
 Karl H. Hoppe, Ulster Park; Laura H. McGoogan, Cary, N.C.;  
 Leon Skarshinski, Red Hook, N.Y., and Michael E. Under-  
 koffer, Cary, N.C., assignors to International Business Ma-  
 chines Corporation, Armonk, N.Y.  
 Filed Oct. 15, 1993, Ser. No. 138,288  
 Int. Cl. <sup>6</sup> H04J 3/14

U.S. Cl. 370—58.2

1. A computer interconnection system comprising:  
a plurality of circuit switches having circuit switch ports coupled by a dynamic connection to provide a dynamically cascadable switching network;  
said dynamically cascadable switching network having a plurality of nodes, including end point and switch nodes, said circuit switches being located in the network between the end point nodes of the network,  
two individual circuit switches of said circuit switches of the network being interconnected by a cross-link group of one or more links,  
said system having transmission means for transmitting frame information including a source endpoint address and a destination endpoint address, each of which can be associated with an endpoint port or a cross-link group, and means for dynamically forming a connection between an endpoint port or a cross-link group to make a connection between a circuit switch port corresponding to said source endpoint address and a circuit switch port corresponding to said destination endpoint.

5,412,654  
HIGHLY DYNAMIC DESTINATION-SEQUENCED  
DESTINATION VECTOR ROUTING FOR MOBILE  
COMPUTERS  
Charles E. Perkins, Ossining, N.Y., assignor to International  
Business Machines Corporation, Armonk, N.Y.  
Filed Jan. 10, 1994, Ser. No. 179,397  
Int. Cl.<sup>6</sup> H04Q 7/22; H04L 12/56  
U.S. Cl. 370—94.1 10 Claims

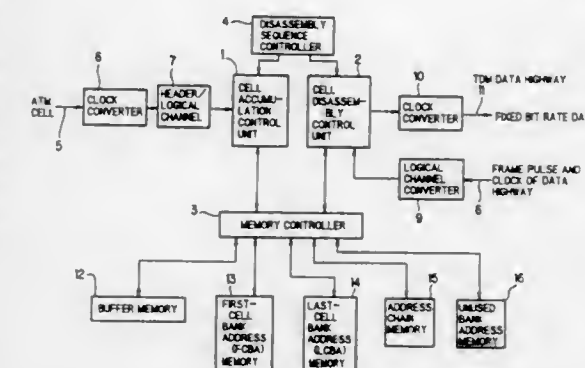


1. A method for routing a packet of information between two mobile hosts that are coupled to an ad-hoc network comprising a plurality of mobile hosts, each of the mobile hosts having a unique network address but not having a fixed location, said ad-hoc network conforming to a network standard including a network-layer and a link-layer, said method comprising the steps of:
  - storing routing tables at each mobile host, said routing tables including a "metric" defined as a number of hops from a source mobile host to a destination mobile host;
  - advertising routes by periodically broadcasting by each mobile host the routing table stored by the mobile host;
  - originating a time stamp by a destination mobile host;
  - tagging each route table entry with a time stamp originated by the destination mobile host;
  - updating, for each destination mobile host, mobile host stored routing tables based on received broadcasts from other mobile hosts;
  - retransmitting by each mobile host new routing information received from a neighboring mobile host; and
  - routing a packet of information by choosing a route from updated routing tables for transmitting a packet of information from a source mobile host as a route having a best

ELECTRICAL

"metric" for a desired destination mobile host, said best "metric" being a minimum number of hops that a packet must jump before reaching its destination, the routing being performed at the link-layer of the ad-hoc network.

5,412,655  
MULTIPROCESSING SYSTEM FOR  
ASSEMBLY/DISASSEMBLY OF ASYNCHRONOUS  
TRANSFER MODE CELLS  
Kenji Yamada, and Tatsuo Nakagawa, both of Tokyo, Japan,  
assignors to NEC Corporation, Tokyo, Japan  
Filed Jan. 27, 1994, Ser. No. 187,047  
Claims priority, application Japan, Jan. 29, 1993, 5-013587;  
Jan. 29, 1993, 5-013613  
Int. Cl.<sup>6</sup> H04L 12/56  
U.S. Cl. 370—60.1 12 Claims



1. A multiprocessing system for disassembling asynchronous transfer mode (ATM) cells into multiplex data on a multiplex transfer line having a plurality of channels, comprising:
  - a buffer memory logically divided into a plurality of data banks, each bank being capable of storing the payload data of an ATM cell;
  - accumulation control means for specifying one unused bank of said buffer memory to store the payload data of a received ATM cell;
  - storage means for storing a collection of addresses of the banks, each storing the payload data of the received ATM cell, said collection being formed for each virtual channel of received ATM cells; and
  - disassembly control means for reading out data as the multiplex data from said buffer memory according to a bank address read out from said collection for the virtual channel corresponding to each channel of the multiplex transmission line.

5,412,656  
**NETWORK HUB FOR MAINTAINING NODE  
 BANDWIDTH IN A SINGLE-NODE NETWORK**  
 Robert C. Brand, Andover, Mass., and Stanford L. Mantiply,  
 Palo Alto, Calif., assignors to Ungermann-Bass, Santa Clara,  
 Calif.  
 Continuation of Ser. No. 331,217, Mar. 30, 1989, Pat. No.  
 5,237,566. This application Feb. 22, 1993, Ser. No. 20,916  
 The portion of the term of this patent subsequent to Aug. 17,  
 2010, has been disclaimed.  
 Int. Cl.<sup>6</sup> H04L 12/54

**U.S. Cl. 370—61** **13 Claims**  
**1.** Apparatus operating to communicate data transmitted by a first of a plurality of nodes for receipt by a second of the plurality of nodes, the data being transmitted and received according to a transmitting and a receiving shared media protocol, respectively, the apparatus comprising:  
 first circuit means coupled to the first of the plurality of nodes for emulating the second of the plurality of nodes by receiving data transmitted by the first one of the plural-



a first interface for connecting to a network channel that is supported by a first data link protocol that detects and corrects end-to-end transmission errors that may be introduced during a signal transmission of a first numbered sequence of first data packets over an access connection; network-to-satellite protocol conversion means connected to the first network interface and a first satellite communications channel for encapsulating whole frames of said first numbered sequence of first data packets and their respective sequence numbers as data information only into a plurality of data fields respectively included in a second numbered sequence of second data packets for satellite transmission with a second data protocol which includes means for selectively rejecting and retransmitting single ones of said second data packets;

satellite-to-client protocol conversion means connected to a second satellite communications channel capable of exchanging data with said first satellite communications channel via an orbiting satellite for unencapsulating said first numbered sequence of first data packets and their

respective sequence numbers from said data fields of said second numbered sequence of second data packets; and a second interface connected to the satellite-to-network protocol conversion means and to a client channel that is supported by said first data link protocol and providing for an end-to-end communication between said client and said network for transparent communications channel support according to said first data link protocol, notwithstanding said intermediate conversion to and from said second data link protocol.

5,412,661

## TWO-DIMENSIONAL DISK ARRAY

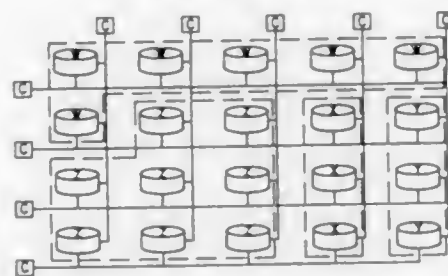
Hsieh T. Hao, Los Altos, and Spencer W. Ng, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 6, 1992, Ser. No. 957,293  
Int. Cl.<sup>6</sup> G06F 11/10, 11/20

U.S. Cl. 371-10.1

11 Claims

HETEROGENEOUS PARITY GROUPS



I. A data storage subsystem for a computer system, comprising:

- a first plurality of no more than  $(n \cdot m)$  disks for storing data, each of said disk containing recorded data, each of said disks being denoted by a pair of index numbers  $(i, j)$ , and where  $n$  and  $m$  are predetermined positive integers such that  $1 \leq i \leq n$  and  $1 \leq j \leq m$ ;
- a second plurality of at least  $(n + m)$  disk controllers for storing data to and receiving data from said disks, each said controller being denoted by an index number  $k$  such that  $1 \leq k \leq (n + m)$ ; and
- a third plurality of coupling channel means for coupling said controllers to said disks, said third plurality of coupling channel means being disposed such that each of said disks denoted by said pair of index numbers  $(i, j)$  is coupled to said controller denoted by said index number  $k = (i)$  and to said controller denoted by said index number  $k = (n + j)$ .

5,412,662

## MEMORY TESTING DEVICE FOR PREVENTING EXCESSIVE WRITE AND ERASURE

Tatsuya Honma, Tatsuo Kinugasa, and Minoru Imai, all of Gyoda, Japan, assignors to Advantest Corporation, Tokyo, Japan

Filed Oct. 29, 1993, Ser. No. 143,054

Claims priority, application Japan, Oct. 30, 1992, 4-292638  
Int. Cl.<sup>6</sup> G11C 29/00

U.S. Cl. 371-22.1

6 Claims

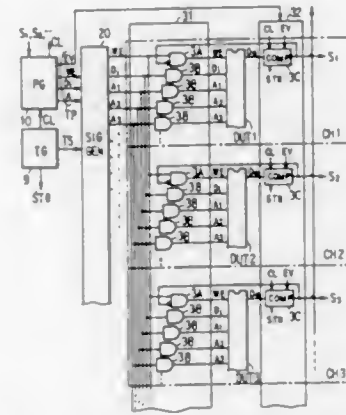
1. A memory testing device having  $n$  memories under test and  $n$ -test channels for simultaneously testing  $n$  memories under test,  $n$  being an integer greater than or equal to one, comprising:

- test pattern generating means for sequentially generating test patterns at desired timings while controlling the sequence of said test patterns, said test patterns each including a write enable signal, expected value data, write data and an address signal;
- signal distributing means which distributes said test patterns to each of said  $n$  test channels, each of said  $n$  test channels providing said write enable signal, said write data and said

address signal to corresponding ones of said  $n$  memories under test for writing therein said write data and reading out therefrom data at an address specified by said address signal;

- $n$  logical comparison and decision means each provided in a corresponding one of said  $n$  test channels for reading out and logically comparing said data read out of said corresponding one of said  $n$  memories under test and said expected value data from said distributing means and for outputting through said corresponding one of said  $n$  channels a decision signal indicating one of a coincidence and a noncoincidence between said data read out and said expected value data, said decision signal being supplied to said test pattern generating means to control the sequence of generating of said test patterns; and
- $n$  gate means each provided in a corresponding one of said  $n$  test channels for receiving at its first and second inputs through said corresponding one of said  $n$  channels said write enable signal from said signal distributing means and said decision signal from said logical comparison and decision means and for inhibiting the application of said write enable signal to a write enable terminal of a corresponding one of said  $n$  memories under test when said decision signal indicates said coincidence.

4. A memory testing device having  $n$  test channels for simultaneously testing  $n$  memories under test each memory having a chip select terminal and being held operative while being



supplied with a chip select signal at the chip select terminal,  $n$  being an integer greater than or equal to one, comprising:

- test pattern generating means for sequentially generating test patterns at desired timings while controlling the sequence of the test patterns, said test patterns each including a write enable signal, expected value data, write data, an address signal and a chip select signal;
- signal distributing means for distributing said test patterns to each of said  $n$  test channels, each of said  $n$  test channels providing said write enable signal, said write data, said address signal and said chip select signal to a corresponding one of said memories under test for writing therein said write data and reading out therefrom data at an address specified by said address signal;

- $n$  logical comparison and decision means each provided in a corresponding one of said  $n$  test channels for reading out end logically comparing said data read out of said corresponding one of said  $n$  memories under test and said expected value signal from said distributing means and for outputting through said corresponding one of said  $n$  channels a decision signal indicating one of coincidence and noncoincidence between said data read out and said expected value data, said decision signal being supplied to said test pattern generating means to control the sequence of generation of said test patterns; and
- $n$  gate means each provided in a corresponding one of said  $n$  channels for receiving at first and second inputs through said corresponding one of said  $n$  channels said chip select

signal from said signal distributing means and said decision signal from said logical comparison and decision means for inhibiting the application of said chip select signal to the write enable terminal of a corresponding one of said  $n$  memories under test when said decision signal indicates said coincidence.

5,412,663

## APPARATUS FOR SYNCHRONIZING ASYNCHRONOUS CIRCUITS FOR TESTING OPERATIONS

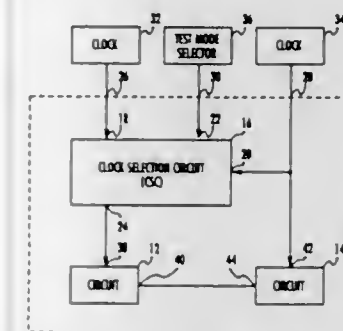
Stephen C. Kromer, and Gopi Ganapathy, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Aug. 20, 1993, Ser. No. 110,053

Int. Cl.<sup>6</sup> H04B 17/00; G06F 13/00

U.S. Cl. 371-22.1

21 Claims



1. A clock selection circuit, for use in a computer system including a first circuit and a second circuit, for synchronizing said first circuit with said second circuit in response to a test mode signal, said computer system including a first clock generating a first clock signal and a second clock generating a second clock signal, the clock selection circuit comprising:

- a first clock input connected with said first clock for receiving said first clock signal;
- a second clock input connected with said second clock for receiving said second clock signal;
- a test mode input for receiving said test mode signal; and
- a clock output connected with an input to said first circuit; the clock selection circuit driving said first circuit with said first clock signal through said clock output when said test mode signal is in a first predetermined state, and driving said first circuit with said second clock signal through said clock output when said test mode signal is in a second predetermined state, said second circuit being driven by said second clock signal regardless of the state of said test mode signal, said first circuit and said second circuit operating synchronously in response to said second clock signal when said test mode signal is in said second predetermined state.

5,412,664

## INTEGRATED CIRCUIT AND METHOD OF TESTING

Douglas Bank, Evanston, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 23, 1992, Ser. No. 996,238

Int. Cl.<sup>6</sup> H04B 17/00; G05B 23/02

U.S. Cl. 371-22.6

18 Claims

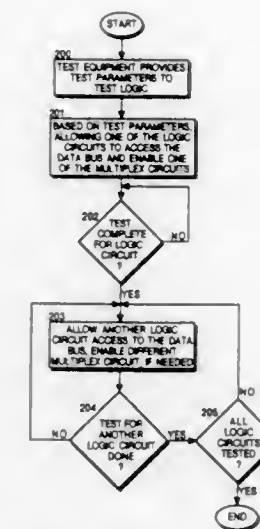
1. A logic circuit that includes a plurality of logic sections, a serial port, a data bus, a plurality of inputs operably coupled to the plurality of logic sections, and a first plurality of output buffers operably coupled to the plurality of logic sections and not coupled to the data bus, wherein a first plurality of output signals from the plurality of logic sections are routed onto the data bus for test purposes, which first plurality of output signals are not normally connected to the data bus, the logic circuit comprising:

- a plurality of output gates, operably coupled to the plurality of logic sections and the data bus;

a second plurality of output buffers, operably coupled to the data bus;

a plurality of output pins, operably coupled to the first plurality of output buffers and the second plurality of output buffers; and

test logic, operably coupled to the first plurality of output



buffers, the second plurality of output buffers, and the plurality of output gates, such that the test logic causes the first plurality of output signals from the plurality of logic sections to flow through the plurality of output gates, onto the data bus, through the second plurality of output buffers and onto the plurality of output pins during a first mode.

5,412,665

## PARALLEL OPERATION LINEAR FEEDBACK SHIFT REGISTER

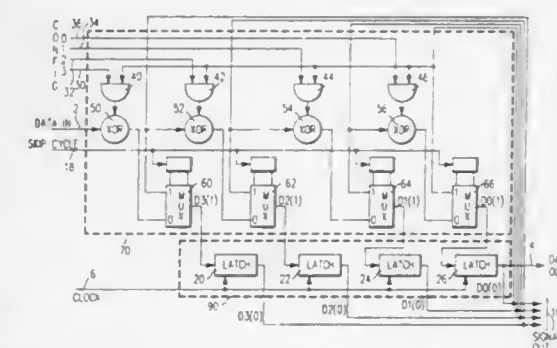
Algirdas J. Gruodis, Wappingers Falls; Piyushkumar C. Patel, Poughkeepsie, both of N.Y., and Kurt P. Szabo, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 10, 1992, Ser. No. 819,438

Int. Cl.<sup>6</sup> G01R 31/3183

U.S. Cl. 371-27

19 Claims



1. A Linear Feedback Shift Register (LFSR) for generating random test patterns, comprising:

register means for storing data, said register means comprising a plurality of latches, wherein at least one of said latches is driven by a clock;

a plurality of sequentially connected, functionally equivalent combinatorial logic networks, one of said networks driving said register means, said register means driving a second of said networks to provide a feedback path;



parallel driving means for driving a parallel pattern at an output bus responsive to pseudo-random patterns generated by said networks; and  
configuration means inputted to said combinatorial logic networks for reconfiguring said combinatorial logic network that generates said pseudo-random patterns.

5,412,666

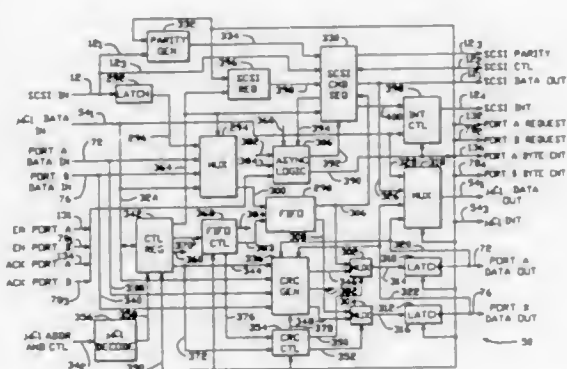
# DISK DRIVE DATA PATH INTEGRITY CONTROL ARCHITECTURE

John P. Squires, Boulder; Charles M. Sander, Stanton M. Keeler, both of Longmont, and Donald W. Clay, Louisville, all of Colo., assignors to Conner Peripherals, Inc., San Jose, Calif.

Division of Ser. No. 611,141, Nov. 9, 1990, abandoned. This application Dec. 29, 1992, Ser. No. 997,898  
Int. Cl. G06F 11/10

U.S. Cl. 371—37.4

9 Claims



1. A data integrity system within a control system for controlling the transfer of data from a host processor via a host interface to a storage unit comprising:

- a first error encoding and detecting means for encoding said received data to form first encoded data and for detecting the validity of said first encoded data retrieved after being stored, said first error encoding means comprising:
  - a first means for uniquely encoding said received data to form said first encoded data such that said first encoded data identifies said received data; and
  - a second means for determining from said retrieved first encoded data received from said second error encoding and detecting means whether said retrieved first encoded data is valid data and whether said retrieved first encoded data is the retrieved first encoded data sought to be retrieved; and
- a second error encoding and detecting means for receiving and encoding said first encoded data from said first error encoding and detecting means to form second encoded data to be stored in said storage unit and for detecting the validity of said second encoded data retrieved from said storage unit after being stored.

5,412,667

# DECODER FOR CROSS INTERLEAVED ERROR CORRECTING ENCODED DATA

Allan Havemose, Exton, Pa., assignor to Commodore Electronics Limited, West Chester, Pa.

Filed Jul. 8, 1993, Ser. No. 88,745

Int. Cl. G06F 11/10; H03M 13/00

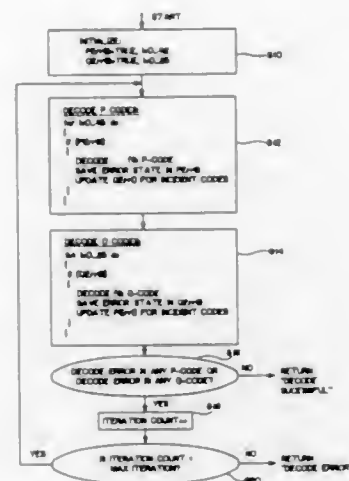
U.S. Cl. 371—37.5

7 Claims

1. A method for efficiently decoding data which has been encoded in a first set of sequences and a second set of sequences according to an error correction encoding technique, each of the sequences in said first set and said second set having

common members with sequences in said second set and said first set, respectively; the method comprising the steps of:

- processing each sequence in the first set of sequences to correct any errors in members of a sequence which can be corrected by decoding the error correction encoded data; and
- only for each member of a sequence of the first set that has been corrected:



determining which sequence in the second set of sequences includes the member containing the corrected error; and  
marking the determined sequence in the second set for evaluation during subsequent error correction processing of the second set.

5,412,668

# PARITY STRIPING FEATURE FOR OPTICAL DISKS

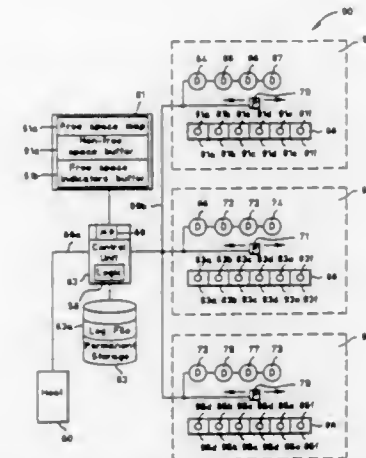
Douglas W. Dewey, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 22, 1994, Ser. No. 310,541

Int. Cl. G06F 11/10

U.S. Cl. 371—40.1

36 Claims



12. An automated storage library, comprising:  
a plurality of data storage medium storage bins;  
a plurality of data storage media in the storage bins, each data storage medium comprising a volume, each volume belonging to a particular parity group, each particular parity group including one or more data volumes and at least one parity volume;  
a host processor;

an electronic memory;  
a control unit coupled with the electronic memory and in communication with the host processor;  
a plurality of storage medium drives;  
a picker for transferring a volume between any drive and any storage bin; and  
parity means coupled to the control unit for building parity data to a parity volume;  
the parity means including means for calculating parity by: mounting each volume belonging to a parity group on a storage medium drive in response to a request to build parity data on a parity volume of the parity group;  
determining a location of free space on each mounted data volume of the parity group;  
generating a free space map in the electronic memory containing locations of data blocks in the data volumes having pre-erased sectors and further containing locations of data blocks in the data volumes having unallocated written sectors;  
writing a first set of volume related information to a first buffer in the electronic memory, the first set of volume related information containing the locations of data blocks in the data volumes having pre-erased sectors and the locations of data blocks in the data volumes having unallocated written sectors;  
writing a second set of volume related information into a second buffer in the electronic memory, the second set of volume related information being a copy of each remaining data block that is not free space on each volume in the parity group; and  
calculating parity of each data volume in the parity group based on the first set of volume related data stored in the first buffer and the second set of volume related data stored in the second buffer.

5,412,669

# ADD, COMPARE AND SELECT CIRCUIT

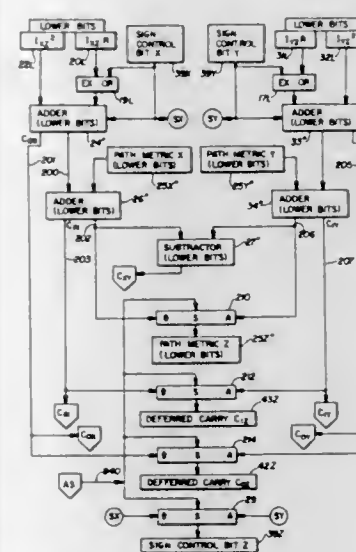
William R. Foland, Jr., Littleton, Colo., assignor to Cirrus Logic, Inc., Fremont, Calif.

Filed Dec. 9, 1993, Ser. No. 164,260

Int. Cl. G06F 11/10

U.S. Cl. 371—43

15 Claims



1. A digital circuit comprising:  
first adder means for adding the lowermost bits of a first two quantities to produce a first sum and a first carry bit;  
second adder means for adding the most significant bits of said first two quantities to produce a second sum;  
third adder means for adding the lowermost bits of a second

two quantities to produce a third sum and a second carry bit;  
fourth adder means for adding the most significant bits of said second two quantities to produce a fourth sum;  
first comparison means to subtract said third sum from said first sum to produce a first difference and a third carry bit;  
second comparison means to subtract said fourth sum from said second sum to produce a second difference; and  
means to adjust the result of said second comparison in accordance with said carry bits to obtain an adjusted uppermost bit in said second difference and thereby correctly indicate whether the sum of said first two quantities or the sum of said second two quantities is least without determining the exact value of the summation quantities.

5,412,670

# N-BIT PARITY NEURAL NETWORK ENCODER

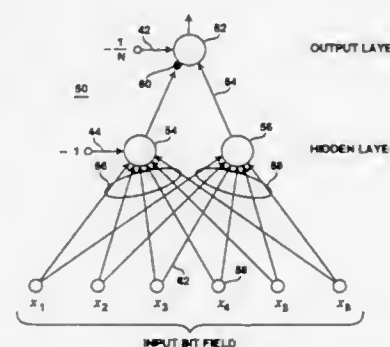
David G. Stork, Stanford, and James D. Allen, Castro Valley, both of Calif., assignors to Ricoh Corporation, Menlo Park, Calif. and Ricoh Company Ltd., Tokyo, Japan

Filed Nov. 30, 1992, Ser. No. 983,659

Int. Cl. G06F 11/10

U.S. Cl. 371—49.2

9 Claims



8. A parity detecting neural network operating on an N-bit input field for providing a binary output signal that indicates if an even or odd number bits in the N-bit input field have been asserted, the neural network comprising:

- a multiplicity of N input terminals, each terminal for accepting a distinct bit from the N-bit input field;
- a hidden layer having a first neural cell and a second neural cell, the first neural cell including,
  - a set of N equally weighted synapses, each synapse connected to a distinct input terminal for producing a set of weighted output signal,
  - a synaptic summing network for accepting the set of weighted output signals and for forming an output signal with a level proportional to a count of asserted bits in the N-bit input field,
  - a nonlinear activation network with an input connected to the synaptic summing network output signal for producing an output signal that is a sum of a first signal with a signal level proportional to the synaptic summing network output signal and a second signal that alternates polarity, having a first polarity if the synaptic summing network output signal level is proportional to an even count of asserted bits and having an opposite second polarity if the synaptic summing network output signal level is proportional to an odd count of asserted bits, the second neural cell including:
    - a set of N equally weighted synapses, each synapse connected to a distinct input terminal for producing a set of weighted output signal, and
    - a synaptic summing network for accepting the set of weighted output signals and for forming an output

signal with a level proportional to a count of asserted bits in the N-bit input field,

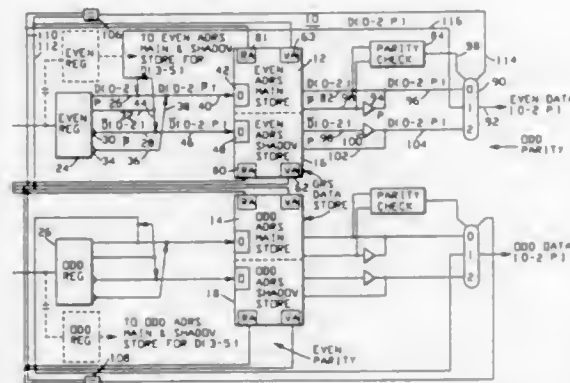
(c) an output layer having a single neural cell with a first synaptic input and a second synaptic input respectively connected to the first neural cell output signal and the second neural cell output signal for producing a binary output signal with a first state indicating an even count of asserted bits in the N-bit input field and a second state indicating an odd count of asserted bits in the N-bit input field by forming a difference signal representative of a difference between the output signal of the hidden layer first and second neural cell output signal, the binary output signal states representative of the polarities of the difference signal.

5,412,671

**DATA PROTECTION AND ERROR CORRECTION, PARTICULARLY FOR GENERAL REGISTER SETS**  
Kenichi Tsuchiya, New Brighton, Minn., assignor to Unisys Corporation, Blue Bell, Pa.  
Continuation of Ser. No. 621,146, Dec. 3, 1990, abandoned. This application Mar. 25, 1993, Ser. No. 37,155  
Int. Cl.<sup>6</sup> G06F 11/10

U.S. Cl. 371—51.1

11 Claims



1. A data protection and correction means for a first store means, wherein said first store means is coupled to receive input data bits from a source that also supplies input parity bits, comprising,

second store means,

first complementing means that receives said input data bits and produces complemented input data bits,

second complementing means that receives said input parity bits and produces complemented parity bits,

first combining means for combining said complemented input data bits with said input parity bits to form a first combined bit set,

second combining means for combining said input data bits with said complemented parity bits to form a second combined bit set,

write means for writing said first combined bit set into one of said first and second store means and said second combined bit set into the other of said first and second store means,

read means for reading from said first store means the one of said first or said second combined bit sets which is stored in said first store means,

parity checking means coupled to said read means for receiving said combined bit set which is read from first store means which is constructed to attempt to verify the parity thereof,

output means coupled to said first and second store means and to said parity checking means for outputting said combined bit set which is stored in said first store means if said parity checking means verifies that the parity of said combined bit set which was stored in said first store means is correct, and for outputting said combined bit set which

is stored in said second store means if said parity checking means fails to verify that the parity of said combined bit set which was stored in said first store means was correct.

8. A method of providing data protection and correction means for a first store means, wherein said first store means is coupled to receive input data bits and input parity bits from a source and a second store means is available, comprising,

complementing said input data bits and input parity bits to produce complemented input bits and complemented parity bits,

combining said complemented input data bits with said input parity bits to form a first combined bit set,

combining said input data bits with said complemented parity bits to form a second combined bit set,

supplying said first combined bit set to one of said first and second store means for storage therein and said second combined bit set to the other of said first and second store means for storage therein,

reading said one of said first or said second combined bit sets which is stored in said first store means therefrom,

verifying the parity of said combined bit set that was read from said first store means,

reading said other of said first or said second combined bit sets which are stored in said second store means therefrom if said parity bit of said combined bit set which was stored in said first store means is not verified, and

outputting either said combined bit set which was stored in first store means if said parity of said combined bit set which was stored in said first store means is verified, or said combined bit set which was stored in said second store means if said parity of said combined bit set which was stored in said first store means is not verified.

5,412,672

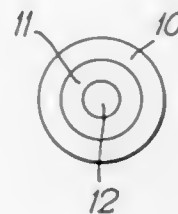
**WAVE-GUIDING STRUCTURE WITH LASING PROPERTIES**

Benjamin J. Ainslie, and Susan P. Craig-Ryan, both of Suffolk, England, assignors to British Telecommunications public limited company, London, England  
Continuation of Ser. No. 960,470, Dec. 16, 1992, Pat. No. 5,278,850. This application Dec. 10, 1993, Ser. No. 165,165  
Claims priority, application United Kingdom, May 16, 1990, 9010943

Int. Cl.<sup>6</sup> H01S 3/30

U.S. Cl. 372—6

23 Claims



1. A method of amplifying optical signals at a wavelength close to 1550 nm, said method comprising:

providing a lasing composition which forms at least part of the core of an optical fibre waveguide wherein said lasing composition is a silica-germania glass containing erbium as a lasing additive and alumina to adjust the bandwidth of operation of the erbium, said lasing composition containing 0.1–5000 ppm molar of erbium and the mole ratio of Ge:Al—1:X where X is less than 0.36; and

simultaneously providing said optical signals and optical pump radiation into said lasing composition so that the pump radiation produces a population inversion in the erbium whereby said signals are amplified by lasing action.

5,412,673

**SINGLE LONGITUDINAL MODE LASER WITHOUT SEEDING**

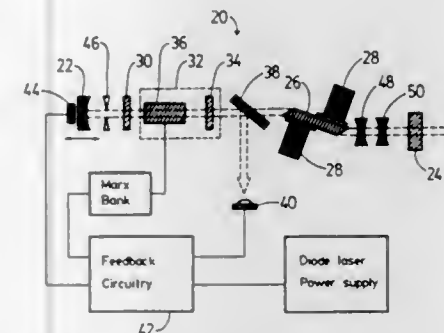
Andrea L. Caprara, Mountain View, and Jean-Marc Heritier, San Jose, both of Calif., assignors to Hoya Corporation, Tokyo, Japan

Filed Dec. 22, 1993, Ser. No. 172,086

Int. Cl.<sup>6</sup> H01S 3/098

U.S. Cl. 372—19

23 Claims



1. A laser device comprising:

a laser cavity defined by two end mirrors;

a frequency selective element arranged in said laser cavity, said frequency selective element having a transmissive peak;

a gain material arranged in the laser cavity; and

feedback circuitry adapted to adjust the length of the laser cavity so that a longitudinal mode of the laser device is near the frequency of the transmission peak of the frequency selective element.

5,412,674

**COMPACT RAPIDLY MODULATABLE DIODE-PUMPED VISIBLE LASER**

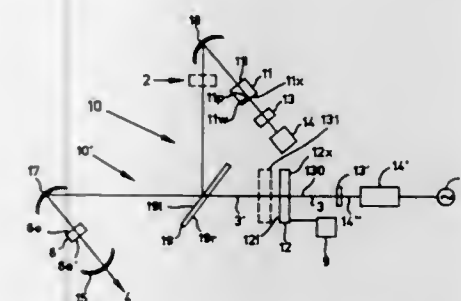
Richard Scheps, Del Mar, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 108,131, Aug. 12, 1993, Pat. No. 5,333,142, and a continuation-in-part of Ser. No. 183,212, Jan. 14, 1994. This application Apr. 7, 1994, Ser. No. 225,845

Int. Cl.<sup>6</sup> H01S 3/109

U.S. Cl. 372—22

48 Claims



1. An apparatus for simultaneously resonating two wavelengths within a preselected range of wavelengths for producing an amplitude modulated third wavelength by sum frequency generation, said third wavelength being modulated at a modulation frequency in the range between 0 Hz and 10 GHz comprising:

a resonator defining a resonator cavity for said simultaneously resonating two wavelengths within said preselected range of wavelengths, said resonator cavity defined by two end reflective elements, two highly reflective concave fold mirror elements, a beam combining element, and an output coupler reflective element arranged to form

a reflective path therebetween for a resonator mode in said resonator cavity;

said beam combining element disposed in said resonator cavity between said two highly reflective concave fold mirror elements to combine said simultaneously resonating two wavelengths in one region of said resonator cavity, and to disperse said simultaneously resonating two wavelengths each along a separate path in another region of said resonator cavity;

a laser gain element disposed in said resonator cavity to produce laser emission including one of said two wavelengths in said preselected range of wavelengths;

means for optically exciting said laser gain element in an end pumping mode to produce said laser emission that includes said one of said two wavelengths in said preselected range of wavelengths;

a laser source aligned and appropriately disposed to inject an optical emission including the other of said two wavelengths within said preselected range of wavelengths into said resonator cavity to resonate therein;

means disposed to effect an amplitude modulation of said third wavelength produced by said resonator apparatus; and,

a nonlinear optical crystal located within said resonator cavity having the property to generate said third wavelength, said third wavelength being the sum frequency of said two wavelengths.

5,412,675

**SEMICONDUCTOR OPTICAL SOURCE CAPABLE OF COMPENSATING FOR TEMPERATURE-INDUCED VARIATION OF LASER OSCILLATION THRESHOLD**  
Tetsufumi Odagawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

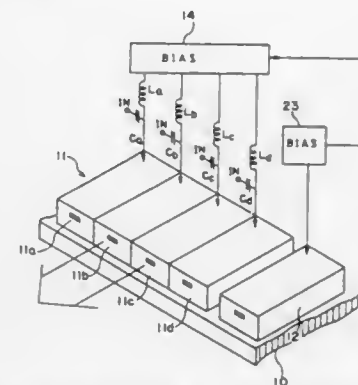
PCT No. PCT/JP92/01702, § 371 Date Jul. 28, 1993, § 102(e) Date Jul. 28, 1993, PCT Pub. No. WO93/13576, PCT Pub. Date Jul. 8, 1993

PCT Filed Dec. 25, 1992, Ser. No. 90,159

Claims priority, application Japan, Dec. 26, 1991, 3-344552  
Int. Cl.<sup>6</sup> H01S 3/133

U.S. Cl. 372—29

6 Claims



1. A semiconductor optical source, comprising:

a first laser diode supplied with a signal current pulse and a first bias current for producing an output optical signal pulse in response to said signal current pulse;

first biasing means for supplying said first bias current to said first laser diode;

a second laser diode supplied with a second bias current for producing an output optical beam in response thereto;

second biasing means for supplying said second bias current to said second laser diode;

heat sink means for maintaining said first laser diode and said second laser diode at a substantially identical temperature; and

control means for controlling said first biasing means such



that said first bias current is maintained at a level that is related to a threshold of said second laser diode wherein said control means controls said second biasing means in response to an optical power of said optical beam produced by said second laser diode by causing said second biasing means to supply said second bias current to said second laser diode such that said optical power of said optical beam is maintained at a predetermined level, said control means further controlling said first biasing means such that said first biasing means supplies said first bias current with a level substantially identical with said second bias current to said first laser diode, said predetermined level of said optical power being determined such that an extinction ratio of said optical signal pulse that is produced by said first laser diode exceeds a desired value at a highest expected operational environment temperature of said semiconductor optical source.

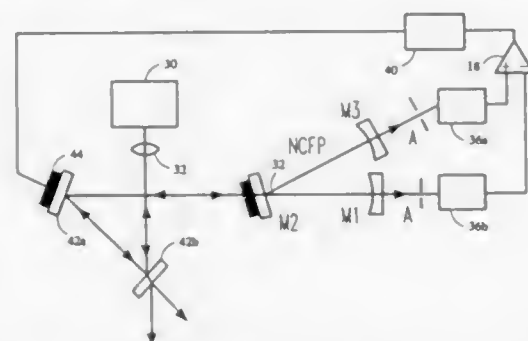
5,412,676

**METHOD AND APPARATUS FOR THE DETERMINATION OF THE RELATIVE FREQUENCY OFFSET BETWEEN AN INPUT OPTICAL SIGNAL AND A RESONANCE FREQUENCY OF AN OPTICAL CAVITY**  
Dietmar Schnier, Hanover, Germany; Alan A. Madej, Gloucester, and Gary R. Hanes, Ottawa, both of Canada, assignors to National Research Council of Canada, Ottawa, Canada

Filed Jun. 6, 1994, Ser. No. 254,867  
Int. Cl.<sup>6</sup> H01S 3/13

U.S. Cl. 372—32

8 Claims



1. A method of providing a control signal comprising the steps of:

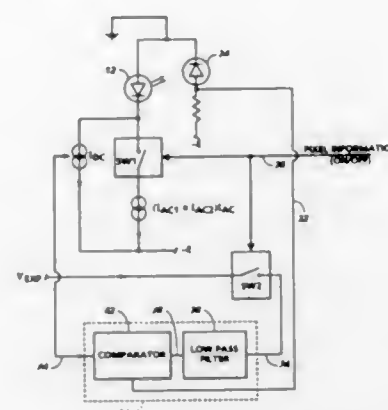
- providing a resonant cavity having a plurality of longitudinal and transverse modes inherently associated with resonance of the cavity;
- providing the resonant cavity with an optical signal having a spatial intensity mode pattern that is suitable for excitation of at least one of the longitudinal modes and a plurality of associated transverse modes of the cavity;
- allowing a plurality of the transverse modes to become excited within the resonant cavity in the presence of the optical signal, each transverse mode having a resonant frequency;
- detecting relative intensities of a selected plurality of transverse modes that are excited within the cavity; and
- generating a control signal by comparing the relative intensities determined in step (c), the control signal being representative of the relative frequency difference between the optical signal and the resonance of the resonant cavity.

**5,412,677**  
**DATA-INSENSITIVE LASER DIODE POWER CONTROL**  
Jean-Michel Guerin, Glendale, and Erwin R. Wechsler, La Crescenta, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed May 2, 1994, Ser. No. 239,147  
Int. Cl.<sup>6</sup> H01S 3/00

U.S. Cl. 372—38

2 Claims



1. A laser diode feedback system for determining fluctuations of heat in the diode and for keeping the temperature of the diode at a generally constant level, said system comprising:  
diode means for emitting a light beam;  
said diode means having a back photodiode and having a selected exposure level;  
a feedback generating means;  
exposure level applying means;  
means for supplying a train of pixel information to said diode means for modulating said light beam of said diode means and to said exposure level applying means to generate a train of pixel information with a DC level equal to the exposure level of said diode means;  
said train of pixel information, with a DC level equal to the exposure level, being electrically connected to said feedback generating means for generating a feedback signal;  
means for providing current to said diode means;  
said back photodiode being located in such a manner that it receives a portion of said modulated light beam;  
said back photodiode generating an electric signal in response to said modulated light beam representing temperature at said diode means;  
said electric signal being the average of said train of pixel information;  
said feedback generating means being operably connected to said back photodiode means for receiving said electric signal;  
said feedback generating means averaging said train of pixel information; with a DC level equal to the exposure level to represent a desired constant temperature level at said diode means and comparing said averaged train of pixel information with a DC level equal to the exposure level to said electric signal in such a manner that if said averaged train of pixel information and said electric signal are not the same, it will generate a feedback signal representing fluctuation between the desired constant temperature and the temperature at said diode means and if said averaged train of pixel information and said electric signal are the same, it will not generate a feedback signal; and  
said current providing means being operably connected to said feedback generating means for receiving said feedback signal and for adjusting the current to said diode means in response to said feedback signal to keep the temperature of said diode means at a generally constant level.

**5,412,678**  
**MULTI-BEAM, ORTHOGONALLY-POLARIZED EMITTING MONOLITHIC QUANTUM WELL LASERS**  
David W. Treat, San Jose; David P. Bour, Spring Court Cupertino, and Thomas L. Paoli, Los Altos, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

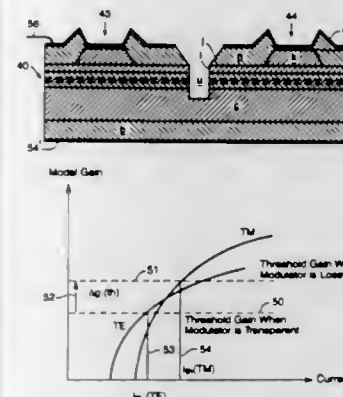
Filed Sep. 22, 1992, Ser. No. 948,524

The portion of the term of this patent subsequent to Mar. 7, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> H01S 3/103, 3/19

U.S. Cl. 372—45

33 Claims



1. A multi-beam semiconductor QW laser, comprising:  
(a) a semiconductor body having at least first and second active portions of the same material exhibiting heavy hole and light hole energy band edges and capable of lasing and providing TE-mode polarized gain from heavy hole band transitions and TM-mode polarized gain from light hole band transitions;  
(b) electrodes for introducing carriers into said active body portions;  
(c) optical reflectors associated with the active body portion;  
(d) said active portions lasing in its TE-mode or its TM-mode in response to its threshold carrier density;  
(e) means for driving said first active portion to lase in its TE mode and means for driving said second active portion to lase in its TM mode.

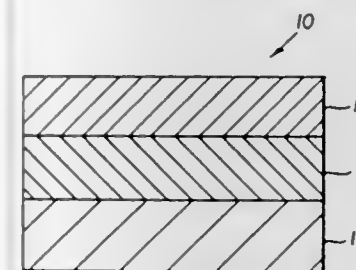
**5,412,679**  
**OPTICAL WAVEGUIDE EPITAXIALLY GROWN ON SEMICONDUCTORS FOR UPCONVERSION**  
Liang-Sun Hung, Webster, and Gustavo R. Paz-Pujalt, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 14, 1994, Ser. No. 195,239

Int. Cl.<sup>6</sup> H01S 3/19

U.S. Cl. 372—45

6 Claims



1. A multilayer structure comprising:  
a single crystal semiconductor substrate;  
an epitaxial buffer layer overlaying the substrate; and  
an epitaxial fluoride outer film layer exhibiting upconversion excitation upon red or infrared irradiation wherein said

epitaxially fluoride layer is  $\text{BaY}_2\text{F}_8$ ,  $\text{BaYbF}_8$ , or  $\text{YLiF}_4$  doped with Ho, Er, Nd, Tm, or Pr.

**5,412,680**  
**LINEAR POLARIZATION OF SEMICONDUCTOR LASER**

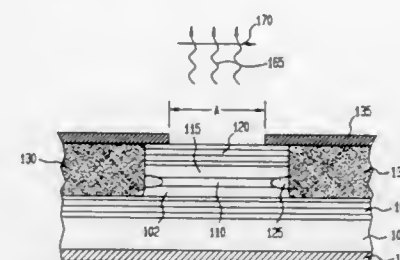
Stanley E. Swirhun, Boulder, and Thomas J. O'Neill, Jr., Superior, both of Colo., assignors to Photonics Research Incorporated, Bloomfield, Colo.

Filed Mar. 18, 1994, Ser. No. 210,526

Int. Cl.<sup>6</sup> H01S 3/19

U.S. Cl. 372—45

19 Claims



1. A vertical cavity surface emitting laser emitting optical radiation at a wavelength,  $\lambda$ , comprising:  
first and second parallel mirrors forming therebetween an optical cavity; and  
an active region disposed between the mirrors, the active region comprising at least one strained semiconductor layer, the strained semiconductor layer having a preferred direction of electrical conductivity substantially along a first direction parallel to the mirrors, and said laser emitting optical radiation having a polarization substantially parallel to this first direction.

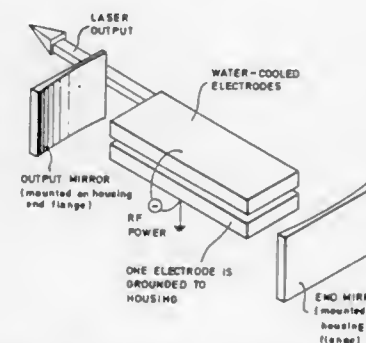
**5,412,681**  
**SLAB-WAVEGUIDE CO<sub>2</sub> LASER**  
Dietmar Eisel, Pleasanton, Calif.; Herbert Gross, Aalen, Germany, and Christopher L. Pertersen, Danville, Calif., assignors to Carl Zeiss, Inc., N.Y.

Filed Mar. 30, 1994, Ser. No. 219,844

Int. Cl.<sup>6</sup> H01S 3/03

U.S. Cl. 372—64

9 Claims



1. A slab-waveguide laser comprising spaced-apart, slab electrodes, whose surfaces excite a CO<sub>2</sub> laser gas and guide laser light, and a resonator formed around the slab electrodes the resonator including a first mirror means and a second mirror means, the resonator being an unstable waveguide resonator in a direction substantially parallel to faces of the slab electrodes and being a stable waveguide resonator in a direction substantially perpendicular to the slab electrodes wherein the CO<sub>2</sub> laser gas has a first band and a second band, and wherein the resonator suppresses laser oscillations substantially at the second band and wherein the first mirror means has an effective reflectivity  $R_1$  and the second mirror means has an effective reflectivity  $R_2$  wherein:

$R_1 R_2 [ > ] \geq R_{lase}$  for wavelengths substantially in the first band and  
 $R_1 R_2 [ < ] \leq R_{threshold}$  for wavelengths substantially in the second band  
 where:  $R_{lase}$  is a minimum combined effective reflectivity needed for laser operation, and  $R_{threshold}$  is a minimum effective reflectivity for which lasing can occur.

5,412,682

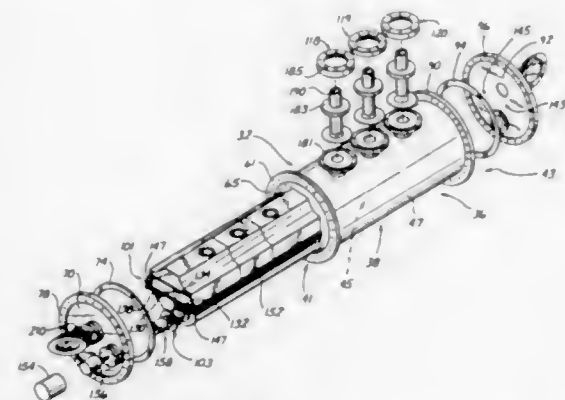
## HALOGEN COMPATIBLE LASER HEAD

James B. Laudenslager, Long Beach; Fred G. Kinley, Mission Viejo, and Shing-Wa P. Tzeng, Fountain Valley, all of Calif., assignors to Advanced Interventional Systems, Inc., Irvine, Calif.

Filed Mar. 31, 1994, Ser. No. 220,969  
 Int. Cl.<sup>6</sup> H01S 3/03

U.S. Cl. 372—65

34 Claims



1. A laser head, comprising:  
 a tube having a wall with a configuration of a hollow cylinder with two ends;  
 a first flange disposed at one of the ends of the tube and extending generally radially outwardly of the tube wall;  
 a single continuous weld connecting the first flange to the wall of the tube;  
 a second flange disposed at the one end generally axially of the first flange;  
 means for coupling the first flange to the second flange to close the one end of the tube; and  
 a metal gasket disposed between the first flange and the second flange to form a pressure seal at the one end of the tube.

5,412,683

## CONFOCAL DIODE PUMPED LASER

William L. Nighan, Jr., Menlo Park, and Mark S. Keirstead, San Jose, both of Calif., assignors to Spectra-Physics Lasers, Inc., Mountain View, Calif.

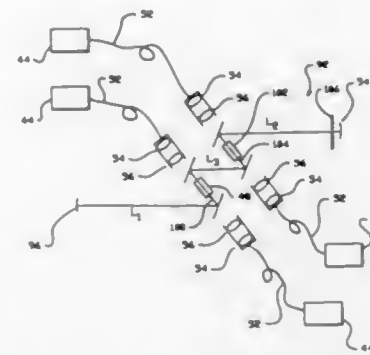
Filed Feb. 4, 1994, Ser. No. 191,772  
 Int. Cl.<sup>6</sup> H01S 3/08, 3/0933, 3/105

U.S. Cl. 372—75

35 Claims

1. A high efficiency, diode pumped laser, comprising:  
 a resonator mirror and an output coupler defining a nearly confocal resonator with a resonator optical axis;  
 a laser crystal positioned in the resonator along the resonator optical axis;  
 a diode pump source supplying a pump beam to the laser

crystal in the laser resonator producing an output beam;  
 and  
 a power source supplying power to the diode pump source;



wherein the output beam has a power greater than about 4 W.

5,412,684

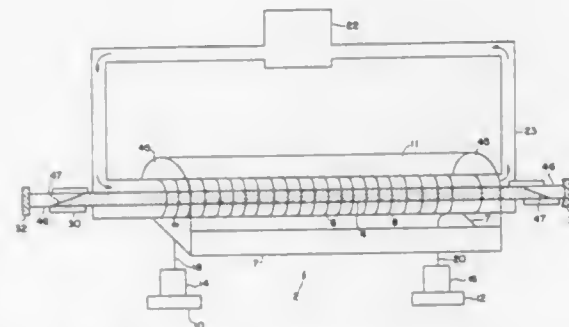
## MICROWAVE EXCITED GAS LASER

LaVerne A. Schlie, Albuquerque, N. Mex.; Brian Turner, Myersville, Md., and John E. Waymouth, Marblehead, Mass., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Mar. 10, 1993, Ser. No. 29,658  
 Int. Cl.<sup>6</sup> H01S 3/097

U.S. Cl. 372—82

15 Claims



1. A metal vapor/inert gas laser, comprising,  
 a laser tube which contains an excitable medium containing an inert gas and metallic material which is capable of vaporizing and lasing, the metallic material when vaporized being present in a much smaller amount than the inert gas,  
 source means generating microwave energy, and  
 coupling means which includes a slow wave structure in proximate relation to said laser tube for coupling microwave energy from said source means to the excitable medium in said laser tube.

5,412,685

## LASER OSCILLATOR

Akira Egawa, Michinori Maeda, and Yoshitaka Kubo, all of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP93/01494, § 371 Date Jun. 15, 1994, § 102(e) Date Jun. 15, 1994, PCT Pub. No. WO94/10727, PCT Pub. Date May 11, 1994

PCT Filed Oct. 14, 1993, Ser. No. 244,915

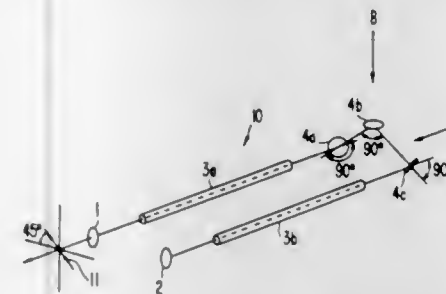
Claims priority, application Japan, Oct. 26, 1992, 4-287646  
 Int. Cl.<sup>6</sup> H01S 3/081

U.S. Cl. 372—93

2 Claims

1. A laser oscillator including a folded-type resonator for

emitting a linearly polarized laser beam such that an optical axis of the laser beam is folded multitudinously, comprising:  
 a laser oscillator including a folding section having first and second reflecting mirrors inclined at an angle of 45° to a horizontal plane with respect to each optical axis of each excitation section, and said first and second reflecting



mirrors are further inclined at an angle of 45° to a vertical plane, a third reflecting mirror horizontally arranged such that it has a center thereof located at a vertex of an isosceles right triangle whose base is defined by a line connecting centers of the first and second reflecting mirrors, said folded resonator thereby producing a linearly polarized output beam.

5,412,686

## METHOD AND APPARATUS FOR POWER ESTIMATION IN A COMMUNICATION SYSTEM

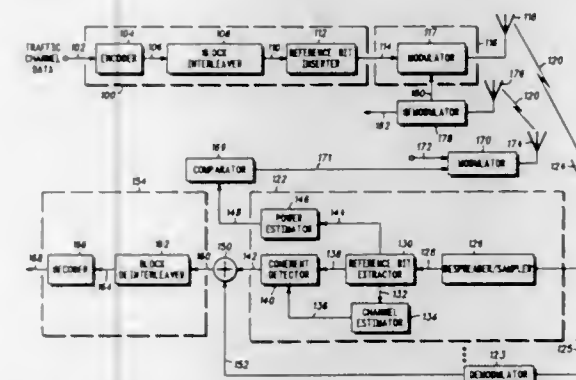
Fuyun Ling, Hoffman Estates, Ill., assignor to Motorola Inc., Schaumburg, Ill.

Filed Sep. 17, 1993, Ser. No. 123,452

Int. Cl.<sup>6</sup> H04L 27/30; H04B 17/00

U.S. Cl. 375—200

34 Claims



18. A communication unit, comprising:  
 (a) signal receiving means for detecting a power control indicator within a signal received from over it communication channel, the power control indicator being derived from a comparison between a sample-based signal power estimate and a predetermined threshold, the sample-based signal power estimate being derived from it magnitude of a complex signal power estimate of a power of a despread communication signal as a function of a stream of samples selected from the group consisting of: a stream of reference samples and a stream of data samples;  
 (b) power adjustment means, operatively coupled to the signal receiving means, for adjusting a particular signal transmission power of a signal transmitter in response to the detected power control indicator.

5,412,687

## DIGITAL COMMUNICATIONS EQUIPMENT USING DIFFERENTIAL QUATERNARY FREQUENCY SHIFT KEYING

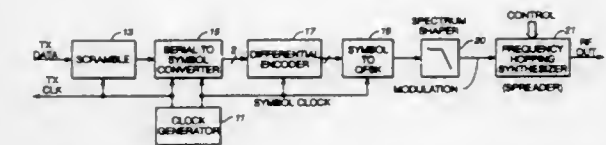
Jeff R. Sutton, San Jose, and Juan G. Grau, Jr., San Mateo, all of Calif., assignors to Proxim Incorporated, Mountain View, Calif.

Filed Oct. 15, 1993, Ser. No. 136,749

Int. Cl.<sup>6</sup> H04K 1/00

U.S. Cl. 375—202

25 Claims



1. A communications transmitter for transmitting a digital bit stream, comprising:  
 means for converting said digital bit stream to a stream of multi-bit symbols;  
 means for differentially encoding said stream of multi-bit symbols to produce a stream of differentially encoded symbols; and  
 means for frequency modulating a carrier signal in accordance with said differentially encoded symbols so as to represent each differentially encoded symbol by one of a plurality of frequencies related in number to a number of bits in said multi-bit symbols.

5,412,688

## PROCESS AND CIRCUIT FOR DETECTING TRANSMISSION USING BI-DIRECTIONAL DIFFERENTIAL LINKS

Roland Marbot, Versailles, France, assignor to Bull, S.A., Paris, France

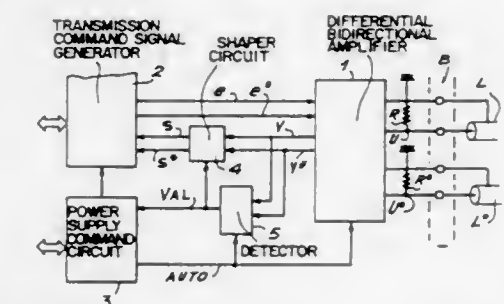
Continuation of Ser. No. 842,973, Feb. 28, 1992, abandoned.  
 This application Feb. 18, 1994, Ser. No. 199,354

Claims priority, application France, Mar. 14, 1991, 91 03127;  
 Jun. 27, 1991, 91 08001

Int. Cl.<sup>6</sup> H04L 5/16, 27/00

U.S. Cl. 375—220

21 Claims



4. A circuit for detecting signal transmissions in a transmission system having at least one transceiver connected via two differential transmission lines (L, L\*) to a similar remote transceiver, said at least one transceiver including differential amplification means (1) for producing differential transmission and reception signals; said differential amplification means (1) including: an impedance (R, R\*) for adaptation to and connected with each of said two differential transmission lines; a transmission signal generator (T1, T1\*, S1) commanded in response to transmission command signals (e, e\*) for supplying transmission signals to said impedance (R, R\*) and each of said two differential transmission lines (L, L\*), and reception means (T2, T2\*, r, S2) for furnishing measurement signals (V, V\*) that are representative of the algebraic sum of a current circulating in said impedance (R, R\*) and a compensation current,



34. A data demodulator provided with:  
phase detection means, receiving a receive signal of an M-channel (M is a positive integer) time division multi-access (TDMA) formula having undergone  $\pi/4$ -shift quadrature phase-shift-keying ( $\pi/4$  QPSK) for detecting the phase of said receive signal by comparing the phase of said receive signal and that of a reference signal whose frequency is substantially equal to K (K is a positive integer) times the center frequency of said receive signal, and sampling the phase of said receive signal, which has been detected, to give a phase signal in a parallel signal form every time a clock signal, resulting from the division of the symbol period of said receive signal into N (N is a positive integer) phases, is supplied;

delay means for generating a delayed phase signal by giving said phase signal a delay equal in length to said symbol period;

phase difference detection means for generating a phase difference signal by subtracting said delayed phase signal from said phase signal; and

decision means responsive to said phase difference signal for generating decision data, which is the result of the phase decision of said phase difference signal,

further provided with:

timing signal generating means, receiving a frame signal notifying the TDMA channel switching of said receive signal, for generating said clock signal synchronized with this frame signal, a sampling signal prepared immediately before the end of reception on said TDMA channel, a clear signal prepared between the preparation of said sampling signal and the reception of said frame signal, and a channel number indicating signal prepared upon reception of said frame signal;

subtracting means, inserted between said phase difference detection means and said decision means, for subtracting from a phase difference signal generated by said phase difference detecting means a correction value for correcting the D.C. offset of this phase difference signal, and supplying the corrected phase difference signal to said decision means;

decision error detection means responsive to the phase difference signal from said subtracting means and to said decision data for detecting the difference between the phase of said phase difference signal and the decision phase of said decision data;

decision error adding means for generating the sum of said decision errors by adding said decision error in the period of the supply of said channel number indicating signals every time said clock signal is supplied and for clearing the sum of said decision errors in response to said clear signal;

a decision error register for sampling the sum of said decision errors every time said sampling signal is supplied and storing said decision error sum;

M correction registers for storing said correction value for each corresponding TDMA channel of said receive signals;

a selector for selecting said correction value from one of said M correction registers as indicated by said channel number indicating signal; and

signal processing means further comprising reading means for reading said decision error sum out of said decision error register, computing means responsive to the read-out decision error sum for computing the average of the sums of said decision errors in each frame period of said TDMA signals and adding said average to said corrected value stored in said correction register of the corresponding TDMA channel to give a new correction value, and correction value storing means for storing these correction values into said correction registers for the respectively corresponding channels.

5,412,695

# METHOD AND DEVICE FOR REMOVING FREQUENCY OFFSET

Hiroyasu Murata, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Jul. 19, 1993, Ser. No. 93,408

Claims priority, application Japan, Dec. 18, 1992, 4-338490

Int. Cl.<sup>6</sup> H04L 27/06

U.S. Cl. 375-344

8 Claims

3. A device for removing a frequency offset in modem reception signals, comprising:

sampling means for digitally sampling and outputting vector signals each having a real component and an imaginary component from reception signals received from a transmission line;

equalizing means for eliminating a distortion due to an inter-

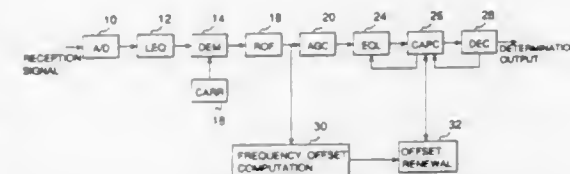
code interference on said transmission line in the vector signals obtained by said sampling means;

determining means for determining a correct signal point on a phase plane from an equalized output signal from said equalizing means to produce a determination signal;

a carrier phase control means including:

first integrating means for computing a first frequency offset value ( $\theta_1$ ) on the basis of an equalization residual signal, obtained as a difference between said equalized output signal from said equalizing means and said determination signal from said determining means, and said equalized output signal;

second integrating means for producing an offset elimination signal having a minus frequency component from said first frequency offset value ( $\theta_1$ ) computed by said first integrating means, and



correcting means for correcting said equalized output signal and said equalization residual signal by said offset elimination signal produced by said second integrating means;

frequency offset computing means for computing a second frequency offset value ( $\theta_2$ ) from said vector signals outputted from said sampling means; and

renewing means for comparing said second frequency offset value ( $\theta_2$ ) computed by said frequency offset computing means and said first frequency offset value ( $\theta_1$ ) computed by said first integrating means of said carrier phase-control means and for substituting said first frequency offset value ( $\theta_1$ ) with said second frequency offset value ( $\theta_2$ ) when a difference between said first frequency offset value ( $\theta_1$ ) and said second frequency offset value ( $\theta_2$ ) exceeds a predetermined value.

5,412,696

# ELECTRONIC CIRCUIT READILY CAPABLE OF CONTROLLING EXTENT OF A RADIO COMMUNICATION ZONE

Susumu Uriya, Tokyo, and Atunori Nakamura, Kanagawa, both of Japan, assignors to NEC Corporation, Tokyo, Japan

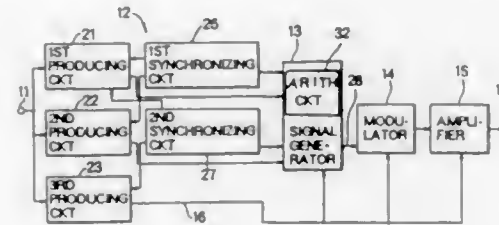
Filed Nov. 30, 1992, Ser. No. 982,989

Claims priority, application Japan, Nov. 30, 1991, 3-342375

Int. Cl.<sup>6</sup> H04L 7/00

U.S. Cl. 375-354

5 Claims



5. An electronic circuit for use in a time division multiple access system and responsive to a data signal sequence for producing a data burst carrying said data signal sequence, said electronic circuit comprising a signal producing circuit for producing a local signal in accordance with said data signal sequence and with a burst control pulse having a control pulse width generated in said signal producing circuit and a signal processing circuit for processing said local signal into said data

burst during presence of said burst control pulse, wherein said signal producing circuit comprises:

first producing means for producing a data pulse, having a data pulse width, in accordance with said data signal sequence, said data pulse having a data time slot and comprising a particular signal previous to said data time slot and a specific signal following said data time slot, said first producing means keeping said data time slot at a time slot width equal to said control pulse width;

second producing means for producing an additional control pulse in accordance with said data signal sequence wherein said additional control pulse having an additional control pulse width equals to said data pulse width;

third producing means for producing said burst control pulse in accordance with said data signal sequence; and local processing means connected to said first producing means, said second producing means, said third producing means, and said signal processing circuit for processing said data pulse into a processed signal in accordance with said burst control pulse and said additional control pulse to supply said processed signal as said local signal to said signal processing circuit.

5,412,697

# DELAY LINE SEPARATOR FOR DATA BUS

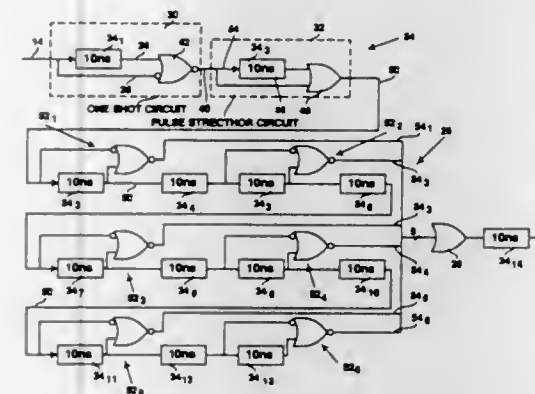
Roger Van Brunt, San Francisco, and Florin Oprescu, Sunnyvale, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Jan. 14, 1993, Ser. No. 4,441

Int. Cl.<sup>6</sup> H04L 7/02; H03D 3/24

U.S. Cl. 375-360

49 Claims



8. A delay line separator for extracting a clock signal from a combined clock/data signal received along a serial data line, said combined clock/data signal including a plurality of sequential bit cells having a predefined width (W), said data being encoded subject to an encoding scheme which ensures at least two rising-edge transitions within no more than a predefined number (N) of bit cells, said separator comprising:

a one-shot pulse means, connected to said serial data line, for generating a pulse signal having an individual pulse corresponding to each rising edge within said data signal;

a pulse stretching means for increasing the width of said pulses within said pulse signal to a width approximately equal to said bit cell width W;

at least N additional one-shot pulse means, sequentially connected to said pulse stretching means, for successively receiving said pulse signal having pulses of increased width and for generating additional pulses corresponding to rising edges in said pulse signal, with each of said additional one-shot pulse means including a delay means for delaying said pulse signal by amount of time T; and

OR-gate means, connected to each of said additional one-shot pulse means, for combining output pulses from each of said additional one-shot pulse means to yield a single

clock signal, said clock signal including pulses having a width of W/2.

5,412,698

# ADAPTIVE DATA SEPARATOR

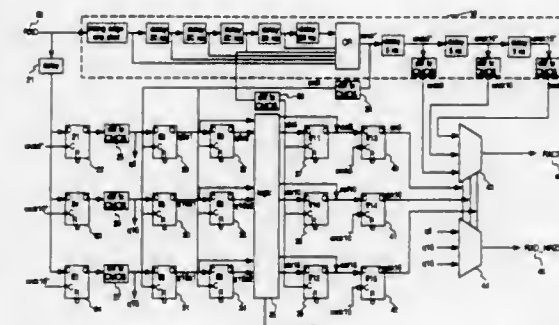
Roger Van Brunt, San Francisco; Daniel L. Hillman, San Jose, both of Calif.; Christopher Nilson, Seattle, Wash.; Florin Oprescu, Sunnyvale, and Michael D. Teener, Santa Cruz, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Mar. 16, 1993, Ser. No. 25,712

Int. Cl.<sup>6</sup> H03L 7/00

U.S. Cl. 375-373

21 Claims



1. An adaptive data separator for determining an optimal clock signal for sampling a packet of serial data which may suffer duty-cycle distortion, said packet of serial data having a predetermined sequence of initial bit values, said packet of serial data comprising a plurality of bit cells each having a predetermined pulse width (W) when transmitted which may undergo distortion during signal propagation, said adaptive data separator comprising:

signal sampling circuitry for sampling said predetermined sequence of initial bit values each on a plurality of different clock signals;

comparing logic circuitry for comparing the samples of said predetermined sequence of initial bit values to known values for determining which of said plurality of different clock signals is the optimal clock signal for sampling said packet of serial data; and

signal selection circuitry for outputting said optimal clock signal and a signal corresponding to data values of said plurality of bit cells sampled on said optimal clock signal, wherein said predetermined sequence of initial bit values comprises first and second test bit cells having opposite values.

5,412,699

# BRAKE TOOL FOR TRANSVERSING INCORE PROBE

Glenn Federman, Adams, N.Y., assignor to Niagara Mohawk Power Corporation, Syracuse, N.Y.

Filed Dec. 7, 1993, Ser. No. 163,294

Int. Cl.<sup>6</sup> G21C 19/00

U.S. Cl. 376-260

10 Claims

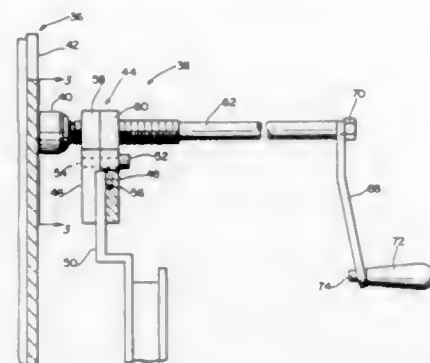
1. In a transversing incore probe system including a probe connected to a helix cable that is advanced into a reactor by a drive assembly and is kept under high tension by a spring biased reel, a brake tool comprising:

a clamping means for maintaining said brake tool in a fixed position relative to said reel;

a head connected to said clamping means for releasably engaging an outside circumferential surface of said reel; and



a means for advancing said head toward and withdrawing said head from said outside circumferential surface to stop



movement of said reel and permit movement of said reel, respectively.

5,412,700

# REACTOR REFUELING CONTAINMENT SYSTEM

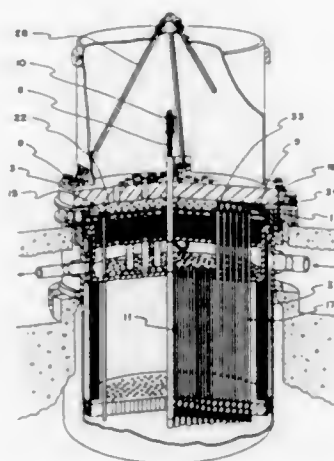
James E. Gillett, Greensburg, and Robert E. Meuschke, Pittsburgh, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 24, 1992, Ser. No. 840,232

Int. Cl.<sup>6</sup> G21C 19/00

U.S. Cl. 376-263

13 Claims



1. A system for contaminate recovery for a nuclear reactor during reactor refueling comprising:

- a relatively flat closure head connected to said nuclear reactor, said closure head having a predetermined number of penetrations for fuel rods, control rods, gadolinium injection piping and instrumentation;
- a barrier plate sandwiched between said nuclear reactor and said closure head forming a primary containment boundary;
- a refueling guard plate sandwiched between said closure head and said barrier plate;
- said refueling guard plate and barrier plate defining an annular chamber containing instrumentation and gadolinium injection piping; and
- a means for sealing connected to said closure head and said barrier plate creating a secondary containment boundary.

# INTERNAL FUEL ROD COATING COMPRISING METAL SILICATE

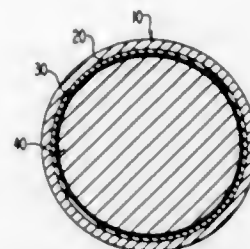
Jerry S. Glazman, Winsted, Conn.; Mark K. Davis, Springfield, Mass., and Philip A. VanSaun, Tolland, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Continuation-in-part of Ser. No. 906,380, Jun. 30, 1992. This application Dec. 29, 1992, Ser. No. 997,915

Int. Cl.<sup>6</sup> G21C 3/00

U.S. Cl. 376-419

22 Claims



11. A coated nuclear fuel assembly component comprising: a zirconium alloy nuclear fuel assembly component; and a cured burnable poison containing coating disposed on said zirconium alloy nuclear fuel assembly component, said cured burnable poison containing coating further comprising: burnable poison particles in an amount effective to provide neutron absorption at a predetermined level; optional graphite particles in an amount effective to provide abrasion resistance to said coating; and an alkali metal silicate binder in an amount effective to durably bind said burnable poison particles and said graphite particles.

5,412,702

# X-RAY COMPUTERIZED TOMOGRAPHIC IMAGING METHOD AND IMAGING SYSTEM CAPABLE OF FORMING SCANOGRAM DATA FROM HELICALLY SCANNED DATA

Shingo Sata, Tochigiken, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Sep. 11, 1992, Ser. No. 943,544

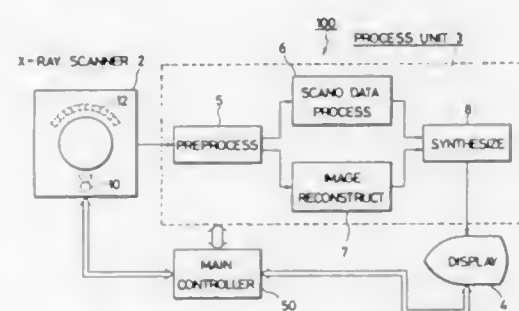
Claims priority, application Japan, Sep. 12, 1991, 3-232688

The portion of the term of this patent subsequent to Jun. 8, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> G01N 23/00

U.S. Cl. 378-4

26 Claims



1. An X-ray CT (computerized tomographic) imaging method comprising the steps of:

- scanning a biological body under medical examination in a helical scanning mode, while relatively rotating an X-ray source around the biological body translated along a longitudinal axis of the biological body, to acquire X-ray projection image data about the helically-scanned biological body;
- selecting only X-ray projection image data acquired by an X-ray detector at a predetermined projection angle from

the entire X-ray projection image data obtained at the helical-scanning step; processing said selected X-ray projection image data to produce a scanogram of said helically-scanned biological body; and reconstructing an X-ray CT image of said helically-scanned biological body based upon said entire X-ray projection image data, whereby both of said scanogram and said X-ray CT image are substantially simultaneously displayed.

5,412,703

# REDUCED PARTIAL VOLUME ARTIFACTS IN IMAGE RECONSTRUCTION, WITH APPLICATION TO X-RAY COMPUTED TOMOGRAPHY

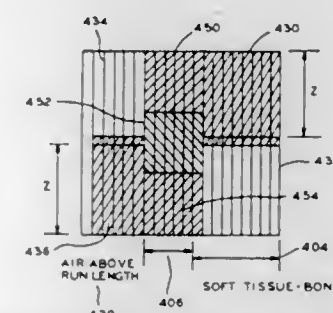
Davil J. Goodenough, Myersville, Md., and Warren S. Edwards, Burnaby, Canada, assignors to Institute for Radiological Image Science, Inc., Myersville, Md.

Filed Feb. 4, 1993, Ser. No. 13,589

Int. Cl.<sup>6</sup> G01N 23/083

U.S. Cl. 378-8

14 Claims



1. An apparatus for correcting an X-ray tomographic image, where the tomographic image is created by measuring an X-ray transmission coefficient at each of a plurality of X-ray beam ray paths through an object to enable reconstructing a tomographic image of said object, comprising:

- means for selecting a plurality of volume averaged voxels along at least one said X-ray beam ray path, and for placing contiguous volume averaged voxels in a runlength of volume averaged voxels, to make a plurality of run lengths of volume averaged voxels;
- means for dividing said plurality of run lengths of volume averaged voxels into a plurality of subslices;
- means, responsive to said plurality of subslices and responsive to said plurality of run lengths of volume averaged voxels, for computing a corrected value of X-ray attenuation coefficient for said X-ray beam ray path;
- means for reconstructing a correction image using said corrected X-ray attenuation coefficient for each said X-ray beam ray path; means for obtaining an improved image by combining said tomographic image with said correction image.

5,412,704

# X-RAY DIAGNOSTICS INSTALLATION HAVING A VARIABLE APERTURE DIAPHRAGM AND METHOD FOR OPERATING SAME

Heinz Horbaschek, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 4, 1994, Ser. No. 283,191

Claims priority, application Germany, Aug. 26, 1993, 43 28 783.2

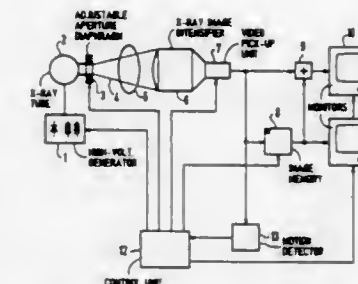
Int. Cl.<sup>6</sup> H05G 1/64

U.S. Cl. 378-98.2

22 Claims

1. An x-ray diagnostics installation comprising: an x-ray tube which emits x-rays; an adjustable aperture diaphragm, having a central region and an outer region surrounding said central region, disposed for gating said x-rays, said diaphragm being suitable

at a first aperture position wherein only x-rays in said central region pass unattenuated through said diaphragm and at a second aperture position wherein x-rays pass through both said central and outer regions unattenuated; means for producing a series of x-ray images of a subject from x-rays gated by said diaphragm; means for producing a respective video signal corresponding to each x-ray image; means for converting each video signal into a digital image;



means for operating said diaphragm to set said diaphragm at said second aperture position for every  $n^{th}$  x-ray image and for otherwise setting set diaphragm at said first aperture position; means for storing the digital image corresponding to said  $n^{th}$  x-ray image; and means for displaying the stored image and an image obtained with said diaphragm at said first position.

5,412,705

# X-RAY EXAMINATION APPARATUS WITH AN IMAGING ARRANGEMENT HAVING A PLURALITY OF IMAGE SENSORS

Rudolph M. Snoeren, and Jan W. Slotboom, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

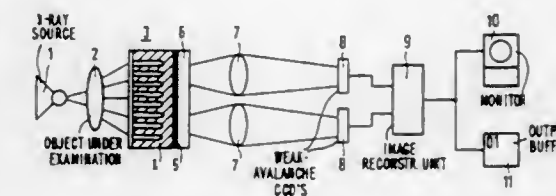
Filed Aug. 18, 1993, Ser. No. 108,865

Claims priority, application European Pat. Off., Aug. 18, 1992, 92202521; Dec. 29, 1992, 92204101

Int. Cl.<sup>6</sup> H04N 1/00

U.S. Cl. 378-98.3

13 Claims



1. An x-ray examination apparatus comprising an x-ray source, an imaging arrangement comprising a radiation conversion means facing the x-ray source, for converting image carrying x-radiation into image carrying visible radiation, image conversion means having a plurality of image sensors for converting the image carrying visible radiation formed by said radiation conversion means into an electrical signal, and a plurality of lenses aligned with the radiation conversion means, so that respective regions of said radiation conversion means are imaged on respective ones of said image sensors, and further comprising multilayer means intermediate the image sensors and the lenses for concentrating a light intensity distribution produced by the radiation conversion means substantially in a single direction by transmitting light having an angle of incidence in a region around normal incidence and reflecting light having an angle of incidence beyond said region.

5,412,706

## MAMMOGRAM MARKING SYSTEM

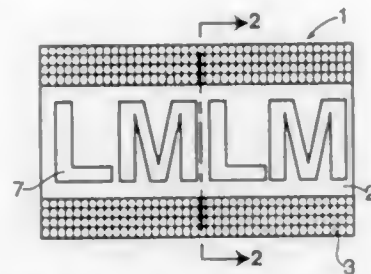
David L. Deibel, 3 Anchorage Cir., Groton, Conn. 06340

Filed Aug. 17, 1993, Ser. No. 107,916

Int. Cl.<sup>6</sup> G03B 42/02

U.S. Cl. 378-162

1 Claim



1. A marking system for taking X-ray mammography films comprising an X-ray transparent letter holding means configured to hold one or more X-ray opaque letters and/or indicia, said holding means having one or more fastening members that permit it to be removably attached to an X-ray film holder, and the X-ray film holder having cooperating fastening members, wherein the fastening members comprise hook and loop fastener loop material at oppositely positioned edges of the letter holding means and hook and loop fastener hook material at one or more places on the X-ray film holder.

5,412,707

## X-RAY EXAMINATION APPARATUS AND ARRANGEMENT FOR REMOTE-CONTROLLED POSITION INDICATION

Antonius J. L. M. Hoeks, Breugel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

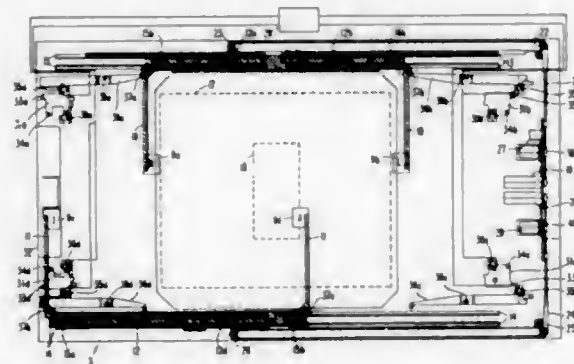
Continuation of Ser. No. 82,186, Jun. 24, 1993. This application Jun. 13, 1994, Ser. No. 259,277

Claims priority, application European Pat. Off., Jun. 25, 1992, 92201870

Int. Cl.<sup>6</sup> G03B 42/02

U.S. Cl. 378-165

8 Claims



1. An x-ray examination apparatus for recording patient position information in an x-ray image when the x-ray image is created, comprising:

- an x-ray source and an x-ray detector defining an imaging field;
- a patient receiving table for positioning a patient in said imaging field;
- a supporting rail and a frame carried by said rail, said frame holding two patient position indicating x-ray absorbing markers affixed to said frame such that one or the other or neither of said markers may be selectively placed inside said imaging field between said table and said film holder by moving said frame along said rail to remotely selected positions corresponding thereto,
- thereby causing one or the other or neither of said patient

position markers to be selectively imaged onto said x-ray detector at the same time that a patient is x-ray imaged onto said x-ray detector.

5,412,708

## VIDEOPHONE SYSTEM FOR SCRUTINY MONITORING WITH COMPUTER CONTROL

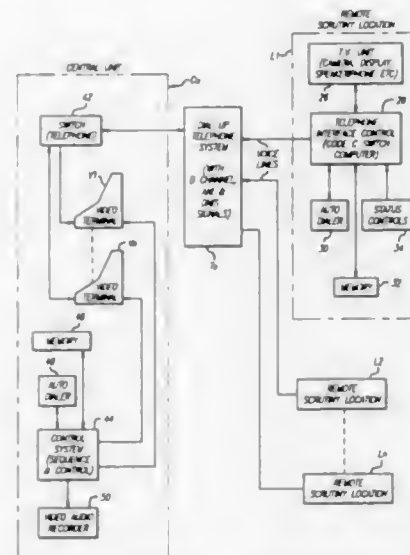
Ronald A. Katz, 570 S. Mapleton Dr., Los Angeles, Calif. 90024

Filed Mar. 12, 1993, Ser. No. 31,235

Int. Cl.<sup>6</sup> H04M 11/00; H04N 7/14

U.S. Cl. 348-14

22 Claims



10. A system for monitoring a plurality of scrutiny locations from a central station utilizing dial-up telephone facilities comprising:

- a plurality of television camera structures with control structure at said plurality of scrutiny locations for providing representative image television signals and for receiving control signals;
- a plurality of switch structures for at least one of said scrutiny locations for providing alert signals;
- a memory apparatus at said one scrutiny location for storing line designations addressable by said alert signals to provide line designation signals;
- at least one television display structure at said central station for providing a display from image television signals;
- at least one telephonic keypad structure at said central station for providing control signals and being associatively coupled to said television display structure;
- telephonic interface apparatus for interconnecting said television structures at said scrutiny locations and said central location for two-way communications; and
- a control computer at said one scrutiny location coupled to said memory apparatus and said telephonic interface apparatus for actuating said telephonic interface apparatus in accordance with said line designation signals to selectively communicate with one of said television display structures and to control said television display structures in accordance with said control signals from a keypad structure.

5,412,709

## DIGITAL TELEPHONE STATION LINE CONTROLLER

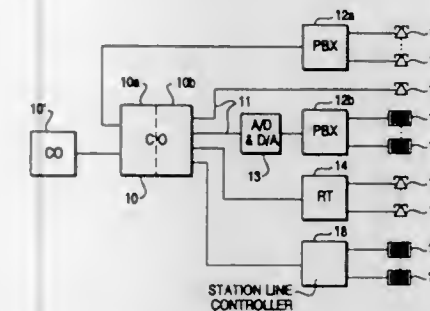
J. Michael Jarvis, Richmond; Andrew F. Bass, Vienna, both of Va., and Gregory R. S. Ilg, Raleigh, N.C., assignors to Charter Leasing Corporation, Richmond, Va.

Filed Jun. 24, 1992, Ser. No. 903,319

Int. Cl.<sup>6</sup> H04M 3/22, 3/42; H04J 1/16

U.S. Cl. 379-28

5 Claims



1. A method of testing terminal devices connected to a public switched telephone network including a central office, comprising the steps of:

- (a) monitoring at least one terminal device to obtain status information, said monitoring including the steps of:
  - (a1) monitoring by a station line controller operation of the station line controller operatively connected to the central office via a digital subscriber carrier system and to each of the at least one terminal device via a digital telephone station loop; and
  - (a2) periodically verifying predetermined operations of each of the at least one terminal device using the station line controller;
- (b) receiving status request signals from the public switched telephone network; and
- (c) reporting the status information from the station line controller to the public switched telephone network in response to the status request signals received in step (b).

5,412,710

## FACSIMILE MACHINE CAPABLE OF TRANSMITTING VOICE MESSAGES

Hidemasa Tanaka, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

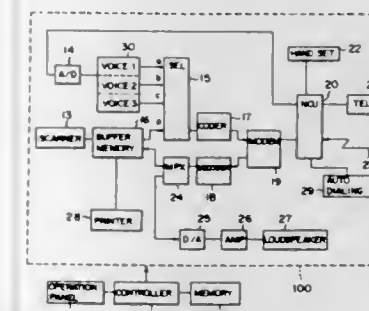
Filed Sep. 11, 1992, Ser. No. 944,461

Claims priority, application Japan, Sep. 11, 1991, 3-231737

Int. Cl.<sup>6</sup> H04M 3/42

U.S. Cl. 379-67

12 Claims



1. A facsimile machine comprising: scanner means for scanning documents and outputting image data corresponding to images on the documents; destination specifying means for specifying a destination station to be called; voice storage means for storing a plurality of voice messages; selecting means connected to said voice storage means for

selecting a voice message from said plurality of the voice messages stored in the voice storage means; transmission means, coupled to said scanner means, said destination specifying means, said voice storage means and said selecting means, for transmitting said image data output from said scanner means and said voice message selected by said selecting means, to a called destination station specified by said destination specifying means; receiving means for receiving image data and a voice message transmitted from another facsimile machine; printing means, coupled to said receiving means, for printing the image data received by said receiving means on a recording paper; and voice output means, coupled to said receiving means, for outputting the voice message received by said receiving means.

5,412,711

## ELECTRONIC EXCHANGE HAVING FUNCTION OF CALLING NUMBER DELIVERY SERVICE AND BLOCKING

Masami Hayashi, Yokohama, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

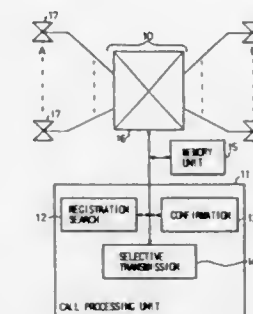
Filed Jan. 31, 1994, Ser. No. 189,420

Claims priority, application Japan, Sep. 14, 1993, 5-228988

Int. Cl.<sup>6</sup> H04M 1/64, 1/57

U.S. Cl. 379-67

8 Claims



1. An electronic exchange performing a switching between a call originating subscriber and a call terminating subscriber as well as providing a calling number delivery service and a calling number delivery blocking service to particular subscribers, the electronic exchange comprising:

- a registration search means for investigating, when the telephone number of the call terminating subscriber is received from the call originating subscriber who is registered to use the calling number delivery blocking service, whether or not the call terminating subscriber is a person who is registered to use the calling number delivery service;
- a confirmation means which is activated when the registration search means has found that the call terminating subscriber is registered and is operative to return an electronic message to the call originating subscriber so as to confirm whether the call originating subscriber allows or inhibits the execution of the calling number delivery blocking service; and
- a selective transmission means which is operative to suspend the transmission of the telephone number of the call originating subscriber to the call terminating subscriber, if an answer is returned, responding to the electronic message, from the call originating subscriber, indicating that the calling number delivery blocking service is to be executed, and conversely, which is operative to transmit the telephone number of the call originating subscriber to the call terminating subscriber, if the answer indicates that the calling number delivery blocking service is not to be executed.



5,412,712

## MULTIPLE LANGUAGE CAPABILITY IN AN INTERACTIVE SYSTEM

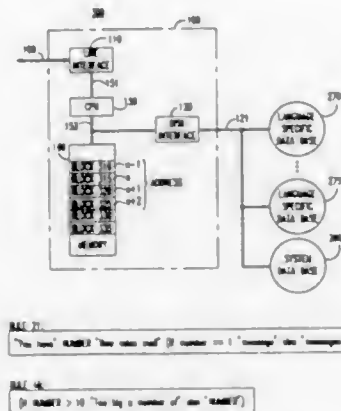
Terry D. Jennings, Westminster, Colo., assignor to AT&amp;T Corp., Murray Hill, N.J.

Continuation of Ser. No. 889,007, May 26, 1992, Pat. No. 5,375,164. This application Mar. 21, 1994, Ser. No. 215,167. The portion of the term of this patent subsequent to Dec. 20, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> H04M 1/64; G10L 5/00

U.S. Cl. 379-88

11 Claims



1. A multi-lingual voice messaging system comprising: means for storing a set of announcements, each announcement represented by an identifier that is associated with a plurality of rules, each rule associated with a different language and representing a plurality of words; means for storing a plurality of language specific data bases, each language specific data base comprising a plurality of language specific output information; means for constructing a language specific announcement from one of the announcements in one of the particular languages by using one of the associated plurality of rules to select some of the plurality of language specific output information where the one of the plurality of rules is associated with said one of the particular languages; and means for providing the selected language specific output information to a user; wherein the plurality of language specific output information is a plurality of language specific voice fragments and the means for providing plays the selected plurality of language specific voice fragments to provide the language specific announcement to the user.

5,412,713

## DISPLAY FOR A TELEPHONE TERMINAL

Kimberly A. Baals, Matawan; Edward W. Boakes, Middletown; Kathleen J. Chylinski, Bridgewater; Darren A. Kall, Highland Park, and Gary C. Smith, Freehold, all of N.J., assignors to AT&amp;T Corp., Murray Hill, N.J.

Filed Apr. 13, 1993, Ser. No. 47,589

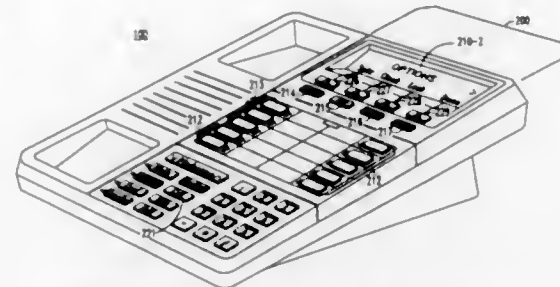
Int. Cl.<sup>6</sup> H04M 11/00

U.S. Cl. 379-96

14 Claims

1. An arrangement for displaying menu screens of information messages in a display device at a telephone terminal connectable to a telecommunication switch, the arrangement comprising: means for generating a plurality of sets of information messages in the telephone terminal, each one of the sets of information messages being displayed in an associated menu screen; directional arrow symbols in each displayed menu screen for providing an indication of additional available menu screens at a level only when said menu screens are available at said level, said directional arrow symbols selectively providing a direction for proceeding in the display

device for accessing said additional available menu screens at said level; means external to each displayed menu screen for accessing each of the additional available menu screens, the accessing means providing first and second button means for respectively providing previous and next functionality for accessing the additional available menu screens, the first button means being associated with a first one of the directional arrow symbols for pro-



viding a means for moving back to an available first one of the menu screens from the displayed menu screen and the second button means being associated with a second one of the directional arrow symbols for providing a means for advancing forward to an available second one of the menu screens; and means for only displaying the first directional arrow symbol in the displayed menu screen when only a first one of the menu screens is available for display.

5,412,714

## MNEMONIC AND SYNONYMIC ADDRESSING IN A TELECOMMUNICATIONS SYSTEM

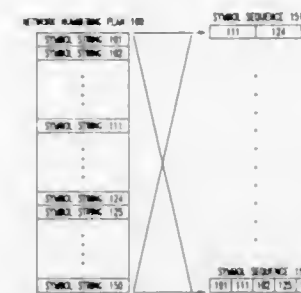
Frank J. Bogart, Boulder; Bruce D. Butterfield, Broomfield; David L. Chavez, Jr., Northglenn; Henry C. Dittmer, Westminster; Frederick R. Fix, Arvada; Larry J. Hardouin, Westminster; Nancy K. Schmidt, Broomfield, and Linda L. Thomson, Westminster, all of Colo., assignors to AT&amp;T Corp., Murray Hill, N.J.

Filed Feb. 24, 1992, Ser. No. 841,159

Int. Cl.<sup>6</sup> H04M 7/00, 3/42, 3/00

U.S. Cl. 379-221

36 Claims



1. A call-processing arrangement in a telecommunications system having a plurality of endpoints, means for accessing each of the endpoints, and a numbering plan according to which a selected endpoint is accessed in response to a user providing a sequence of symbols associated with the selected endpoint,

## CHARACTERIZED IN THAT:

the numbering plan assigns, to at least some of the endpoints, at least one predefined sequence of symbols that includes a plurality of strings of symbols arranged in the sequence in any order,

so that the accessing means access a selected endpoint, selected from said at least some of the endpoints, irrespective of the order in which the user provides the strings of symbols of the sequence of symbols associated with said selected endpoint.

5,412,715

## APPARATUS AND METHOD FOR CONNECTING TELEPHONE SWITCHING DEVICES

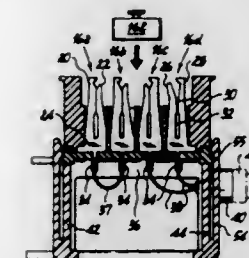
Kevin Volpe, E. Haven, Conn., assignor to Executone Information Systems, Inc., Milford, Conn.

Filed May 19, 1993, Ser. No. 63,861

Int. Cl.<sup>6</sup> H04M 1/00; H01R 4/24

U.S. Cl. 377-326

20 Claims



1. An apparatus for use in connecting telephone equipment including a private branch exchange (PBX) and a first auxiliary device including a dialer to telephone lines, the apparatus comprising:

- a plurality of conductive element sets for connecting to respective telephone lines, said conductive element sets having:
  - a first plurality of conductive elements;
  - a second plurality of conductive elements, each of said second plurality of conductive elements electrically coupled to a respective one of said first plurality of conductive elements;
  - a third plurality of conductive elements, each of said third plurality of conductive elements electrically isolated from said first and second pluralities of conductive elements;
  - a plurality of bridge connectors, each of said plurality of bridge connectors for coupling a respective one of said second plurality of conductive elements with a respective one of said third plurality of conductive elements;
  - a fourth plurality of conductive elements, each of said fourth plurality of conductive elements electrically isolated from said first, second, and third pluralities of conductive elements, said fourth plurality of conductive elements for electrically coupling to said first auxiliary device; and
  - a unitary connector for electrically coupling at least one of said third plurality of conductive elements and at least one of said fourth plurality of conductive elements to operatively connect said telephone lines to said dialer and said PBX.

5,412,716

## SYSTEM FOR EFFICIENTLY POWERING REPEATERS IN SMALL DIAMETER CABLES

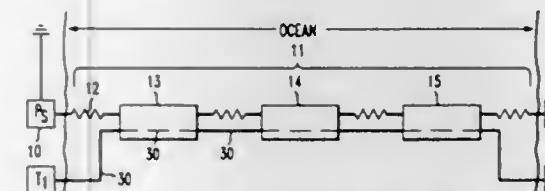
Matthew S. Blaha, Hanover Township, Morris County, N.J., assignor to AT&amp;T Bell Laboratories, Murray Hill, N.J.

Filed May 3, 1993, Ser. No. 56,085

Int. Cl.<sup>6</sup> H04B 3/44

U.S. Cl. 379-338

2 Claims



1. A DC-powered telecommunications cable transmission system, comprising:
  - (a) a plurality of series-connected cable sections, each sec-

- tion comprising an electrical conductor, and each of said conductors having a predetermined end-to-end resistance;
- (b) a plurality of repeaters, each repeater comprising electronic amplifying means serially connected with said electrical conductors of said cable sections, with the load resistance of each individual said repeater being substantially different from that of any other said repeater;
- (c) at least one voltage source connected to one or both ends of said series-connected repeaters for powering said repeaters;
- (d) a step-down DC-to-DC power converter connected across each said repeater for reducing the voltage supplied to each said amplifying means; and
- (e) a plurality of zener diodes serially connected in the path of said conductors, each said diode being connected across a one of said repeaters and also across a one of said power converters, said diodes being selected so as to increase the voltage drop across each said repeater so that the total of the voltage drops across all said repeaters is equal to the total voltage drops across the aggregate of said cable section conductors, thereby to prevent said circuit from oscillating in the presence of said voltage converters.

5,412,717

## COMPUTER SYSTEM SECURITY METHOD AND APPARATUS HAVING PROGRAM AUTHORIZATION INFORMATION DATA STRUCTURES

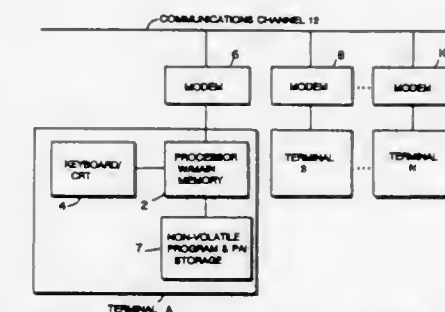
Addison M. Fischer, 60 14th Ave. South, Naples, Fla. 33942

Filed May 15, 1992, Ser. No. 883,868

Int. Cl.<sup>6</sup> H04L 9/00

U.S. Cl. 380-4

181 Claims



1. In a digital computer system having a digital data processing means for executing a plurality of digital programs and a memory means for storing digital program instructions and digital data, apparatus for protecting a digital computer user from operations typically performable by a digital computer program executing on behalf of a user comprising:
  - means for storing a plurality of digital authorization entries in said memory means, wherein said entries qualify operations which an associated program is permitted to perform when executed by said processing means; and
  - means for storing in at least one segment, digital data for associating said authorization entries with at least one program.

5,412,718

## METHOD FOR UTILIZING MEDIUM NONUNIFORMITIES TO MINIMIZE UNAUTHORIZED DUPLICATION OF DIGITAL INFORMATION

Arcot D. Narasimhalu; Weiguo Wang, and Mohan S. Kankanhalli, all of Singapore, Singapore, assignors to Institute of Systems Science, Kent Ridge, Singapore

Filed Sep. 13, 1993, Ser. No. 120,969

Int. Cl.<sup>6</sup> H04L 9/00

U.S. Cl. 380-4

14 Claims

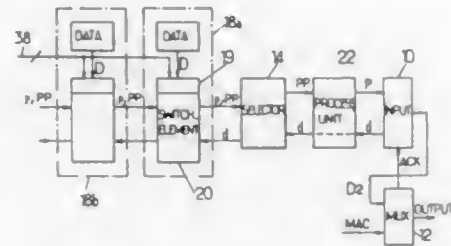
1. In a system for distributing information including at least a storage medium and at least an output device, said informa-

U.S. Cl. 380—20 9 Claims  
1. A method for forming a digital multiplex signal to be



transmitted or broadcast, comprising a sequence of packets of predetermined length, comprising the steps of:

providing a plurality of sources of packet precursors each including data to be included in a respective packet, in each source, adding a digital identification field identifying one process to be applied among a catalog of predetermined processes, to each packet precursor delivered by the source,



storing all said processes in a memory, and subjecting each said packet precursor in turn to the process which is defined by the identification field thereof in processing means provided with said memory to constitute a respective packet, prior to transmission or broadcasting.

5,412,725

# AUTHENTICATION FOR ANALOG COMMUNICATION SYSTEMS

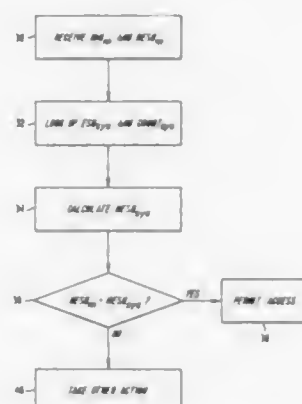
Jonas Näslund, Upsala; Thomas Johansson, Stockholm, and Johan Dahlström, Sollentuna, all of Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Nov. 24, 1993, Ser. No. 156,696

Int. Cl.<sup>6</sup> H04K 1/00

U.S. Cl. 380—23

22 Claims



1. A method for authenticating an identification of a remote station in a radiocommunication system comprising the steps of:

incrementing a first value stored in said remote station in response to each occurrence of at least one predetermined event; calculating in the remote station a first modified value of an identification code of said remote station known to said remote station and to said system using said first value as an input; incrementing a second value stored in said system in response to said each occurrence of at least one predetermined event; calculating, in said system, a second modified value of said identification code of said remote station known to said remote station and to said system by using said second value as an input;

transmitting said first modified value from said remote station to said system, and comparing said first modified value to said second modified value to authenticate identification of said remote station.

5,412,726

# TELECOMMUNICATION INSTALLATION WITH SECURE REMOTE LOADING OF PREPAYMENT MEANS AND CORRESPONDING REMOTE LOADING PROCESS

Rola Nevoux, Elancourt, and Philippe Hiole, Herouville Saint Clair, both of France, assignors to Telecom Etablissement autonome de droit public and la Poste-Etablissement autonome de droit public, Paris, France

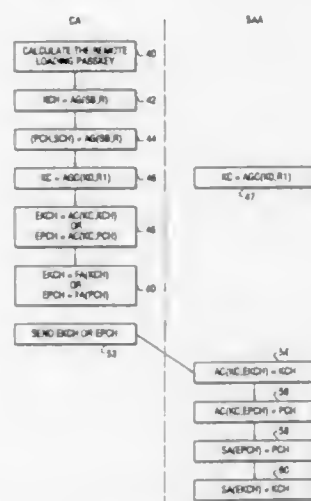
Filed Sep. 21, 1993, Ser. No. 124,196

Claims priority, application France, Sep. 21, 1992, 92 11223

Int. Cl.<sup>6</sup> H04K 1/00

U.S. Cl. 380—24

15 Claims



1. A telecommunication installation comprising: at least one switched telephone network (RTC); an autonomous telephone subscriber access system (SAA) comprising:

at least one base station (BF) linked to the switched telephone network; handling means linked to the base station comprising charge metering means (MG) able to calculate the charges for using the paying services of the switched telephone network (RTC); first enciphering/deciphering means (MACSAA) able to establish a cryptographic function (AC or SA) with the aid of a storage passkey (KC or SA);

at least one autonomous set (PA) comprising: means able to establish an intercommunication with the base station (BF); prepayment means (MPAY) able to contain value units intended for paying the usage charges calculated and transmitted by the charge metering means; first means of set authentication (AUPA) able to establish an authentication function (A) with the aid of a predetermined set base passkey (SB) personal to each subscriber;

an authorization center (CA) comprising: second enciphering/deciphering means (MACCA) able to establish the enciphering/deciphering function (AC or FC) with the aid of the storage passkey (KC or FA); second means of set authentication (AUPACA) able to establish the set authentication function (A) with the aid of the set base passkey (SB);

wherein the autonomous set (PA) furthermore comprises: first generator means (AGPA) able to establish a generation function (AG) with the aid of the set base passkey (SB);

first remote loading means (ACHPA) able to establish a remote loading function (ACH or SCH) with the aid of a remote loading passkey (KCH or SCH) which is the transform of a predetermined word under the generation function (AG) with the aid of the set base passkey (SB); wherein the access system (SAA) furthermore comprises:

first means of system authentication (AUSAA) able to establish a system authentication function (AO or FO) with the aid of a predetermined system base passkey (KO or SO); second remote loading means (ACHSAA) able to issue a predetermined number of value units and to establish the remote loading function (ACH or FCH) with the aid of the remote loading passkey (KCH or PCH);

wherein the authorization center (CA) comprises:

second means of system authentication (AUSAACA) able to establish the system authentication function (AO or FO) with the aid of the system base passkey (KO or PO); and second generator means (AGCA) able to establish the generation function (AG or FG) with the aid of the set base passkey (SB); and

wherein the installation furthermore comprises a remote loading mode in which in response to a remote loading request word (R) for a predetermined number of value units emanating from the autonomous set (PA), the first and second means of set authentication (AUPA and AUPACA) as well as the first and second means of system authentication (AUSAA and AUSAACA) carry out a respective active authentication of the autonomous set as well as of the access system, by respectively exchanging a set authentication word (R0) emanating from the access system and the transform (RES0) of this word under the set authentication function (A) with the aid of the set base passkey (SB) as well as by exchanging a system authentication word (R2) emanating from the authorization center (CA) and the transform (RES2) of this word under the system authentication function (AO or FO) with the aid of the system base passkey (KO or SO);

wherein in the case of checked authenticity of the access system and of the autonomous set, the second generator means (AGCA) calculate the remote loading passkey (KCH or (SCH, PCH)) at the level of the authorization center (CA), the remote loading passkey being the transform of the remote loading request word under the generation function (AG) with the aid of the set base passkey (SB);

wherein in the case of generation of the remote loading passkey at the level of the authorization center, the second enciphering/deciphering means (MACCA) transmit the enciphered loading passkey (EKCH or EPCH) with the aid of the storage passkey (KC or FA) to the first enciphering/deciphering means (MACSAA) which decipher it with a view to storing it at the level of the access system (SAA) and in the case of storage of the remote loading passkey in the access system (SAA), the first and second remote loading means (ACHSAA and ACHPA) exchange the remote loading request word (R) for the number of value units to be remotely loaded (n) as well as the transform (RES) of said remote loading request word under the remote loading function (ACH or FCH) with the aid of the remote loading passkey (KCH or (SCH, PCH)) with a view to remotely loading, in a secure manner, the means for prepayment of said number of value units (n).

5,412,727

# ANTI-FRAUD VOTER REGISTRATION AND VOTING SYSTEM USING A DATA CARD

Jerome Drexler, Los Altos Hills, and Christopher J. Dyball, Half Moon Bay, both of Calif., assignors to Drexler Technology Corporation, Mountain View, Calif.

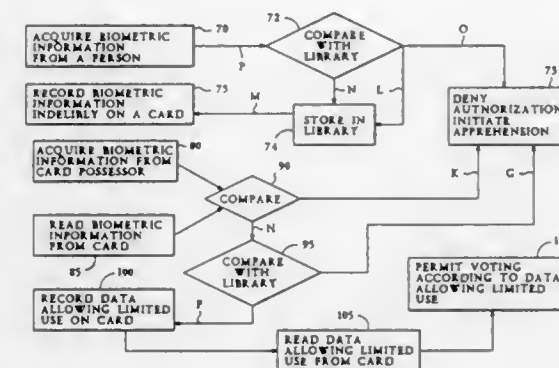
Continuation-in-part of Ser. No. 181,697, Jan. 14, 1994. This

application Jan. 26, 1994, Ser. No. 188,089

Int. Cl.<sup>6</sup> H04K 1/00

U.S. Cl. 380—24

22 Claims



1. A method of voting comprising, registering a person to vote and acquiring first biometric information and name identification of said person, recording said first biometric information and said name identification indelibly on a card at a first terminal, said card having optical and magnetic recording media thereon, the indelibly written information on said optical recording medium, verifying at a later time that a holder of said card is a registered voter at a verification terminal by acquiring second biometric information of said holder, reading said said first biometric information from said card, comparing said first and second biometric information, and writing voting permission data on said card in a non-permanent manner on said magnetic recording medium if said first and second biometric information match.

5,412,728

# DEVICE FOR SECURITY PROTECTION OF DIGITAL DATA USING ELEMENTARY INSTRUCTIONS DATA PROCESSING

Christian Besnard, 10, boulevard Gallieni, F 94360 Bry Sur Marne, and Joël Martin, 15, rue Berthelot, F 78200 Mantes La Jolie, both of France

PCT No. PCT/FR92/00421, § 371 Date Nov. 29, 1993, § 102(e) Date Nov. 29, 1993, PCT Pub. No. WO92/22159, PCT Pub. Date Dec. 10, 1992

PCT Filed May 12, 1992, Ser. No. 142,485

Claims priority, application France, May 30, 1991, 91 06534

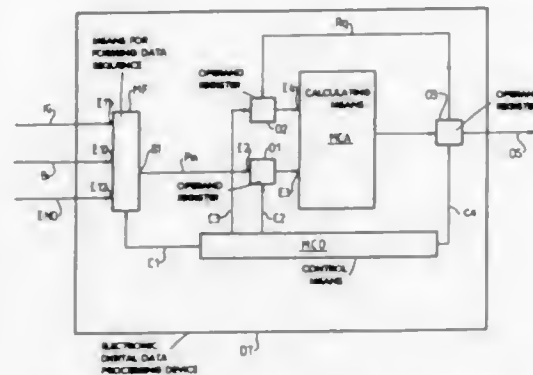
Int. Cl.<sup>6</sup> H04K 1/00

U.S. Cl. 380—28

15 Claims

1. Electronic digital data processing device, including: at least one input (E10) for receiving elementary input data to be processed (Bi); processing means responsive to said input data for supplying output data (DS) depending on the said input data (Bi), said processing means comprises: means (MF) for forming a data sequence (SD) from the input data thus received; means for storing an initial quantity (RO) in memory; calculating means (MCA) for carrying out a non-reversible and quasi-random operation with two operands on an incoming set of the said operation, said calculating means comprising two operand registers (01, 02) and an output register (03); and

control means (MCO) for breaking down the data sequence (SD) into a set of portions (Pm) which overlap and which form the first operand, as well as for initially loading the initial quantity (RO), and a first portion (PO) of the data sequence into the operand registers (O1,



O2), then for responding to each appearance of the calculated result (Rq) by loading the latter and another portion (P1) of the data sequence into the operand registers (O1 and O2), until the said portions of the data sequence have been completely processed; wherein the sequence of results supplies said output data (DS).

5,412,729

DEVICE AND METHOD FOR DATA ENCRYPTION  
Zunquan Liu, 13687 Paseo Cardiel #A, San Diego, Calif.  
92129-2875

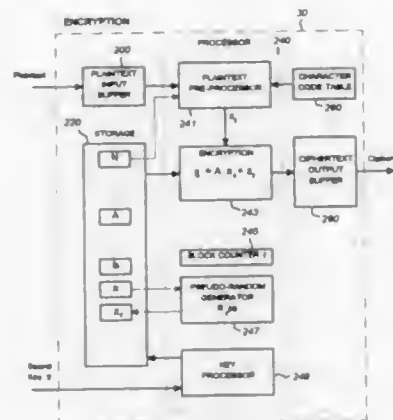
Filed May 13, 1993, Ser. No. 61,205

Claims priority, application European Pat. Off., May 5, 1993,  
93107314

Int. Cl.<sup>6</sup> H04K 1/06

U.S. Cl. 380—37

13 Claims



1. A cryptographical system for users to encrypt plaintext into ciphertext and decrypt the ciphertext back to the plaintext, comprising:

- a secret key shared between the users;
- means for deriving a set of user-selectable encryption parameters from said secret key, each of said user-selectable encryption parameters having a range of values;
- means responsive to said set of user-selectable encryption parameters for generating a mapping among a repertoire thereof for mapping plaintext into ciphertext;
- means for deriving a set of decryption parameters from said secret key; and
- means responsive to said set of decryption parameters for generating an inverse mapping associated with said mapping for inverse mapping the ciphertext back to the plaintext; and wherein

said repertoire of mappings having a size dependent on the range of values of each of said user-selectable encryption

parameters, whereby others not privy to said secret key are confronted with a computationally infeasible task of exhaustive research among a repertoire of mappings of indeterminable size;

means responsive to a block size parameter for partitioning the plaintext block-by-block into plaintext blocks or vectors each having a size according to said block size parameter; and wherein:

said mapping maps a plaintext vector into a corresponding ciphertext vector; and

said set of user-selectable encryption parameters includes said block size parameter and

a mapping matrix;

said mapping is such that each ciphertext vector is a vector sum that includes a first vector sum component formed by a product of said mapping matrix and the corresponding plaintext vector;

said set of decryption parameters includes an inverse mapping matrix associated with said mapping matrix; and

said inverse mapping is such that each plaintext vector is a product of said inverse mapping matrix and a resultant vector produced by the corresponding ciphertext vector minus the vector sum except for its first vector sum component.

5,412,730

ENCRYPTED DATA TRANSMISSION SYSTEM  
EMPLOYING MEANS FOR RANDOMLY ALTERING  
THE ENCRYPTION KEYS

Michael F. Jones, Nashua, N.H., assignor to Telequip Corporation, Hollis, N.H.

Continuation-in-part of Ser. No. 418,178, Oct. 6, 1989,

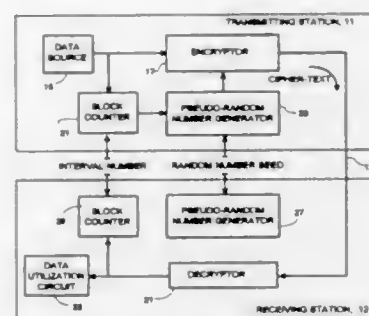
abandoned. This application Apr. 23, 1992, Ser. No. 872,674

Int. Cl.<sup>6</sup> H04L 9/00

U.S. Cl. 380—46

2 Claims

MICROFICHE APPENDIX INCLUDED  
(2 Microfiche, 119 Pages)



1. A method for transmitting data comprising a sequence of blocks in encrypted form over a communication link from a transmitter to a receiver comprising, in combination, the steps of:

- providing a seed value to both said transmitter and receiver, generating a first sequence of pseudo-random key values based on said seed value at said transmitter, each new key value in said sequence being produced at a time dependent upon a predetermined characteristic of the data being transmitted over said link,
- encrypting the data sent over said link at said transmitter in accordance with said first sequence,
- generating a second sequence of pseudo-random key values based on said seed value at said receiver, each new key value in said sequence being produced at a time dependent upon said predetermined characteristic of said data transmitted over said link such that said first and second sequences are identical to one another a new one of said key values in said first and said second sequences being produced each time a predetermined number of said blocks are transmitted over said link, and

decrypting the data sent over said link at said receiver in accordance with said second sequence.

5,412,731

AUTOMATIC STEREOPHONIC MANIPULATION  
SYSTEM AND APPARATUS FOR IMAGE  
ENHANCEMENT

Stephen W. Desper, Tujunga, Calif., assignor to Desper Products, Inc., Los Angeles, Calif.

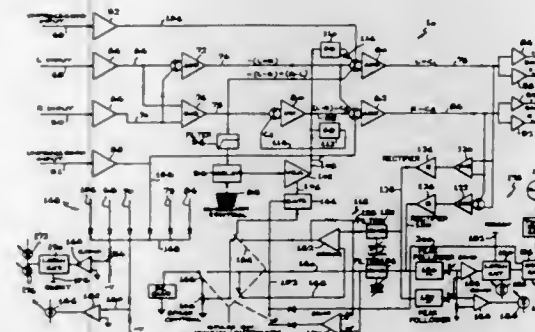
Continuation of Ser. No. 352,638, May 12, 1989, abandoned,

which is a continuation of Ser. No. 142,258, Jan. 7, 1988,  
abandoned, which is a continuation of Ser. No. 946,677, Jan. 5,  
1987, abandoned, which is a continuation of Ser. No. 439,741,  
Nov. 8, 1982, abandoned. This application Jan. 9, 1990, Ser. No.  
463,891

Int. Cl.<sup>6</sup> H04S 1/00

U.S. Cl. 381—1

40 Claims



1. An automatic stereophonic image enhancement system comprising:

- left and right lines each having an input and an output;
- a left adder in said left line and a right adder in said right line respectively between said input and said output;
- input connection means connected to each of said left and right lines between its respective input and its adder said input connection means receiving any signal appearing at the left line input and receiving any signal appearing at the right line input, said input connection means producing a combined signal comprised of a combination of the signals received from the left and right line inputs;
- delay means connected to said input connection means for delaying the combined signal at said input connection means to produce a delayed signal;
- control means for receiving said delayed signal from said delay means, said control means having an output connected to both of said adders in said left and right lines for delivery of the delayed signal thereto, said control means controlling the amplitude of the delayed signal so as to produce a delayed and amplitude controlled compensation signal to each said adder; and
- output connection means connected to both said left and right lines between said adders and said respective outputs, said output connection means sensing the signal in said left and right lines at said outputs thereof and being connected to said control means for automatically adjusting said control means to maintain the delayed and amplitude controlled signal in said adders substantially at a desired level.

5,412,732

STEREO SURROUND SYSTEM

Kazuhiko Kanishi; Yasushi Nishimura, and Kazuaki Sugawara,  
all of Tokyo, Japan, assignors to Pioneer Electronic Corporation,  
Tokyo, Japan

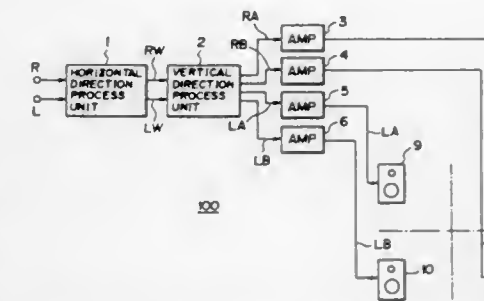
Filed Jan. 13, 1993, Ser. No. 3,594

Claims priority, application Japan, Jan. 16, 1992, 4-005843

Int. Cl.<sup>6</sup> H04S 5/02

U.S. Cl. 381—18

14 Claims



1. A stereo surround system, to which stereo audio signals of right and left channels are inputted, comprising:

- a right side speaker group including at least two speakers arranged vertically;
- a left side speaker group arranged at a left side of said right side speaker group, and including at least two speakers arranged vertically; and
- a process means, coupled to said right side speaker group and said left side speaker group, for processing the inputted stereo audio signal of the right channel to generate at least two kinds of separated surround signals to said right side speaker group such that one surround signal is supplied to one speaker and another surround signal is supplied to another speaker in said right side speaker group, and for processing the inputted stereo audio signal of the left channel to generate at least two kinds of separated surround signals to said left side speaker group such that one surround signal is supplied to one speaker and another surround signal is supplied to another speaker in said left side speaker group.

5,412,733

ACOUSTIC REPRODUCING APPARATUS

Atsushi Nagayoshi, Neyagawa; Koichi Higuchi; Kazutoshi Yamaguchi, both of Hirakata; Eiichi Takakura, Neyagawa; Masataka Saito, Hirakata, and I. Fusanori, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

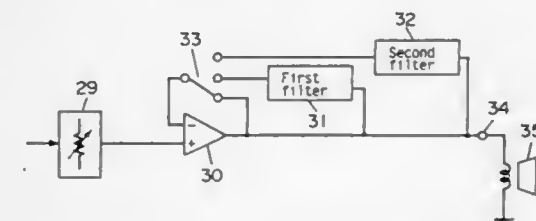
Continuation of Ser. No. 761,344, Nov. 6, 1991, abandoned. This  
application Oct. 28, 1993, Ser. No. 142,115

Claims priority, application Japan, Jan. 19, 1990, 2-11455;  
Apr. 16, 1990, 2-100072

Int. Cl.<sup>6</sup> H04R 1/10

U.S. Cl. 381—74

3 Claims



1. An acoustic reproducing apparatus for reducing sound leakage from open-air-type headphones comprising:

- an attenuating filter having a pre-fixed sharp attenuation characteristic such that energy components of a maximum amplitude part in a sound leakage frequency band ranging



between 4-8 kHz, which are the measured energy components of spectral components of sound leaking from said open-air-type headphones to the environment, is attenuated, all other energy components of sound leakage from said headphones are not sharply attenuated, and wherein attenuation on a 1 kHz part of said sound leakage frequency band is substantially zero; and

a control switch for switching an operation of said attenuating filter between a first position, where said energy components of maximum amplitude part in said sound leakage frequency band are selectively attenuated, and a second position, where sound corresponding to the entire spectral range is output to said headphones; and

an intensifying filter for intensifying a low frequency band less than 1 kHz of sound output to said open-air-type headphones, wherein said intensifying filter is selectively controlled by said control switch.

5,412,734

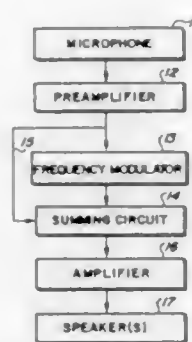
# APPARATUS AND METHOD FOR REDUCING ACOUSTIC FEEDBACK

Samuel L. Thomasson, 1038 E. Hearn Way, Gilbert, Ariz. 85234  
Filed Sep. 13, 1993, Ser. No. 120,187

Int. Cl.<sup>6</sup> H04R 27/00

U.S. Cl. 351-83

19 Claims



1. A method for reducing acoustic feedback, said method comprising the steps of:

projecting a composite acoustic signal having baseband audio and FM components;

sensing said composite acoustic signal and converting said composite acoustic signal into an electrical signal having a baseband audio component and an FM component;

separating said electrical signal into the baseband audio component and the FM component;

producing a reconstructed baseband audio component from said FM component; and

subtracting said reconstructed baseband audio component from said baseband audio component.

5,412,735

# ADAPTIVE NOISE REDUCTION CIRCUIT FOR A SOUND REPRODUCTION SYSTEM

A. Maynard Engebretson, Ladue, Mo., and Michael P. O'Connell, Somerville, Mass., assignors to Central Institute for the Deaf, St. Louis, Mo.

Filed Feb. 27, 1992, Ser. No. 842,566

Int. Cl.<sup>6</sup> H04B 15/00

U.S. Cl. 381-94

39 Claims

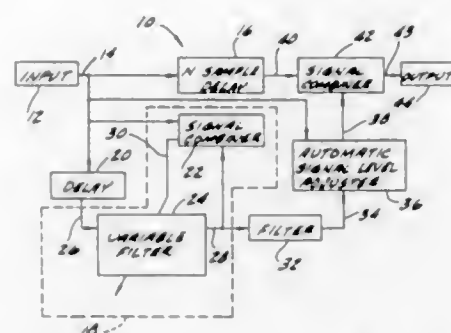
39. A noise reduction circuit for a sound reproduction system having a microphone for producing an input signal in response to sound in which a noise component is present, said circuit comprising:

an adaptive filter including a variable filter responsive to the input signal for producing a noise-estimating signal and further including a first combining means responsive to the input signal and the noise-estimating signal for producing a composite signal;

said variable filter having parameters which are varied in

response to the composite signal to change the operating characteristics thereof;

means for adjusting the amplitude of the noise-estimating signal to produce an amplitude adjusted signal; and



second combining means for combining the input signal and the amplitude adjusted signal to attenuate noise components in the input signal and for producing a noise-reduced output signal.

5,412,736

# PERSONAL AUDIO SYSTEM AND EARPHONE FOR SAME

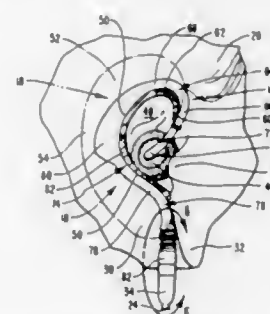
Shawn P. Kelililki, 536 S. Commerce Rd. (536), Orem, Utah 84058

Filed Mar. 23, 1992, Ser. No. 855,729

Int. Cl.<sup>6</sup> H04R 25/00

U.S. Cl. 381-187

54 Claims



1. An earphone designed for secure carriage on the ear of a user during vigorous activity thereby, the ear of the user being the externally visible auricle upstanding from the head to the rear of the opening to the auditory canal, the auricle including a promontory-shaped tragus at the front of the opening to the auditory canal and a bowl-shaped concha to the rear thereof communicating with the auditory canal and being located immediate to the head, the back surface of the concha at the head defining the base of the auricle, the auricle further including a generally planar scapha projecting upwardly and rearwardly from the periphery of the concha generally parallel to and apart from the head, the scapha being encircled at the outer perimeter thereof by an upstanding ridge-like helix, the helix terminating at the lower end thereof in the earlobe and at the upper end thereof in a spine directed into the concha above the tragus, said earphone comprising:

(a) a light-weight audio speaker; and

(b) an ear-mountable speaker support integrally formed and ergonomically tailored to cradle the ear of the user, said speaker support comprising a flexible open loop, formed substantially in a single plane, said loop being so sized and configured as to rest freely against the head conforming to the shape of the base of the auricle with said plane of said loop being generally parallel to the head free of forces urging said loop away from the head, said loop extending without significant resilient deformation within said plane

of said loop from a first end worn behind the earlobe in snug engagement with the back surface of the concha, to a second end supporting said speaker and worn at the concha, said open loop between said first and second ends thereof passing about the rear and over the top of the base of the auricle, around the front of the spine of the helix, and above the tragus positioning a substantial portion of the length of said open loop behind the scapha interior of the helix wherein said speaker support further comprises audio signal transfer means for electrically coupling said speaker to an audio signal source at a location on said speaker support below the earlobe between the earlobe and the head.

5,412,737

# METHOD FOR IDENTIFYING FILM TYPE

Omri Govrin, Eschar Village, Israel, assignor to Scitex Corporation Ltd., Herzliya, Israel

Filed Feb. 10, 1993, Ser. No. 16,026

Claims priority, application Israel, Feb. 20, 1992, 101029

Int. Cl.<sup>6</sup> G06K 9/46, 9/66

U.S. Cl. 382-168

21 Claims

ORIGINAL IMAGE  
INCREASE SIGNAL-TO-NOISE RATIO - 30  
CREATE LUMINANCE SEPARATION - 32  
ELIMINATE AREAS OF HIGH AND LOW CONTRAST - 34  
CREATE R, G, B AND L HISTOGRAMS - 36  
FOR ALL HISTOGRAMS, REDEFINE THE HIGHEST TRANSMISSION LEVEL SO AS TO ELIMINATE ANY PERFORMANCES AND FRAME DATA - 38  
DETERMINE DARK LEVELS DR, DL, DB AND DL  
DETERMINE BRIGHT LEVELS BR, BL, BB AND BL - 42  
DETERMINE - 44  
RATIO BETWEEN RED AND GREEN DARK LEVELS RD, D  
RATIO BETWEEN RED AND BLUE DARK LEVELS RB, D  
RATIO BETWEEN RED AND GREEN BRIGHT LEVELS RG, B  
RATIO BETWEEN RED AND BLUE BRIGHT LEVELS RB, B  
PERFORM TESTS - 46  
1) IS DR DARKER THAN A PRESET THRESHOLD R, DARK, TH?  
2) IS RB BRIGHTER THAN A PRESET THRESHOLD B, BRIGHT, TH?  
3) IS RB BRIGHTER THAN A PRESET THRESHOLD L, BRIGHT, TH?  
4) IS RD D SMALLER THAN THE THRESHOLD RD, D, TH?  
5) IS RB D SMALLER THAN THE THRESHOLD RB, D, TH?  
6) IS RB B SMALLER THAN THE THRESHOLD RB, B, TH?  
7) IS RB B SMALLER THAN THE THRESHOLD RB, B, TH?

1. A method for identifying the film type of a color input medium having picture and film border areas and which is scanned to produce an input image having a multiplicity of color separations having portions corresponding to said picture and border areas, the method comprising the steps of:

creating picture histograms for each color separation and for luminance values of said picture area of said input image;

defining a dark level and a bright level for each of said picture histograms; and

identifying a film type by comparing said dark and bright levels to predetermined thresholds that define predetermined characteristics of a given film type.

wherein said multiplicity of color separations comprise red, blue and green color separations, wherein said dark and bright levels include red dark and red bright, green dark and green bright, blue dark and blue bright, and luminance dark and luminance bright levels.

5,412,738

# RECOGNITION SYSTEM, PARTICULARLY FOR RECOGNISING PEOPLE

Roberto Brunelli, Trento; Daniele Falavigna, Buttapietra, both of Italy; Tomaso Poggio, Wellesley, Mass., and Luigi Stringa, Villazzano, Italy, assignors to Istituto Trentino Di Cultura, Trento, Italy

Filed Aug. 10, 1993, Ser. No. 103,700

Claims priority, application Italy, Aug. 11, 1992, TO92A0695

Int. Cl.<sup>6</sup> G06K 9/00

U.S. Cl. 382-115

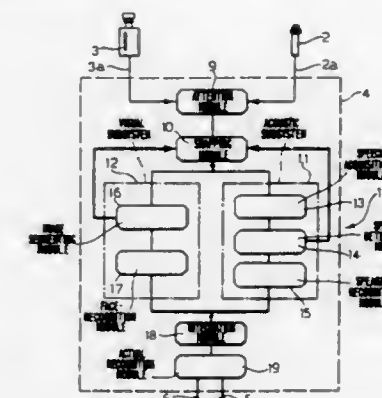
24 Claims

1. A system for recognizing people comprising:

means for sensing whether a person is to be recognized; a first detector subsystem, responsive to said sensing means, including,

first detector means for detecting first features including static and dynamic data associated with the person to be recognized,

a first database including prestored static and dynamic data relating to at least one person to be recognized, and means for comparing the detected static and dynamic data with the prestored static and dynamic data and obtaining first distance data;



a second detector subsystem, responsive to said sensing means, including,

second detector means for detecting second features associated with the person to be recognized,

a second database including prestored second features relating to at least one person to be recognized, and means for comparing the detected second features and the prestored second features and obtaining second distance data; and

an integration subsystem including means for combining the first distance data and the second distance data resulting in recognition data, and determining whether the recognition data corresponds to a value related to the prestored static and dynamic data and the prestored second features associated with one person.

5,412,739

Patent Not Issued For This Number

5,412,740

# SIGNAL PROCESSING SYSTEM HAVING REDUCED MEMORY SPACE

Jalil Fadavi-Ardekani, Orefield, Pa., assignor to AT&T Corp., Murray Hill, N.J.

Continuation of Ser. No. 647,325, Jan. 29, 1991, abandoned. This application Apr. 21, 1994, Ser. No. 231,346

Int. Cl.<sup>6</sup> G06K 9/00

U.S. Cl. 382-293

20 Claims

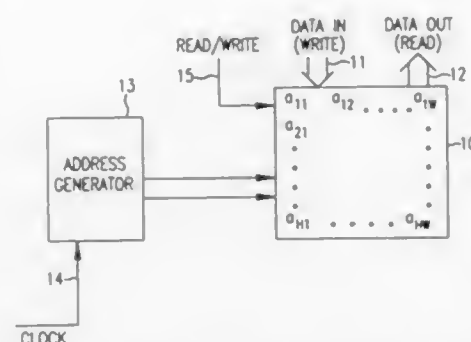
1. A signal processing system comprising:

means for transposing a two-dimensional data array between row and column format, characterized in that said means for transposing comprises:

an integrated circuit memory array having at least H×W address locations, where H is the number of rows and W

is the number of columns of said two-dimensional data array, and wherein said array is non-square ( $H \neq W$ );  
 a P register for storing an address location (P);  
 an L register for storing an incrementer (L);  
 an address generator connected to said memory array for selecting each of said  $H \times W$  address locations (P) in a repetitive cycle of sequences;  
 means for performing modulus arithmetic on a given address location (P) in order to generate the next address location in the sequence according to formula:

$$P = \{P + L\} \text{ mod } (M)$$



wherein L is the incrementer by which P is incremented from one address location to the next, according to the formula:

$$L = \{L \times H\} \text{ mod } (M)$$

and

and wherein the modulus (M) is:

$$M = H \times W - 1;$$

and further comprises means for performing a read operation followed by a write operation on each selected memory address location (P) before proceeding to the next address location in a sequence.

#### 5,412,741 APPARATUS AND METHOD FOR COMPRESSING INFORMATION

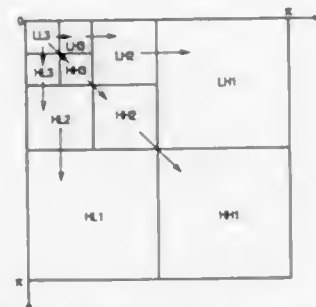
Jerome M. Shapiro, Philadelphia, Pa., assignor to David Sarnoff Research Center, Inc., Princeton, N.J.

Filed Jan. 22, 1993, Ser. No. 7,694

Int. Cl.<sup>6</sup> G06K 9/36; H04N 7/12

U.S. Cl. 382-232

21 Claims



1. In a digital compression encoder responsive to an array of a relatively large number of multibit coefficients defining image data at a relatively high resolution that has been hierarchical subband decomposed by a wavelet transform at a given plurality of lower resolutions, whereby the lowest low (LL) subband comprises an array having the smallest number of multibit coefficients of all the wavelet-transform subband arrays, each LL subband multibit coefficient comprises an ancestor

of all multibit coefficients of all higher subbands descended from that LL subband multibit coefficient, and each of said multibit coefficients of said LL subband and said multibit coefficients of said descendants thereof includes a most significant bit; wherein said encoder includes coding means for deriving a data-compressed code comprising (a) a ZEROTREE symbol at first given coordinates of said LL subband or at coordinates of descendants of said first given coordinates of said LL subband which are occupied by coefficients that are zerotree roots, (b) an ISOLATED ZERO symbol at second given coordinates of said LL subband or at coordinates of descendants of said second given coordinates of said LL subband which are occupied by isolated-zero coefficients, and (c) at least one type of non-zero symbol at third given coordinates of said LL subband or at coordinates of descendants of said third given coordinates of said LL subband which are occupied by non-zero coefficients; the improvement for efficiently deriving said data-compressed code wherein said encoder comprises:

means responsive to each multibit coefficient of said LL subband and said multibit coefficients of all of its descendants of said wavelet transform for deriving a zerotree map, wherein said zerotree map includes a zerotree-map multibit coefficient corresponding to each coefficient of said LL subband array, and each zerotree-map coefficient has a binary "1" value in a bit position thereof only if either its corresponding LL-subband-array coefficient or any of the descendants of its corresponding LL-subband-array coefficient has its most significant bit in that bit position; and

said coding means includes means that starts with a list of coordinates of said relatively small number of coefficients of said LL subband of said array and a relatively high initial threshold value for dynamically deriving in sequence said data-compressed code from the multibit coefficients of the wavelet-transform subband and the multibit coefficients of the zerotree map first at said relatively high initial threshold value and then at one or more successively lower threshold values by ignoring from consideration in said sequential dynamic derivation all coordinates of coefficients which are descendants of coordinates which have already been found in said sequential dynamic derivation to be occupied by coefficients that are zerotree roots.

#### 5,412,742 METHOD FOR THE DETECTION OF LINE WIDTH OF LINE IMAGE IN IMAGE PROCESSOR

Naruto Takasaki, and Yutaka Tanaka, both of Yokohama, Japan, assignors to Hitachi Software Engineering Co., Ltd., Kanagawa, Japan

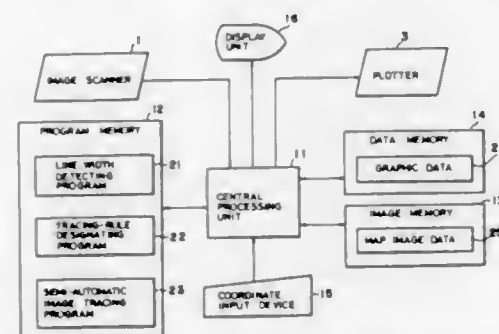
Filed Feb. 26, 1992, Ser. No. 841,408

Claims priority, application Japan, Feb. 26, 1991, 3-030551

Int. Cl.<sup>6</sup> G06K 9/30

U.S. Cl. 382-316

13 Claims



1. In a line image processing method for tracing a line image on the basis of a tracing rule defined in terms of a parameter of the line image, the improvement comprising the steps of:

designating a point near the line image to be traced as a start point;  
 retrieving a first beginning point on a first contour edge of the line image from the start point;  
 retrieving a first ending point on a second contour edge of the line image from the first beginning point;  
 detecting the number of pixels in a first continuous pixel line arranged in the line-width direction of the line image from the first beginning point to the first ending point as the line width of the line image; and  
 tracing the line image according to a tracing rule that is defined using the detected line width as a parameter of the tracing rule.

#### 5,412,743 METHOD AND APPARATUS FOR AMPLITUDE MODULATION OF A LASER BEAM

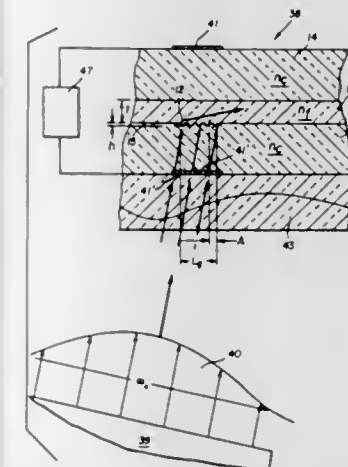
John C. Brazas, Jr., Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 6, 1993, Ser. No. 163,206

Int. Cl.<sup>6</sup> G02F 1/01

U.S. Cl. 385-2

14 Claims



10. An apparatus for modulating the amplitude of a laser light beam, comprising:

- a thin-film waveguide for propagation of a laser beam, comprising:
  - two spaced-apart parallel surfaces, and
  - a transparent electro-optic layer between said surfaces, the index of refraction of said layer being higher than that of its surroundings and changeably responsive to a varying electric field;
- a diffraction grating at one of said two surfaces for coupling radiative laser light into said waveguide, said grating being shorter in the direction of propagation than the coupling length of the incident beam;
- an electrode adjacent to each of said two surfaces in proximity to said diffraction grating;
- signal means operably connected across said electrodes for imposing a varying electric field on said electro-optic layer so that said radiative laser light will be variably coupled into said waveguide, whereby the amplitude of laser light within said waveguide is modulated in response to said signal means.

#### 5,412,744 FREQUENCY ROUTING DEVICE HAVING A WIDE AND SUBSTANTIALLY FLAT PASSBAND

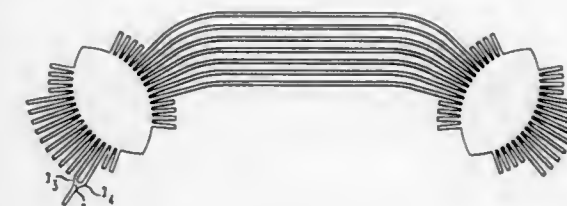
Corrado Dragone, Little Silver, N.J., assignor to AT&T Corp., Murray Hill, N.J.

Filed May 2, 1994, Ser. No. 238,074

Int. Cl.<sup>6</sup> G02B 6/28

U.S. Cl. 385-24

7 Claims



1. An optical apparatus comprising:
  - a first plurality of waveguides;
  - a first free space region connected to the first plurality of waveguides;
  - a second plurality of waveguides connected to the first free space region;
  - an optical grating connected to the second plurality of waveguides comprising a plurality of unequal length waveguides;
  - a third plurality of waveguides connected to the optical grating;
  - a second free space region connected to the third plurality of waveguides;
  - and
  - at least one waveguide connected to the second free space region;
 wherein said first plurality of waveguides includes at least two adjacent waveguides having ends remote from the first free space region; and  
 a Y-branch coupler connected to the remote ends of the two adjacent waveguides, said adjacent waveguides being located a predetermined distance apart along the first free space region to produce a specifiable passband width.

#### 5,412,745 FIBER OPTIC COUPLER EXHIBITING LOW NONADIABATIC LOSS

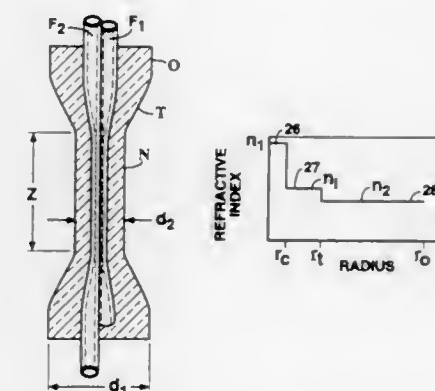
David L. Weidman, and Donald R. Young, Jr., both of Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed May 5, 1994, Ser. No. 238,384

Int. Cl.<sup>6</sup> G02B 6/26

U.S. Cl. 385-43

13 Claims





of refractive index lower than that of said core, at least one of said fibers having a refractive index pedestal having a maximum refractive index  $n_1$  between said core and cladding, wherein  $n_1 > n_2$ ,  $n_1$  being the maximum refractive index of the core of said at least one fiber and  $n_2$  being the refractive index of the cladding of said at least one fiber, those portions of said fibers that are in said coupling region being surrounded by a medium having a refractive index  $n_3$ , wherein  $n_3 < n_2$ .

5,412,746

## OPTICAL COUPLER AND AMPLIFIER

Rolf Rossberg, Schwiebedingen; Rainer Fritschl, Kornthal-Münchingen; Jürgen Otterbach, Leonberg, and Rolf Heldemann, Weinsberger, all of Germany, assignors to Alcatel N. V., Amsterdam, Netherlands

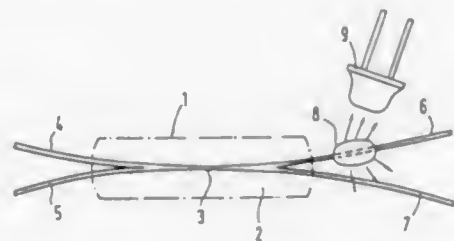
Filed Mar. 22, 1994, Ser. No. 216,187

Claims priority, application Germany, Mar. 30, 1993, 43 10 291.3

Int. Cl. G02B 6/00, 6/36

U.S. Cl. 385—48

3 Claims



## 1. An optical coupler and amplifier comprising:

- a coupling region (3) embedded in an enclosure (2) and having several optical fibers protruding from the enclosure on two diametric sides and forming input and output light-conducting pigtails (4, 5, 6, 7) for incoming and outgoing optical waveguides, respectively, said optical fibers having a primary coating formed thereon at least on a mid-portion thereof outside the coupling region;
  - a lens body (8) mounted on the mid-portion of an output light-conducting pigtail (6) of the optical coupler, the lens body (8) surrounding the primary coating on the output light-conducting pigtail (6) on which said lens body is mounted; and
  - a detector (9) pointed at the lens body (8) mounted on the mid-portion of the output light-conducting pigtail for receiving light from the lens body; and
- wherein the lens body (8) is disposed at a short distance from the enclosure (2) so as to receive a lost light being dissipated in the primary coating of the output light-conducting pigtail.

5,412,747

## APPARATUS FOR AND METHOD OF POLISHING OPTICAL CONNECTORS

Yoshihiro Matsuoka, Chiba; Nobutoshi Takeda, Funabashi, and Tohru Mizuhashi, Chiba, all of Japan, assignors to Emit Selko Co., Ltd. and Daito Selki Co., Ltd., both of Tokyo, Japan

Filed Mar. 7, 1994, Ser. No. 206,797

Int. Cl. G02B 6/38

U.S. Cl. 385—85

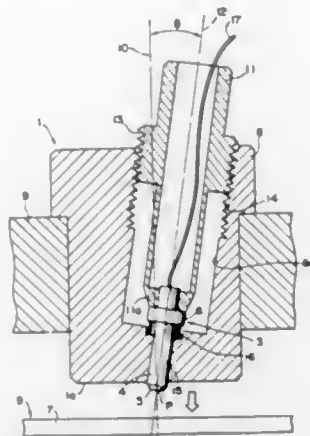
6 Claims

## 1. An apparatus for polishing optical connectors, comprising:

- an optical connector support section including:
  - a holding member for holding an optical connector mounted therein, said optical connector having an optical axis; and
  - a rotary member which is rotatable about a predetermined axis of rotation;
- said holding member being mounted in said rotary member such that optical axis of said optical connector is at

a predetermined angle of inclination to said axis of rotation of said rotary member;

a polishing member section arranged to contact with an end face of said optical connector which is mounted in said holding member, for polishing said end face of said optical connector to a predetermined shape;



first drive means for rotating said rotary member of said optical connector support section to thereby rotate the inclined optical connector around said predetermined axis of rotation; and

second drive means for rotating said polishing member section to cause said polishing member section to move relative to said end face of said optical connector.

5,412,748

## OPTICAL SEMICONDUCTOR MODULE

Hideto Furuyama, Yokohama; Hiroshi Hamasaki, Sagami-hara, and Tamon Kobayashi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

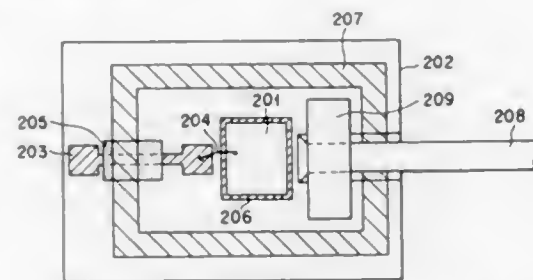
Filed Dec. 3, 1993, Ser. No. 160,919

Claims priority, application Japan, Dec. 4, 1992, 4-325210; Sep. 16, 1993, 5-229781

Int. Cl. G02B 6/00, 6/36

U.S. Cl. 385—92

6 Claims



1. An optical semiconductor module comprising:
  - a submount body having a groove buried with an insulator;
  - an optical semiconductor device mounted on said submount body;
  - a cap member, arranged across the groove on said submount body and bonded and fixed to said submount body by a bonding member, for hermetically sealing said optical semiconductor device; and
  - an electrical wiring layer arranged to extend from an outside of said cap member on said submount body to an inside of said cap member through the groove buried with the insulator, said electrical wiring layer being electrically connected to said optical semiconductor element.

5,412,749

## DUAL FIBER OPTIC ILLUMINATION BUNDLE

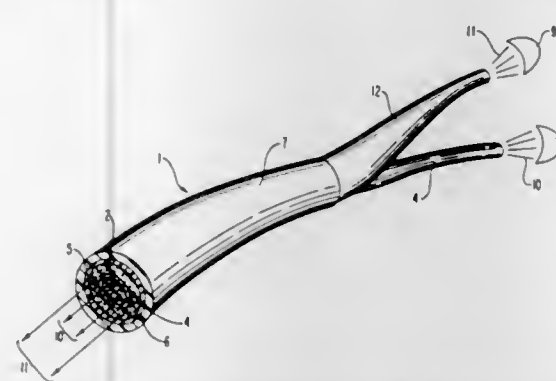
Emile G. Sayegh, and Wendall D. Willey, both of Austin, Tex., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Oct. 26, 1993, Ser. No. 143,264

Int. Cl. G02B 6/04

U.S. Cl. 385—115

4 Claims



1. A dual fiber optic illumination bundle cable comprising:
  - (a) a first fiber optic illumination bundle having a generally round cross-section, said first fiber optic illumination bundle being comprised of a plurality of fiber optic strands, each of said fiber optic strands comprising in order a core and a cladding layer;
  - (b) a dark-pigmented resilient polymer layer surrounding and contiguous with said first fiber optic illumination bundle;
  - (c) a second fiber optic illumination bundle disposed about and at least partially surrounding said dark-pigmented polymer layer, said second fiber optic illumination bundle being comprised of a plurality of fiber optic strands just as said first fiber optic illumination bundle;
  - (d) a resilient polymer layer surrounding and contiguous with said second fiber optic illumination bundle; and
  - (e) a flexible protective polymer jacket surrounding and contiguous with said last mentioned resilient polymer layer.

5,412,750

## LIQUID-CORE LIGHT GUIDE ILLUMINATOR APPARATUS

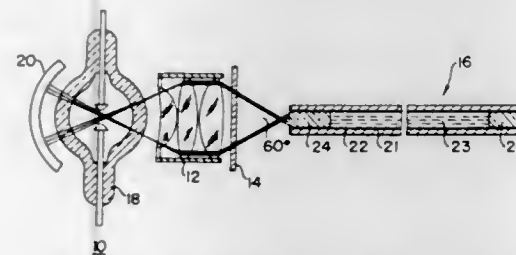
Guenther Nath, Otto Heilmann Strasse 3, 8022 Gruenwald, Germany

Filed Dec. 28, 1993, Ser. No. 174,132

Int. Cl. G02B 6/20; F21V 7/04

U.S. Cl. 385—125

35 Claims



1. A retrofittable multimedia patch management system for telecommunication cables, said cables having a coil portion, a first end portion and a second end portion, comprising:
  - tray means for supporting said coiled portion of said cables, said tray means including a bottom panel having a pair of opposed side edges and a rear edge, said tray being means being connectable to a front connector panel by interconnection of tab means extending from said tray means with receiving apertures defined by said front connector panel, said front connector panel having a plurality of rectangular apertures disposed therethrough; and
  - a plurality of multimedia modular connector assemblies, each of said connector assemblies having means for snaplocked mounting one of said connector assemblies within one of said rectangular apertures and each of said connector assemblies also having at least one telecommunication connector.

5,412,751

## EXPANDABLE FUZZY MICROCONTROLLER CORE

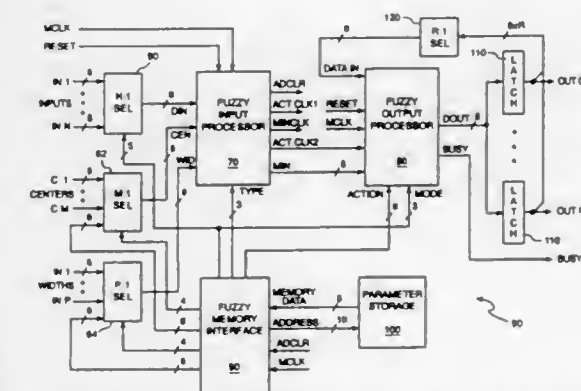
Paul M. Basehore, and Charles D. Watson, both of Sanford, Fla., assignors to American Neurologix, Inc., Sanford, Fla.

Continuation-in-part of Ser. No. 893,093, Jun. 3, 1992, which is a continuation-in-part of Ser. No. 712,871, Jun. 12, 1991, Pat. No. 5,245,695. This application Mar. 31, 1993, Ser. No. 41,235

Int. Cl. G06F 15/00

U.S. Cl. 395—3

12 Claims



1. An illuminator apparatus having a light source and, optically coupled thereto, a liquid-core light guide comprising a cylindrical, tubular sheath of fluorocarbon material having an inner wall and surrounding an active core of a lightguiding liquid, wherein said inner wall of said sheath is coated with a thin layer of an amorphous copolymer, based on a combination of tetrafluorethylene and a fluorinated cyclic ether (Teflon AF®) and said coating has a thickness of less than 10 μm.

1. An apparatus for determining an optimum rule from a set of fuzzy logic rules corresponding to a given output, said fuzzy logic rules having rule terms corresponding to a set of membership functions, the apparatus comprising:

means for fuzzifying at least one crisp input signal to a plurality of fuzzified signals in accordance with a corresponding plurality of said membership functions, each of said membership functions including a predetermined linear slope and predetermined fuzzy set parameter data including width, center and membership function type, said fuzzifying means comprising:

means for determining a distance of said at least one crisp input signal from said center of each of said membership functions, and

means for linearly complementing each of said distances relative to said corresponding width of said membership functions, said complemented distances being output as said fuzzified signals, respectively;

means for receiving said at least one fuzzified input signal and for determining a minimum rule term for each of said rules in response to said at least one fuzzified input signal, said determining means successively comparing said minimum rule terms for each of said rules corresponding to said given output to determine a maximum among said minimum rule terms; and

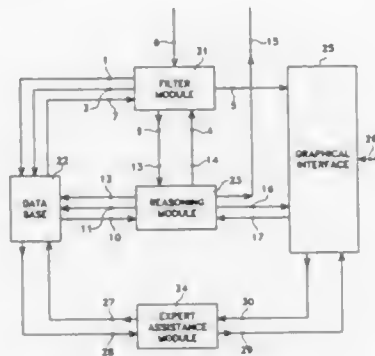
means for receiving said minimum rule terms and for identifying said maximum among said minimum rule terms by outputting a maximum rule signal when said maximum among said minimum rule terms has been determined, said maximum among said minimum rule terms corresponding to said optimum rule.

5,412,753

# EXPERT SYSTEM CAPABLE OF MEETING REAL TIME CONSTRAINTS

Andrew Alston, Bourg-La Reine; Jean-Michel Delory, Levis St Nom; Marc Gandara, Paris, and Hassan Laasri, Arpajon, all of France, assignors to Alcatel N.V., Amsterdam, Netherlands  
Filed Nov. 27, 1992, Ser. No. 982,311

Claims priority, application France, Nov. 29, 1991, 91 14859  
Int. Cl.<sup>6</sup> G08C 25/00; G06F 15/20; H04B 17/00  
U.S. Cl. 395—12 4 Claims



1. Expert system for solving problems on the basis of a flow of input messages concerning the operation and the status of a network of machines while meeting real time constraints, said status changing with time, said system comprising:

filter means for detecting in realtime significant events on the basis of input messages, each significant event being a manifestation of a problem, as judged by a human expert;

a database for storing:

all input messages,

the significant events detected by the filter means,

intermediate data produced by the expert system,

a model of the network of machines, and

archives relating to problems processed previously, whether solved or not;

reasoning means for reasoning responsive to said filter means and to said database, said reasoning means comprising:

correlating means for determining whether a significant event detected in realtime by said filter means can be correlated with significant events previously detected

by said filter means to thereby establish a new or updated common problem associated with a plurality of interrelated significant events having a possible common cause;

a plurality of specialists for processing part of the common problem, each comprising a subset of rules and knowledge provided by a human expert and being capable of executing in parallel without blocking each other; and

command means responsive to each significant event detected in realtime by said filter means and also responsive to each new or updated common problem associated with a plurality of interrelated significant events established by said correlating means for selecting and executing specialists according to heuristic rules provided by a human expert and making a decision or declaring that a decision is impossible at the end of a predetermined time period in respect of a problem represented by significant events communicated to said reasoning means by said filter means;

a graphical interface for human/expert system communications; and

expert assistant means for supplying a human expert with data stored in said database.

5,412,754

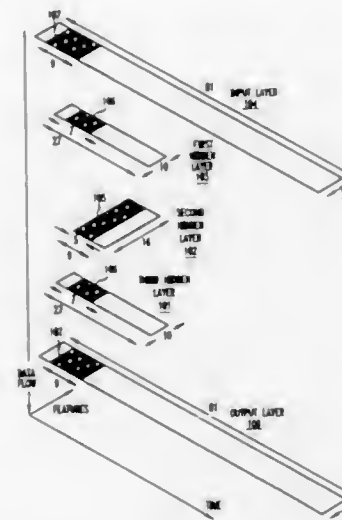
# REVERSE TIME DELAY NEURAL NETWORK FOR PATTERN GENERATION

Yann A. Le Cun, Lincroft, and Patrice Y. Simard, Eatontown, both of N.J., assignors to AT&T Corp., Murray Hill, N.J.  
Filed Jun. 30, 1992, Ser. No. 906,928

Int. Cl.<sup>6</sup> G06F 15/18

U.S. Cl. 395—24

11 Claims



6. Time delay neural network apparatus for outputting a trajectory in response to an input label frame wherein the trajectory is represented as a temporally related sequence of frames, each frame having a plurality of feature elements, the apparatus comprising:

an input layer means for fully connecting the input label frame to at least a first hidden layer means,

a plurality of hidden layer means including first and second hidden layer means connected at least substantially in succession, each hidden layer means for oversampling constrained features from its respective input to create a less complex temporally ordered frame sequence, and

output layer means connected to at least the second hidden layer means of the plurality of hidden layer means for oversampling the less complex temporally ordered frame sequence from the second hidden layer means to generate the trajectory which is related to the input label frame, wherein the temporally ordered frame sequence in each

respective layer means is at least twice as long as the sequence in priorly connected layer means and wherein the number of feature elements per frame decreases monotonically in each layer means, from the input label frame to the trajectory, and the plurality of hidden layer means and the output layer means are constrained.

5,412,755

# OPTICAL IMPLEMENTATION OF INNER PRODUCT NEURAL ASSOCIATIVE MEMORY

Hua-Kuang Liu, Pasadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

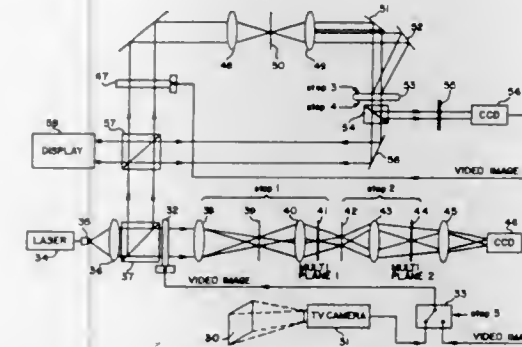
Continuation of Ser. No. 880,210, Nov. 26, 1991, abandoned.

This application Feb. 8, 1994, Ser. No. 195,737

Int. Cl.<sup>6</sup> G06F 15/18

U.S. Cl. 395—25

5 Claims



1. An optical inner-product neural associative memory for retrieving the best match between an initial input two-dimensional N-tuple binary vector  $\vec{V}$  and a number M of stored two-dimensional N-tuple binary vectors  $\vec{V}_i$ , where  $i=1, \dots, M$ , each binary element of said two dimensional N-tuple binary vectors  $\vec{V}$  and  $\vec{V}_i$  being represented by a binary optical value, comprising:

- a source of coherent light;
- a first optical storage means for storing said number M of two-dimensional N-tuple binary vectors  $\vec{V}_i$  at a first multiplication plane;
- a first spatial light modulator responsive to said coherent light for entering a vector image of said initial input two-dimensional N-tuple binary vector  $\vec{V}$  in search of a best match with one of said number M of stored two-dimensional N-tuple binary vectors  $\vec{V}_i$ ;
- optical means at said first multiplication plane responsive to said initial input two-dimensional N-tuple binary vector and said number M of two-dimensional N-tuple binary vectors stored in said first optical storage means for forming an inner-product scalar  $\alpha_i$  as a beam of light for each of said stored number M of two-dimensional N-tuple binary vectors;
- a second optical storage means at a second multiplication plane for storing said number M of two-dimensional N-tuple binary vectors as corresponding vectors;
- means at said second multiplication plane for weighting each of said number M of two-dimensional N-tuple binary vectors stored in said second optical storage means by multiplication of each of said number M of two-dimensional N-tuple binary vectors stored in said second optical storage means by said inner-product scalar beam of light to produce a number M of two-dimensional weighted vectors;
- a second spatial light modulator;
- means for detecting each of said number M of two-dimensional weighted vectors;
- means for entering a vector image of each of said number M

of two-dimensional weighted vectors through said second spatial light modulator;

means for optically summing said number M of two-dimensional weighted vectors and optically thresholding the sum of said number M of two-dimensional weighted vectors in order to produce a two-dimensional binary vector that is an approximation of one of said stored two-dimensional N-tuple binary vectors; and

means for entering said two-dimensional binary vector produced as an approximation of one of said stored two-dimensional binary vectors by said means for optically summing and thresholding as an input binary vector into said optical inner-product neural associative memory through said first spatial light modulator to commence another iterative cycle corresponding to the same cycle of operations performed with said initial input two-dimensional N-tuple binary vector, and to recommence subsequent iterations until convergence is reached between said initial input two-dimensional N-tuple vector and a best match with one of said number M of two-dimensional N-tuple binary vectors stored in said first and said second optical storage means.

5,412,756

# ARTIFICIAL INTELLIGENCE SOFTWARE SHELL FOR PLANT OPERATION SIMULATION

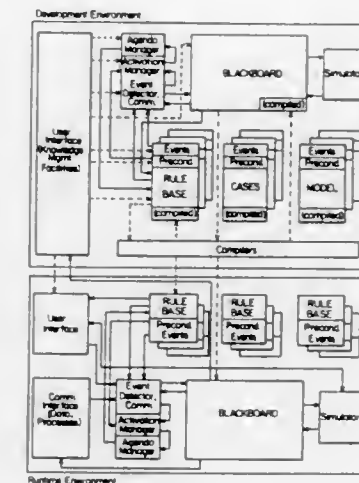
Douglas A. Bauman, Apollo; Simon Lowenfeld, Export; Brian A. Schultz, and Robert W. Thompson, Jr., both of Pittsburgh, all of Pa., assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 22, 1992, Ser. No. 995,209

Int. Cl.<sup>6</sup> G06F 15/18

U.S. Cl. 395—50

55 Claims



1. An artificial intelligence software shell for plant operation simulation comprising:

a blackboard module including a database having objects representing plant elements and concepts;

at least one knowledge source module including an artificial intelligence operation scheme, in communication with the blackboard module, operating on specific predefined blackboard objects;

a user interface module, in communication with the blackboard module, enabling a user to view blackboard status information; and

a control module, in communication with the blackboard module and the at least one knowledge source module, receiving input data and controlling operation of the at least one knowledge source module;

wherein the control module includes:

an event detector module, in communication with the user interface module, determining when the at least one



knowledge source should execute, the event detector module including a hash table including a data point structure having entries for objects, and at least one expression list, the hash table being defined by a chaining algorithm.

5,412,757

## FUZZY CONTROL SYSTEM

Tsunekazu Endo, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

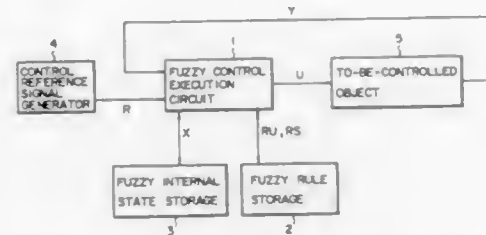
Filed Nov. 26, 1991, Ser. No. 798,155

Claims priority, application Japan, Nov. 28, 1990, 2-327125; Nov. 28, 1990, 2-327126

Int. Cl. G06F 9/44, 15/00

U.S. Cl. 395-61

14 Claims



1. A fuzzy control system for controlling a physical object, the physical object being responsive to a control signal and producing a status signal corresponding to the status of the physical object, the fuzzy control system comprising:

- means for receiving the status signal from the physical object;
- means for generating a control reference value;
- means for selectively calculating a control deviation from the received status signal and the control reference value;
- operation means, connected to said selective calculating means, for performing a fuzzy inference operation on the control deviation calculated by said selective calculating means and a control deviation contained in a fuzzy rule, the fuzzy rule defined by expert knowledge, to obtain a control deviation membership function;
- calculating means for calculating matching between a membership function about an internal state of said physical object and a membership function about an internal state variable included in said fuzzy rule to obtain a matching point, and calculating a membership function about the control signal for said physical object and a membership function about a new internal state variable from an internal state variable membership value corresponding to the matching point;
- means for storing the membership function about said new internal state variable;
- and means for outputting said control signal to said physical object and controlling the physical object.

5,412,758

## FLEXIBLE SYSTEM FOR KNOWLEDGE ACQUISITION IN EXPERT SYSTEM DEVELOPMENT

Usha Srikanth, and Srikanth Sundararajan, both of Ft. Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 686,093, Apr. 16, 1991, abandoned.

This application Oct. 23, 1992, Ser. No. 965,985

Int. Cl. G06F 15/18

U.S. Cl. 395-75

14 Claims

1. A method of developing an expert system having a knowledgebase using an artificial intelligence program loaded on a computer system and knowledge data provided, via a data input/output system of said computer system, by a user of said artificial intelligence program who is not necessarily competent in any computer language, comprising the steps of:

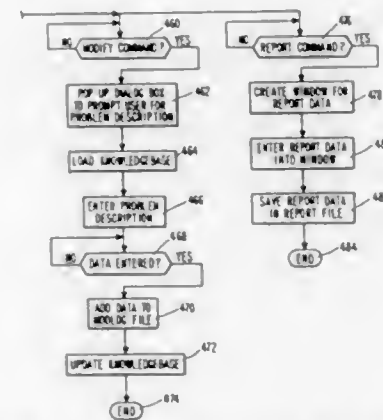
- interfacing via an interface said artificial intelligence program to said data input/output system of said computer

system such that said artificial intelligence program and said data input/output system may communicate knowledge data therebetween, said interface having a predetermined set of commands for controlling the communication of said knowledge data to/from said artificial intelligence program;

said user selecting predetermined ones of said predetermined set of commands to run said artificial intelligence program;

said user inputting acquired knowledge data to said artificial intelligence program in response to inquiries from said artificial intelligence program via said interface;

said user selecting other commands of said predetermined set of commands to add knowledge data to said knowledgebase or to modify knowledge data of said knowledgebase and inputting human language phrases comprising facts and rules representing the knowledge data to be added or modified as a problem description of a problem encountered during the running of said artificial intelligence program;



said interface storing said knowledge data inputted by said user in response to inquiries from said artificial intelligence program and said inputted human language phrases representing said problem description together in a file of a programming shell of said artificial intelligence program, said file being unique to said knowledgebase and unique to said user; said expert system storing to said file an indication as to when and where during the running of said artificial intelligence program said problem described in said problem description was encountered;

programming, by a knowledge engineer who is proficient in a computer language understandable by said artificial intelligence program, said stored human language phrases representing said problem description into said artificial intelligence program in said computer language understandable by said artificial intelligence program; and said knowledge engineer updating said knowledgebase on a periodic basis in accordance with said human language phrases programmed into said computer language understandable by said artificial intelligence program.

5,412,759

## ROBOT CONTROL METHOD AND APPARATUS

Tatsuo Yano, Ono; Masayuki Watanabe, Otowa; Kouji Ota, Toyota, and Tadayuki Matsumoto, Miyoshi, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo and Toyota Jidosha Kabushiki Kaisha, Aichi, both of Japan

Filed Jul. 21, 1992, Ser. No. 915,598

Claims priority, application Japan, Jul. 26, 1991, 3-187601

Int. Cl. G06F 15/46

U.S. Cl. 395-83

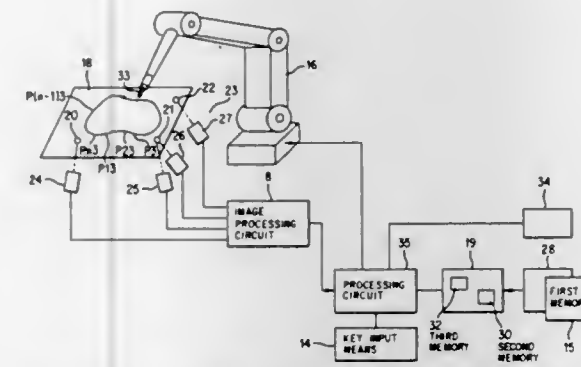
6 Claims

2. A robot control apparatus which controls the sending and receiving of operation data between a first robot and a second robot, comprising:

a first work position detection means for detecting a current position of a first workpiece of a first robot according to first operation data;

a first transform means for transforming said first operation data of said first robot into transformed first operation data that corresponds to a position of said first workpiece of said first robot when said first workpiece is located at a first reference position, and storing said transformed first operation data in a first memory;

a second transform means for transforming said transformed first operation data into second operation data that corresponds to a position of a second workpiece of a second robot when the second workpiece of said second robot is located at a second reference position, and storing said second operation data in a second memory;



a second work position detection means for detecting a current position of the second workpiece of said second robot;

a third transform means for transforming said second operation data into transformed second operation data so that said transformed second operation data is in agreement with said current position of the second workpiece of said second robot, and storing said transformed second operation data in a third memory; and

a controller that controls said second robot to perform a work operation on said second workpiece in accordance with said transformed second operation data stored in said third memory.

5,412,760

## CIRCUIT ARRANGEMENT FOR SWITCHED NETWORKS CONSISTING OF EXCHANGES, PREFERABLY TELEPHONE NETWORKS

Albert Peitz, Munich, Germany, assignor to Peitz GmbH, Munich, Germany

Continuation of Ser. No. 513,506, Apr. 20, 1990, abandoned.

This application Oct. 25, 1991, Ser. No. 782,472

Claims priority, application Germany, Mar. 19, 1990, 40 08 790.5

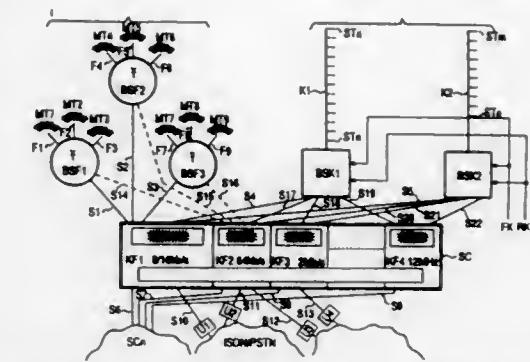
Int. Cl. H04Q 7/04; H04J 3/16

U.S. Cl. 370-95.1

3 Claims

1. A circuit arrangement for switched networks containing exchanges, such as telephone networks, in which mobile subscribers (MT1-MT9) via radio paths (F1-9) and stationary subscribers (Sta-ST9) via cable paths (K1-K2) each have access to an exchange (SC), the radio paths and the cable paths each providing multiple communication channel pairs, and in which each mobile subscriber as well as each stationary subscriber has a terminal device to which is assigned identification, with which the subscriber identifies himself and is thus identified and located by the exchange at any location within the switched network independent of whether mobile or stationary, whereafter, for the establishment of a connection from the subscriber to the exchange or vice versa, a communication-channel pair is assigned, from the provided pairs, so that the mobile and stationary subscribers have access to the same

exchange, said cable paths being broad-band cables connected by branches of the television cable connection type to individual subscribers, said cables being routed throughout subscriber areas and extending up to the stationary subscribers, without intervention by the exchange after the assignment of the communication-channel pair and without connection by means of



wired channels other than said branches to the cables, whereby each subscriber, whether mobile or stationary is reached in operationally identical manner and each mobile subscriber and each stationary subscriber has access to all the communication channel pairs which are provided by the respective radio paths and cable paths and whereby each subscriber can set up calls and can be reached at any location under his identification.

5,412,761

## ARCHITECTURE AND METHOD FOR SUPPORTING ENABLE/DISABLE OF PRINTER PANEL SWITCHING BY A HOST COMPUTER

Mitsuaki Teradaira, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

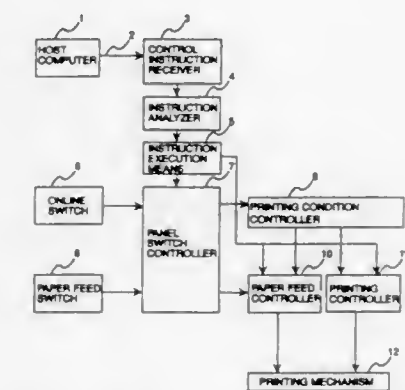
Continuation of Ser. No. 91,523, Jul. 14, 1993, which is a continuation of Ser. No. 837,842, Feb. 18, 1992, abandoned. This application Jun. 15, 1994, Ser. No. 259,929

Claims priority, application Japan, Feb. 18, 1991, 3-023618; May 24, 1991, 3-120399

Int. Cl. G06F 15/00

U.S. Cl. 395-111

20 Claims



1. A printer controller architecture, supporting a plurality of operating conditions, said operating conditions comprising on-line mode, off-line mode, and paper feed mode, said printer controller architecture having at least one panel switch for controlling said on-line mode operating condition, and a communication link with a host computer, said host computer providing a plurality of instructions comprising at least one of an enable instruction a disable instruction and a control instruction, comprising:

- a) a control instruction receiver for receiving the plurality of instructions from said host computer;

- b) an control instruction analyzer for analyzing the instructions received by said control instruction receiver;
- c) instruction execution means for executing said control instructions in accordance with the instructions executed by said instruction execution means analyzed said control instruction analyzer; and
- d) control means responsive to said instruction execution means said for one of enabling operability at least one panel switch; when the plurality of instructions comprises the enable instruction and disabling operability of said at least one panel switch when the plurality of instructions executed by said instruction execution means comprises the disable instruction.

5,412,762

## GEOMETRIC MODELING METHOD AND APPARATUS THEREFOR

Koichi Kondo, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 46,985, Jun. 3, 1993, abandoned, which is a continuation of Ser. No. 454,628, Dec. 21, 1989, Pat. No. 5,265,197. This application Dec. 13, 1993, Ser. No. 165,575

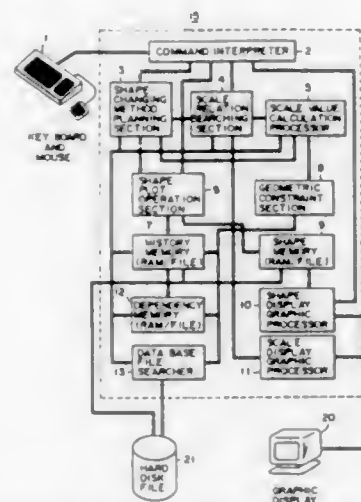
Claims priority, application Japan, Dec. 23, 1988, 63-323402; Oct. 26, 1989, 1-277014

The portion of the term of this patent subsequent to Nov. 23, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> G06F 15/60, 15/62

U.S. Cl. 395—120

46 Claims



1. A geometric modeling method, in a geometric modeling apparatus constituted by inputting means for inputting an input command or input data by which to produce a two- or three-dimensional shape, processing means for executing a plot operation on the basis of the input command or the input data, thereby executing a graphic data processing with respect to the two or three-dimensional shape or a scale thereof, and display means for displaying the shape produced by said processing means, said geometric modeling method comprising the steps of:

inputting an input command or input data for cancelling a scale from said inputting means to said processing means in order to cancel the displayed scale after the shape or the scale is displayed on said display means;

syntactically-analyzing an input command;

cancelling the scale by modifying a dependency between the plot operations on the basis of storage information comprising a plot operation executed to produce the shape, a scale that is stored in correspondence with the plot operation and is selected for each shape element of the produced shape or specified between shape elements thereof, and a dependency in the plot operations; and

displaying the shape or scale produced after the scale is

canceled in accordance with the cancellation step on said display means.

5,412,763

## METHOD FOR DISPLAYING AN IMAGE OF A PORTION OF THE INSIDE OF A THREE-DIMENSIONAL PHYSICAL STRUCTURE

Jérôme Knoploch, Paris; Guy Prevost, Gif sur Yvette, and Nicolas Trell, Saint-Cloud, all of France, assignors to General Electric CGR S.A., Issy Moulineaux, France

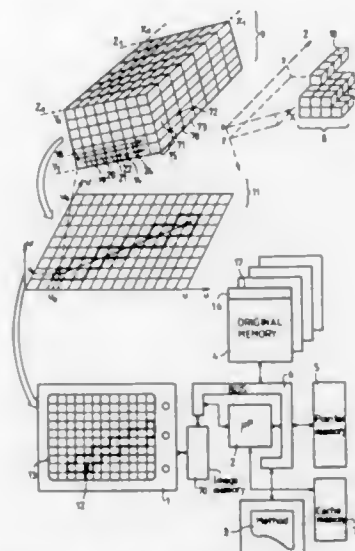
Filed May 24, 1991, Ser. No. 705,646

Claims priority, application France, May 25, 1990, 90 06513

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—124

8 Claims



1. In a method for displaying a portion of an image of a physical structure on a display screen, including the steps of defining the structure by a plurality of adjacent "voxels", which are volumetric elements, each voxel being representative of

- (a) a position in three dimensional space; and
- (b) a value of at least one physical magnitude representative of the structure at the position in space;
- storing memory words in an original memory for describing an image of the structure on a screen;
- relating an original address to each original memory word;
- storing original data in each of the original words;
- associating the original addresses of the original words to the position of the voxels in three dimensional space;
- associating the original data to the values of physical magnitude; the improvement comprising:
- scanning the original addresses of the original memory;
- selecting original memory words from the original memory which contain information that corresponds to the portion of the structure to be displayed;
- establishing positions on the display screen, calculated from corresponding selected original addresses of original memory words;
- relating at least one display magnitude to a corresponding display screen position;
- generating the image by displaying a collection display magnitudes at corresponding display screen positions;
- creating a pointer memory storing pointer information in pointer words, at corresponding pointer addresses;
- associating the address of each pointer word to a position address on the display screen;
- associating the information in each pointer word with the original address of an original memory word in the original memory.

5,412,764

## THREE-DIMENSIONAL IMAGE DISPLAY APPARATUS USING NUMERICAL PROJECTION

Yuko Tanaka, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

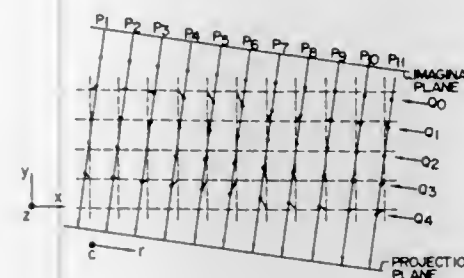
Filed Jun. 21, 1991, Ser. No. 718,977

Claims priority, application Japan, Jun. 22, 1990, 2-162957

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—124

20 Claims



1. A three-dimensional image processing apparatus for generating a two-dimensional image on a projection plane from a three-dimensional object, comprising:

- means for storing three-dimensional image data representing the three-dimensional object;
- coordinate setting means for projecting a plurality of rays from an imaginary plane to the projection plane, the imaginary plane being opposite the projection plane the three-dimensional image data being graphically located between the imaginary plane and the projection plane;
- sampling means for setting a plurality of sampling points of the three-dimensional image along the plurality of rays extending from the imaginary plane to the projection plane and passing through the three-dimensional image data and for sampling image data of the three-dimensional image at the sampling points, at least one of periods and phases of the sampling points on at least adjacent rays being set to be different from each other; and
- means for projecting the image data sampled by said sampling means on the projection plane.

5,412,765

## METHOD FOR VECTOR FIELD VISUALIZATION USING TIME VARYING TEXTURE MAPS

Boris Yamrom, Schenectady, and Kenneth M. Martin, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 992,309, Dec. 21, 1992, abandoned.

This application Aug. 5, 1994, Ser. No. 286,588

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—130

5 Claims



1. A computer implemented method for displaying a representation of at least one of a 2-D and a 3-D vector field on a graphics processor including a display screen, means for storing and applying texture information for objects to be rendered, and means for storing sample vector data representing vectors in said at least one 2-D and 3-D vector field, said method comprising the steps of:

- (a) creating an ordered plurality of one-dimensional texture

maps stacked vertically, each texture map comprised of a plurality of segments of visible texture elements followed by segments of invisible texture elements, wherein each of said plurality of texture maps following a position of the first of said plurality of texture maps is created by right-shifting the preceding texture map by a fixed number of texture elements wherein texture elements in the right-most positions of said texture maps wrap around to the left-most positions of said texture maps wherein for each texture map, visible elements within each of said plurality of segments after the first of said segments have a lesser intensity than the visible elements in the preceding segment and wherein each texture map comprises sections with a length equal to a visible segment and an invisible segment, within which sections, visible texture elements have a constant intensity, and whereby application of said texture maps creates a visual effect of fading line segments along said vector field;

- (b) sequentially applying said ordered plurality of texture maps from the vertical stack to said sample vector data;
- (c) displaying said vector data after each texture map is applied; and
- (d) repeating steps (b) and (c) a fixed number of times, whereupon application of said texture maps creates a visual effect of moving line segments along said vector field.

5,412,766

## DATA PROCESSING METHOD AND APPARATUS FOR CONVERTING COLOR IMAGE DATA TO NON-LINEAR PALETTE

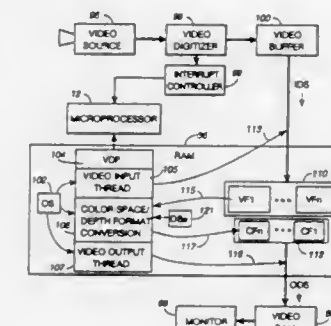
Mark A. Pietras, Boynton Beach, Fla., and Arturo A. Rodriguez, Belmont, Calif., assignors to International Business Machines Incorporated, Armonk, N.Y.

Filed Oct. 21, 1992, Ser. No. 964,236

Int. Cl.<sup>6</sup> G06T 5/20

U.S. Cl. 395—131

31 Claims



17. The method of operating a personal computer system having a main memory for storing data and programs including a multitasking operating system, a microprocessor for executing programs stored in said main memory, a source of frames of video data with each frame comprising a series of digitized pixel color values, and a video display device for displaying video data comprising a series of palette colors, wherein said method comprises the steps of:

- (a) storing in said main memory a conversion table having a plurality of created error diffusion arrays covering the color range of said pixel color values, each array in said table being for a different corresponding color value, each array being accessed using said corresponding color value as an index into said table, each array in said table having "n" fields respectively containing palette color values ordered in accordance with an order matrix by sorted luminance values, said palette color values being from a palette of quantized colors;
- (b) storing in said main memory a series of input pixel color values from said source;



- (c) processing said input pixel color values in blocks wherein each block has "n" values corresponding to "n" laterally and vertically adjacent pixels on a screen, said processing being done by
- (c1) converting each block of input pixel color values into a corresponding converted block containing palette colors, by looking up in said conversion table for each input pixel color value in said each block the array indexed by such color value, and by setting a corresponding value in said corresponding converted block to a preordered palette color from such array;
- and (c2) transmitting to said video display device said palette colors from said converted block;
- and wherein said conversion table is created by:
- (d) storing in said main memory a palette of quantized palette colors;
- (e) for each different pixel color value, creating a corresponding error diffusion array in said conversion table by
- (e1) calculating, for each palette color in said palette, a Euclidean distance between such palette color and a first pixel color value from said series of input pixel color values,
- (e2) selecting a first palette color corresponding to which palette color has a minimum Euclidean distance from the first pixel color value,
- (e3) selecting (n-1) additional palette colors by adding color error differences between said first pixel color value and a palette color last selected to form a search color, by calculating Euclidean distances between said search color and each palette color in said palette, and by selecting another palette color having a minimum Euclidean distance,
- (e4) sorting said first palette color and (n-1) additional palette colors selected by said preceding steps in accordance with luminance thereof,
- (e5) reordering said palette colors as sorted by said preceding step in accordance with an order matrix,
- and (e6) storing said palette colors as reordered by said preceding step in consecutive fields of said corresponding array in said conversion table as a plurality of error diffusion arrays.

5,412,767

## IMAGE PROCESSING SYSTEM UTILIZING BRUSH PROFILE

Robert J. Long, Oxon, England, assignor to Quantel, Ltd., Newbury, England

Continuation of Ser. No. 525,098, May 17, 1990, abandoned.

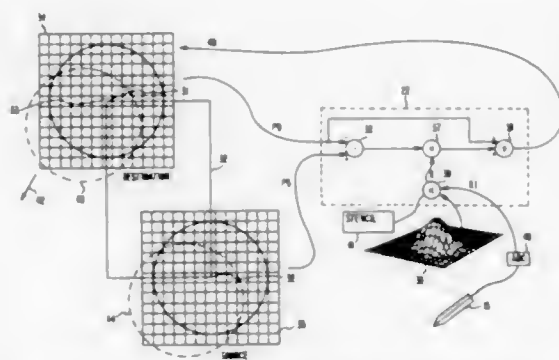
This application Sep. 23, 1993, Ser. No. 126,108

Claims priority, application United Kingdom, May 17, 1989, 8911339; Oct. 13, 1989, 8923094

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—133

22 Claims



1. A method of processing image data defining a multiplicity

of pixels which together form an image, the method comprising the steps of:

- selecting data defining a brush profile;
- employing operator means to define a destination position in the image and to define a source position in the image different than the destination position such that there is a predetermined displacement relationship between the destination position and the source position, and repeating a cycle of:
- delineating a destination patch corresponding to a first region of the image including the destination position, the destination patch comprising an array of pixels each having an associated image data value,
- delineating a source patch corresponding to a second region of the image including the source position, the second region being different than the first region and comprising an array of pixels each having an associated image data value; and
- modifying the image data value of each pixel of the destination patch in dependence upon the image data value of both said destination patch pixel and the corresponding source patch pixel and in dependence upon the brush profile data,
- the destination and source patches of each cycle differing in position from the destination and source patches of the preceding cycle.

5,412,768

## METHOD AND APPARATUS FOR ROTATING AN IMAGE

Yutaka Ozaki, Yokohama, Japan, assignor to Matsushita Graphic Communication Systems, Inc., Tokyo, Japan

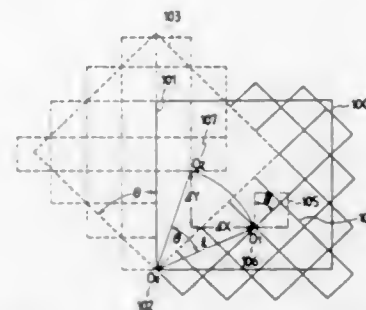
Continuation of Ser. No. 642,742, Jan. 17, 1991, abandoned. This application Apr. 13, 1994, Ser. No. 227,088

Claims priority, application Japan, Jan. 22, 1990, 2-13164; Jan. 22, 1990, 2-13165

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—137

11 Claims



1. A method of rotating a reproduced video image by an apparatus including a central processing unit (cpu), a main memory, an image storing memory for storing image data in rows, a plurality of input latches, a plurality of output latches, a data conversion circuit, an exchange circuit, a row order change circuit and a selection circuit with said plurality of input latches connected to said cpu, said main memory and said image storing memory, said data conversion circuit connected between a predetermined number of input latches and output latches, said exchange circuit and said row order change circuit connected between an input latch and an output latch, and said selection circuit connected to said predetermined number of output latches connected to said data conversion circuit, comprising the steps of:

calculating a conversion mode number M with respect to image data of N rows×N columns by referring to an equation expressed as:  $M = \lceil \log_2 N \rceil$  where N is a power of 2 and when a numeral within a bracket "[ ]" is equal to an integer, the bracket denotes the integer; and when a numeral within the bracket contains a fraction, the bracket denotes an integer which is obtained by counting the

fraction as one, said step of calculating a conversion including a step of reading out the N rows of image data from the image storing memory;

numbering the N rows by 0~N-1 and transferring the rows to the plurality of input latches;

calculating rows having numbers A and B for each of conversion modes L (1~M) by referring to equations expressed as:

$$A = k \cdot 2^L \sim k \cdot 2^L + 2^{L-1} - 1$$

$$B = A + 2^{L-1}$$

$$k = 0 \sim (N/2^L) - 1$$

where a character "\*" denotes an operator of product;

representing row bit arrangements of the rows having the numbers A and B by A(j) and B(j) respectively;

converting the row bit arrangements A(j) and B(j) into bit arrangements A'(j) and B'(j) with said data conversion circuit by referring to equations expressed as:

$$A'(j) = A(j)$$

$$j = k \cdot 2^L \sim k \cdot 2^L + 2^{L-1} - 1$$

$$A'(j) = B(j) - 2^{L-1}$$

$$j = k \cdot 2^L + 2^{L-1} \sim k \cdot 2^L + 2^L - 1$$

$$B'(j) = B(j)$$

$$j = k \cdot 2^L + 2^{L-1} \sim k \cdot 2^L + 2^L - 1$$

$$B'(j) = A(j) + 2^{L-1}$$

$$j = k \cdot 2^L \sim k \cdot 2^L + 2^{L-1} - 1$$

$$k = 0 \sim (N/2^L) - 1$$

latching the row data obtained by the step of converting in said plurality of output latches;

writing the latched row data into said image storing memory via said selection circuit;

varying L from 1 to M and thereby deriving conversion image data of N rows×N columns;

representing bit arrangements of rows of the conversion image data by E(j); and

converting the bit arrangements of the rows of the conversion image data by referring to equations expressed as:

$$F(j) = E(N-j-1), j = 0 \sim N-1$$

where F(j) denotes rows composing 90-degree clockwise-rotated image data of N rows×N columns.

5,412,769

## METHOD AND SYSTEM FOR RETRIEVING TIME-SERIES INFORMATION

Tetsuya Maruoka, Sagami, and Shoichi Masui, Kawasaki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

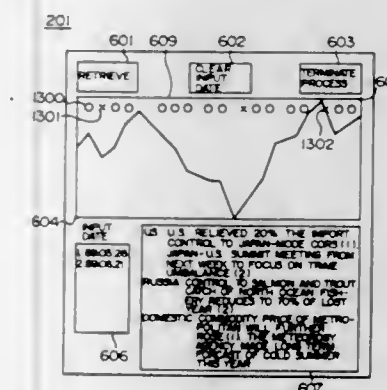
Filed Dec. 22, 1992, Ser. No. 995,154

Claims priority, application Japan, Jan. 24, 1992, 4-010541

Int. Cl.<sup>6</sup> G06F 15/24

U.S. Cl. 395—140

7 Claims



1. A method for retrieving time-series information by pre-

dicting future time-series information based on determined time-series information by using a computer having a memory; comprising the steps of:

- preparing detail of the determined time-series information in a table;
- storing past time-series news and event information in a database;
- displaying a graph representing transition of the determined time-series information on a screen;
- calculating prediction result for each point based on the detail of the determined time-series information;
- determining whether the calculated prediction result hits to the determined time-series information or not;
- applying a hit/miss mark on the graph; and
- retrieving past time-series news and event information corresponding to a time point on the graph entered by a user and displaying the retrieved news and event information on the screen.

5,412,770

## CAD FREE-FORM RESHAPING METHOD

Juli Yamashita, and Yukio Fukui, both of Higashi, Japan, assignors to Agency Of Industrial Science And Technology, Tokyo, Japan

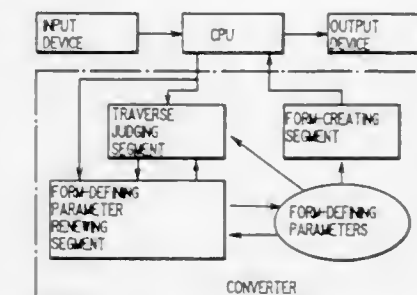
Filed Sep. 24, 1993, Ser. No. 125,854

Claims priority, application Japan, Sep. 25, 1992, 4-280813

Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 395—142

3 Claims



1. In a method of reshaping a free form consisting of curves or surfaces parametrically expressed by form-defining parameters on a computer display of a CAD system, the improvement which comprises the steps of:

determining whether a cursor whose coordinates are input from an input device has traversed the free form;

calculating new form-defining parameters to determine a segment of the form including the point of traverse when the cursor proved to have traversed so that the newly created segment of curve does not intersect the locus drawn by the traversing cursor; and

achieving the intended reshaping by creating a new form based on the new form-defining parameters.

5,412,771

## GENERATION OF INTERDEPENDENT FONT CHARACTERS BASED ON LIGATURE AND GLYPH CATEGORIZATIONS

Daniel J. Fenwick, Santa Cruz, Calif., assignor to Signature Software, Inc., Hood River, Oreg.

Filed Feb. 7, 1992, Ser. No. 832,599

Int. Cl.<sup>6</sup> G06T 5/00

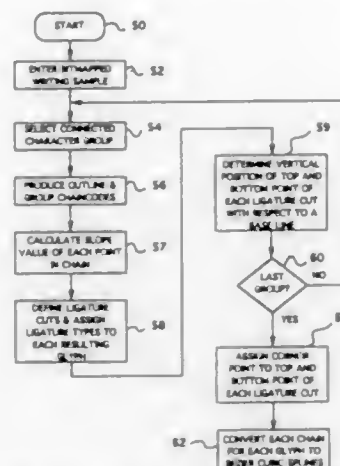
U.S. Cl. 395—150

18 Claims

1. A computer implemented method, using a prototype set of glyph image data, for producing a contextual font for creating strings of glyphs representing characters in a language having a desired appearance, comprising the steps of:

from a prototype set of glyph image data, said glyph image data comprising a set of glyphs, categorizing each glyph within said set of glyphs to be utilized to create said font

According to a set of predefined ligature types, each of said glyphs having either zero ligatures, one ligature, or two ligatures, each of said ligatures having an appearance value, such that each of said glyphs is categorized into at least two ligature type categories; averaging appearance values associated with ligatures of said glyphs categorized within each of said ligature type categories to produce a representative ligature defined by representative appearance values for each of said ligature type categories; and



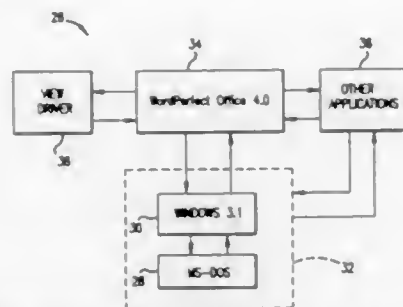
modifying said set of glyphs to produce a modified set of glyphs representing said font, each of said glyphs being modified as necessary to conform said appearance values for each of said glyphs to said representative appearance values from a ligature type category corresponding to each of said glyphs, whereby strings of glyphs produced from said modified set of glyphs have said desired appearance.

**5,412,772**  
**SYSTEM FOR PERMITTING A VIEW OF AN OBJECT OR A USER INTERFACE TO BE EXCHANGED BETWEEN OPERATING SYSTEM ENVIRONMENTS**  
Lynn T. Monson, Orem, Utah, assignor to Novell, Inc., Orem, Utah

Filed Oct. 13, 1992, Ser. No. 960,005  
Int. Cl. G06F 9/38

U.S. Cl. 395—155

5 Claims



1. A digital computer for presenting a view of an object, said digital computer operating in a first operating system environment, said object represented by object data and said view represented by view data associated with said object data, said object being one of several types of objects and including a control defined by control data forming a part of said view data, said view data created in a second operating system environment different from said first operating system environment, and said control being of the type which may or may not

be recognizable by the digital computer, said digital computer comprising:

a display device;  
an input device for providing input signals from a user;  
a data storage memory device storing said object data and said view data, said stored view data including a tag identifying said control, and further including data for associating said object data and said view data;  
a processor device, connected to said display device, said input device, and said data storage memory device, for receiving said input signals from the user enabling accessing of said view data, for determining based on said tag identifying said control whether said control is recognizable by said processor device or not, and for providing output signals to said display device in accordance with said input signals such that a view of said object according to said view data is displayed thereon and further such that if said control is determined to be recognizable said view is displayed so as to include said control thereon, and if said control is determined to be not recognizable said view is displayed without said control thereon; and wherein said object's type is defined to include at least one property which may or may not be specified in said view data, said data storage memory device further including a default specification for said property, said view data further including a tag identifying said object's type, and said processor device further for identifying said object's type based on said tag identifying said object, for determining said object's at least one property from said object type, and for displaying said view in accordance with said object's at least one property as specified in said view data if said property is specified by said view data and otherwise displaying said view in accordance with said default specification of said property as stored in said data storage memory device.

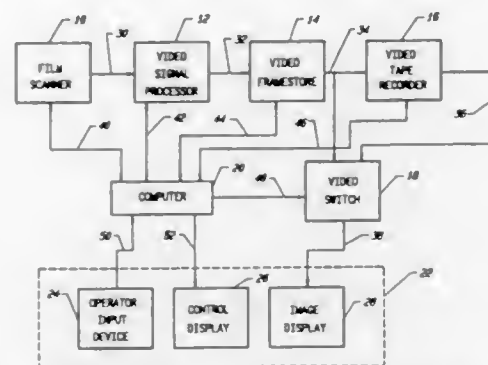
**5,412,773**  
**COMPUTERIZED INTERACTIVE MENU-DRIVEN VIDEO SIGNAL PROCESSING APPARATUS AND METHOD**

John B. Carlucci, Milpitas; Jon E. Graham, San Jose; Douglas D. Kuper, Campbell; Kathryn K. Uenaka, San Jose, and David C. Collier, Gilroy, all of Calif., assignors to Sony Electronics Inc., Park Ridge, N.J.

Filed Nov. 19, 1991, Ser. No. 794,489  
Int. Cl. G06F 3/14; H04N 3/36

U.S. Cl. 395—156

50 Claims



1. A computerized film-to-video signal processor with an interactive menu-driven operator control interface comprising: processor means for receiving computerized signal processing control data and for coupling to a film scanner and receiving therefrom a video signal which represents a scanned optical film image, and for selectively processing said received video signal in accordance with said received computerized signal processing control data; and computer means for providing a first operator feedback signal representing a first pictographic menu display de-

picting a first operator control command corresponding to said computerized signal processing control data, for receiving a first control signal corresponding to said first operator control command, and for providing said computerized signal processing control data to said processor means in accordance with said received first control signal.

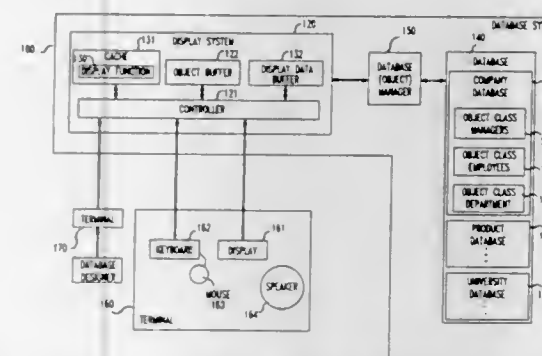
**5,412,774**  
**APPARATUS FOR AND METHOD OF DISPLAYING A DATA ITEM OF A DATABASE USING THE DISPLAY FUNCTION OF A SELECTED DATA ITEM**

Rakesh Agrawal, San Jose, Calif.; Narain H. Gehani, Summit, N.J., and Jagannathan Srinivasan, West Lafayette, Ind., assignors to AT&T Corp., Murray Hill, N.J.

Continuation of Ser. No. 574,825, Aug. 29, 1990, abandoned.  
This application Nov. 3, 1993, Ser. No. 147,469  
Int. Cl. G06F 15/62

U.S. Cl. 395—157

21 Claims



8. A method of operating a display apparatus for displaying one or more data objects obtained from one or more databases, including at least a relational or an object database, the method comprising a plurality of steps including

receiving a protocol communicated from said database, said protocol controlling communications between said database and said display apparatus and including  
1) one or more window types used by said display apparatus for said displayed objects,  
2) one or more labels for labeling each of the window types for said displayed objects, and  
3) data for providing a display for each window type of said displayed objects; and processing said received protocol and creating for each of said window types a display representation of said displayed objects, using the received data and the labels.

**5,412,775**  
**DISPLAY CONTROL METHOD AND APPARATUS DETERMINING CORRESPONDING VALIDITY OF WINDOWS OR OPERATIONS**

Miyuki Maeda, Gardena, Calif.; Khotaro Yamasbata, Machida, Japan, and Akira Maeda, Gardena, Calif., assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 336,069, Apr. 11, 1989, abandoned.  
This application Dec. 5, 1991, Ser. No. 803,766  
Claims priority, application Japan, Apr. 13, 1988, 63-90874; Jun. 30, 1988, 63-164757

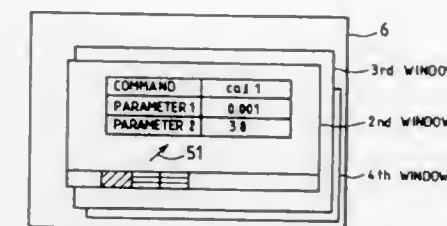
Int. Cl. G06F 3/14

U.S. Cl. 395—158

8 Claims

1. A display control apparatus comprising:  
a display terminal having a multi-window controlled screen; means for selectively displaying a plurality of active windows;  
first data representative of a status of the plurality of the active windows comprising an associated identity with an each of the plurality of windows, validity of display, non-validity of display, overlapping order of relative

display of the plurality of the windows from front to back on the screen and nonvisibility of a valid one of the plurality of windows, wherein the first data indicates whether or not each of said plurality of windows should be validly displayed and visible on said display terminal;  
a memory for storing said plurality of windows and the first data corresponding to each of said plurality of windows; and



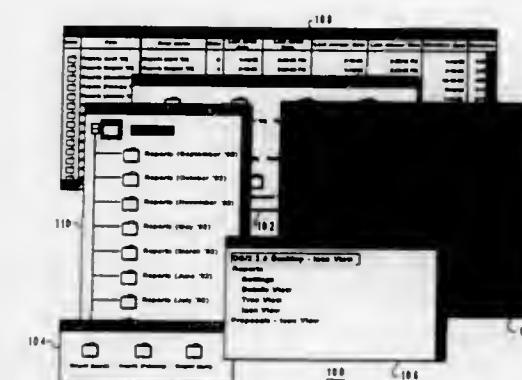
a processor connected to said display terminal and said memory, for displaying (1) at least one of said plurality of windows stored in said memory on said multi-window controlled screen of said display terminal, and (2) a display symbol distinct from the windows having a selectively variable appearance in accordance with the first data representative of the window status.

**5,412,776**  
**METHOD OF GENERATING A HIERARCHICAL WINDOW LIST IN A GRAPHICAL USER INTERFACE**  
Marc A. Bloomfield, Lighthouse Point, Fla., and Christopher A. H. Andrew, Orem, Utah, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1992, Ser. No. 996,223  
Int. Cl. G06F 3/14

U.S. Cl. 395—160

4 Claims



1. A method of enhancing the efficiency of user manipulation of a plurality of object owned windows which are simultaneously open in a graphic user interface on a computer system, the method comprising the steps of:

maintaining for each of a plurality of objects, an object list of opened windows owned by each object;  
monitoring user inputs to the computer system for a user request for a window list;  
responsive to user request for the window list, retrieving each object list and, for object lists having a single opened window, adding a window entry to the window list and for object lists having a plurality of opened windows, adding an object entry and a plurality of window entries to the window list each entry in the window list including a title identifying each object or owning object and a description;



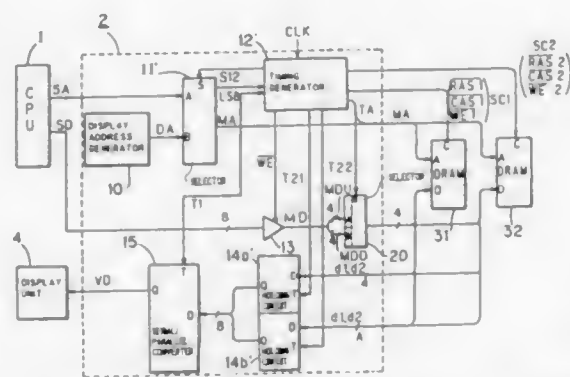
displaying the window list such that a user may select an entry therefrom;  
responsive to user selection of an object title entry, assigning all opened windows belonging to the object to a selection list;  
responsive to user selection of an entry including a window description, assigning the associated open window to the selection list; and  
thereafter, displaying a menu of permitted actions for all entries in the selection list wherein user manipulation of said plurality of object owned windows is enhanced.

5,412,777

**DISPLAY DEVICE HAVING A BUILT-IN MEMORY**  
Kingo Wakimoto, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed May 29, 1992, Ser. No. 890,148  
Claims priority, application Japan, Aug. 7, 1991, 3-197650  
Int. Cl.<sup>6</sup> G06F 3/14

U.S. Cl. 395—166

8 Claims

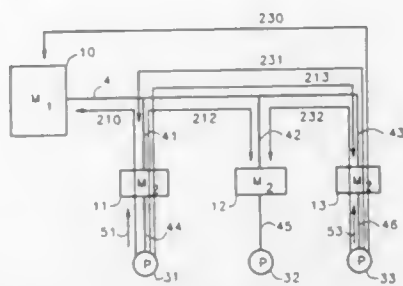


1. A display device having a built-in memory for performing display data reading and writing operations, comprising:  
a plurality of memories, said display data being read from and written to each of said plurality of memories in units of  $n$  bits,  $n$  being an integer;  
memory selecting means for receiving an absolute address and selecting a selected memory of said plurality of memories on the basis of at least a part of said absolute address to access said selected memory independent of other memories;  
access address producing means for producing  $m$  access addresses on the basis of said absolute address,  $m$  being an integer;  
writing control means for receiving writing data of  $(n \times m)$  bits and storing said writing data as  $n$  bits in each of said  $m$  access addresses in said selected memory in writing said display data;  
reading control means for extracting  $n$ -bit data stored in each of said  $m$  access addresses in said selected memory in reading said display data to output display data of  $(n \times m)$  bits; and  
a display unit which receives said display data and displays an image on the basis of said display data.

**METHOD OF CLASSIFICATION AND PERFORMANCE EVALUATION OF COMPUTER ARCHITECTURES**  
Frédéric Andres, Paris, France, assignor to Bull, S.A., Paris, France  
PCT No. PCT/FR92/01203, § 371 Date Aug. 18, 1993, § 102(e) Date Aug. 18, 1993, PCT Pub. No. WO93/12505, PCT Pub. Date Jun. 24, 1993  
PCT Filed Dec. 17, 1992, Ser. No. 107,663  
Claims priority, application France, Dec. 19, 1991, 91 15812  
Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 395—200

13 Claims



1. A computer implemented method of classification of an architecture of a computer of the shared or distributed memory type, said computer comprising a plurality of processors in operative relation with one or more memories via interconnect networks, said classification being done with a view to performance evaluation of the architecture by a performance evaluator executed by a system, the method comprising the steps of:  
storing a description of the computer in a memory of the computer;  
determining a number of local communications between a memory and a processor and storing said number of local communications as a first number;  
determining a number of shared communications between a memory and a processor and storing said number of shared communications as a second number; and  
determining a range coefficient by calculating a ratio between said first number and said second number.

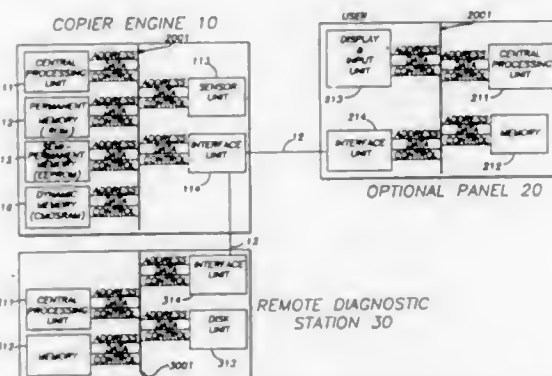
5,412,779

**METHOD AND APPARATUS FOR CONTROLLING AND COMMUNICATING WITH BUSINESS OFFICE DEVICES**  
Tetsuro Motoyama, San Jose, Calif., assignor to Ricoh Company, Ltd., Tokyo, Japan and Ricoh Corporation, San Jose, Calif.

Continuation of Ser. No. 902,462, Jun. 19, 1992, abandoned, which is a continuation of Ser. No. 549,278, Jul. 6, 1990, abandoned. This application Jul. 28, 1994, Ser. No. 282,168  
Int. Cl.<sup>6</sup> G06F 3/00

U.S. Cl. 395—275

34 Claims



1. A system for controlling communication of at least one of

state data including static, semi-static or dynamic data or combinations thereof and control data, comprising:

at least one office device and an operation terminal, wherein each of said at least one office device communicates with a first end of a respective communication line connected between each of said at least one office device and said operation terminal, and wherein said operation terminal communicates with each of said at least one office device through a second end of the respective communication line,

wherein each of said at least one office device includes:

means for generating said at least one of state data and control data as binary signals, including information representative of a type of data and a length of the binary signals,

means, coupled to said means for generating, for storing said at least one of state data and control data,

office device processor means, coupled to said storing means, for processing said at least one of state data and control data and for controlling said office device in response to said processing, and

office device communication interface means, having an output coupled to said first end of the respective communication line and having an input coupled to said office device processor means, for interfacing transmission of said at least one of state data and control data between said office device and said respective communication line; and wherein said operation terminal includes:

operation terminal communication interface means, coupled to said second end of the respective communication line of each of said at least one office device, for interfacing transmission of said at least one of state data and control data between said operation terminal and said respective communication line, and

operation terminal processor means, coupled to said operation terminal communication interface means, for processing said at least one of state data and control data, wherein said operation terminal communication interface means communicates with said communication interface means of each of said at least one office device through the respective communication line thereof.

5,412,780

**DATA STORAGE METHOD AND APPARATUS WITH ADAPTIVE BUFFER THRESHOLD CONTROL BASED UPON BUFFER'S WAITING TIME AND FILLING DEGREE OF PREVIOUS DATA TRANSFER**

Nigel Rushton, Bristol, Great Britain, assignor to Hewlett-Packard Company, Palo Alto, Calif.

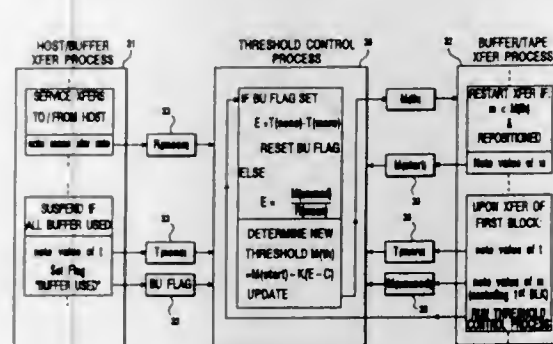
Filed Apr. 27, 1992, Ser. No. 873,426

Claims priority, application United Kingdom, May 29, 1991, 9111524

Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 395—250

8 Claims



1. A data storage method of transferring data between a storage medium and means coupled to a data storage apparatus,

tus, the method being performed with a data storage apparatus including a buffer memory, said method comprising:

a) transferring data between said storage apparatus and said means coupled thereto,

b) storing data in said buffer memory,

c) transferring data between said buffer memory and said storage medium in successive transfer operations each of which comprises a preparatory phase setting up conditions for data transfer, and a transfer phase in which data are transferred substantially continuously,

performing the data transfer of step (c) in a controlled direction,

performing steps (a), (b) and (c) in a controlled sequence, controlling the direction of the data transfer of step (c) and the sequence of steps (a), (b) and (c) for any given data item as a function of whether data are being written to, or read from, the storage medium; an amount of said buffer memory ready to be used in the transfer process of step (a)

defining an externally-useful memory amount which, for data writing, is an amount of said buffer memory free to receive data and which, for data reading, is an amount of said buffer memory with data to be transferred from the apparatus;

instigating each transfer operation of step (c) in response to said externally-useful memory amount dropping below a threshold value;

measuring the following parameters of memory utilization, where they exist, during a previously-initiated step (c) transfer operation;

a waiting time during which said externally-useful memory amount is substantially zero;

remaining externally-useful memory amount present when said previously-initiated step (c) transfer operation first results in said externally-useful memory amount increasing;

using the waiting time which is measured as non-zero to determine adaptively said threshold value to minimize said waiting time, and

using said remaining externally-useful memory amount which is measured as non-zero to determine adaptively said threshold value to minimize a remaining said externally-useful memory amount present when an increase in said externally-useful memory amount is about to occur for a first time following instigation of a step (c) transfer operation, to minimize step (c) transfer operations in number.

5,412,781

**METHOD AND ARRANGEMENT OF BUFFER ALLOCATION IN COMMUNICATION SYSTEMS BY EMPLOYING FIXED AND DYNAMIC BUFFER ALLOCATION FUNCTIONS**

Guenter Lukas, Stockerau; Friedrich Ramberger, Hengersdorf, both of Austria, and Siegfried Spahl, Puchheim-Bahnhof, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Jun. 5, 1992, Ser. No. 894,578

Claims priority, application Germany, Jun. 6, 1991, 41 18 623.0

Int. Cl.<sup>6</sup> G06F 13/00

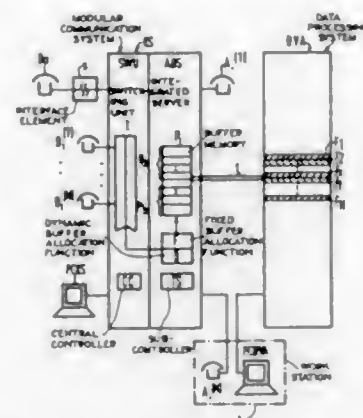
U.S. Cl. 395—250

4 Claims

1. A method for buffer allocation in a communication system having a buffer memory system which stores data including irregularly arriving status data, said buffer memory system in said communication system being connected to a data processing system via a trunk line, said data processing system running first applications that require buffer memory locations in said buffer memory system at a defined execution time and running second applications that do not require buffer memory locations in the buffer memory system at said defined execution time but instead at a later execution time, comprising the steps of:

providing a fixed buffer allocation function for allocating

buffer memory locations at first sub-areas in the buffer memory system to said applications; and providing a dynamic buffer allocation function in combina-



tion with the fixed buffer allocation function for simultaneously allocating buffer memory locations at second sub-areas in the buffer memory system to said first applications.

5,412,782

# PROGRAMMED I/O ETHERNET ADAPTER WITH EARLY INTERRUPTS FOR ACCELERATING DATA TRANSFER

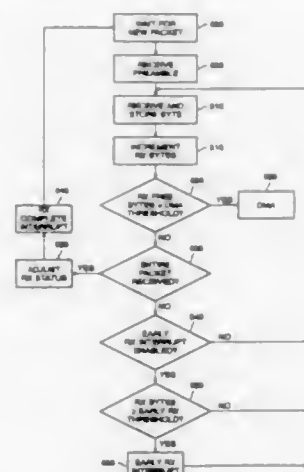
Richard Hausman, Soquel; Paul W. Sberer; James P. Rivers, both of Sunnyvale; Cynthia Zikmund, Boulder Creek; Glenn W. Connery, Sunnyvale; Niles E. Strohl, Tracy, and Richard S. Reid, Mountain View, all of Calif., assignors to 3COM Corporation, Santa Clara, Calif.

Filed Jul. 2, 1992, Ser. No. 907,946

Int. Cl.<sup>6</sup> C06F 13/00, 13/38

U.S. Cl. 395—250

6 Claims



1. A method of transferring a packet of data from a computer network communications media through an adapter to a host computer, said method comprising the steps of:

- a) receiving from said communications media through a transceiver and storing in an adapter receive buffer a predetermined first receive threshold number of bytes of said packet;
- b) thereupon generating a first early receive interrupt from said adapter to said host computer; and
- c) thereafter receiving from said communications media through said transceiver and storing in said adapter receive buffer a remainder of said packet; and

wherein said adapter receive buffer has a predetermined size, said method further comprising the steps of:

- d) if additional bytes of a data packet are received from said communications media through said transceiver and stored in said adapter receive buffer while said adapter receive buffer contains allotted bytes of at least one packet not yet completely transferred to said host computer, such that the total number of allotted bytes in said adapter receive buffer is equal to said size of said adapter receive buffer less a predetermined adapter receive buffer free byte threshold, initiating a direct memory access (DMA) mode; and
- e) receiving from said communications media through said transceiver and storing in a host computer receive buffer through DMA additional bytes of data.

5,412,783

# METHOD FOR EFFICIENT SERIALIZED TRANSMISSION OF HANDSHAKE SIGNAL ON A DIGITAL BUS

Zdenek E. Skokan, Redwood City, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

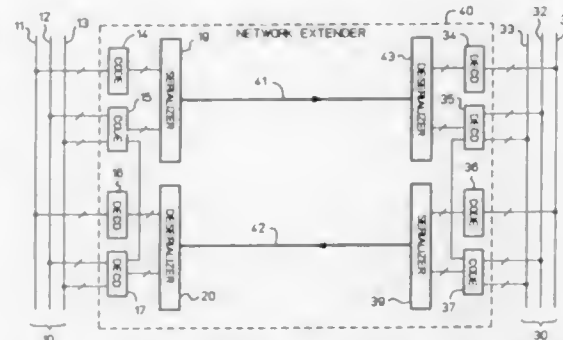
Continuation of Ser. No. 786,461, Nov. 10, 1991, abandoned.

This application Jul. 2, 1993, Ser. No. 87,148

Int. Cl.<sup>6</sup> G06F 13/42

U.S. Cl. 395—325

20 Claims



1. In a computing system having a parallel bus network in which a first parallel bus network segment is connected to a second parallel bus network segment by an interconnection medium, a method comprising the steps of:

- (a) encoding control signals, appearing on the first parallel bus network, as control symbols;
- (b) encoding data signals, appearing on the first parallel bus network, as data symbols;
- (c) sending the control symbols and the data symbols in a data transmission from the first parallel bus network segment to the second parallel bus network segment across the interconnection medium during a data transaction; and,
- (d) encoding in the data transmission a handshake signal generated on the first parallel bus network segment and used in the data transaction, including the substeps of:
  - (d.1) sampling the handshake signal;
  - (d.2) when the handshake signal is at a first signal level, sending a control symbol of encoded control signals across the interconnection medium from the first parallel bus network segment to the second parallel bus network segment; and,
  - (d.3) when the handshake signal is at a second signal level, sending a data symbol of encoded data signals across the interconnection medium from the first parallel bus network segment to the second parallel bus network segment.

5,412,784

# APPARATUS FOR PARALLELIZING SERIAL INSTRUCTION SEQUENCES AND CREATING ENTRY POINTS INTO PARALLELIZED INSTRUCTION SEQUENCES AT PLACES OTHER THAN BEGINNING OF PARTICULAR PARALLELIZED INSTRUCTION SEQUENCE

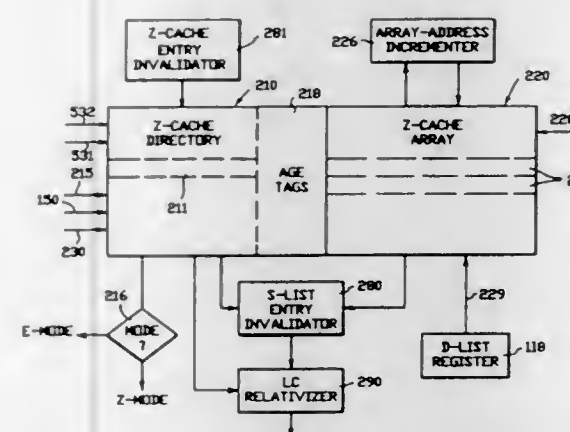
Rudolph N. Rechtschaffen, Scarsdale, and Kattamuri Ekanadham, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 15, 1991, Ser. No. 731,223

Int. Cl.<sup>6</sup> G06F 9/40, 9/00

U.S. Cl. 395—375

23 Claims



1. Apparatus for creating, during execution of a computer program having a first and a second sequence of instructions, each instruction in said first and second sequences having an instruction address and at least some of said instruction addresses of said second sequence being the same as some of said instruction addresses of said first sequence, an entry point into a set of stored parallel subsequences of instructions created from said first sequence of instructions, said parallel subsequences each having a beginning and being executable asynchronously all in parallel on separate processing elements, said first sequence defining a monotonically increasing sequence number associated with each said instruction in said first sequence, said sequence numbers being associated with said instructions in said parallel subsequences of instructions, said entry point allowing said set of parallel subsequences to be entered and executed asynchronously in parallel in place of a corresponding portion of said second sequence starting at a point other than at said beginning of said each parallel subsequence, comprising:

- means for storing a subset of said instruction addresses of said first sequence and said sequence numbers associated with said stored instruction addresses;
- comparison means for detecting, during execution of said second sequence of instructions, a coincidence of an instruction address of said second sequence of instructions with an instruction address in said stored subset of instruction addresses; and
- means responsive to said comparison means for creating an entry point into said set of parallel subsequences which corresponds to said detected coinciding instruction address.

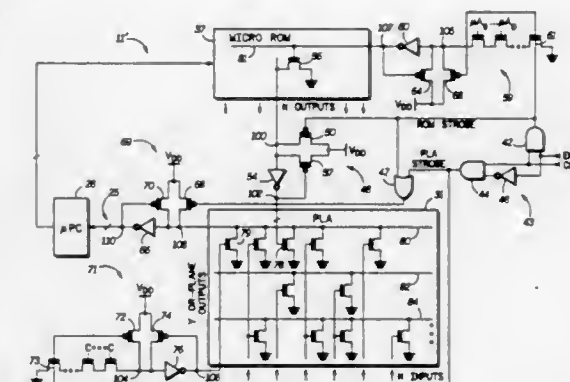
5,412,785

MICROPROGRAMMED DATA PROCESSOR WHICH INCLUDES A MICROSEQUENCER IN WHICH A NEXT MICROADDRESS OUTPUT OF A MICROROM IS CONNECTED TO THE OR-PLANE OF AN ENTRY PLA Robert J. Skruhak, and Michael E. Gladden, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill. Continuation of Ser. No. 506,982, Apr. 9, 1990, abandoned. This application Mar. 26, 1993, Ser. No. 38,046

Int. Cl.<sup>6</sup> G06F 9/26

U.S. Cl. 395—375

1 Claim



1. In a microprogrammed data processor, a microsequencer comprising:

- an instruction pipe having a plurality of stages for holding macroinstructions;
- an entry PLA further comprising:
  - an AND-plane having a plurality of inputs coupled to outputs of the instruction pipe and having a plurality of outputs; and
  - an OR-plane having a first plurality of inputs connected to the plurality of outputs of the AND-plane, a plurality of output lines, a first plurality of transistors, each of the first plurality of transistors having a first current terminal connected to one of the output lines of the OR-plane, a second current terminal connected to a reference voltage and a control terminal connected to one of the first plurality of inputs of the OR-plane, a second plurality of inputs and a second plurality of transistors, each of the second plurality of transistors having a first current terminal connected to one of the output lines of the OR-plane, a second current terminal for receiving a reference voltage and a control terminal connected to one of the second plurality of inputs of the OR-plane;
- a memory further comprising:
  - an address decoder having a plurality of inputs and a plurality of outputs; and
  - a memory array having a plurality of inputs, each connected to one of the plurality of outputs of the address decoder, and a plurality of outputs, each coupled to one of the second plurality of inputs of the OR-plane of the entry PLA;
- microinstruction address register having a plurality of inputs, each coupled to one of the plurality of output lines of the OR-plane of the entry PLA, and a plurality of outputs, each coupled to one of the plurality of inputs of the address decoder of the memory;
- first enable means coupled to the address decoder of the memory for receiving a first enable signal and for enabling the address in response to the first enable signal;
- second enable means coupled to the AND-plane of the entry PLA for receiving a second enable signal and for enabling the AND-plane of the entry PLA in response to the first enable signal;
- first sense amplifier means having a plurality of inputs coupled to the plurality of outputs of the memory array, a



plurality of outputs coupled to the second plurality of inputs of the OR-plane of the entry PLA and an enable input coupled to receive the first enable signal; and second sense amplifier means having a plurality of inputs coupled to the plurality of output lines of the OR-plane of the entry PLA, a plurality of outputs coupled to the plurality of inputs of the microinstruction address register and an enable input coupled to receive a third enable signal, the third enable signal is a logical OR of the first enable signal and the second enable signal,

5,412,786

## DATA PRE-FETCH CONTROL DEVICE

Yoshihiro Kusano, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

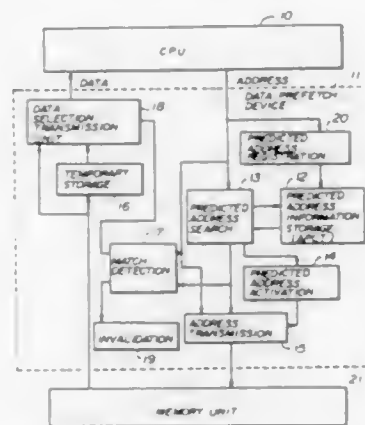
Filed Nov. 29, 1993, Ser. No. 158,318

Claims priority, application Japan, Nov. 30, 1992, 4-320407

Int. Cl.<sup>6</sup> G06F 9/40

U.S. Cl. 395—375

3 Claims



1. A data processing device including at least one CPU and at least one memory device, said data processing device comprising:

- first means for storing information concerning a predicted access which is expected to occur subsequent to the occurrence of an access;
- second means for searching the first means by using an address of an access request from the CPU to the memory for obtaining an address of the predicted access;
- third means for sending the address of the predicted address thereof obtained by the second means to the memory device as a predicted access request when the predicted address of the access request is found in the first means;
- fourth means for temporarily storing the predicted access address obtained by the second means;
- fifth means for temporarily storing the data responded from the memory as a result of the predicted access request;
- sixth means for evaluating whether the next access address generated by the CPU and the predicted access address storing in the fourth means are equal and controlling so that the data is sent to the fifth means to the CPU when equal and the data in the fifth means is invalidated and the access address is sent to the memory as a normal memory access when not equal; and
- seventh means for setting history information concerning an address of the access to the first means, said history information indicating said predicted access.

5,412,787  
TWO-LEVEL TLB HAVING THE SECOND LEVEL TLB IMPLEMENTED IN CACHE TAG RAMS

Mark Forsyth, and Patrick Knebel, both of Fort Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

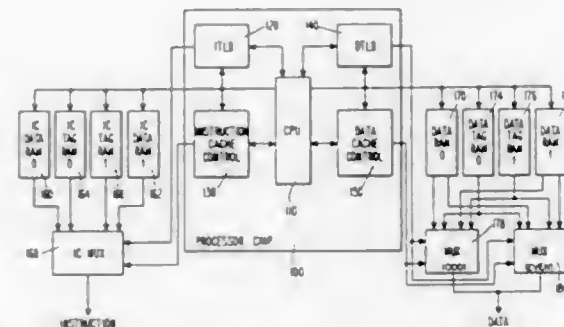
Continuation of Ser. No. 616,540, Nov. 21, 1990, abandoned.

This application Oct. 13, 1993, Ser. No. 136,715

Int. Cl.<sup>6</sup> G06F 12/10

U.S. Cl. 395—400

13 Claims



1. A computer system comprising:  
first memory means for storing blocks of data;  
second memory means for storing blocks of instruction data;  
a first-level data translation lookaside buffer (DTLB) for storing address translation information for use in translating virtual addresses to physical addresses of said blocks of data stored in said first memory means;

a first-level instruction translation lookaside buffer (ITLB) for storing address translation information for use in translating virtual addresses to physical addresses of said blocks of instruction data stored in said second memory means;

first tag memory means divided into a first area for storing data tag information corresponding to said blocks of data in said first memory means and a second area for storing a second-level data translation lookaside buffer (DTLB) for storing address translation information for use in translating virtual addresses to physical addresses of said blocks of data stored in said first memory means;

second tag memory means divided into a first area for storing data tag information corresponding to said blocks of instruction data in said second memory means and a second area for storing a second-level instruction translation lookaside buffer (ITLB) for storing address translation information for use in translating virtual addresses to physical addresses of said blocks of instruction data stored in said second memory means; and

processing means for (1) providing a virtual address of one of data stored in said first memory means and of instruction data stored in said second memory means, (2) when a virtual address of data stored in said first memory means is provided, searching said first-level DTLB for address translation information for said virtual address of data stored in said first memory means and translating said virtual address of data stored in said first memory means to a physical address of a corresponding block of data stored in said first memory means if said address translation information for said virtual address of data stored in said first memory means is found in said first-level DTLB, else searching said first-level ITLB for address translation information for said virtual address of instruction data stored in said second memory means and translating said virtual address of instruction data stored in said second memory means to a physical address of a corresponding block of instruction data stored in said second memory means if said address translation information for said virtual address of instruction data stored in said second memory means is found in said first-level ITLB, (3) when a

virtual address of data stored in said first memory means is provided and said address translation information for said virtual address of data stored in said first memory means is not found in said first-level DTLB, searching said second-level DTLB stored in said first tag memory means for address translation information for said virtual address of data stored in said first memory means and translating said virtual address of data stored in said first memory means to said physical address of said corresponding block of data stored in said first memory means if said address translation information for said virtual address of data stored in said first memory means is found in said second-level DTLB, else when said address translation information for said virtual address of data stored in said first memory means is not found in said first-level ITLB, searching said second-level ITLB stored in said second tag memory means for address translation information for said virtual address of instruction data stored in said second memory means and translating said virtual address of instruction data stored in said second memory means to said physical address of said corresponding block of instruction data stored in said second memory means if said address translation information for said virtual address of instruction data stored in said second memory means is found in said second-level ITLB, and (4) when said processor has completed a virtual address to physical address translation, accessing one of said first memory means and said second memory means at the physical address of one of said corresponding block of data stored in said first memory means and said corresponding block of instruction data stored in said second memory means.

5,412,788

MEMORY BANK MANAGEMENT AND ARBITRATION IN MULTIPROCESSOR COMPUTER SYSTEM

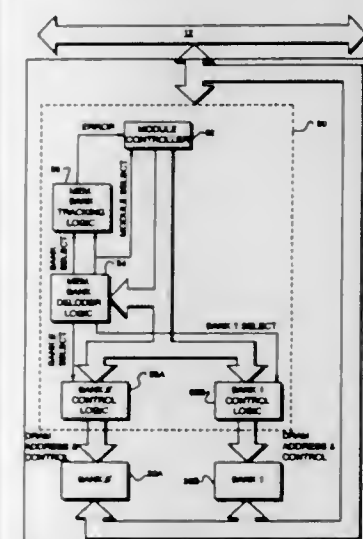
Hansel A. Collins, Clinton, and David W. Hartwell, Boxboro, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 16, 1992, Ser. No. 870,448

Int. Cl.<sup>6</sup> G06F 13/16, 13/14

U.S. Cl. 395—425

8 Claims



1. In a data processing system having a plurality of commander nodes and a plurality of memory banks interconnected by a system bus; said commander nodes gaining control of said system bus by arbitration therefore during request cycles associated therewith and, after gaining control of the system bus, sending address transfers thereover; said address transfers representing address information corresponding to a plurality of memory locations in particular ones of the memory banks to which said commander nodes desire access; a memory management and arbitration method for minimizing system bus

contention by minimizing memory bank conflicts comprises the steps of:

- A) each commander node desiring access to a particular one of said memory banks determining whether said particular one of said memory banks is available for access before initiating an arbitration for said system bus, said availability determining step including the following steps performed by each commander node
  - i) monitoring the system bus,
  - ii) decoding address transfers received over the system bus to produce a plurality of decoded memory bank identifying signals identifying the memory banks that contain the memory locations represented by the address transfers,
  - iii) storing the decoded memory bank identifying signals for the memory banks involved in a predetermined number of prior address transfers, and
  - iv) comparing the stored memory bank identifying signals with a memory bank identifying signal associated with said particular one of said memory banks, and
  - v) if said compared memory bank identifying signals are not the same, determining that said particular one of said memory banks is available for access; and
- B) after determining that said particular one of said memory banks is available for access, each commander node transmitting a request for system bus control.

5,412,789

MULTI-PORT MEMORY WITH SERIALLY CONNECTED OUTPUT ELEMENTS

Mitsuharu Ohki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

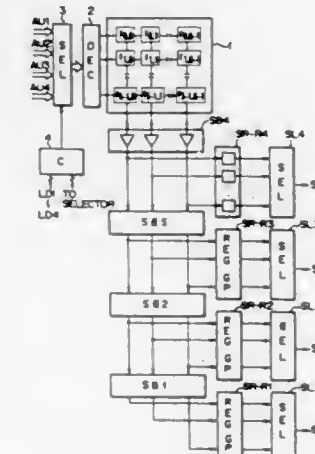
Filed Apr. 27, 1992, Ser. No. 874,742

Claims priority, application Japan, Apr. 30, 1991, 3-126690

Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 395—425

9 Claims



1. A multi-port memory, comprising:

- P stages of buffer groups, connected in series to Q connection lines of rows or columns of a semiconductor memory, for driving Q data pieces received from the semiconductor memory, where P and Q are integers greater than 1;
- P register groups for receiving the Q data pieces from Q outputs of each buffer group and for storing said Q data pieces;
- T (where T is an integer larger than 1) selector means, each selector means separately receiving at parallel inputs nQ data pieces which are output from nQ (where n is an integer larger than or equal to 1) registers of said P register groups, selecting data pieces from among the nQ data pieces and separately outputting the selected data pieces at

a serial output port located at a respective output terminal; and  
control means connected to the semiconductor memory, the buffer groups, the register groups, and the selector means for selectively designating respective address bits of said rows or columns, for controlling the buffer groups and the register groups to load said register groups, and for controlling the selection by said selector means.

5,412,790

# HIGH-THROUGHPUT DATA PROCESSING SYSTEM EQUIPPED WITH CACHE MEMORY SYSTEM FOR ACHIEVING HIGH HIT RATIO

Atsushi Okamura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

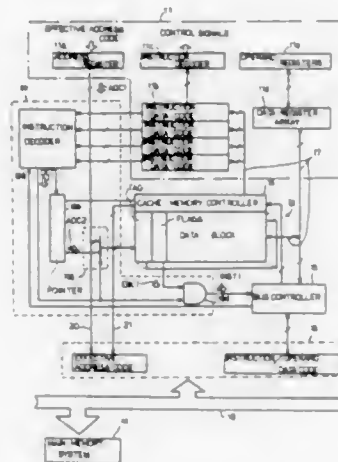
Filed May 7, 1992, Ser. No. 879,314

Claims priority, application Japan, May 17, 1991, 3-112035

Int. Cl.<sup>6</sup> G06F 12/12

U.S. Cl. 395—425

6 Claims



1. A data processing system comprising

- a pre-fetch cue register system having a plurality of memory locations for storing a plurality of instruction codes;
- a data register means for storing a data code;
- a main memory system for storing instruction codes;
- a first instruction decoder sequentially supplied with said instruction codes from said main memory system, and producing control signals from said instruction codes;
- a cache memory system storing a plurality of data blocks having data blocks each storing a plurality of data codes, and communicating with said data register and said main memory system through a first bus and a second bus, respectively;
- a second instruction decoder operative to check instruction codes stored in said pre-fetch cue register system to see whether or not the communication between said data register, said main memory system and said cache memory system is predicted, said second instruction decoder being further operative to check said instruction codes stored in said pre-fetch cue register system to see whether or not a bus request for at least one of said first and second buses is predicted;
- a pointer supplying an auxiliary address code indicative of an address assigned to one of said data blocks each storing said plurality of data codes to said cache memory system while said communication between said data register, said main memory system and said cache memory system is not predicted, said cache memory system checking said data blocks sequentially indicated by said auxiliary address code to see whether or not at least one of said plurality of data codes is supplied from said data register, and
- purge means for allowing said cache memory system to transfer said at least one of said plurality of data codes to said main memory system in absence of any predicted said

communication between said data register, said main memory system and said cache memory system, and of any predicted said bus request.

5,412,791

# MASS DATA STORAGE LIBRARY

Charles W. Martin, Richardsoo; Frederick S. Reid, Plano; Gary L. Forbus, Dallas; Steve M. Adams, Garland; C. Pat Shannon, Dallas, and Eric A. Pirpleh, Garland, all of Tex., assignors to E-Systems, Inc., Dallas, Tex.

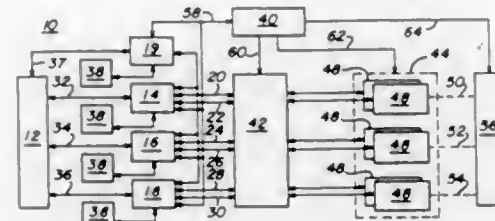
Continuation of Ser. No. 430,134, Nov. 1, 1989, Pat. No.

5,214,768. This application Apr. 12, 1993, Ser. No. 45,025

Int. Cl.<sup>6</sup> G06F 12/00

U.S. Cl. 395—425

28 Claims



1. A mass data storage and retrieval system comprising: a plurality of means for information storage forming a mass storage library;
- a data directory for maintaining a directory of the information stored in the mass storage library and for generating, in response to a request, a data location output signal identifying the location within the mass storage library of information responsive to the request;
- a plurality of data recorder modules for receiving and reading information from and writing information to a selected means for information storage;
- interface means bi-directionally coupled to the data recorder modules for simultaneous reading and writing of information from and to the selected means for information storage received by the data recorder module;
- a control computer coupled to the data directory for receiving the data location output signal and, in response thereto, generating a first command signal output to the mass storage library for selecting and loading the selected means for information storage in the data recorder module and for generating a second command signal for coupling the interface means to the recorder module loaded with the selected means for information storage.

5,412,792

# METHOD AND ARRANGEMENT FOR CONTROLLING MEMORY BANK ACCESS REQUESTS IN DATA PROCESSING SYSTEM

Isao Hasegawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 456,804, Dec. 26, 1989, abandoned.

This application Apr. 9, 1993, Ser. No. 46,485

Claims priority, application Japan, Dec. 27, 1988, 63-328031

Int. Cl.<sup>6</sup> G06F 12/06

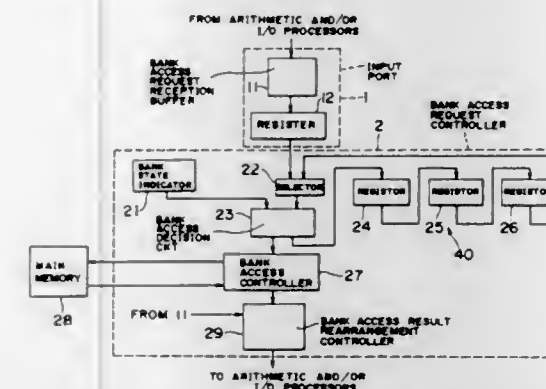
U.S. Cl. 395—425

7 Claims

1. A method of controlling the priority of memory bank access requests received at a request selector via a single bank access request reception buffer, each of said memory bank access requests undergoing an access decision check by an access checking means and transferring said memory bank access requests based on respective said access decision checks, said method comprising the steps of:

- (a) receiving, at said request selector, a first memory bank access request and/or a second memory bank access request, said first memory bank access request being one of a plurality of memory bank access requests newly applied

- in series to said request selector, and said second memory bank access request being applied via step (g);
- (b) selecting at said request selector, for transfer to said memory bank, one of said first or said second memory bank access requests, whenever said first and second memory bank access requests are not applied simultaneously to said request selector;
- (c) selecting, at said request selector, said second memory bank access request whenever said first and second memory bank access requests are simultaneously applied to said request selector;



- (d) determining whether a memory bank demanded in a specific memory bank access request selected by said request selector is available or not;
- (e) transferring the specific memory bank access request selected by said request selector whenever the demanded memory bank is available;
- (f) holding the specific memory bank access request selected by said request selector in a memory means for a predetermined time period whenever the demanded memory bank is not available; and
- (g) re-applying the specific memory bank access request stored in said memory means to said request selector as said second memory bank access request.

5,412,793

# METHOD FOR TESTING ERASE CHARACTERISTICS OF A FLASH MEMORY ARRAY

Jerry Kreifels, Citrus Heights; Mickey L. Fandrich, Placerville, and William Smith, Fair Oaks, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 801,953, Dec. 3, 1991, abandoned. This application Jul. 19, 1994, Ser. No. 277,369

Int. Cl.<sup>6</sup> G06F 12/00

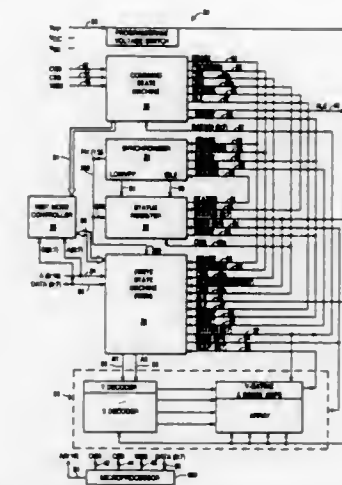
U.S. Cl. 395—425

7 Claims

1. A method of determining erasure characteristics of a flash memory array using an on-board write state machine, said write state machine responsive to erase commands, said write state machine, upon receipt of an erase command, automatically preconditioning the memory array and erasing the memory array by repetitively applying a plurality of pulses and verifying erasure until erasure of the array is verified, the method for determining erasure characteristics comprising the steps of:

- a) configuring the write state machine to prevent preconditioning and to apply a single erase pulse to the memory array in response to subsequently received erase commands;
- b) issuing an erase command to the write state machine;
- c) said write state machine applying a single erase pulse to the memory array in response to the issued erase command;

- d) if array erasure is unsuccessful, issuing another erase command to the write state machine;



- e) repeating steps b), c) and d) until the entire array is successfully erased.

5,412,794

# MICROPROCESSOR BASED SYSTEMS PROVIDING SIMULATED LOW VOLTAGE CONDITIONS FOR TESTING RESET CIRCUITS

John B. Phoenix, Birmingham; Kenneth Vincent, Alcester, and David C. Hurst, West Midlands, all of England, assignors to Lucas Industries public limited company, Solihull, United Kingdom

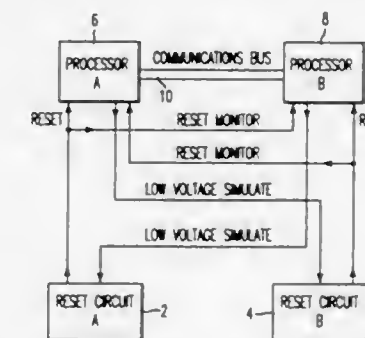
Filed Nov. 12, 1991, Ser. No. 789,839

Claims priority, application United Kingdom, Nov. 10, 1990, 9024488

Int. Cl.<sup>6</sup> G06F 9/455

U.S. Cl. 395—500

8 Claims



1. A microprocessor-controlled system, comprising: a first microprocessor;
- means for establishing a supply voltage for said microprocessor; and
- a reset circuit coupled to said microprocessor for holding the microprocessor in an inoperative reset condition; the reset circuit incorporating:
  - a reset line coupled to said microprocessor;
  - a low-voltage detection means for receiving said microprocessor supply voltage and producing a reset output signal level on said reset line if said microprocessor supply voltage falls below a predetermined level;
  - a timing means for holding said detected reset output signal level on said reset line for a specified reset period after said low-voltage detection means has indicated a presence of said supply voltage at an acceptable level; and



means for generating a simulated low voltage signal applied to said low-voltage detection means to force said reset circuit, and hence the microprocessor, into said reset condition, for testing purposes; and

a second microprocessor coupled to said first microprocessor for the mutual exchange of information, each of said first and second microprocessors having its own reset circuit associated with it and each having a simulated low voltage signal generating means for inducing a simulated low voltage signal applied to said low-voltage detection means of said reset circuit associated with the other one of said first and second microprocessors.

5,412,795

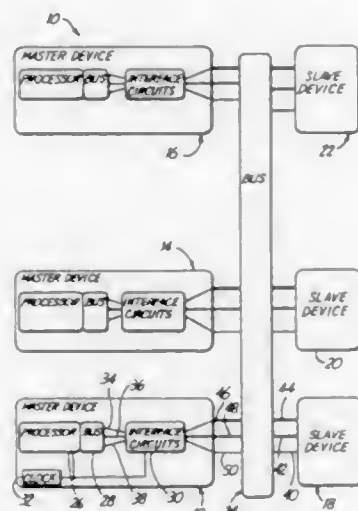
**STATE MACHINE HAVING A VARIABLE TIMING MECHANISM FOR VARYING THE DURATION OF LOGICAL OUTPUT STATES OF THE STATE MACHINE BASED ON VARIATION IN THE CLOCK FREQUENCY**  
 Ronald J. Larson, Minneapolis, Minn., assignor to Micral, Inc., New Brighton, Minn.

Filed Feb. 25, 1992, Ser. No. 840,883

Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 395—500

28 Claims



1. A computer system, comprising:

- a first bus system;
- a second bus system; and
- interface means for connecting the first bus system to the second bus, the interface means including
  - logical interpreter means for receiving input signals from the first bus system representative of a desired operation and for providing output signals to the second bus system in a series of logical states based on the signals received from the first bus system, the series of logical states required to accomplish the desired operation comprising an output cycle; and
  - time controller means, coupled to the logical interpreter means, for receiving a clock signal having clock pulses and a frequency from the first bus system, and for adjusting timing in the logical interpreter means based on variation in the clock frequency so the duration of each of the logical states in the output cycle corresponds to a number of clock pulses so that the output cycle is within predetermined time limits, the time controller means including a counter coupled to the logical interpreter means and providing timed inputs to the logical interpreter means, the timed inputs controlling the duration of each of the logical states.

5,412,796  
**METHOD AND APPARATUS FOR GENERATING IMAGES SIMULATING NON-HOMOGENEOUS FOG EFFECTS**

Graham J. Olive, Burgess Hill, England, assignor to Rediffusion Simulation Limited, Sussex, United Kingdom

PCT No. PCT/GB91/00627, § 371 Date Aug. 3, 1992, § 102(e) Date Aug. 3, 1992, PCT Pub. No. WO91/18359, PCT Pub. Date Nov. 28, 1991

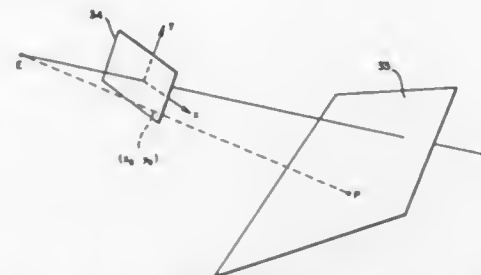
PCT Filed Apr. 22, 1991, Ser. No. 915,999

Claims priority, application United Kingdom, May 12, 1990, 9010703; Jun. 1, 1990, 9012229

Int. Cl.<sup>6</sup> G09B 9/08

U.S. Cl. 395—500

3 Claims



1. A method for simulating the effects of non-homogeneous fog in an image displayed on a screen, the image being intended to represent the appearance of a model defined in a database in world space coordinates from an eyepoint position in said world space coordinates, and the model being defined in terms of a plurality of features having predetermined attributes, said method comprising the following steps:

- a) defining a non homogeneous fog structure in world space coordinates as a series of parallel strata of predetermined extinction coefficients,
- b) determining a position relative to the defined parallel strata of the eyepoint,
- c) determining a position relative to the defined parallel strata of a feature which may contribute to the image,
- d) determining a distance from the eyepoint to the feature,
- e) calculating an average value of the extinction coefficient between the eyepoint and the feature from the defined parallel strata located between the eyepoint and the feature,
- f) modulating said attributes as a function of said distance and a calculated average value of the extinction coefficient,

the average value of the extinction coefficient between the eyepoint and the feature being calculated by: calculating and storing average extinction coefficient values for each of a series of distances from the eyepoint in a direction perpendicular to the parallel strata, calculating the distance from the eyepoint to the feature in the direction perpendicular to the parallel strata, and looking up the stored average extinction coefficient corresponding to said distance from eyepoint to feature, the non-homogeneous fog structure being defined in the model by a series of sample extinction coefficients, each corresponding to the extinction coefficient at a respective one of a series of parallel equally spaced sample planes, the non-homogeneous fog structure being redefined with reference to the eyepoint by a series of average extinction coefficients each corresponding to the average extinction coefficient between the eyepoint and a respective resample plane, the resample planes being parallel to and equally spaced to the said sample planes and one of the resample planes passing through the eyepoint, and each resampled average extinction coefficient being stored at an address corresponding to a distance from the eyepoint to the resample plane to which that coefficient is related.

5,412,797  
**METHOD FOR IMPLEMENTING ONE-TO-MANY BINARY RELATIONS IN OBJECT-ORIENTED SYSTEMS USING DOUBLY-LINKED RINGS**

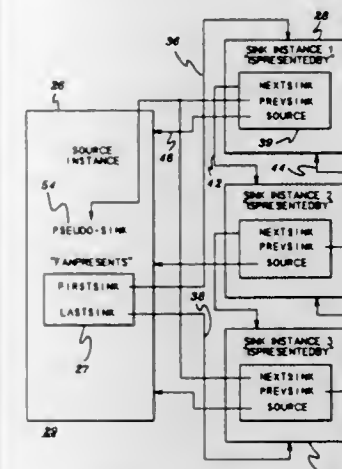
William B. Rubin, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1992, Ser. No. 938,075

Int. Cl.<sup>6</sup> G06F 13/00, 15/00

U.S. Cl. 395—500

33 Claims



1. A method for implementing a one-to-many binary relation in an automated object-oriented data repository, said method comprising the steps of:

- creating within said automated object-oriented data repository a source instance from a source class and a plurality of sink instances from a sink class;
- storing within said source instance a first sink pointer for pointing to a first sink instance of said plurality of sink instances and a last sink pointer for pointing to a last sink instance of said plurality of sink instances;
- storing within each of said sink instances a next sink pointer for pointing to a next sink instance of said plurality of sink instances when a next sink instance exists or a pseudo-sink address associated with said source instance when there is no next sink instance, and a previous sink pointer for pointing to a previous sink instance of said plurality of sink instances when there is a previous sink instance or said pseudo-sink address when there is no previous sink instance;
- inserting a binary relationship between said source instance and each of said plurality of sink instances by setting said first sink pointer to said first sink instance, said last sink pointer to said last sink instance, said next sink pointer to said next sink instance if there is a next sink instance or said pseudo-sink address if there is no next sink instance, and said previous sink pointer to said previous sink instance if there is a previous sink instance or said pseudo-sink address if there is no previous sink instance.

5,412,798

**SYSTEM FOR ENABLING ACCESS TO DEVICE DRIVER RESIDING IN RESOURCE MEMORY CORRESPONDING TO COUPLED RESOURCE BY ALLOWING MEMORY MAPPING TO DEVICE DRIVER TO BE EXECUTED**

John I. Garney, Aloha, Oreg., assignor to Intel Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 815,331, Dec. 27, 1991, Pat. No.

5,319,751. This application Jan. 22, 1993, Ser. No. 7,849

The portion of the term of this patent subsequent to Jun. 7, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> G06F 15/40

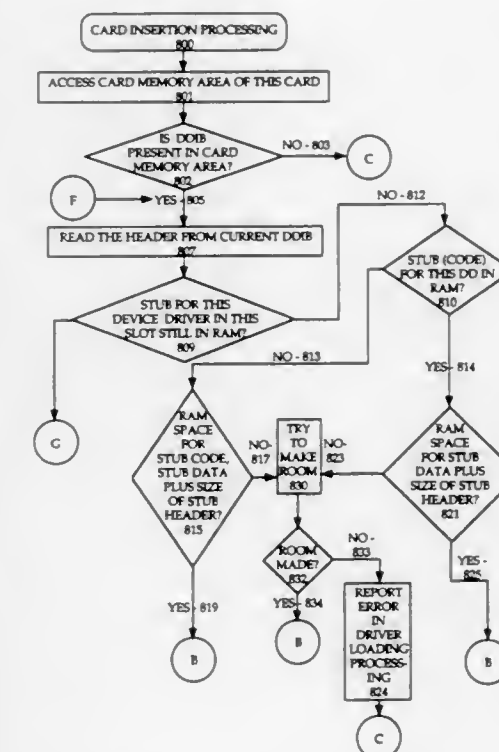
U.S. Cl. 395—500

18 Claims

16. A computer system that dynamically configures device

drivers of removable computer system resources, said computer system comprising:

- a processor;
- a system memory;
- a removable computer system resource, said removable system resource having a resource memory, said resource memory containing a device driver stub and a full device driver;
- an interface for receiving said removable system resources;
- means for allocating a contiguous portion of said system memory;
- means for receiving an indication that a removable system resource has been coupled to said interface;
- means for determining whether said allocated portion of system memory has an unused contiguous sub-portion sufficiently large to contain a copy of said device driver stub, an used sub-portion being system memory not containing a copy of device driver stub corresponding to a different removable system resource coupled to said interface;



means for consolidating unused sub-portions such that if said allocated portion of system memory does not have an unused sub-portion sufficiently large to contain said device driver stub copy, consolidating said unused sub-portions until said unused sub-portions form a consolidated unused sub-portion of contiguous allocated memory sufficiently large to contain said copy of said device driver stub;

means for copying said device driver stub processing logic into said sufficiently large unused sub-portion;

means for executing said device driver stub from said system memory;

means for enabling access to said full device driver, said access being enabled by said device driver stub, said means for enabling access to said full device driver further including means for allowing memory mapping to said full device driver residing in said resource memory; and

means for executing said full device driver from said resource memory.

5,412,799

EFFICIENT DATA PROCESSOR INSTRUMENTATION  
FOR SYSTEMATIC PROGRAM DEBUGGING AND  
DEVELOPMENT

Gregory M. Papadopoulos, Arlington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

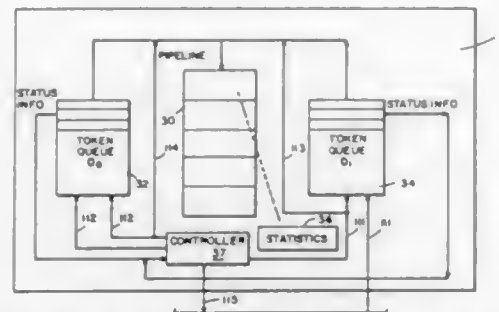
Continuation of Ser. No. 486,061, Feb. 27, 1990, abandoned.

This application Apr. 2, 1993, Ser. No. 41,908

Int. Cl. G06F 15/82, 11/34

U.S. Cl. 395—500

19 Claims



1. In a data processing system comprising at least one processor for executing instructions stored in memory, execution of instructions being initiated by the processing of tokens which carry operands, an instruction being executed only after all required operands are available, and the execution of some instructions generating new tokens to be processed in order to initiate execution of new instructions, a method of determining a maximum level of parallel execution of instructions that is possible with execution of a program comprised of a plurality of instructions, said method comprising the steps of:

- simulating execution of the program in multiprocessors having unlimited processing capability with respect to the program by executing the program in the at least one processor one program step at a time, each program step after a first program step processing all tokens generated in a previous program step, each program step comprising: processing with the at least one processor all tokens which are available at the start of the program step, the processing of the tokens initiating execution of all of the executable instructions whose execution is free of dependency upon unavailable operands; and storing new tokens generated during the program step for processing during a subsequent program step; and
- for each program step, counting and recording a number of instructions that are executed during the program step to produce a parallelism characteristic of the program.

5,412,800

SYSTEM FOR RUNNING INCOMPATIBLE GRAPHICS  
PROGRAMS

Vlad Bril, Campbell, and Paul W. T. Heller, San Jose, both of Calif., assignors to Cirrus Logic, Inc., Fremont, Calif.

Continuation of Ser. No. 994,606, Dec. 21, 1992, abandoned,

which is a continuation of Ser. No. 357,386, May 25, 1989,

abandoned. This application Oct. 8, 1993, Ser. No. 134,509

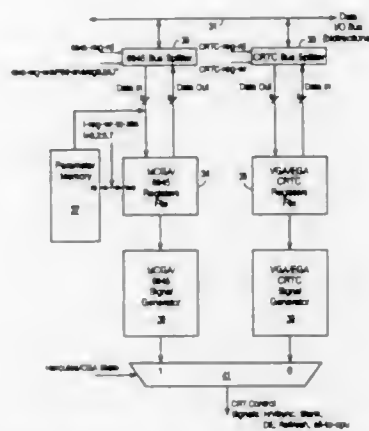
Int. Cl. G06F 9/455

U.S. Cl. 395—500

19 Claims

1. In a computer system capable of operating with a plurality of computer programs, some of which are normally compatible with an output display device connected to said computer system and others of which are normally non-compatible with said output display device, said computer system comprising an input/output bus, a display controller having a first set of registers having input and output terminals, means connecting said input terminals to said input/output bus and means selectively connecting said output terminals to said output display device, said display controller having a second set of registers having input and output terminals, means connecting said input terminals to said input/output bus and means selectively connecting said output terminals to said output display device, said first set of registers being operable to provide control signals to said output display device for said programs which are normally non-compatible with said output display device, said second set of registers being operable to provide control signals to said output display device for said programs which are normally compatible with said output display device, each of said plurality of programs providing to said first set of registers over said input/output bus a plurality of particular parameter values, a method of reconfiguring said first set of registers in order to provide compatibility between said output display device and ones of said programs normally non-compatible

necting said output terminals to said output display device, said first set of registers being operable to provide control signals to said output display device for said programs which are normally non-compatible with said output display device, said second set of registers being operable to provide control signals to said output display device for said programs which are normally compatible with said output display device, each of said plurality of programs providing to said first set of registers over said input/output bus a plurality of particular parameter values, a method of reconfiguring said first set of registers in order to provide compatibility between said output display device and ones of said programs normally non-compatible



with said output display device, said method comprising the steps of:

- using said plurality of particular parameter values from one of said plurality of programs to determine whether said one of said programs is of a type normally compatible or normally non-compatible with said output display device; and
- if said one of said programs is of a type normally non-compatible with said output display device, modifying said plurality of particular parameter values received by said first set of registers to produce modified parameter values to enable execution of said normally non-compatible programs on said output display device.

5,412,801

GAP RECOVERY FOR OFF-SITE DATA STORAGE AND  
RECOVERY SYSTEMS

James C. de Remer, Sausalito; Thomas D. Childers, Mill Valley, and James T. Flesher, San Francisco, all of Calif., assignors to E-Net, San Francisco, Calif.

Filed Jan. 17, 1990, Ser. No. 466,508

Int. Cl. G06F 12/16

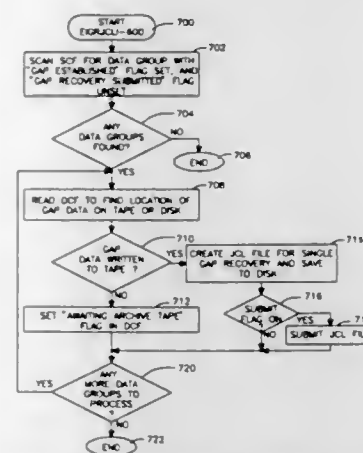
U.S. Cl. 395—575

49 Claims

1. A method of logging a complete series of journal data, which is sequentially created and is stored in a computing machine system at a central site, to a remote site, the method being characterized in that there may be a gap in the series of data, created at the central site, that is being received at the remote site, the method comprising the steps of:

- copying the journal data being stored at the central site;
- transmitting the copied journal data to the remote site;
- detecting a gap in the complete series of journal data that is in the copied journal data transmitted to the remote site; and

- identifying groups of data (data groups) in the series of journal data being transmitted at the remote site and creat-



ing an ending timestamp for each data group indicating an ending of the corresponding data group.

5,412,802

REASONING METHOD AND FAULT DIAGNOSIS  
METHOD AND SYSTEM IMPLEMENTING THE SAME

Tsumoto Fujinami, Kawasaki; Kouji Inoue, Yokohama; Hiroshi Tsuji, Itami; Keiichi Renge, Yokohama; Kenzo Moriyama, Fujisawa, and Kenji Tozuka, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Touboku Software, Ltd., Miyagi, both of Japan

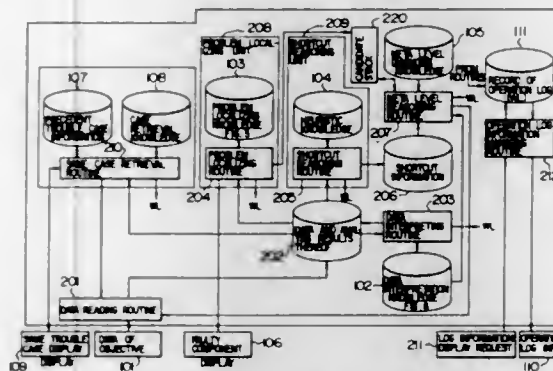
Filed May 6, 1991, Ser. No. 695,928

Claims priority, application Japan, May 11, 1990, 2-122393

Int. Cl. G01R 31/28

U.S. Cl. 395—575

2 Claims



1. A fault diagnosis method for specifically identifying a faulty component by using knowledge of fault diagnosis based on data expressing features or states of an objective under diagnosis, the method comprising the steps of:

- providing problem localizing knowledge for identifying a faulty component based on an operation principle of said objective under diagnosis, heuristic knowledge for localizing the faulty component based on available expertise, and meta-level diagnosis knowledge for determining a scheme of using said problem localizing knowledge and said heuristic knowledge; and
- executing a reasoning for the faulty component of said objective under diagnosis through a combination of a reasoning based on the use of said problem localizing knowledge and a reasoning based on the use of said heuristic knowledge in accordance with said meta-level diagnosis knowledge by localizing the faulty component by omitting intermediate steps involved in the diagnosis which are deter-

mined in accordance with said heuristic knowledge based on data obtained during the diagnosis; determining applicability of said omitting; providing a stepwise execution mode in which a diagnosis processing is interrupted every time execution of one diagnosis step has been completed; providing a one-path execution mode in which the diagnosis processing is interrupted every time one faulty component has been identified; providing an all-path execution mode in which the diagnosis processing is terminated when all faulty components have been identified; providing flags for discriminatively indicating diagnosis steps executed in said one-path execution mode and diagnosis steps executed in said all-path execution mode in association with said problem localizing knowledge; detecting a flag indicating that a given diagnosis step to be executed has previously been executed from said flags upon identifying a faulty component either in said one-path execution mode or said all-path execution mode; and, aborting execution of said given diagnosis step while regarding the result of said execution as being unsuccessful when the detecting occurs.

5,412,803

COMMUNICATIONS SYSTEM HAVING PLURALITY OF  
ORIGINATOR AND CORRESPONDING RECIPIENT  
BUFFERS WITH EACH BUFFER HAVING THREE  
DIFFERENT LOGICAL AREAS FOR TRANSMITTING  
MESSAGES IN SINGLE TRANSFER

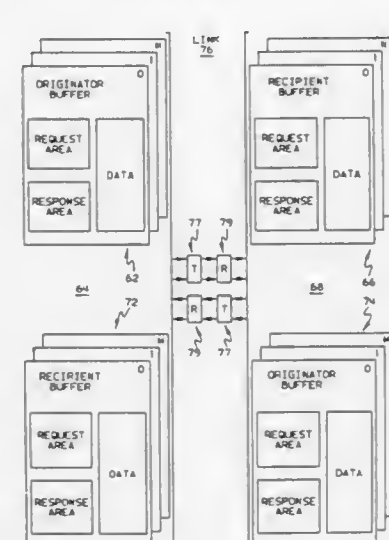
Neil G. Bartow, Saugerties; Paul J. Brown, Poughkeepsie; Robert S. Capowski, Verbank; Louis T. Fasano, Poughkeepsie; Thomas A. Gregg, Highland; Gregory Salyer, Woodstock, and Douglas W. Westcott, Rhinebeck, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 20, 1992, Ser. No. 839,652

Int. Cl. G06F 13/00

U.S. Cl. 395—575

22 Claims



5. A data processing system having at least first and second elements interconnected by high performance channels for synchronously exchanging messages with low latency between said first and second elements, each of said high performance channels supporting at least one message and comprising: an originator buffer in said first element and a dedicated recipient buffer in said second element, each of said originator buffer and said recipient buffer being composed of three logical areas designated as a request area, a response area and a data area, respectively, said first element containing a plurality of originator buffers and a plurality of recipient buffers and said second element containing a



plurality of originator buffers and a plurality of recipient buffers each of said originator buffers and said recipient buffers being hardware communications buffers, said request area for storing request messages, said response area for storing response messages and said data area for storing data, each of said three logical areas being separate from one another;

first and second transmission paths of a high performance link connecting channels;

said first element managing both a connected originator buffer and a dedicated recipient buffer and transferring only a single request message over said first transmission path without requiring a correct request signal and a correct grant signal from said originator buffer and said recipient buffer, respectively, said single request message comprising a message request from the request area of said originator buffer to the request area of said recipient buffer and, selectively transferring message data from the data area of said originator buffer to the data area of said recipient buffer; and

said second element responding by transferring only a single response message over said second transmission path, said single response message comprising a message response from said response area of said recipient buffer to said response area of said originator buffer and, selectively transferring message data from the data area of said recipient buffer to the data area of said originator buffer, wherein a message transmission is performed in a single transfer without a handshaking request signal and a handshaking grant signal and said channel supports a plurality of concurrent message operations.

5,412,804

#### EXTENDING THE SEMANTICS OF THE OUTER JOIN OPERATOR FOR UN-NESTING QUERIES TO A DATA BASE

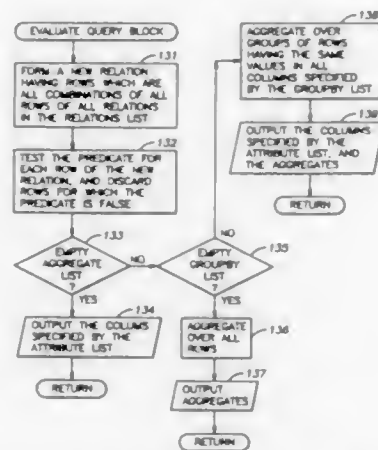
Murali M. Krishna, Colorado Springs, Colo., assignor to Oracle Corporation, Redwood City, Calif.

Filed Apr. 30, 1992, Ser. No. 876,393

Int. Cl.<sup>6</sup> G06F 15/40

U.S. Cl. 395—600

20 Claims



1. A method of operating a digital computer for un-nesting an inner query from an outer query, said inner query referencing a first relation also referenced in said outer query, said inner query including a first predicate joining said first relation to a second relation, said inner query also including a count aggregate, said outer query having a second predicate referencing said first relation and said inner query, said method comprising the steps of:

- converting said inner query to a first un-nested query by removing said first predicate and modifying said count aggregate function to count over groups of distinct values of said second relation; and
- converting said outer query to a second un-nested query

1. An apparatus for constructing a memory requirement data structure, from a data structure, in a first memory on a first computer to access information from a database on a second computer, comprising:

- means for determining values of said memory requirement data structure from said data structure on said first computer;
- means for constructing said memory requirement data structure in said first memory from said values;
- means for transmitting said memory requirement data structure to a second memory in said second computer;
- means for calculating a total memory requirement from said memory requirement data structure stored in said second memory; and
- means for determining if additional memory is needed in said second computer to reconstruct said data structure based on said total memory requirement.

5,412,806

#### CALIBRATION OF LOGICAL COST FORMULAE FOR QUERIES IN A HETEROGENEOUS DBMS USING SYNTHETIC DATABASE

Weimin Du, San Jose; Ravi Krishnamurthy, Cupertino, and Ming-Chiao Shan, Saratoga, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 20, 1992, Ser. No. 932,426

Int. Cl.<sup>6</sup> G06F 15/16, 15/403

U.S. Cl. 395—600

20 Claims

1. A database access system for optimizing database queries in a heterogeneous distributed database system, the system comprising:

receiving results of said inner query by modifying said second predicate so that said second predicate is applied to said first relation and said results for values of said first relation which are joined to said results by said first predicate and so that said second predicate is applied to said first relation and a value of zero for values of said first relation which are not joined to any of said results by said first predicate.

5,412,805

#### APPARATUS AND METHOD FOR EFFICIENTLY ALLOCATING MEMORY TO RECONSTRUCT A DATA STRUCTURE

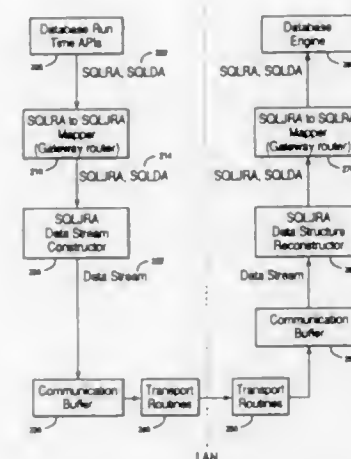
Lloyd E. Jordan, II; Shaw-Ben Shi; Martin J. Sirkin, all of Austin, and Paul E. Stephens, Cedar Park, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 3, 1992, Ser. No. 923,633

Int. Cl.<sup>6</sup> G06F 17/00

U.S. Cl. 395—600

16 Claims



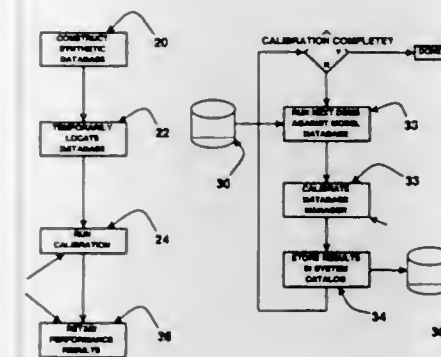
a first database machine incorporating a first relational database management system and accompanying first database;

a second database machine incorporating a relational database management system and accompanying second database;

the first and second relational database management systems being different but conforming at least to a predetermined structured query language (SQL);

communication means for electronic bidirectional communications between the different database machines;

means coupled to the communication means for sending and receiving an electronic message to and from any of the database machines, the message containing data defining a database query;



a data access logical cost model comprising logical cost formulae for optimizing queries in each database in the system;

a synthetic database for use in calibrating the data access logical cost model for each relational database management system in the distributed database system;

means for querying the synthetic data base on each database machine to determine cost coefficients for use in said logical costs formula to calibrate the data access logical cost model; and

means responsive to a database query for accessing each of the first and second databases of said first and second database machines in accordance with a least cost index obtained from said data access logical cost model.

5,412,807

#### SYSTEM AND METHOD FOR TEXT SEARCHING USING AN N-ARY SEARCH TREE

Bruce Moreland, Redmond, Wash., assignor to Microsoft Corporation, Redmond, Wash.

Filed Aug. 20, 1992, Ser. No. 932,758

Int. Cl.<sup>6</sup> G06F 15/40

U.S. Cl. 395—600

33 Claims

1. A method of searching a text file for the occurrence of user-selected portions of text that satisfy user-specified conditions, the method comprising the steps of:

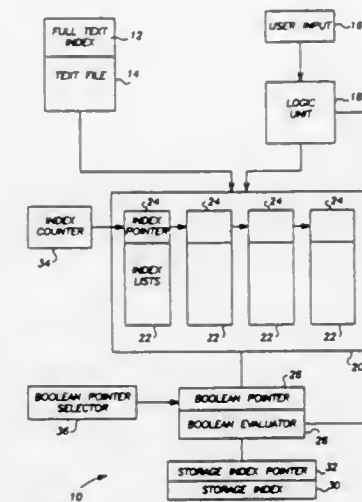
- providing a full-text index containing location information about all words in the text file;
- constructing an n-ary Boolean search tree corresponding to the user-selected text portions and a logical interrelation of the user-selected text portions required to satisfy the user-specified conditions where n is greater than two, said search tree containing a plurality of terminal nodes defining a plurality of word terms corresponding to the user-selected text portions, a plurality of non-terminal nodes each containing a logical operator term corresponding to said logical interrelation of said word terms, and a root node corresponding to portions of the text file where the user-selected text portions satisfy the user-specified conditions;
- constructing a plurality of index lists, corresponding in number to said plurality of word terms, from said full-text

index, each of said index lists associated with a corresponding word term and containing a sequential listing of all occurrences of said corresponding word term in the text file starting at a first end of the text file and the location in the text file of each occurrence of said corresponding word term;

(d) providing an index pointer for each of said plurality of index lists, each of said index pointers selecting a current occurrence in each of said plurality of index lists, said index pointers initially selecting a first location in each of said plurality of index lists;

(e) providing a Boolean pointer pointing to a selected non-terminal node on said search tree;

(f) applying said logical operator term at said selected non-terminal node to said current occurrence in each of said plurality of index lists for word terms at terminal nodes adjacent to said selected non-terminal node;



(g) generating a hit indicator when said occurrence in each of said plurality of index lists for word terms at terminal nodes adjacent to said selected non-terminal node satisfies said logical operator term at said selected non-terminal node;

(h) temporarily storing a list of locations within the text file for which the word terms at adjacent terminal nodes satisfy said logical operator term at each of said non-terminal nodes; and

(i) advancing said index pointer for one of said index lists for which said current occurrence is at the location in the text file nearest said first end if said hit indicator is not generated or if said logical operator term at said selected non-terminal node is an OR operator, and advancing said index pointer for one of said index lists for which the next sequential occurrence in the text file is at the location in the text file nearest said first end if said hit indicator is generated.

5,412,808

#### SYSTEM FOR PARSING EXTENDED FILE NAMES IN AN OPERATING SYSTEM

Eric J. Bauer, Tinton Falls, N.J., assignor to AT&T Corp., Murray Hill, N.J.

Continuation of Ser. No. 735,394, Jul. 24, 1991, abandoned. This application Mar. 10, 1993, Ser. No. 29,345

Int. Cl.<sup>6</sup> G06F 15/40

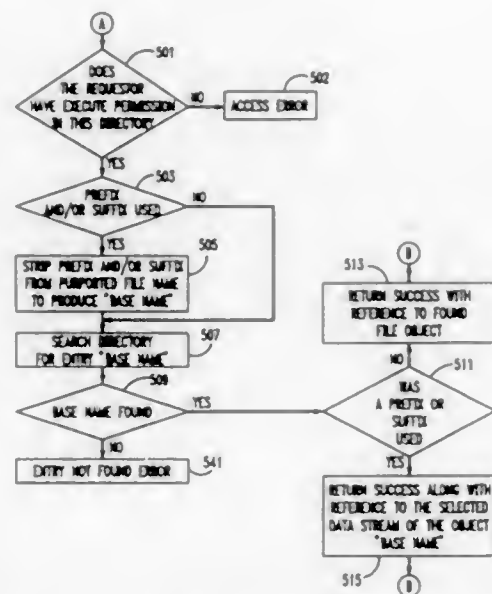
U.S. Cl. 395—600

20 Claims

1. A file system apparatus including a file system for enabling access to data or characteristics of data of previously stored files using an operating system call of said file system, said apparatus comprising

a file system for storing said files identified by a base name,

where one or more of said files includes a plurality of data streams,  
 table means including one or more stored appended segments, each appended segment being a prefix or suffix associated with one or more base names, each appended segment identifying a different data stream of said one or more stored base name files, and said one or more appended segments not identifying associated one or more base names,  
 means for receiving a file access request including one or more appended segments and a base name,



means, utilizing said table means, for parsing the file access request into a base name segment and one or more appended segments,  
 means for searching said file system using an operating system call including said base name segment to select a desired stored base name file, and  
 means for accessing a data stream associated with said desired base name file, said data stream identified using at least one of said appended segments.

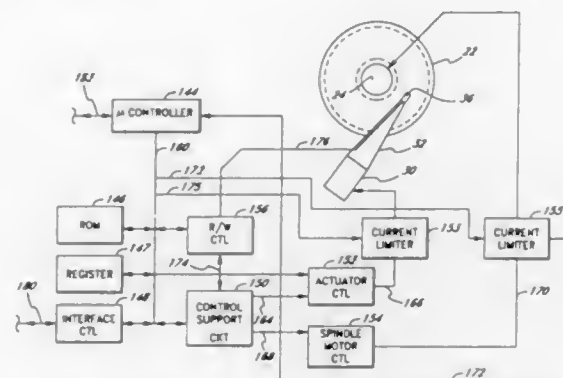
# 5,412,809 DISK DRIVE POWER CONTROL CIRCUIT AND METHOD

Karman Tam, Irvine; Erik Moe, Huntington Beach, and Hanan Kupferman, Diamond Bar, all of Calif., assignors to Mitsumi Electric Co., Ltd., Kanagawa, Japan

Filed Nov. 12, 1992, Ser. No. 975,503  
 Int. Cl.<sup>6</sup> G11B 19/28, 21/02; G06F 1/32

U.S. Cl. 395—750

11 Claims



6. A disk drive apparatus for driving a magnetic disk to read and write information therein, said disk drive apparatus having an actuator assembly for positioning a read/write head on the surface of the magnetic disk, a spindle motor for rotation of the magnetic disk, and an electronic circuit for controlling the operation of the above elements, wherein said disk drive apparatus further comprising:

- a memory for storing a set of information regarding start-up current versus frictional resistance in said spindle motor, where said start-up current is defined as a current required for said spindle motor to overcome said frictional resistance and to start rotation for reaching a predetermined rotation speed;
- a micro-controller for evaluating said frictional resistance in the current state of said spindle motor and selecting the lowest possible start-up current for said spindle motor to start rotation with reference to said information in said memory; and
- a current limiter for limiting a level of said start-up current for said spindle motor according to the instruction from said micro-controller.

## DESIGNS

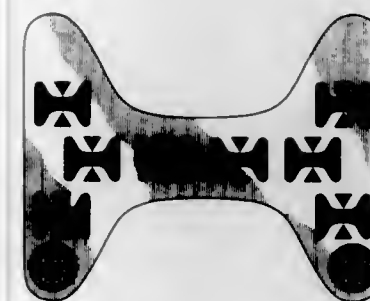
MAY 2, 1995

357,791

### SEAT BELT PROTECTOR

Nelson F. Granda, 6448 S. LaPorte St., Chicago, Ill. 60638  
 Continuation of Ser. No. 940,803, Sep. 8, 1992, abandoned. This application May 4, 1994, Ser. No. 22,375  
 Term of patent 14 years

U.S. Cl. D2—639



357,792

### CLOTH HEAD COVER

Mark Cromer, 544 Coronado St., Ventura, Calif. 93001  
 Filed Apr. 19, 1993, Ser. No. 7,154  
 Term of patent 14 years

U.S. Cl. D2—867



357,793

### BOOT

Gerald R. Loader, Slough, United Kingdom, assignor to Button Fronts (London) Limited, Slough, England  
 Filed Oct. 15, 1993, Ser. No. 14,225  
 Claims priority, application United Kingdom, Apr. 19, 1993, 2030459

Term of patent 14 years

U.S. Cl. D2—899



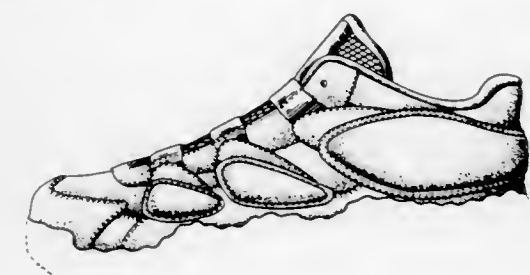
357,794

### SHOE UPPER

Eric P. Avar, Aloha, and Bradford A. Johnson, Portland, both of Oreg., assignors to Nike, Inc., Beaverton, Oreg.  
 Continuation-in-part of Ser. No. 26,156, Jul. 20, 1994. This application Aug. 31, 1994, Ser. No. 27,892

Term of patent 14 years

U.S. Cl. D2—969



357,795

### ANKLE ELEMENT

Kevin J. Crowley, Brentwood, N.H., assignor to FILA U.S.A., Inc., Hunt Valley, Md.  
 Filed Nov. 17, 1993, Ser. No. 15,434  
 Term of patent 14 years

U.S. Cl. D2—972



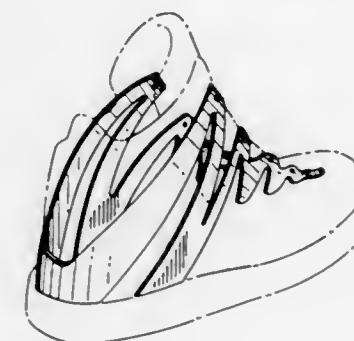
357,796

### SHOE UPPER ELEMENT

Kevin J. Crowley, II, Newbury Port, Mass., assignor to FILA U.S.A., Inc., Hunt Valley, Md.  
 Filed Nov. 19, 1993, Ser. No. 15,528

Term of patent 14 years

U.S. Cl. D2—972





357,797

## SIDE ELEMENT OF A SHOE

David Raysse, New York, N.Y., assignor to FILA U.S.A., Inc., Ludie M. Wilkerson, 1457 Oakley St., New York, N.Y. 10469  
Hunt Valley, Md.

Filed Nov. 19, 1993, Ser. No. 15,530

Term of patent 14 years

U.S. Cl. D2—972



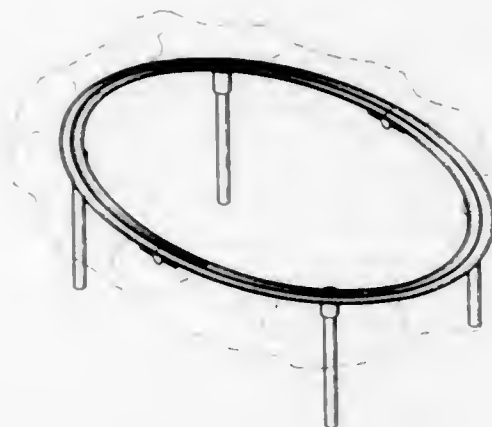
357,799

## QUILTING RING

Ludie M. Wilkerson, 1457 Oakley St., New York, N.Y. 10469  
Filed Apr. 26, 1993, Ser. No. 7,491

Term of patent 14 years

U.S. Cl. D3—26



357,798

## CRUTCH PACK

Steven M. Dietrich, 5039 N. 19th Ave., #4, Phoenix, Ariz.  
85015, and Michael A. Steingard, 8602 N. Starling La., Phoe-  
nix, Ariz. 85028

Filed Jun. 20, 1994, Ser. No. 24,670

Term of patent 14 years

U.S. Cl. D3—10



357,800

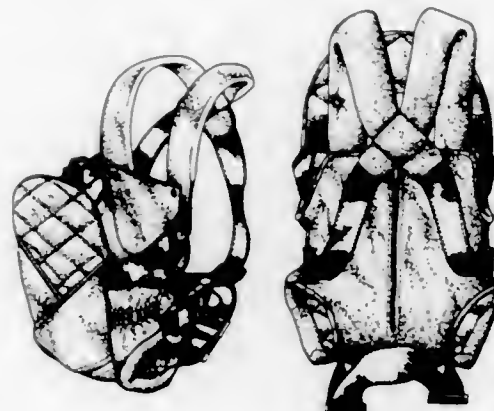
## SOFT BABY CARRIER

Tracy C. Roan, Springfield, and David J. Stroud, Spring Valley,  
both of Ohio, assignors to Lisco, Inc., Tampa, Fla.

Filed Feb. 10, 1994, Ser. No. 18,608

Term of patent 14 years

U.S. Cl. D3—214



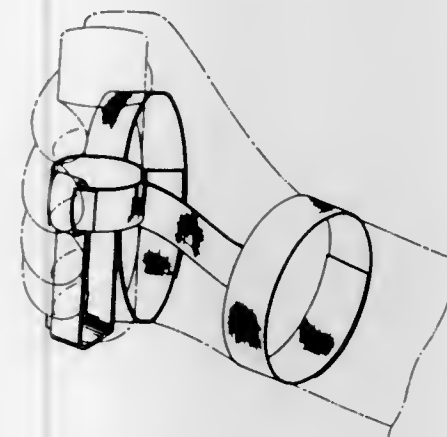
357,801

## COMBINED HAND AND WRIST ARTICLE STRAP

Daniel W. Short, Rte. 1, Box 39, Grant St., Alto, Ga. 30510  
Filed Feb. 4, 1993, Ser. No. 4,394

Term of patent 14 years

U.S. Cl. D3—215



357,802

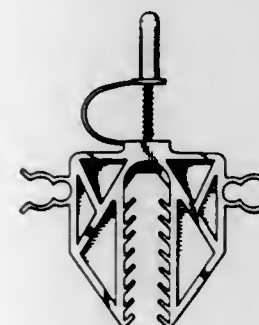
## COMBINED BOW AND ARROW HOLDER

Gary J. Todd, Marine City, and Ronald A. Dickinson, Rich-  
mond, both of Mich., assignors to Pro Release, Inc., Mt.  
Clemens, Mich.

Filed Aug. 19, 1993, Ser. No. 12,003

Term of patent 14 years

U.S. Cl. D3—262



357,803

## PACKAGE FOR A CONTACT LENS

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville,  
Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd.,  
Jacksonville, Fla. 32211, and John E. Studer, 106 Burnham  
Rd., Morris Plains, N.J. 07950

Filed Apr. 21, 1994, Ser. No. 21,644

Term of patent 14 years

U.S. Cl. D3—264



357,804

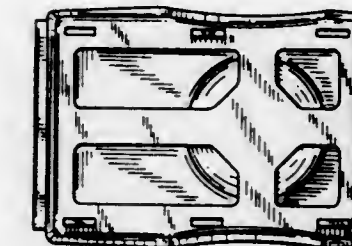
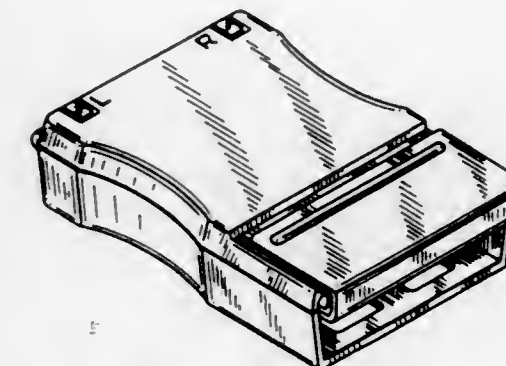
## CONTACT LENS PACKAGE

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville,  
Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd.,  
Jacksonville, Fla. 32211, and Charles R. Ashley, P.O. Box  
5325, Clinton, N.J. 08809

Filed Apr. 21, 1994, Ser. No. 21,660

Term of patent 14 years

U.S. Cl. D3—264



357,805

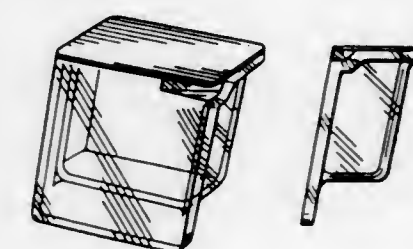
## CONTACT LENS PACKAGE

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville,  
Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd.,  
Jacksonville, Fla. 32211, and Charles R. Ashley, P.O. Box  
5325, Clinton, N.J. 08809

Filed Apr. 21, 1994, Ser. No. 21,793

Term of patent 14 years

U.S. Cl. D3—264



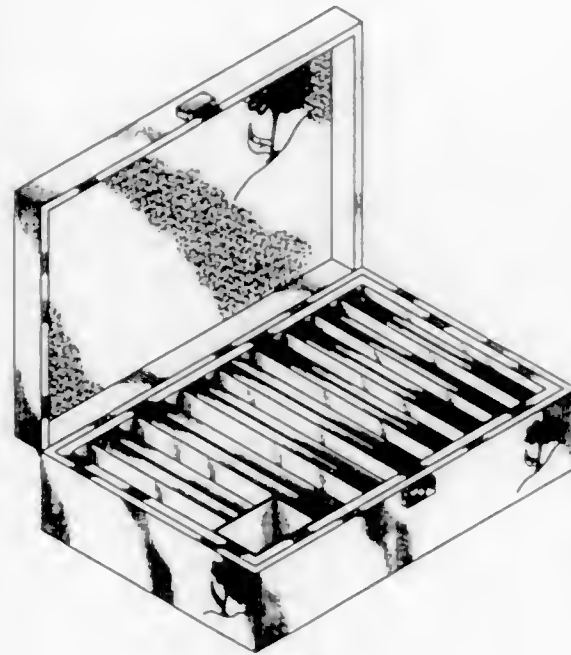
357,806

## JEWELRY BOX

Lorrie A. Murphy, 109 McKean Ct., North Wales, Pa. 19454  
Continuation of Ser. No. 948,757, Sep. 14, 1992, abandoned. This  
application May 4, 1994, Ser. No. 22,371

Term of patent 14 years

U.S. Cl. D3—273



357,808

## FRONT AND SIDE PANELS FOR A PIECE OF LUGGAGE

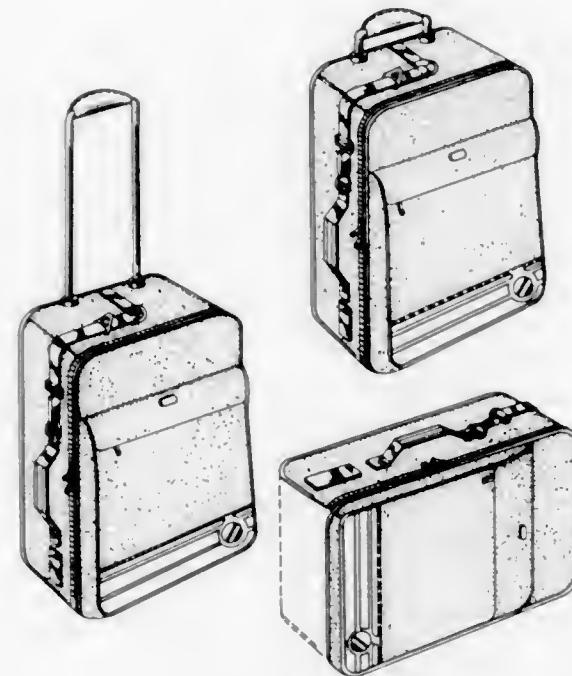
Michel Anmasson, Rueil-Malmaison, France, assignor to Delsey  
(Societe Anonyme), Bobigny, France

Filed Jun. 9, 1993, Ser. No. 9,254

Claims priority, application France, Dec. 14, 1992, 927,574

Term of patent 14 years

U.S. Cl. D3—318



357,807

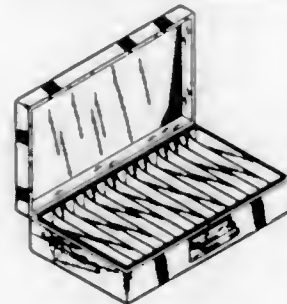
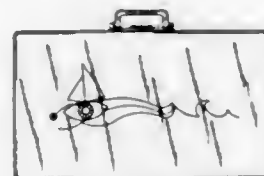
## VIDEO TAPE FIREPROOF STORAGE BOX

Kathy Meyer, 408 Third St., Fenton, Iowa 50539

Filed Sep. 14, 1993, Ser. No. 12,866

Term of patent 14 years

U.S. Cl. D3—276



357,809

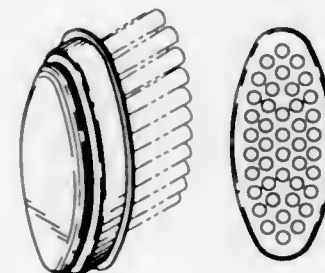
## TOOTHBRUSH HEAD INSERT

Steven R. Brown, 601 4th St., #323, San Francisco, Calif. 94107,  
and Gary J. Banik, Portland, Oreg., assignors to Steven R.  
Brown, San Francisco, Calif.

Filed Dec. 7, 1993, Ser. No. 16,088

Term of patent 14 years

U.S. Cl. D4—113



357,810

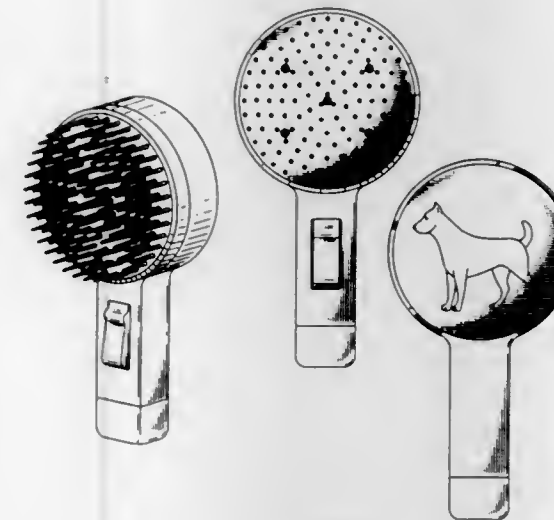
## COMBINED PET BRUSH AND CONTAINER FOR PESTICIDE

Michael L. Evans, 306 Harrill St., Madisonville, Tenn. 37354

Filed Dec. 3, 1993, Ser. No. 15,953

Term of patent 14 years

U.S. Cl. D4—114



357,812

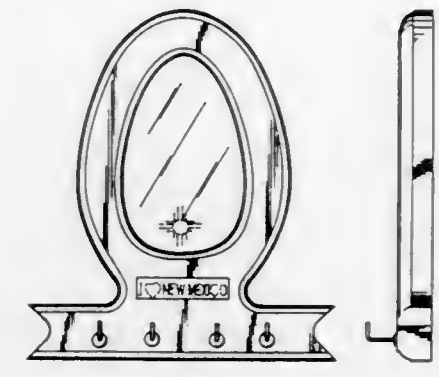
## MIRROR WITH HOOKS

Henry A. Pena, P.O. Box 687, La Madera, N. Mex. 87539

Filed Nov. 16, 1993, Ser. No. 15,429

Term of patent 14 years

U.S. Cl. D6—309



357,813

## BOOT HANGER

John J. Koresko, P.O. Box 3152, Hollywood, Calif. 90028

Filed Oct. 13, 1992, Ser. No. 408

Term of patent 14 years

U.S. Cl. D6—317



357,811

## PATTERN FOR SYNTHETIC LEATHER FOR A HANDBAG

Woo-Sang Jung, #112-501 Olympic Kijachon Apt. 89, Oryun-  
dong, Songpa-ku, Seoul, Rep. of Korea

Filed Apr. 22, 1993, Ser. No. 7,434

Claims priority, application Rep. of Korea, Feb. 27, 1993, 1993-3322

Term of patent 14 years

U.S. Cl. D5—27



357,814

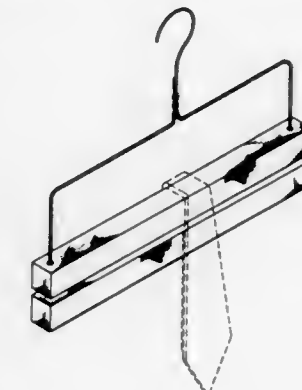
## MULTI-PURPOSE HANGER

Charles C. Vernia, 14 North Hill Dr., Floyds Knobs, Ind. 47119

Filed Dec. 13, 1993, Ser. No. 16,313

Term of patent 14 years

U.S. Cl. D6—326

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UMI



357,815  
ROCKING CHAIR

Salvador Vidal, 5005 Collins Ave., Apt. 222, Miami Beach, Fla. 33140

Filed Jul. 13, 1992, Ser. No. 913,071  
Term of patent 14 years

U.S. Cl. D6—348



357,817  
CHAIR

Scott S. Willens, San Francisco, Calif., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 25, 1994, Ser. No. 19,258  
Term of patent 14 years

U.S. Cl. D6—374



357,816  
CHAIR

Gordon Vine, East Sussex, Great Britain, assignor to Geebro Limited, Hailsham East Sussex, United Kingdom

Filed Feb. 26, 1993, Ser. No. 5,252

Claims priority, application United Kingdom, Aug. 28, 1992, 2025337

Term of patent 14 years

U.S. Cl. D6—370



357,818  
SPLIT BACK CHAIR

Darren Stoddart, Joplin, Mo.; Richard Minchey, Goodlettsville, Tenn., and Joseph E. Blazar, Joplin, Mo., assignors to Sunbeam Corporation, Fort Lauderdale, Fla.

Filed Mar. 29, 1994, Ser. No. 20,585

Term of patent 14 years

U.S. Cl. D6—376



357,819  
DUAL ROD FAN STYLE CHAIR

Andy Hill; Darren Stoddart, both of Joplin, Mo.; Richard Minchey, Goodlettsville, Tenn., and Joseph E. Blazar, Joplin, Mo., assignors to Sunbeam Corporation, Fort Lauderdale, Fla.

Filed Mar. 29, 1994, Ser. No. 20,620

Term of patent 14 years

U.S. Cl. D6—376



357,820  
CROWNED BACK CHAIR

Richard Minchey, Goodlettsville, Tenn.; Darren Stoddart, and Joseph E. Blazar, both of Joplin, Mo., assignors to Sunbeam Corporation, Fort Lauderdale, Fla.

Filed Mar. 29, 1994, Ser. No. 20,621

Term of patent 14 years

U.S. Cl. D6—376



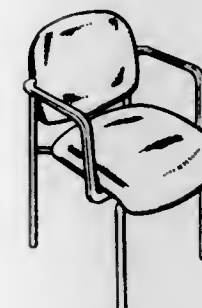
357,821  
CHAIR

Romeo Tedesco, Weston, Canada, assignor to Global Upholstery Limited, Downsview, Canada

Filed Oct. 8, 1991, Ser. No. 772,820

Term of patent 14 years

U.S. Cl. D6—379



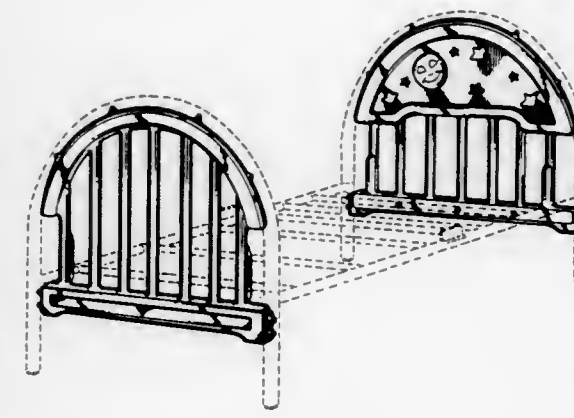
357,822  
BED

William B. Bellows, Sinking Spring, and James M. F. Hutchinson, Mohnton, both of Pa., assignors to Graco Children's Products, Inc., Elverson, Pa.

Filed Oct. 4, 1993, Ser. No. 13,817

Term of patent 14 years

U.S. Cl. D6—395



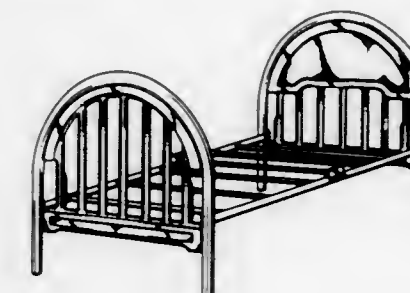
357,823  
TODDLER BED

William B. Bellows, Sinking Spring, and James M. F. Hutchinson, Mohnton, both of Pa., assignors to Graco Children's Products, Inc., Elverson, Pa.

Continuation-in-part of Ser. No. 13,817, Oct. 4, 1993. This application Oct. 7, 1993, Ser. No. 13,943

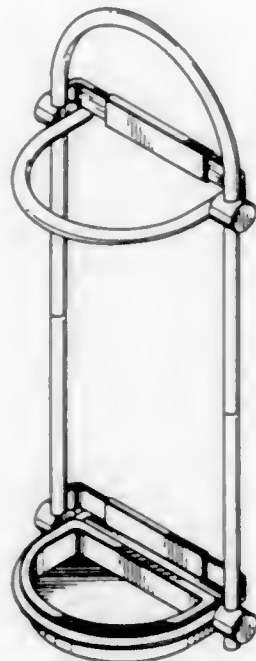
Term of patent 14 years

U.S. Cl. D6—395



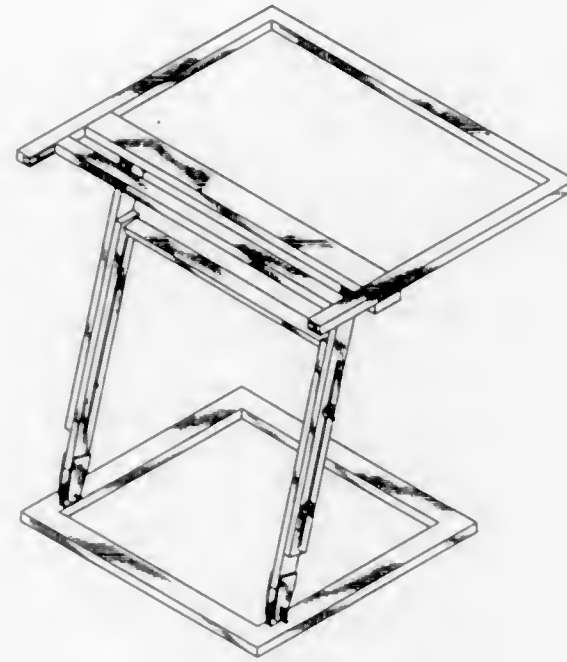
357,824  
UMBRELLA STAND

Hsien-Chang Chan, No. 9, Alley 20, Lane 158, Sec. 3, Pa-Te Rd., Taipei City, Taiwan, Prov. of China  
Filed Jan. 7, 1993, Ser. No. 3,447  
Term of patent 14 years  
U.S. Cl. D6-416



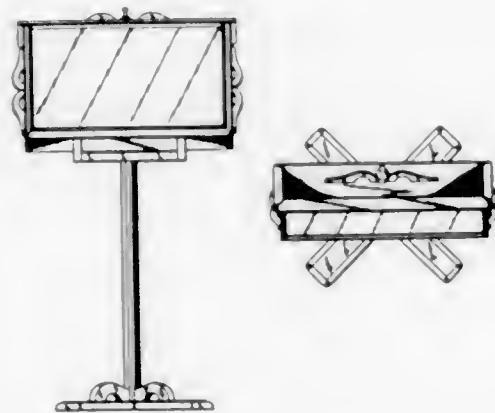
357,826  
UNIVERSAL CRAFT STAND

Larry L. Fiddament, 3140 W. George St., Banning, Calif. 92220  
Filed Feb. 25, 1992, Ser. No. 840,998  
Term of patent 14 years  
U.S. Cl. D6-429



357,825  
BIBLE STAND

Earsel W. Gillam, 5236 Algire Rd., Bellville, Ohio 44813  
Filed Jan. 11, 1993, Ser. No. 3,761  
Term of patent 14 years  
U.S. Cl. D6-419



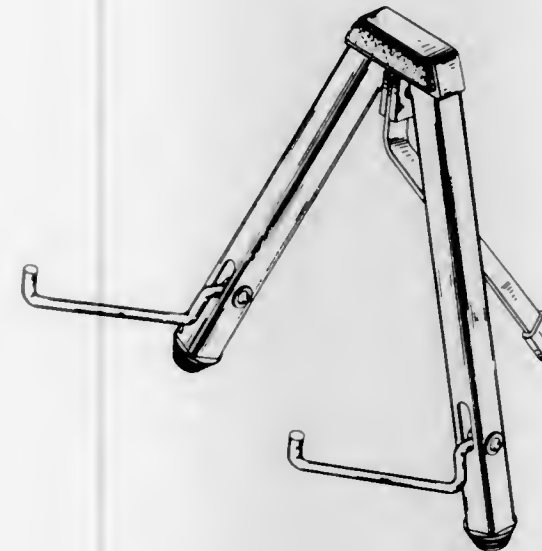
357,827  
LOG HOLDER

Robert Schultz, 261 Rte. 206, Somerville, N.J. 08876  
Filed Oct. 19, 1993, Ser. No. 14,292  
Term of patent 14 years  
U.S. Cl. D6-462



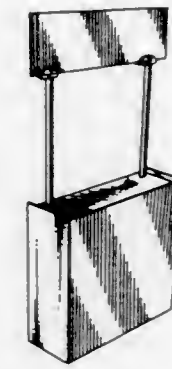
357,828  
COLLAPSIBLE GUITAR STAND

Tsun-Chi Liao, Taichung, Taiwan, Prov. of China, assignor to Hwa Shin Musical Instrument Co., Ltd., Taichung, Taiwan, Prov. of China  
Filed May 10, 1993, Ser. No. 8,089  
Term of patent 14 years  
U.S. Cl. D6-466



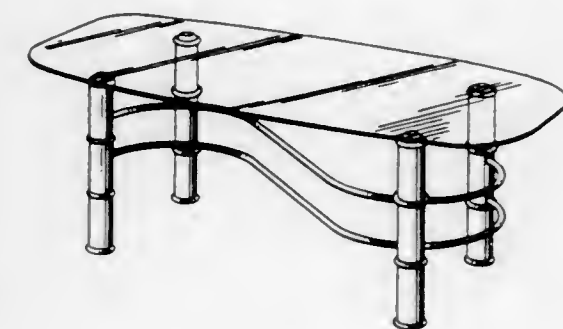
357,830  
CORRUGATED PAPER BOOTH

Martin H. Englander; Louis W. Englander, Jr., and Darrell G. Forson, all of Waco, Tex., assignors to Englander Container Company, Waco, Tex.  
Filed Dec. 1, 1993, Ser. No. 15,884  
Term of patent 14 years  
U.S. Cl. D6-481



357,831  
COFFEE TABLE

John Yeh, 660 S. Aberdeen, Anaheim Hills, Calif. 92807  
Filed Jan. 24, 1994, Ser. No. 17,809  
Term of patent 14 years  
U.S. Cl. D6-487



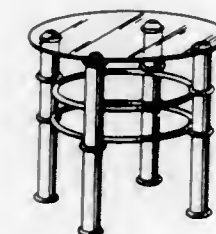
357,829  
WALL INSERT FOR GOLF CLUBS AND GOLF BAG STORAGE

Nicholas J. Lanza, 28-15 Rutgers Ter., Fair Lawn, N.J. 07410  
Filed Aug. 18, 1992, Ser. No. 932,033  
Term of patent 14 years  
U.S. Cl. D6-477



357,832  
END TABLE

John Yeh, 660 S. Aberdeen, Anaheim Hills, Calif. 92807  
Filed Jan. 24, 1994, Ser. No. 17,808  
Term of patent 14 years  
U.S. Cl. D6-488





357,833

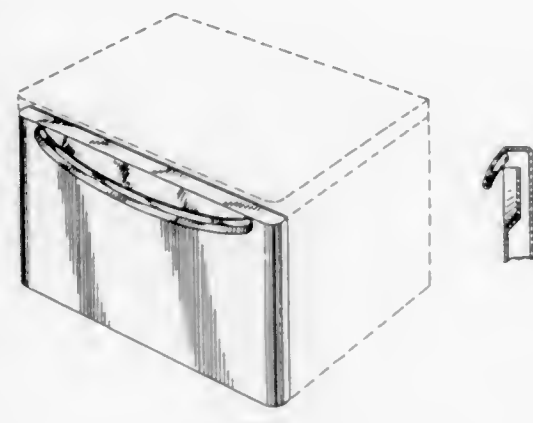
## CABINET PANEL AND HANDLE

Thomas J. Newhouse, Grand Rapids, Mich., assignor to Meridian, Inc., Spring Lake, Mich.

Filed Jun. 18, 1992, Ser. No. 900,958

Term of patent 14 years

U.S. Cl. D6-494



357,835

## PANEL FOR CABINETRY

John B. Brandon, Attica, N.Y., assignor to Harrow Products Inc., Grand Rapids, Mich.

Filed Sep. 17, 1993, Ser. No. 13,076

Term of patent 14 years

U.S. Cl. D6-509



357,834

## HEADREST

Carl G. Nordstrom, Lake Oswego, and Shawn R. Irwin, Newberg, both of Oreg., assignors to A-Dec, Inc., Newberg, Oreg.

Continuation of Ser. No. 929,116, Aug. 13, 1992, abandoned.

This application Jun. 10, 1993, Ser. No. 9,394

Term of patent 14 years

U.S. Cl. D6-501



357,836

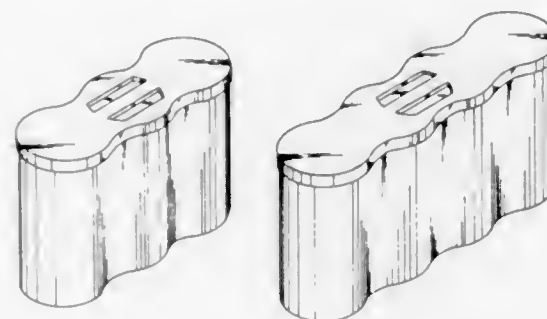
## BATHROOM TISSUE HOLDER

Vickie M. Traver, 6501 Red Hook Plaza, Suite 201, St. Thomas, Virgin Islands (U.S.) 00802-1306

Filed Jan. 12, 1994, Ser. No. 17,553

Term of patent 14 years

U.S. Cl. D6-520



357,837

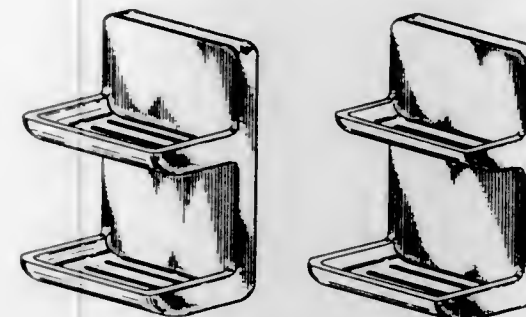
## TWO TIER SOAP HOLDER

Arthur R. Kea, 867 Lovers Ln., Akron, Ohio 44306

Division of Ser. No. 892,505, Jun. 1, 1992, Pat. No. Des. 347,957. This application Apr. 15, 1994, Ser. No. 21,405

Term of patent 14 years

U.S. Cl. D6-540



357,840

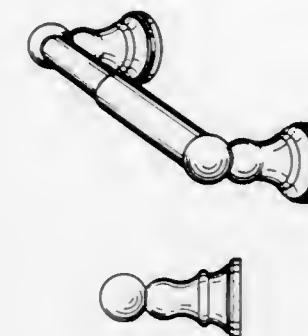
## TOWEL BAR

John S. Lehn, Reading; Leslie A. Meck, Blandon, and Julie A. Pirsch, Wayne, all of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.

Filed Oct. 20, 1993, Ser. No. 14,377

Term of patent 14 years

U.S. Cl. D6-549



357,838

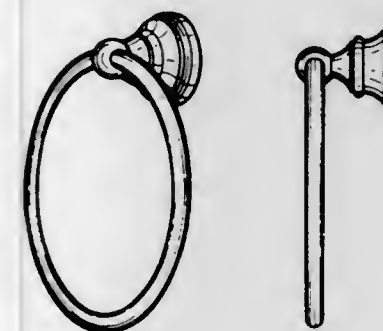
## RING TOWEL HOLDER

John S. Lehn, Reading; Leslie A. Meck, Blandon, and Julie A. Pirsch, Wayne, all of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.

Filed Oct. 20, 1993, Ser. No. 14,376

Term of patent 14 years

U.S. Cl. D6-546



357,841

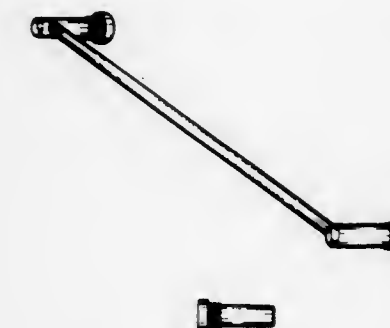
## TOWEL BAR

John S. Lehn, Reading; Leslie A. Meck, Blandon, and Julie A. Pirsch, Wayne, all of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.

Filed Oct. 20, 1993, Ser. No. 14,378

Term of patent 14 years

U.S. Cl. D6-549



357,839

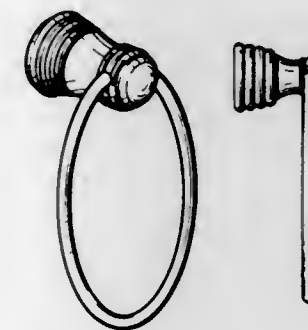
## TOWEL RING

John S. Lehn, Reading; Leslie A. Meck, Blandon, and Julie A. Pirsch, Wayne, all of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.

Filed Oct. 20, 1993, Ser. No. 14,383

Term of patent 14 years

U.S. Cl. D6-546



357,842

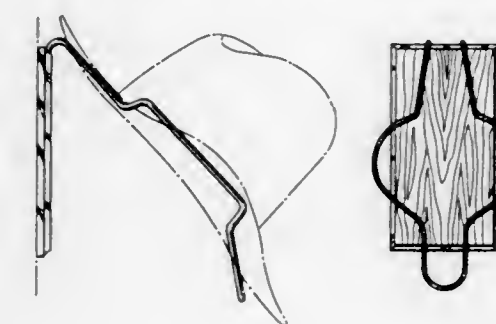
## BLOCKING HAT RACK

Kenneth O. Cohrs, 4432 Bramble Ln., Colorado Springs, Colo. 80925

Filed Apr. 6, 1992, Ser. No. 864,029

Term of patent 14 years

U.S. Cl. D6-566



357,843

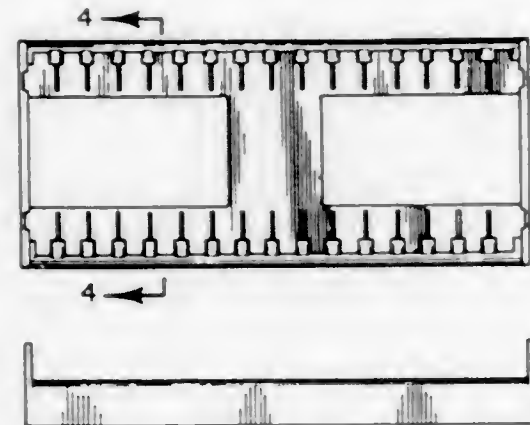
## CD AND AUDIO CASSETTE SHELF

Frank Real, and Francisco Real, both of 9950 Marconi Dr.,  
#106, Otay Mesa, Calif. 92173

Filed Sep. 27, 1993, Ser. No. 13,490

Term of patent 14 years

U.S. Cl. D6—629



357,845

## TEMPERATURE KEEPING BAG FOR BOTTLES

Steve J. Hertzzenberg, 21 Katznelson St., Ramat Ha'Sharon,  
Israel

Filed Mar. 10, 1993, Ser. No. 5,743

Term of patent 14 years

U.S. Cl. D7—607



357,844

## CONTAINER FOR DISKETTE

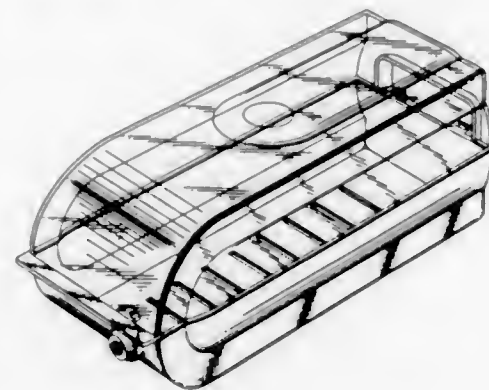
Patrick T. Ho, Kwai Chung, Hong Kong, assignor to STD Elec-  
tronic International Ltd., Hong Kong, Hong Kong

Filed Feb. 22, 1993, Ser. No. 5,084

Claims priority, application United Kingdom, Aug. 24, 1992,  
2025209

Term of patent 14 years

U.S. Cl. D6—634



357,846

## TOASTER TONG

Patrick J. McNaughton, Minneapolis, Minn., assignor to Mc-  
Naughton Incorporated, Minneapolis, Minn.

Filed Mar. 4, 1994, Ser. No. 19,563

Term of patent 14 years

U.S. Cl. D7—686



357,847

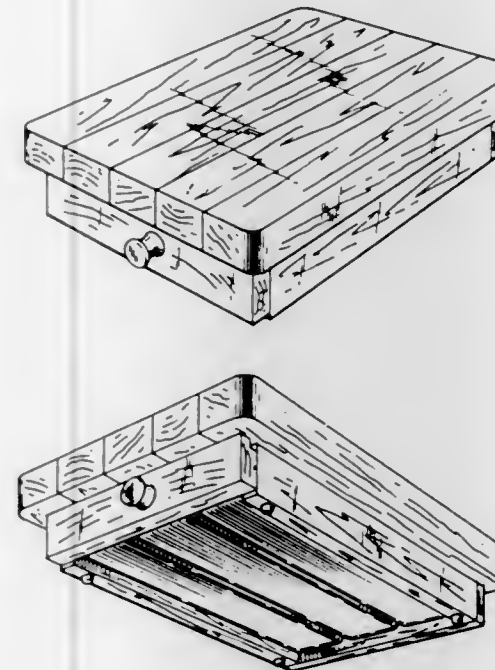
## CUTTING BOARD AND STORAGE UNIT

Harry W. Hoffman, Sheboygan, Wis., assignor to Bemis Manu-  
facturing Company, Sheboygan Falls, Wis.

Filed Feb. 19, 1993, Ser. No. 5,222

Term of patent 14 years

U.S. Cl. D7—698



357,849

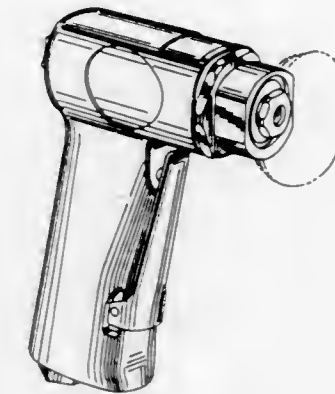
## MINIATURE SANDER WITH THROTTLE

Nobuyuki Izumisawa, Tokyo, Japan, assignor to Shinano, Inc.,  
Saitama, Japan

Filed Mar. 28, 1994, Ser. No. 20,523

Term of patent 14 years

U.S. Cl. D8—62



357,850

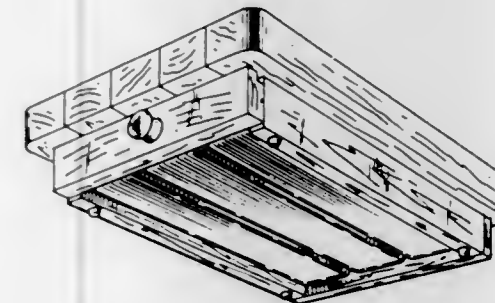
## IMPLEMENT HEAD FOR SUPPORTING SANDPAPER

David C. Walsh, 200 Custom Pl., Bogart, Ga. 30622

Filed Dec. 2, 1992, Ser. No. 2,106

Term of patent 14 years

U.S. Cl. D8—90



357,848

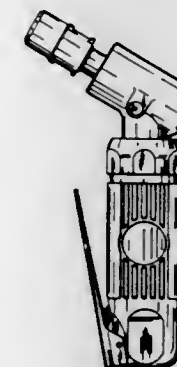
## ANGLE HEAD DIE GRINDER

Osamu Izumisawa, Tokyo, Japan, assignor to Shinano Pneu-  
matic Industries, Inc., Japan

Filed Feb. 10, 1994, Ser. No. 18,621

Term of patent 14 years

U.S. Cl. D8—62



357,851

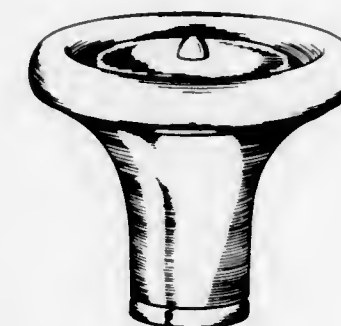
## CABINET KNOB

Robert A. Off, Escondido, Calif., assignor to Transfer Flow  
International, Inc., Chico, Calif.

Filed Aug. 16, 1993, Ser. No. 11,851

Term of patent 14 years

U.S. Cl. D8—310



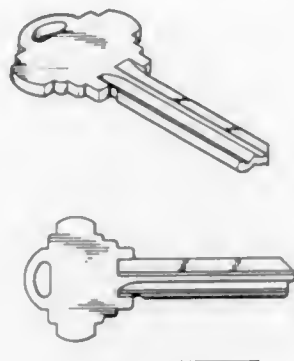


357,852  
KEY

Chao C. Shen, No. 62, Hoshan St., Tainan, Taiwan, Prov. of China

Filed Jul. 13, 1994, Ser. No. 25,845  
Term of patent 14 years

U.S. Cl. D8—347



357,853

SUPPORT GRILL FOR A CURTAIN VALANCE

Howard S. Howard, 30-60 Whitestone Expressway, Flushing, N.Y. 11354

Filed Jun. 9, 1993, Ser. No. 9,255  
Term of patent 14 years

U.S. Cl. D8—377



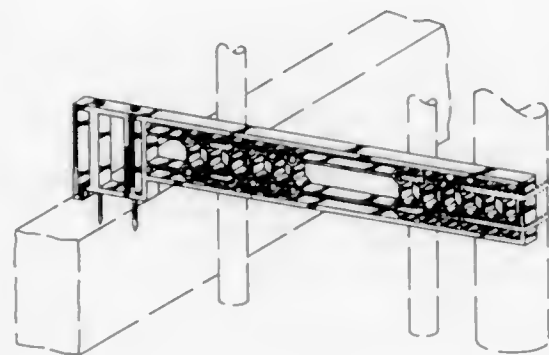
357,854

CONCRETE CONSTRUCTION JIG FOR HOLDING PLUMBING

Michael W. Payne, 2741 Meadow Dr., Slaughter, La. 70777

Filed Dec. 13, 1993, Ser. No. 16,264  
Term of patent 14 years

U.S. Cl. D8—380



357,855

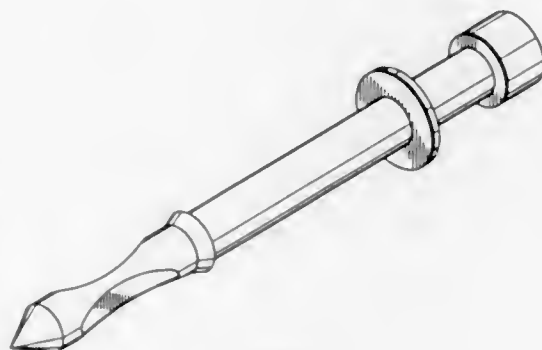
INSULATING WALL TIE FOR CONCRETE SANDWICH WALLS

David O. Keith, and David M. Hansen, both of American Fork, Utah, assignors to H. K. Composites, Inc., Orem, Utah

Filed Aug. 17, 1993, Ser. No. 11,867

Term of patent 14 years

U.S. Cl. D8—384



357,856

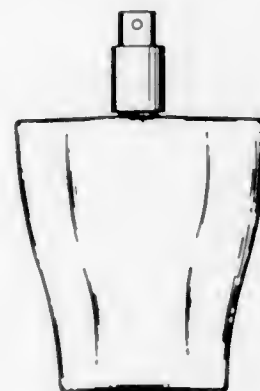
COMBINED PUMP DISPENSER AND CAP

Aoshi Kudo, Tokyo, Japan, and Marc Newson, Paris, France, assignors to Shiseido Company, Ltd., Tokyo, Japan

Filed Feb. 26, 1993, Ser. No. 5,195

Claims priority, application Japan, Sep. 9, 1992, 4-26453  
Term of patent 14 years

U.S. Cl. D9—300

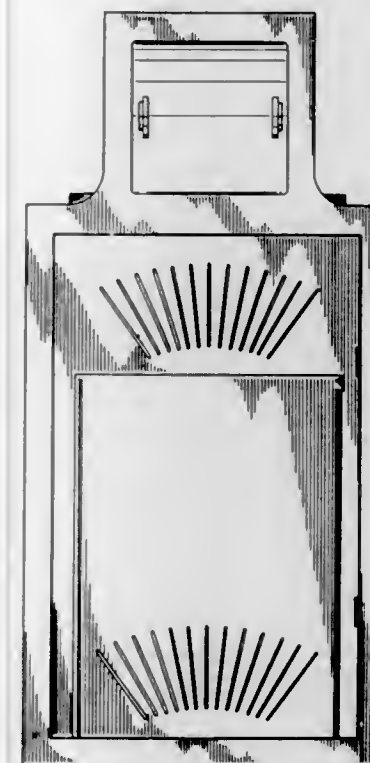
357,857  
DISPENSER

Stephan Weiss, 211 E. 70th St., New York, N.Y. 10021

Filed Aug. 27, 1993, Ser. No. 12,234

Term of patent 14 years

U.S. Cl. D9—300



357,859

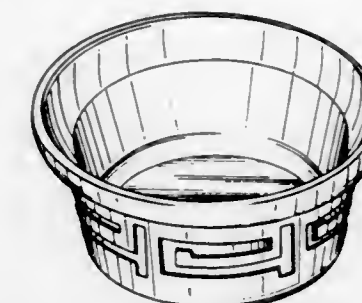
CONTAINER

Marissa A. Klapwald, Caledonia, Wis., assignor to S. C. Johnson &amp; Son, Inc., Racine, Wis.

Filed Jan. 21, 1994, Ser. No. 17,727

Term of patent 14 years

U.S. Cl. D9—429



357,860

PACKING BOX

Kwang-Bong Lee, Seoul, Rep. of Korea, assignor to Lotte Confectionery Co., Ltd., Seoul, Rep. of Korea

Filed Jan. 13, 1993, Ser. No. 3,672

Term of patent 14 years

U.S. Cl. D9—432



357,861

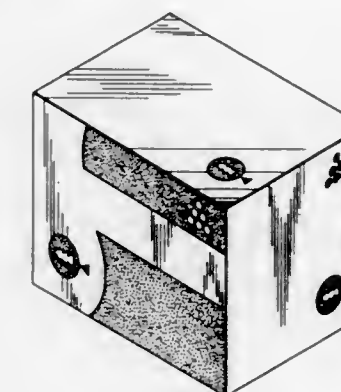
CONTAINER

Shuzo Sawa, Yumiko Saimen, and Yasuhiko Nanba, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 22, 1994, Ser. No. 21,697

Claims priority, application Japan, Sep. 22, 1993, 5-28668  
Term of patent 14 years

U.S. Cl. D9—432



357,858

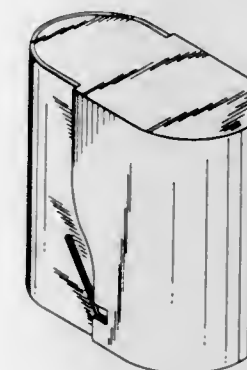
WATCH BOX

Jerome N. Dikowitz, Plainview, N.Y., assignor to E. Gluck Corporation, Long Island City, N.Y.

Filed Feb. 2, 1994, Ser. No. 18,193

Term of patent 14 years

U.S. Cl. D9—422



357,862  
HANDLE

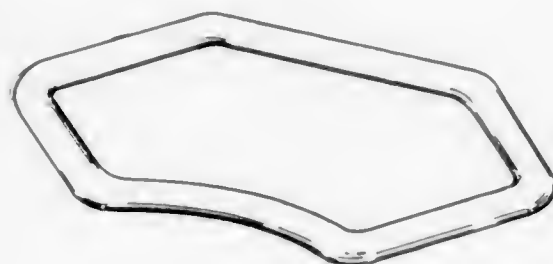
Lena L. Lorentzen, Enskede, and Goran Sundin, Rimbo, both of Sweden, assignors to Curt Landin Production AB, Johanne-shov, Sweden

Filed Mar. 26, 1993, Ser. No. 6,390

Claims priority, application Sweden, Sep. 30, 1992, 92-1989

Term of patent 14 years

U.S. Cl. D9—434



357,864

BEVERAGE BOTTLE

Kevin R. Rusnock, Broomfield, and Barbara E. Lee, Golden, both of Colo., assignors to Coors Brewing Company, Golden, Colo.

Continuation-in-part of Ser. No. 490,964, Mar. 9, 1990, Pat. No. Des. 330,334. This application Oct. 16, 1992, Ser. No. 507

The portion of the term of this patent subsequent to Oct. 20, 2006, has been disclaimed.

Term of patent 14 years

U.S. Cl. D9—500



357,865

COMBINED BOTTLE AND CAP

Elizabeth A. Hansen, Cary, N.C., assignor to Bristol-Myers Squibb Company, New York, N.Y.

Filed Jan. 18, 1994, Ser. No. 17,574

Term of patent 14 years

U.S. Cl. D9—503



357,863

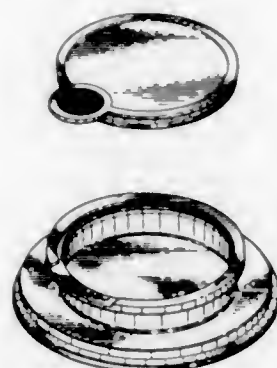
SEAL WITH CAPPED CONTAINER

Augusto A. Picozza, Orlando, Fla., assignor to Dart Industries Inc., Deerfield, Ill.

Filed Mar. 31, 1993, Ser. No. 6,510

Term of patent 14 years

U.S. Cl. D9—436



357,866

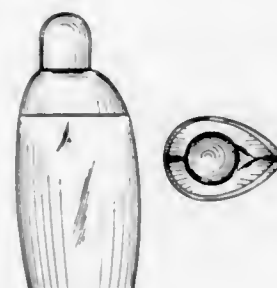
FRAGRANCE BOTTLE WITH COVER

Annegret Beier-Rosetti, Paris, France, assignor to L'Oreal S.A., France

Filed Feb. 16, 1994, Ser. No. 18,806

Term of patent 14 years

U.S. Cl. D9—523



357,867

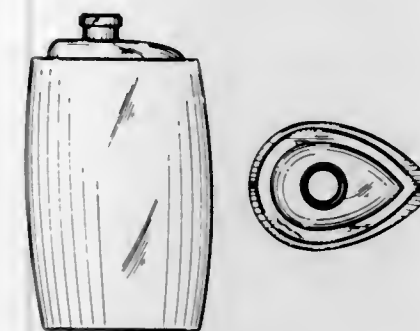
FRAGRANCE BOTTLE

Annegret Beier-Rosetti, Paris, France, assignor to L'Oreal S.A., France

Filed Feb. 16, 1994, Ser. No. 18,807

Term of patent 14 years

U.S. Cl. D9—523



357,868

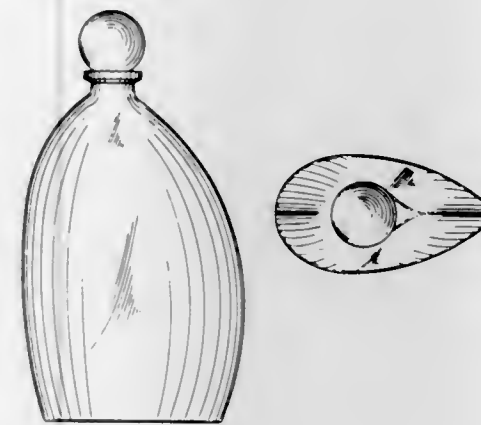
FRAGRANCE BOTTLE

Annegret Beier-Rosetti, Paris, France, assignor to L'Oreal S.A., France

Filed Feb. 16, 1994, Ser. No. 18,809

Term of patent 14 years

U.S. Cl. D9—523



357,869

COSMETIC CONTAINER

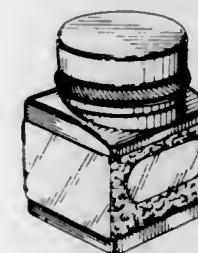
Sim Sangbok, Seoul, Rep. of Korea, assignor to Pacific Chemical Co., Ltd., Seoul, Rep. of Korea

Division of Ser. No. 933,511, Aug. 24, 1992. This application

Aug. 22, 1994, Ser. No. 27,419

Term of patent 14 years

U.S. Cl. D9—564



357,870

COMBINED BOTTLE AND CLOSURE

Kilian J. O'Neill, Egham; Rutland P. G. Rutgers, and Michael E. Butler, both of London, all of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 7, 1994, Ser. No. 17,293

Claims priority, application United Kingdom, Jul. 8, 1993, 2032253

Term of patent 14 years

U.S. Cl. D9—565



357,871

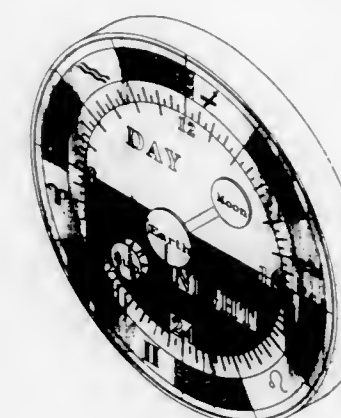
SPACE TIME CLOCK

Marco Biancardi, P.O. Box 980, Makawao, Maui, Hi. 96768

Filed Sep. 7, 1993, Ser. No. 12,622

Term of patent 14 years

U.S. Cl. D10—22





357,872  
CLOCK

Asao Takashima, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Feb. 16, 1993, Ser. No. 4,928  
Term of patent 14 years

U.S. Cl. D10—28



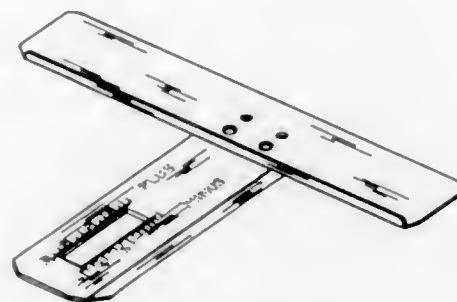
357,875

SAWING GUIDE

Charles Becker, 889 Horan Dr., Fenton, Mo. 63026  
Filed Dec. 21, 1993, Ser. No. 16,689

Term of patent 14 years

U.S. Cl. D10—65



357,873

WATCH WITH PERPETUAL HEBRAIC CALENDAR  
Alain Silberstein, 13, quai de Strasbourg, 25000 Besancon, FranceFiled Sep. 30, 1993, Ser. No. 13,696  
Term of patent 14 years

U.S. Cl. D10—31



357,876

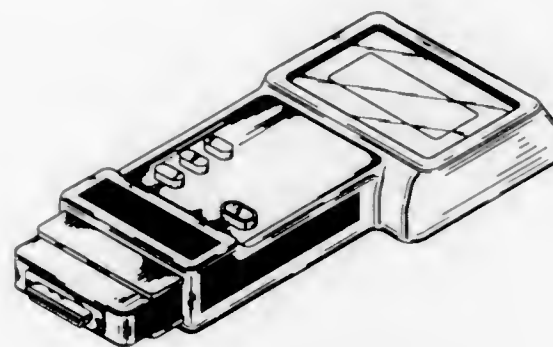
DIAGNOSTIC TESTER

Patrick N. McConnell, Goshen, Ind., assignor to The Dometic Corporation, Lagrange, Ind.

Filed Jun. 10, 1993, Ser. No. 9,364

Term of patent 14 years

U.S. Cl. D10—78



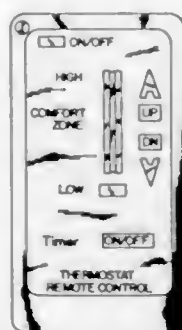
357,874

TIMER MECHANISM FOR A REMOTELY CONTROLLED THERMOSTAT SYSTEM

Jeffrey J. Touhey, 905 S.E. 96th Ave., Vancouver, Wash. 98664  
Filed Jan. 18, 1994, Ser. No. 17,545

Term of patent 14 years

U.S. Cl. D10—40



357,877

MILK FLOW METER

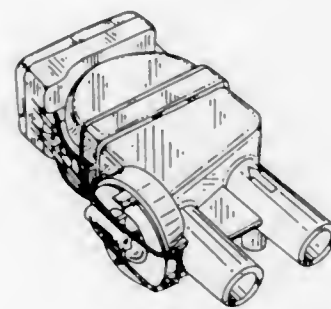
Leif B. Johannesson, Tumba, and Per A. Fagerström, Hägersten, both of Sweden, assignors to Alfa Laval Agri AB, Tumba, Sweden

Filed Nov. 24, 1993, Ser. No. 15,706

Claims priority, application Sweden, May 27, 1993, 93-1261

Term of patent 14 years

U.S. Cl. D10—96



357,878

SPEEDOMETER SENSOR FOR A BICYCLE

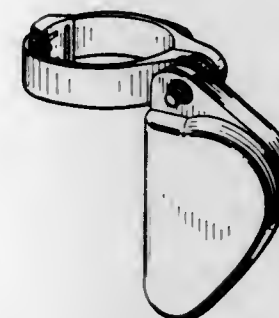
Masao Tsushi, Sakai, Japan, assignor to Cateye Co., Ltd., Osaka, Japan

Filed Feb. 24, 1994, Ser. No. 19,161

Claims priority, application Japan, Aug. 31, 1993, 5-26562

Term of patent 14 years

U.S. Cl. D10—98



357,879

SPEEDOMETER FOR A BICYCLE

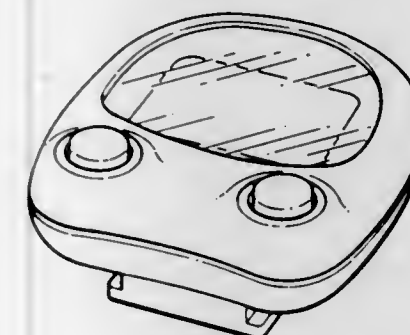
Takashi Ueda, Izumi, Japan, assignor to Cateye Co., Ltd., Osaka, Japan

Filed Feb. 22, 1994, Ser. No. 19,165

Claims priority, application Japan, Aug. 31, 1993, 5-26561

Term of patent 14 years

U.S. Cl. D10—98



357,880

SPEEDOMETER FOR BICYCLE

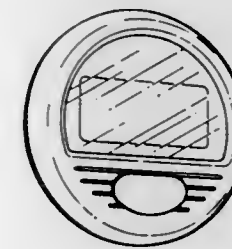
Takashi Ueda, Izumi, Japan, assignor to Cateye Co., Ltd., Osaka, Japan

Filed Apr. 26, 1994, Ser. No. 21,981

Claims priority, application Japan, Nov. 10, 1993, 5-34090

Term of patent 14 years

U.S. Cl. D10—98



357,881

PORTABLE RAILROAD CROSSING SIGNAL

Bruce E. Chinn, Jefferson City, Mo., and Garry W. Viebrock, 948 Windsor, Jefferson City, Mo. 65109, assignors to Garry W. Viebrock, Jefferson City, Mo.

Filed Aug. 16, 1993, Ser. No. 11,782

Term of patent 14 years

U.S. Cl. D10—114



357,882

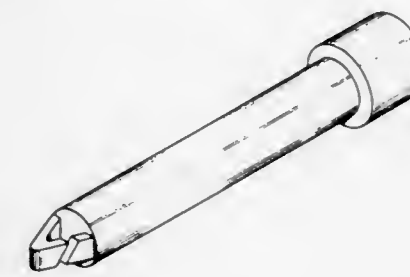
CHEMILUMINESCENT LIGHT STICK

Gregg W. Nevarez, 5427 Quail Ridge Dr., Camarillo, Calif. 93012, and Anthony Wilson, 650 Picacho La., Santa Barbara, Calif. 93108

Filed Mar. 16, 1994, Ser. No. 20,167

Term of patent 14 years

U.S. Cl. D10—114



357,883

## CLOCK HAND

Kenneth W. Krauss, 19308 NE. 25 Ave. #193, Aventura, Fla. 33180

Filed Mar. 8, 1994, Ser. No. 19,642

Term of patent 14 years

U.S. Cl. D10—127



357,884

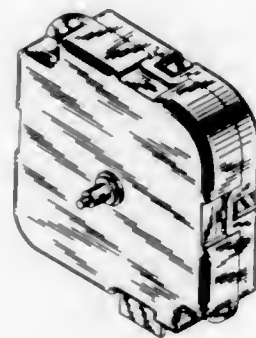
## CLOCK MOVEMENT

Takumi Matsuda, and Shigeru Kohata, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Japan

Filed Aug. 10, 1992, Ser. No. 927,944

Term of patent 14 years

U.S. Cl. D10—129



357,885

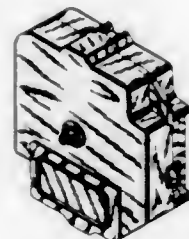
## CLOCK MOVEMENT

Takumi Matsuda, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Feb. 1, 1993, Ser. No. 4,314

Term of patent 14 years

U.S. Cl. D10—129



357,886

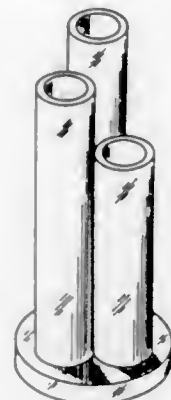
## TRANSPARENT MULTIPLE TUBULAR FLOWER BUD VASE

Walter D. Fuller, 6421 NE. 18th Ave., Ft. Lauderdale, Fla. 33334

Filed Feb. 19, 1993, Ser. No. 5,031

Term of patent 14 years

U.S. Cl. D11—152



357,887

## SPORTS CAR BODY

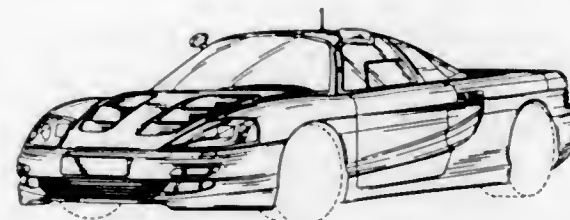
Bruno Sacco, and Josef Gallitzendörfer, both of Sindelfingen, Germany, assignors to Mercedes Benz AG, Stuttgart, Germany

Filed Mar. 6, 1992, Ser. No. 846,424

Claims priority, application Germany, Sep. 6, 1991, M 91 06 370.1

Term of patent 14 years

U.S. Cl. D12—92



357,888

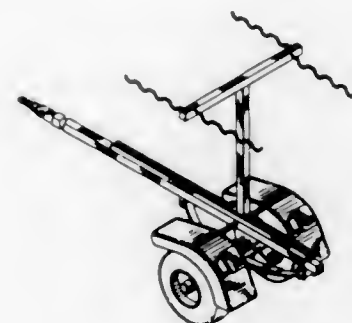
## NARROW WHEEL TRACK UTILITY TRAILER

Stan G. Geddes, 84 Gateway Drive SW., Calgary, Alberta T3E 4J9, Canada

Filed Feb. 3, 1993, Ser. No. 4,364

Term of patent 14 years

U.S. Cl. D12—101



357,889

## INCLINE BICYCLE

Eric Jones, 130 Corey La., Ortonville, Mich. 48462

Filed Feb. 15, 1994, Ser. No. 18,763

Term of patent 14 years

U.S. Cl. D12—111



357,890

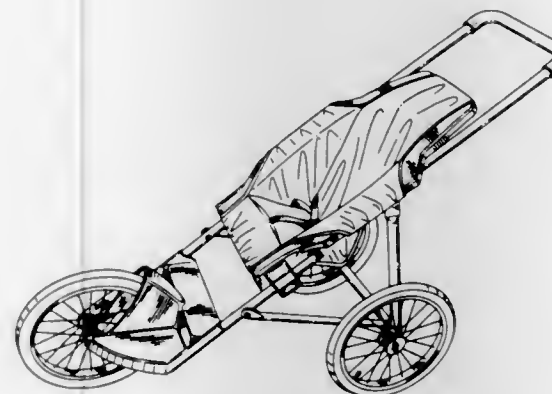
## INFANT STROLLER

David Eyman, Cincinnati, Ohio, and Thomas J. Schmidlin, Newport, Ky., assignors to TRI Industries, Inc., Bloomington, Minn.

Filed Jul. 6, 1994, Ser. No. 25,595

Term of patent 14 years

U.S. Cl. D12—129



357,891

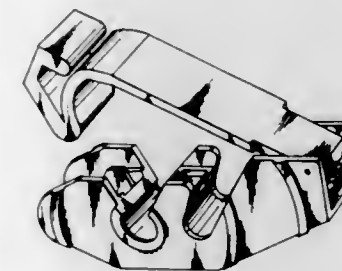
## VEHICLE WINDSHIELD WIPER UNIT CONNECTOR

Albert Lee, 232 Margate Rd., Timonium, Md. 21093

Filed Apr. 30, 1993, Ser. No. 7,702

Term of patent 14 years

U.S. Cl. D12—220



357,892

## ONE-PERSON WATERCRAFT HULL

Chad M. Rolland, Warren, and Robert J. Rauch, Thief River Falls, both of Minn., assignors to Arctco, Inc., Thief River Falls, Minn.

Filed Nov. 30, 1993, Ser. No. 15,831

Term of patent 14 years

U.S. Cl. D12—314



357,893

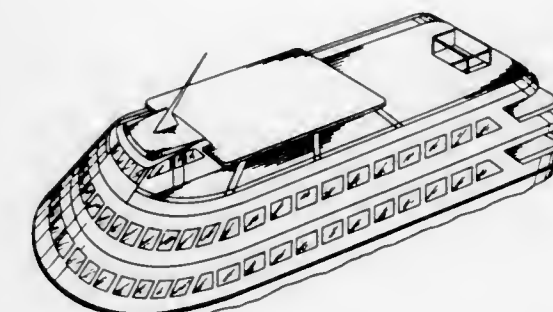
## TOP SIDES AND SUPERSTRUCTURE PORTION OF A BOAT

Luther H. Blount, One Shipyard La., Warren, R.I. 02885

Filed Dec. 27, 1988, Ser. No. 292,627

Term of patent 14 years

U.S. Cl. D12—315



357,894

## HELICOPTER

George E. Arnold; Dennis E. Gregory, both of Bedford; Robert G. Anderson, Saginaw, and Alan W. Myers, Burleson, all of Tex., assignors to Bell Helicopter Textron Inc., Fort Worth, Tex.

Filed Sep. 20, 1993, Ser. No. 13,174

Term of patent 14 years

U.S. Cl. D12—327





357,895

SET OF SIDE STORAGE COMPARTMENTS FOR AN  
AUTOMOTIVE VAN  
LeRoy H. McCusker, 922 W. Mill St., Cannon Falls, Minn.  
55009

Filed Oct. 7, 1993, Ser. No. 13,963  
Term of patent 14 years

U.S. Cl. D12—423



357,898

ACCESSORY CONNECTOR

Scott H. Richards, Plantation; Donald W. Burnette, Sunrise;  
Frank M. Tyneski, Plantation, and James V. Pottala, Fort  
Lauderdale, all of Fla., assignors to Motorola, Inc., Schaum-  
burg, Ill.

Filed Jan. 31, 1994, Ser. No. 18,113  
Term of patent 14 years

U.S. Cl. D13—133



357,896

BATTERY HOUSING FOR A MOBILE PHONE

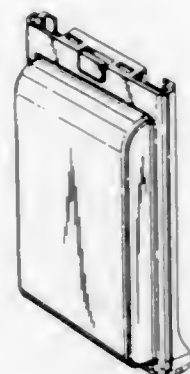
Adrian Berry, London, England, assignor to Nokia Mobile  
Phones Ltd., Salo, Finland

Filed Mar. 29, 1994, Ser. No. 20,547

Claims priority, application United Kingdom, Sep. 30, 1993,  
2034235

Term of patent 14 years

U.S. Cl. D13—103



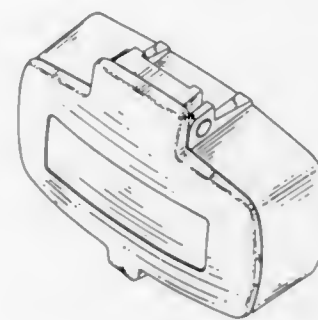
357,899

AUTOMOTIVE ELECTRICAL WIRING JUNCTION BOX

Evan L. Hopkins, and E. Leon Hopkins, both of Emporia, Kans.,  
assignors to Hopkins Manufacturing Corporation, Emporia,  
Kans.

Filed Feb. 14, 1994, Ser. No. 18,675  
Term of patent 14 years

U.S. Cl. D13—152



357,900

COMBINED HEAT SINK AND FAN

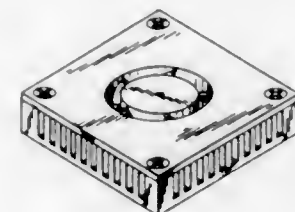
Tadashi Katsui; Katsuhiko Nakata, both of Kawasaki, and Taka-  
shi Kitahara, Unoke, all of Japan, assignors to Fujitsu Lim-  
ited, Kawasaki, Japan

Filed Sep. 24, 1993, Ser. No. 13,461

Claims priority, application Japan, Apr. 1, 1993, 5-9461  
The portion of the term of this patent subsequent to Mar. 28,  
2009, has been disclaimed.

Term of patent 14 years

U.S. Cl. D13—179



357,897

BATTERY WITH TERMINAL

Fumio Daio, Nara, and Seichi Mizutani, Osaka, both of Japan,  
assignors to Matsushita Electric Industrial Co., Ltd., Osaka,  
Japan

Filed Apr. 15, 1994, Ser. No. 21,370

Term of patent 14 years

U.S. Cl. D13—103



357,901

POWER SUPPLY UNIT

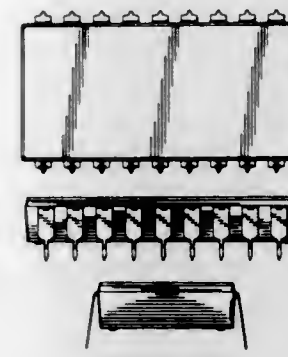
Johan Hörman, Hågersten, Sweden, assignor to Telefonak-  
tiebolaget LM Ericsson, Stockholm, Sweden

Filed Mar. 25, 1994, Ser. No. 20,368

Claims priority, application Sweden, Sep. 27, 1993, 93-2138;  
Sep. 27, 1993, 93-2139

Term of patent 14 years

U.S. Cl. D13—182



357,902

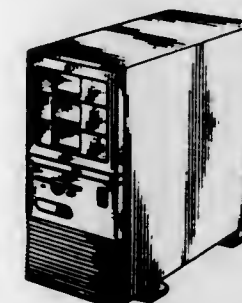
PERSONAL COMPUTER

George R. Daniela, Spring, Tex., assignor to Compaq Computer  
Corporation, Houston, Tex.

Filed Aug. 13, 1993, Ser. No. 11,829

Term of patent 14 years

U.S. Cl. D14—100



357,904

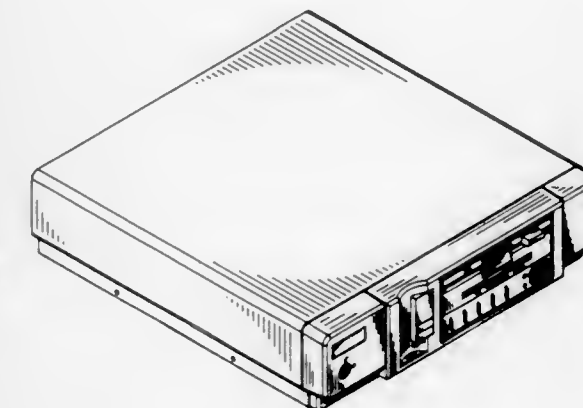
DESKTOP COMPUTER

Mark Kimbrough, Austin, Tex., assignor to Dell USA, L.P.,  
Austin, Tex.

Filed Jan. 12, 1994, Ser. No. 17,409

Term of patent 14 years

U.S. Cl. D14—100



357,905

DESKTOP COMPUTER

Mark Kimbrough, Austin, Tex., assignor to Dell USA, L.P.,  
Austin, Tex.

Filed Jan. 12, 1994, Ser. No. 17,458

Term of patent 14 years

U.S. Cl. D14—100



357,903

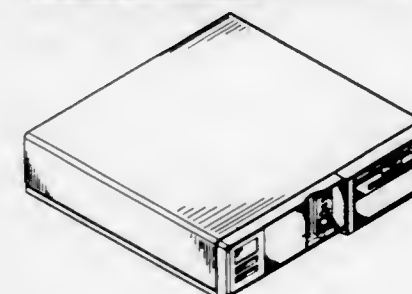
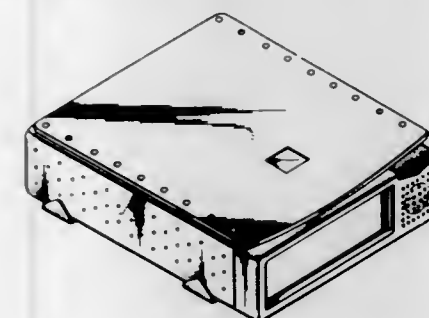
COMPUTER CABINET

Chun S. Lin, Taipei, Taiwan, Prov. of China, assignor to Macase  
Industrial Group Co., Inc., Norcross, Ga.

Filed Nov. 29, 1993, Ser. No. 15,851

Term of patent 14 years

U.S. Cl. D14—100



357,906

## INFRARED DATA TRANSMITTER FOR USE WITH A MICROPHONE

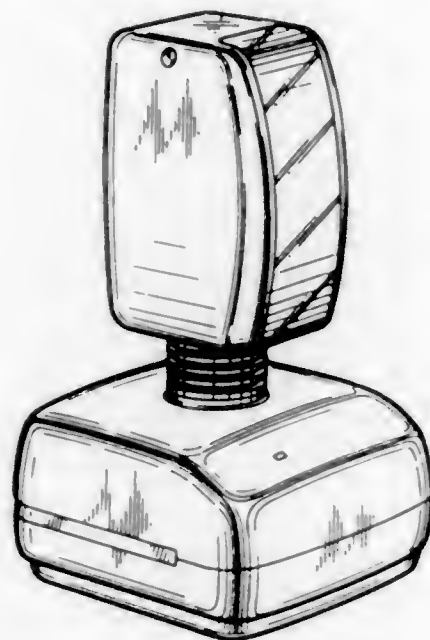
Hiroyuki Fukushima, Kami-Fukuoka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 13, 1993, Ser. No. 10,587

Claims priority, application Japan, Jan. 14, 1993, 5-768

Term of patent 14 years

U.S. Cl. D14—107



357,908

## COMPUTER MONITOR

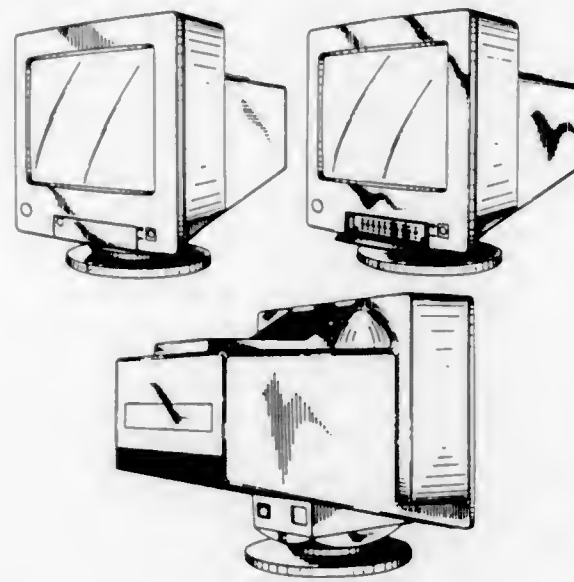
Toshitaka Imai, Sagamihara, Japan; Markus Oates, Rowledge, United Kingdom; Richard Sapper, Milan, Italy; Tomoyuki Takahashi, Fujisawa, Japan, and John A. Wiseman, Ridgefield, Conn., assignors to International Business Machines Incorporated, Armonk, N.Y.

Filed Oct. 13, 1993, Ser. No. 14,143

Claims priority, application United Kingdom, Apr. 13, 1993, 2030330

Term of patent 14 years

U.S. Cl. D14—113



357,907

## SCANNER

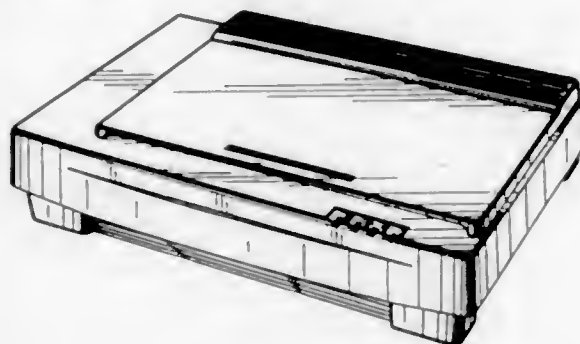
Mikio Kosako, Kyoto, and Tomoyuki Hirose, Mie, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 28, 1994, Ser. No. 19,260

Claims priority, application Japan, Aug. 31, 1993, 5-26536

Term of patent 14 years

U.S. Cl. D14—107



357,909

## CONNECTING TERMINAL FOR CHIP CARDS

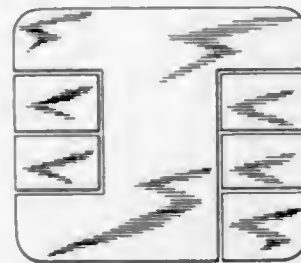
Jean-Pierre Gloton, Aix en Provence, France, assignor to Gemplus Card International, Gemenos, France

Filed Jan. 8, 1992, Ser. No. 818,211

Claims priority, application France, Jul. 11, 1991, 91 4379

Term of patent 14 years

U.S. Cl. D14—114



357,910

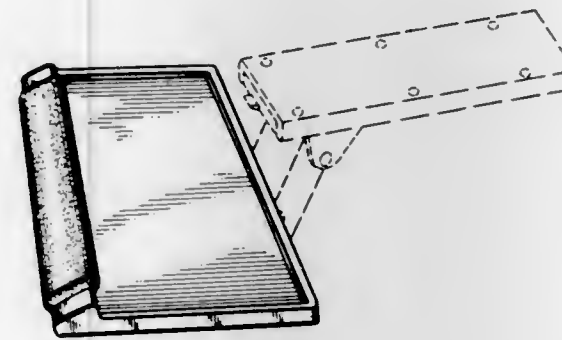
## COMBINED KEYBOARD TRAY AND WRIST REST

Thomas J. Newhouse, Grand Rapids, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Jun. 18, 1992, Ser. No. 900,830

Term of patent 14 years

U.S. Cl. D14—114



357,912

## VIDEO PHONE/PERSONAL COMPUTER

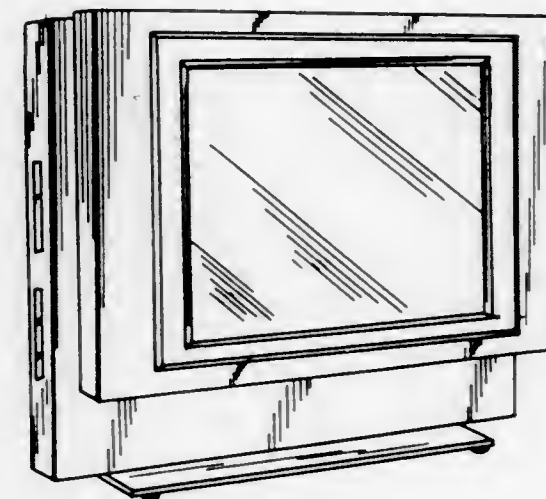
Sten T. Martin, Stockholm, Sweden, assignor to Unicom Corporation, San Mateo, Calif.

Filed Oct. 6, 1992, Ser. No. 149

Claims priority, application Sweden, Apr. 6, 1992, 92-0785

Term of patent 14 years

U.S. Cl. D14—130



357,911

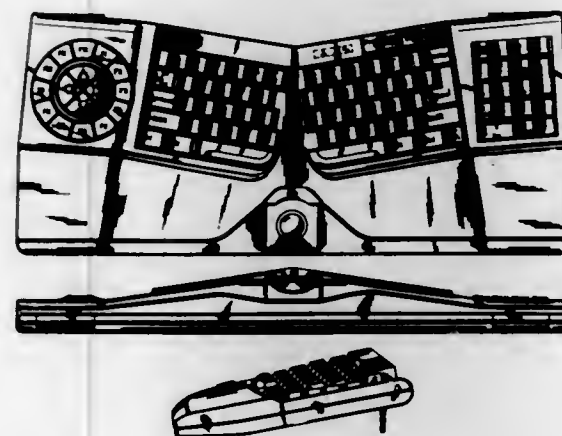
## COMPUTER KEYBOARD

Alan H. Grant, Chevy Chase, Md., and Eugene A. Helmsie, Spencer, N.Y., assignors to Ergonomics, Inc., Chevy Chase, Md.

Continuation of Ser. No. 4,848, Feb. 16, 1993, abandoned. This application May 4, 1994, Ser. No. 22,402

Term of patent 14 years

U.S. Cl. D14—115



357,913

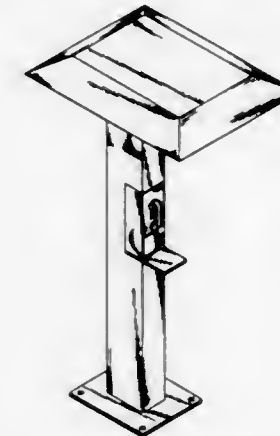
## TELEPHONE KIOSK

Naum Kunis, 1532 Glen Hollow La., Dunedin, Fla. 34698

Filed Nov. 12, 1992, Ser. No. 1,355

Term of patent 14 years

U.S. Cl. D14—146





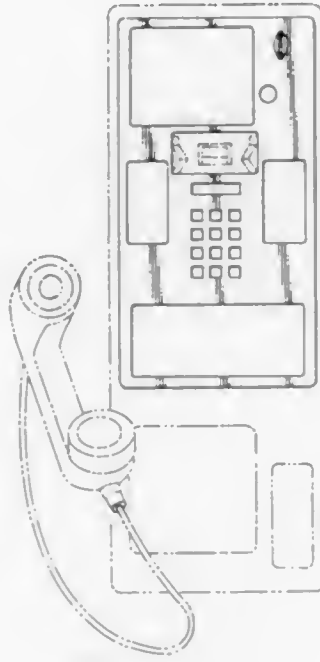
357,914

## FACE PANEL FOR A COIN TELEPHONE BOX

James R. DeArkland, 8119 Buena Fortuna, Carpinteria, Calif. 93013  
 Jay C. Covington, 2726 Sheridan Rd., Evanston, Ill. 60201

Continuation-in-part of Ser. No. 9,713, Jun. 21, 1993. This application Dec. 29, 1993, Ser. No. 16,915  
 The portion of the term of this patent subsequent to Jul. 27, 2007, has been disclaimed.  
 Term of patent 14 years

U.S. Cl. D14—146



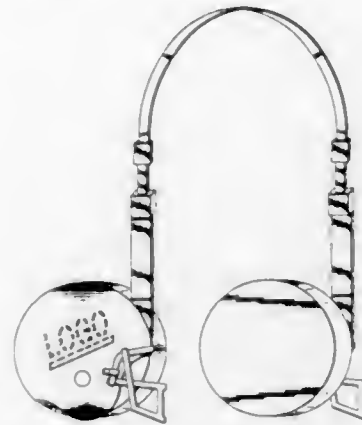
357,916

## HEADPHONE

Jay C. Covington, 2726 Sheridan Rd., Evanston, Ill. 60201  
 Filed Feb. 19, 1993, Ser. No. 5,071

Term of patent 14 years

U.S. Cl. D14—205



357,917

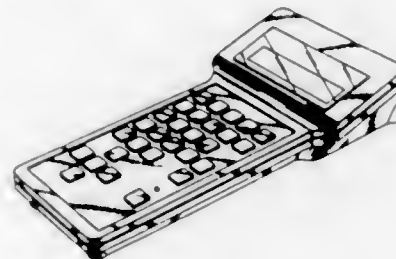
## REMOTE CONTROLLER FOR A DISC RECORDING/REPRODUCING UNIT

Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Katsuhiko Takashima, Urawa, and Tooru Katayama, Asaka, all of Japan, assignors to TEAC Corporation, Tokyo, Japan

Filed Jun. 8, 1993, Ser. No. 9,249

Claims priority, application Japan, Dec. 10, 1992, 4-36402  
 Term of patent 14 years

U.S. Cl. D14—218



357,915

## TELEPHONE STATION

Stefan Hillenmayer, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 7, 1993, Ser. No. 7,991

Claims priority, application Germany, Nov. 9, 1992, M9208271.8

Term of patent 14 years

U.S. Cl. D14—151



357,918

## PROTECTIVE RIM FOR REMOTE CONTROLS

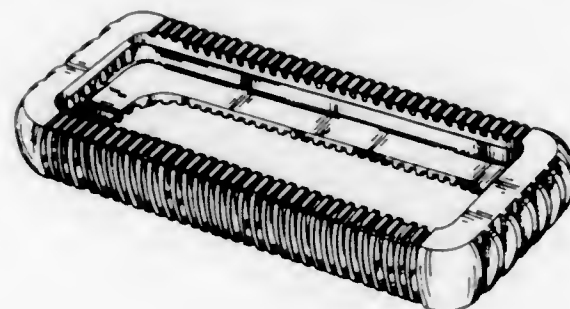
Alessandro Doria, Milan, Italy, assignor to Daniels S.R.L., Milan, Italy

Filed Jun. 25, 1993, Ser. No. 9,999

Claims priority, application Hague Agreement, Dec. 28, 1992, DM/024772

Term of patent 14 years

U.S. Cl. D14—218



357,919

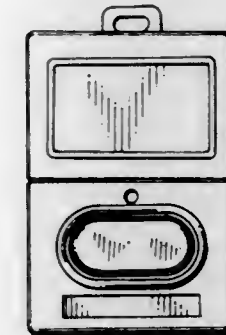
## REMOTE CONTROL UNIT

Philip Tsui, Mississauga, Canada, assignor to Capital Prospect Ltd., Hong Kong

Filed Jul. 26, 1993, Ser. No. 11,092

Term of patent 14 years

U.S. Cl. D14—218



357,920

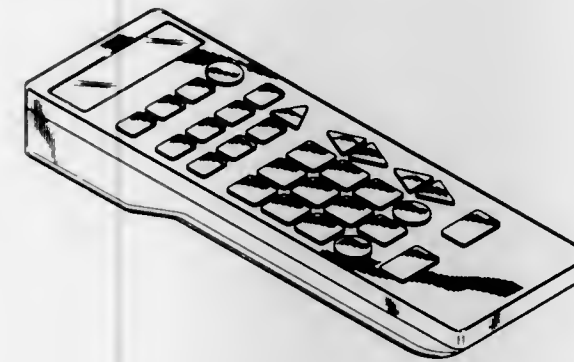
## REMOTE CONTROL UNIT

John V. C. Davis, Santa Ana, Calif., assignor to Pacific Media Data, Inc., Costa Mesa, Calif.

Filed Sep. 15, 1993, Ser. No. 12,976

Term of patent 14 years

U.S. Cl. D14—218



357,921

## EARPHONE WITH MICROPHONE

Yang Ming-Chin, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 25, 1994, Ser. No. 19,233

Claims priority, application Japan, Aug. 31, 1993, 5-26343

Term of patent 14 years

U.S. Cl. D14—223



357,922

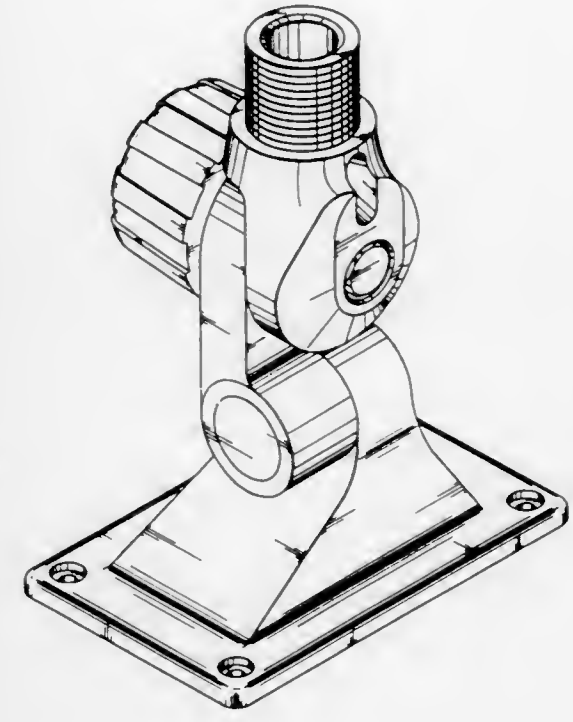
## ANTENNA MOUNT

Mark A. Nysether, Everett, and John R. Brown, Rainier, both of Wash., assignors to Sea-Dog Corporation, Everett, Wash.

Filed Mar. 31, 1993, Ser. No. 6,496

Term of patent 14 years

U.S. Cl. D14—238



357,923

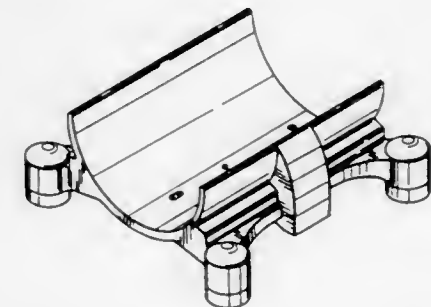
## MOUNTING STRUCTURE FOR A PUMP

Kenneth A. Peterson, Walnut; Nils J. Gerber, Fountain Valley, both of Calif., and Robert W. Matthes, Washington Crossing, Pa., assignors to Shurflo Pump Manufacturing Company, Santa Ana, Calif.

Filed Jan. 11, 1994, Ser. No. 17,341

Term of patent 14 years

U.S. Cl. D15—9.1



357,924

CLIP-ON, CLIP-IN THERMAL UNIT FOR  
TEMPERATURE MODIFICATION OF A FOODSTUFF IN  
A CONTAINERGeorge P. Miller, P.O. Box 152; Randall S. Miller, P.O. Box  
1606, and Wayne Thomas, 810 8th St., all of Eagle Lake, Fla.  
33839Filed Jun. 13, 1994, Ser. No. 24,460  
Term of patent 14 years

U.S. Cl. D15—79

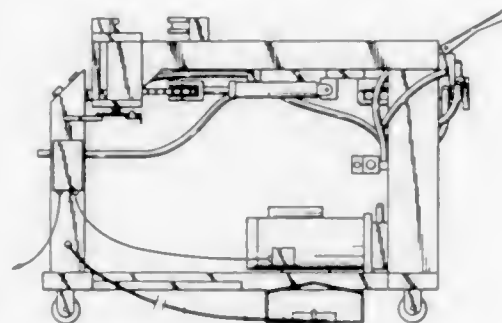


357,925

## TUBE BENDING MACHINE

Lawrence P. Dossey, Duncan, Okla., assignor to Chisholm Ma-  
chine, Inc., Duncan, Okla.Filed Oct. 29, 1993, Ser. No. 14,639  
Term of patent 14 years

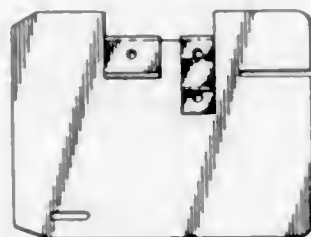
U.S. Cl. D15—122



357,926

WAFER FOR THE WELDING AND/OR CUTTING OF  
PLASTIC TUBESIvars V. Ivansons, Newark; Vadlis Ivansons, and Dudley W. C.  
Spencer, both of Wilmington, all of Del., assignors to Denco,  
Inc., Wilmington, Del.Filed Jan. 21, 1994, Ser. No. 17,685  
Term of patent 14 years

U.S. Cl. D15—139



357,927

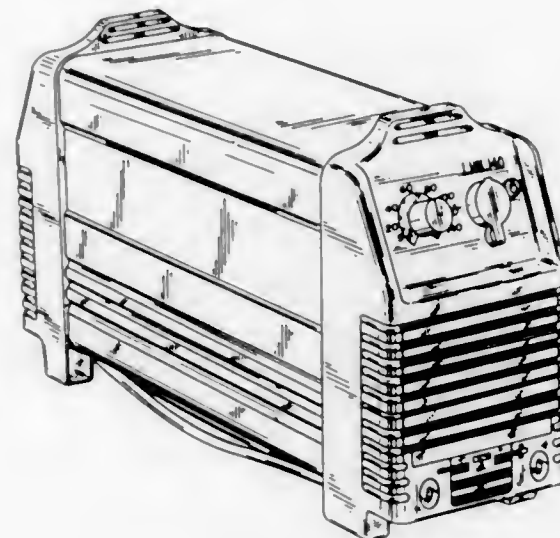
## WELDING APPARATUS

Stephan Söderholm, Gothenburg, Sweden, assignor to ESAB  
Aktiebolag, Gothenburg, Sweden

Filed May 10, 1993, Ser. No. 8,551

Claims priority, application Sweden, Nov. 11, 1992, 92-2381  
Term of patent 14 years

U.S. Cl. D15—144.1



357,928

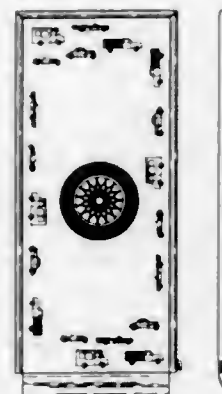
PORTABLE, INFLATABLE AUTOMOTIVE REPAIR AND  
MAINTENANCE ACCESSORY WITH DRAIN

John D. Kelleher, 307 Woodland E. Dr., Greenfield, Ind. 46140

Filed Apr. 25, 1994, Ser. No. 21,903

Term of patent 14 years

U.S. Cl. D15—150



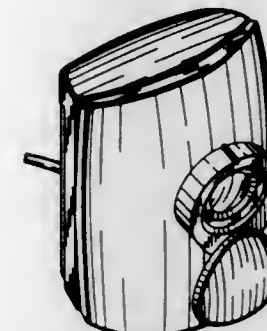
357,929

MINIATURE VIDEO CAMERA FOR A PERSONAL  
COMPUTERSusanne M. Pierce, Menlo Park, Calif., assignor to Apple Com-  
puter, Inc., Cupertino, Calif.

Filed Mar. 7, 1994, Ser. No. 19,627

Term of patent 14 years

U.S. Cl. D16—202



357,930

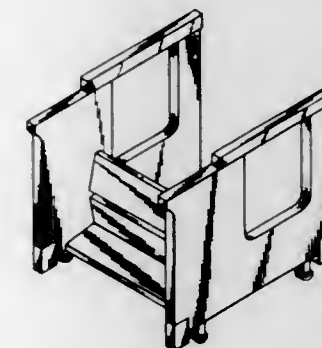
## EQUIPMENT STAND

David R. Gotham, Rochester, N.Y.; William H. Cushman,  
Irving, Tex., and Eugene W. Lachut, Spencerport, N.Y., as-  
signors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 22, 1994, Ser. No. 19,086

Term of patent 14 years

U.S. Cl. D16—235



357,931

## SPECTACLES

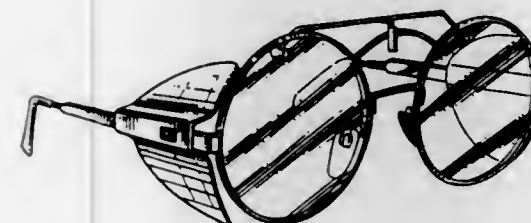
Christopher M. Tanner, Enfield, United Kingdom, assignor to  
Barn House Promotions, PLC, United Kingdom

Filed Feb. 16, 1994, Ser. No. 18,813

Claims priority, application United Kingdom, Aug. 12, 1993,  
2033100

Term of patent 14 years

U.S. Cl. D16—317



357,932

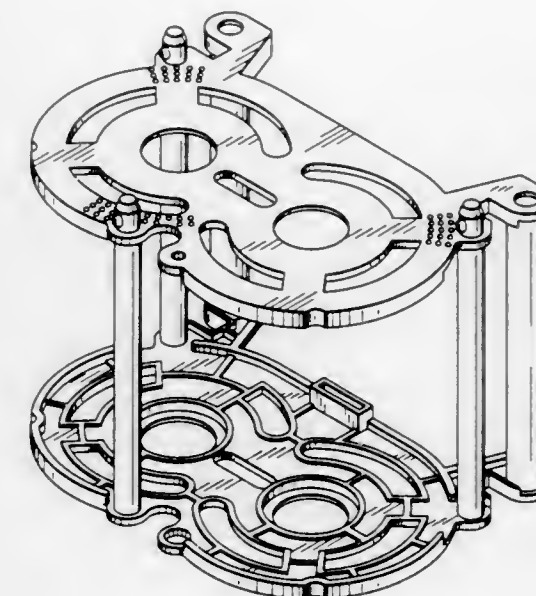
## RIBBON MOUNTING FIXTURE

Phillip B. Daley, Cincinnati, and Richard D. Puckett, Miamis-  
burg, both of Ohio, assignors to NCR Corporation, Dayton,  
Ohio

Filed Mar. 2, 1992, Ser. No. 844,415

Term of patent 14 years

U.S. Cl. D18—12



357,933

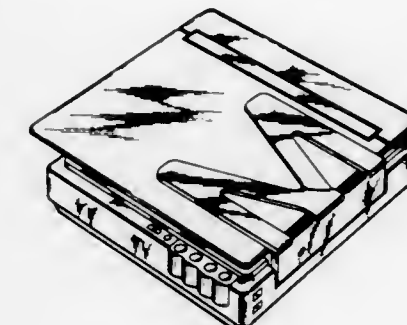
## COPYING MACHINE

Masaaki Ishibashi, Tokyo; Takeshi Komada, Yokosuka, and  
Yosuke Ohsawa, Yokohama, all of Japan, assignors to Canon  
Kabushiki Kaisha, Tokyo, JapanContinuation of Ser. No. 952,789, Sep. 30, 1992, abandoned. This  
application Jun. 22, 1994, Ser. No. 27,671

Claims priority, application Japan, Apr. 17, 1992, 4-11540

Term of patent 14 years

U.S. Cl. D18—36





357,934

## OFFSET PRINTING MACHINE

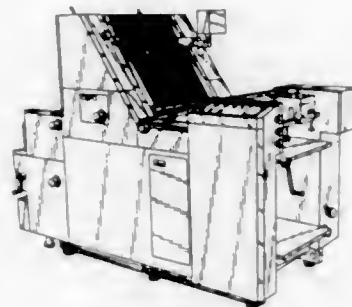
Nobuhiko Karafuji, Tokyo, and Hideo Aoyama, Hiroshima, both of Japan, assignors to Ryobi Ltd., Hiroshima, Japan

Filed Sep. 17, 1993, Ser. No. 13,091

Claims priority, application Japan, Mar. 17, 1993, 5-7773  
The portion of the term of this patent subsequent to Sep. 13, 2008, has been disclaimed.

Term of patent 14 years

U.S. Cl. D18—53



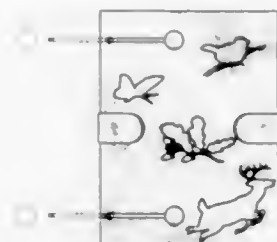
357,935  
BOOK

Faron C. Williams, 1249 Yerian Rd., North Lima, Ohio 44452

Filed Oct. 12, 1993, Ser. No. 14,053

Term of patent 14 years

U.S. Cl. D19—27



357,936

## WRITING INSTRUMENT

Barnabas C. Chen, Roland Heights, Calif., assignor to World Trend, Inc., Pomona, Calif.

Filed Mar. 11, 1994, Ser. No. 19,869

Term of patent 14 years

U.S. Cl. D19—48



357,937

## MAGIC SOUND BOOK

Pak F. Ho, Tsuen Wan, Hong Kong, assignor to Fun Kids Industrial Limited, Tsuen Wan, Hong Kong

Filed Jun. 20, 1994, Ser. No. 24,689

Claims priority, application United Kingdom, Apr. 27, 1994, 2038667

Term of patent 14 years

U.S. Cl. D19—60



357,938

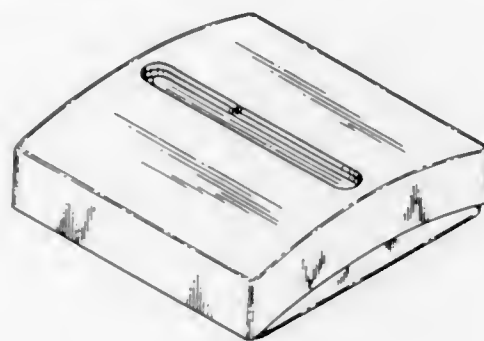
## SELF-STICK REMOVABLE NOTE HOLDER

Stephen H. Wolff, 35 W. 35th St., New York, N.Y. 10001

Filed May 11, 1994, Ser. No. 22,765

Term of patent 14 years

U.S. Cl. D19—86



357,939

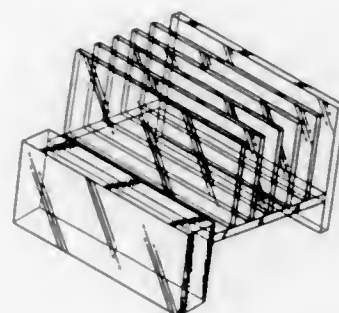
## CARD STAND

Jeanette L. Turmala, P.O. Box 15430, Seattle, Wash. 98115-0430

Filed Aug. 26, 1993, Ser. No. 12,185

Term of patent 14 years

U.S. Cl. D19—90



357,940

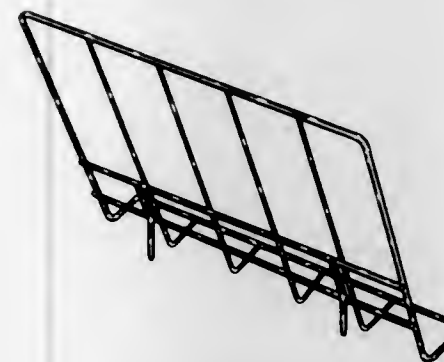
## WIRE DOCUMENT STAND

Steven E. Linder, Portland, Oreg., assignor to Anthro Corporation, Portland, Oreg.

Filed Jan. 15, 1993, Ser. No. 3,787

Term of patent 14 years

U.S. Cl. D19—91



357,941

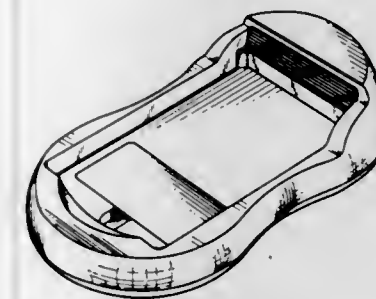
## SELF-LIGHTING NOTE HOLDER

Martha D. Davis, Newport Beach, Calif., assignor to MKG, Inc., Newport Beach, Calif.

Filed May 12, 1994, Ser. No. 22,812

Term of patent 14 years

U.S. Cl. D19—92



357,942

## ILLUMINABLE SIGN POST

Denis Louis-Seize, Clarence Creek, Canada, assignor to Louis-XVI Signs, Clarence Creek, Canada

Filed Sep. 14, 1993, Ser. No. 12,963

Claims priority, application Canada, Mar. 18, 1993, 18-03-93-2

Term of patent 14 years

U.S. Cl. D20—10



357,943

## INFORMATION COLUMN

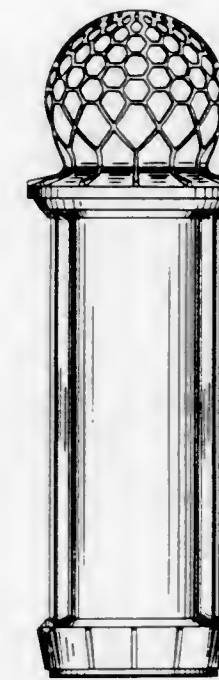
Martin Szekeley, Paris, France, assignor to J. C. Decaux, France

Filed Dec. 16, 1993, Ser. No. 16,505

Claims priority, application France, Jun. 18, 1993, 933204

Term of patent 14 years

U.S. Cl. D20—10



357,944

## ADVERTISING KIOSK

Michael J. Atwell, Medina, and Thomas J. O'Donnell, Westlake, both of Ohio, assignors to Ohio Mattress Company Licensing & Component Group, Cleveland, Ohio

Filed Apr. 13, 1994, Ser. No. 21,249

Term of patent 14 years

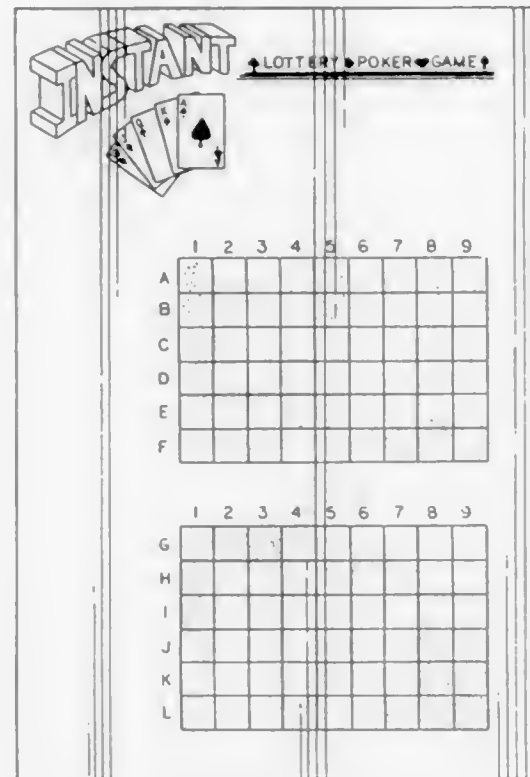
U.S. Cl. D20—10



357,945

## LOTTERY POKER GAME

Donat Wadolowski, 2864 W. Henderson, Chicago, Ill. 60618  
 Filed May 3, 1993, Ser. No. 7,793  
 Term of patent 14 years  
 U.S. Cl. D21—37



357,947

## JOYSTICK

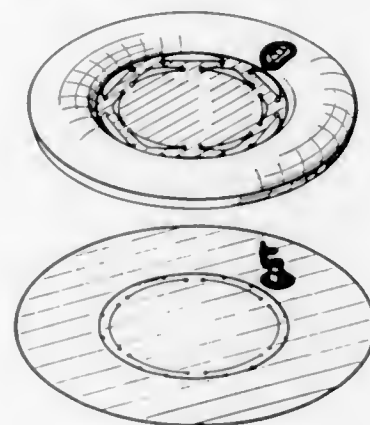
Emmanuel Richer, Bourgoin-Jallieu, France, assignor to Rex-  
 roth Sigma, France  
 Filed Feb. 1, 1994, Ser. No. 18,205  
 Term of patent 14 years  
 U.S. Cl. D21—48



357,948

## INFLATABLE THROWING TOY

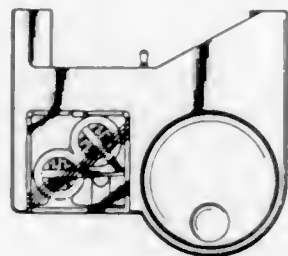
Morten Noldus-Nilsen, Bel Colles Alle 8A, DK-2960 Rungsted  
 Kyst, Denmark  
 Filed Mar. 23, 1993, Ser. No. 6,086  
 Claims priority, application Denmark, Sep. 23, 1992, MA0951  
 1992  
 Term of patent 14 years  
 U.S. Cl. D21—84



357,946

## EAR PHONE HOUSING FOR VIDEO GAMES

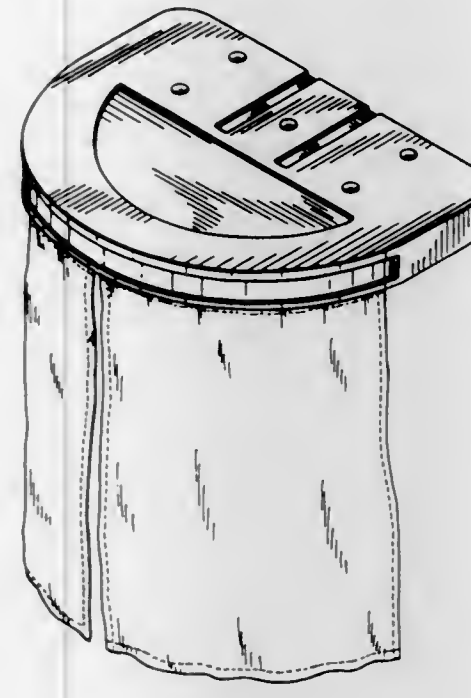
Patrick T. Ho, Kwai Chung, Hong Kong, assignor to STD Elec-  
 tronic International Ltd., Hong Kong  
 Filed Jun. 4, 1993, Ser. No. 9,030  
 Claims priority, application United Kingdom, Dec. 8, 1992,  
 2027629  
 Term of patent 14 years  
 U.S. Cl. D21—48



357,949

## CURTAIN FOR A TOY BUILDING SET

Henrik K. Nielsen, Copenhagen, and Kirsten E. Hertz, Gadst-  
 rup, both of Denmark, assignors to Interlego AG, Baar, Swit-  
 zerland  
 Filed Sep. 22, 1993, Ser. No. 13,308  
 Term of patent 14 years  
 U.S. Cl. D21—121



357,951

## RESISTANCE CYLINDER FOR AN EXERCISER

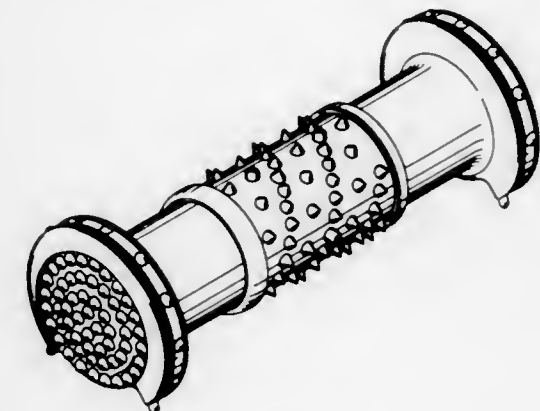
Ping Chen, No. 20, Nan-Mei St., Taichung City, Taiwan, Prov.  
 of China  
 Filed Jan. 3, 1994, Ser. No. 17,005  
 Term of patent 14 years  
 U.S. Cl. D21—191



357,952

## MULTI-FUNCTIONAL PHYSICAL EXERCISER

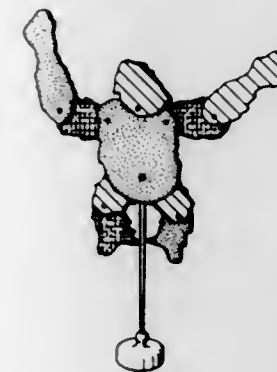
Ping Chen, No. 20, Nan-Mei St., Taichung City, Taiwan, Prov.  
 of China  
 Filed Jan. 3, 1994, Ser. No. 17,017  
 Term of patent 14 years  
 U.S. Cl. D21—191



357,950

## ANIMAL FIGURE

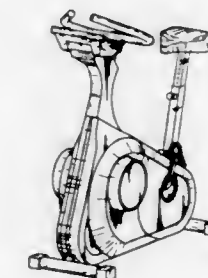
Lester Wagenheim, 22 Hunting Hollow Dr., Pepper Pike, Ohio  
 44124-5247  
 Filed May 26, 1993, Ser. No. 8,728  
 Term of patent 14 years  
 U.S. Cl. D21—154



357,953

## EXERCISE CYCLE

Cynthia M. K. Warehime; Craig L. Johnson, both of Bothell, and  
 James A. Duncan, Renton, all of Wash., assignors to Stair-  
 Master Sports/Medical Products, Inc., Kirkland, Wash.  
 Filed Mar. 21, 1994, Ser. No. 20,209  
 Term of patent 14 years  
 U.S. Cl. D21—194





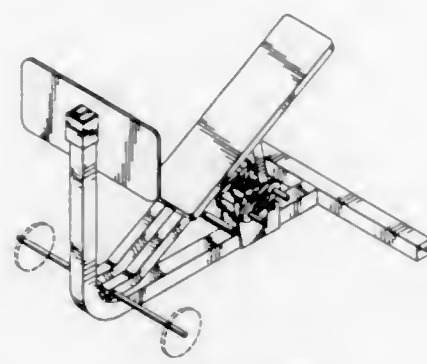
357,954  
EXERCISER

San-Ping Lee, No. 257-8, Chung-Cheng Rd., Tsao-Tun Chen, Michael Hung, 9-16, Nan Kan Hsia, Nan Kan, Lu Chu Hsiang, Nantou Hsien, Taiwan, Prov. of China  
Filed Jan. 10, 1994, Ser. No. 17,309  
Term of patent 14 years  
U.S. Cl. D21-195



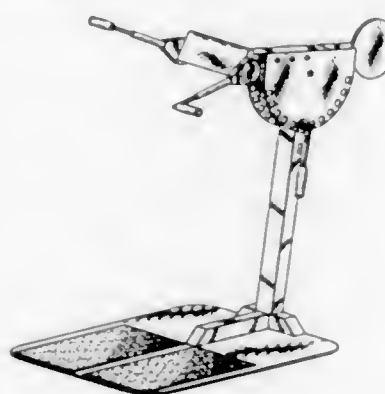
357,955  
PHYSICAL EXERCISER

Jerry L. Wilson, 570 NE. 53rd Ave., Hillsboro, Oreg. 97124  
Filed Jan. 18, 1994, Ser. No. 17,620  
Term of patent 14 years  
U.S. Cl. D21-195



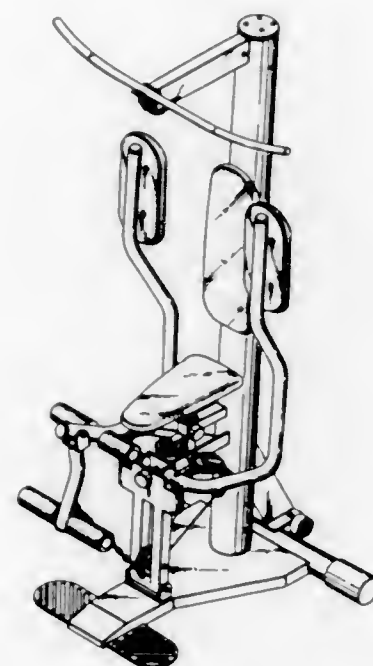
357,956

WEIGHT MACHINE FOR USE FROM A WHEELCHAIR  
Paul G. Hughes, 49-J Hamilton Dr., Novato, Calif. 94949  
Filed Feb. 14, 1994, Ser. No. 18,703  
Term of patent 14 years  
U.S. Cl. D21-195



357,957  
PHYSICAL EXERCISER

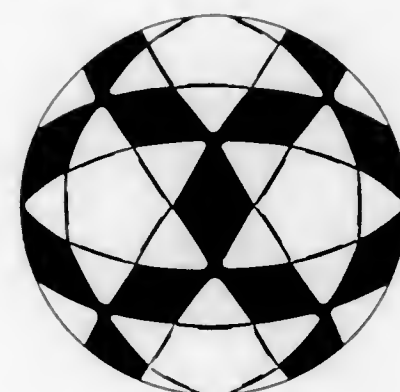
Tao Yuan County, Taiwan, Prov. of China  
Filed Mar. 4, 1994, Ser. No. 19,534  
Term of patent 14 years  
U.S. Cl. D21-195



357,958

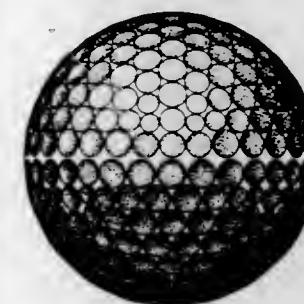
SOCCER BALL

Jose C. Andero, Jr., 4935 McConnell Ave., Suite 11, Los Angeles, Calif. 90066  
Filed Dec. 20, 1993, Ser. No. 16,550  
Term of patent 14 years  
U.S. Cl. D21-204



357,959  
GOLF BALL

Keiji Moriyama, Akashi, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan  
Filed Nov. 9, 1993, Ser. No. 15,128  
Claims priority, application Japan, May 14, 1993, 5-14015  
Term of patent 14 years  
U.S. Cl. D21-205



357,960  
HOCKEY STICK

Bien-Horn Chen, 4F., No. 10, Lane 8, Section 2, Roosevelt Road, Taipei, Taiwan, Prov. of China  
Filed Jul. 7, 1993, Ser. No. 11,461  
Term of patent 14 years  
U.S. Cl. D21-210



357,961

GOLF DRIVER HEAD

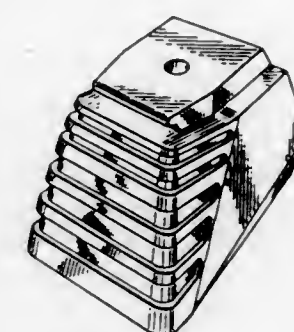
Robert J. Mader, 1218 Arlington Ave., Torrance, Calif. 90501  
Filed Sep. 17, 1993, Ser. No. 13,089  
Term of patent 14 years  
U.S. Cl. D21-214



357,962

RIBBED BRAKE PAD FOR A ROLLER SKATE

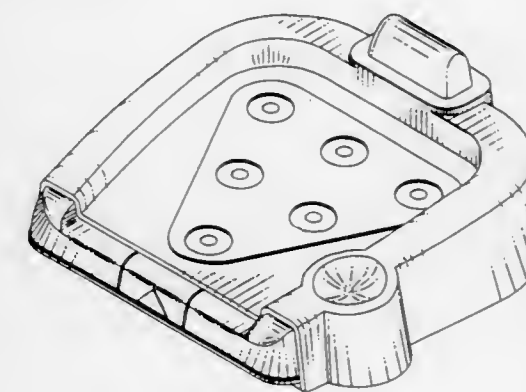
Paul G. Moldenhauer, St. Louis Park, Minn., and Douglas H. Graham, Boonton, N.J., assignors to Rollerblade, Inc., Minnetonka, Minn.  
Filed Jun. 14, 1991, Ser. No. 715,134  
Term of patent 14 years  
U.S. Cl. D21-226



357,963

BOWLING GAME

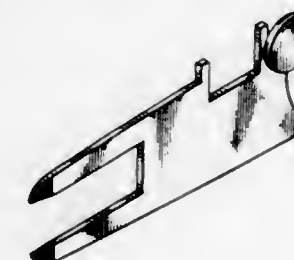
James D. Amburgey, Richardson; Jay M. Bro; Peter J. Myers, both of Plano, and Robert H. Escher, Lewisville, all of Tex., assignors to Today's Kids, Inc., Boonesville, Ark.  
Filed Feb. 4, 1994, Ser. No. 18,403  
Term of patent 14 years  
U.S. Cl. D21-233



357,964

MULTIPURPOSE TOOL FOR GOLFERS

Thomas F. Williams, 1552 Husted Ave., San Jose, Calif. 95125  
Continuation of Ser. No. 955,418, Oct. 2, 1992, abandoned. This application Sep. 2, 1994, Ser. No. 28,018  
Term of patent 14 years  
U.S. Cl. D21-234



357,965  
FLIPPER

Renzo Maggi, Rivanazzano, Italy, assignor to Salvas S.p.A.,  
Castellnuovo Scrivia, Italy  
Filed Jan. 3, 1994, Ser. No. 16,989  
Claims priority, application Italy, Jul. 8, 1993, MI9300375  
Term of patent 14 years  
U.S. Cl. D21—239

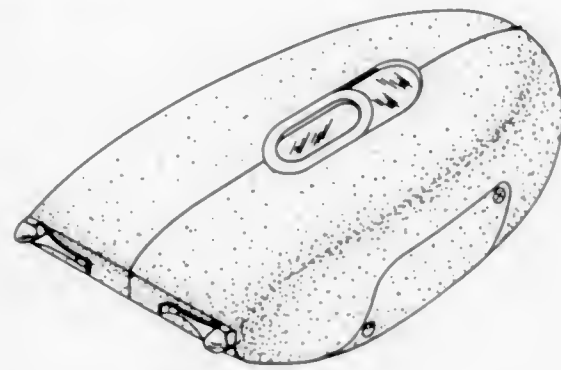


357,968  
HANDLE FOR A FISHING ROD

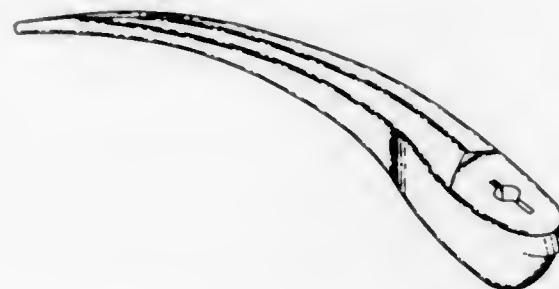
Ryuichi Ohmura, Shizuoka, Japan, assignor to Fuji Kogyo Co.,  
Ltd., Shizuoka, Japan  
Filed Nov. 21, 1985, Ser. No. 805,937  
The portion of the term of this patent subsequent to Mar. 2,  
2006, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D22—142



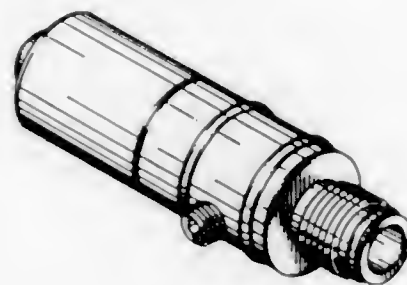
357,966  
ELECTRONIC PERSONAL PROTECTION INSTRUMENT  
William Gunby, 2749 Biarritz Dr., Palm Beach Gardens, Fla.  
33410  
Filed Oct. 6, 1993, Ser. No. 13,905  
Term of patent 14 years  
U.S. Cl. D22—117



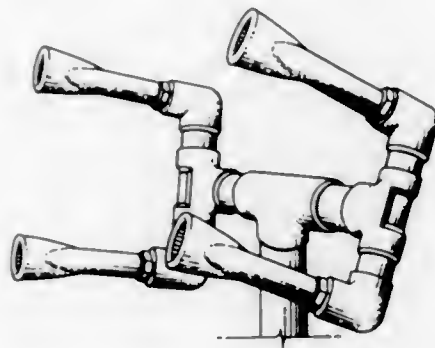
357,969  
COMBINED BAIT HOLDER AND WEIGHT  
Jeffrey L. Brickey, 2402 Killarney Way SE., Bellevue, Wash.  
98004-7038  
Filed Jun. 1, 1993, Ser. No. 9,007  
Term of patent 14 years  
U.S. Cl. D22—145



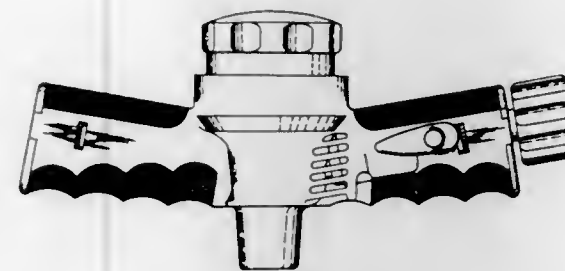
357,967  
UNIVERSAL REGULATOR UNIT FOR AIRGUNS  
Daniel H. Colby, Des Plaines, Ill., assignor to Air America,  
Glenview, Ill.  
Filed Nov. 30, 1993, Ser. No. 15,814  
Term of patent 14 years  
U.S. Cl. D22—103



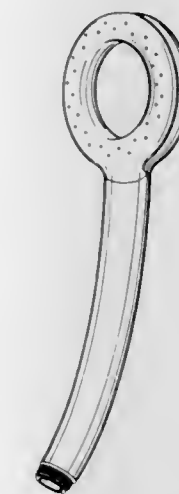
357,970  
AERATION SPRAY ARM UNIT FOR USE IN SWIMMING  
POOLS  
William G. Lupton, and Joseph E. Boardman, both of 2045 Main  
St., Chatham, Mass. 02633  
Filed May 11, 1993, Ser. No. 8,193  
Term of patent 14 years  
U.S. Cl. D23—213



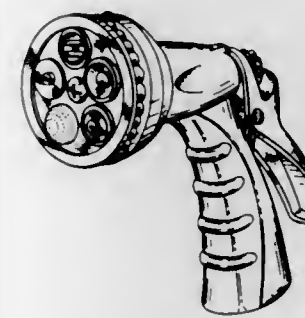
357,971  
ROOT FEEDER HEAD ASSEMBLY  
Loren L. Prothe, Lexington, Ky., assignor to Weatherly Con-  
sumer Products, Inc., Lexington, Ky.  
Filed Jun. 18, 1993, Ser. No. 9,726  
Term of patent 14 years  
U.S. Cl. D23—217



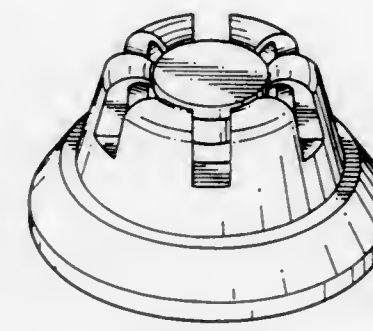
357,972  
SHOWER HEAD  
Hing-Wah Huen, Kowloon, Hong Kong, assignor to Fairform  
Mfg. Co., Ltd., Kowloon, Hong Kong  
Filed Jul. 12, 1993, Ser. No. 10,577  
Term of patent 14 years  
U.S. Cl. D23—223



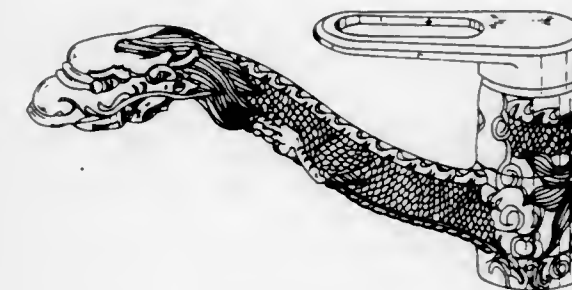
357,973  
HOSE END TRIGGER NOZZLE  
Lawrence G. McCain, Beverly Hills, Calif., assignor to Arcadia,  
San Diego, Calif.  
Filed Aug. 11, 1994, Ser. No. 27,027  
Term of patent 14 years  
U.S. Cl. D23—226



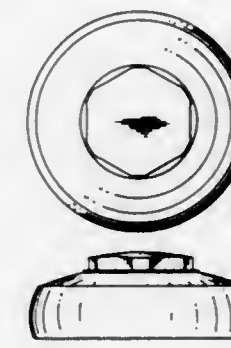
357,974  
CONNECTOR FOR USE WITH AN INFLATION  
MECHANISM  
Matthew L. Phillips, North Easton, Mass., and Paul J. Mul-  
hauser, New York, N.Y., assignors to Reebok International  
Ltd., Stoughton, Mass.  
Continuation-in-part of Ser. No. 6,555, Mar. 31, 1993, Pat. No.  
Des. 347,263, which is a division of Ser. No. 973,670, Nov. 9,  
1992. This application Oct. 13, 1993, Ser. No. 14,100  
Term of patent 14 years  
U.S. Cl. D23—231



357,975  
FAUCET  
Wen-Mu Wang, No. 32, Lane 266, Fu Te I Rd., Hsi Tze Chen,  
Taipei Hsien, Taiwan, Prov. of China  
Filed Mar. 30, 1994, Ser. No. 20,642  
Term of patent 14 years  
U.S. Cl. D23—238



357,976  
FLUSH VALVE COVER  
Charles S. Allen, Kenilworth, and Jerry P. Gronwick, Park  
Ridge, both of Ill., assignors to Sloan Valve Company, Frank-  
lin Park, Ill.  
Filed Dec. 23, 1993, Ser. No. 16,736  
Term of patent 14 years  
U.S. Cl. D23—249





357,977

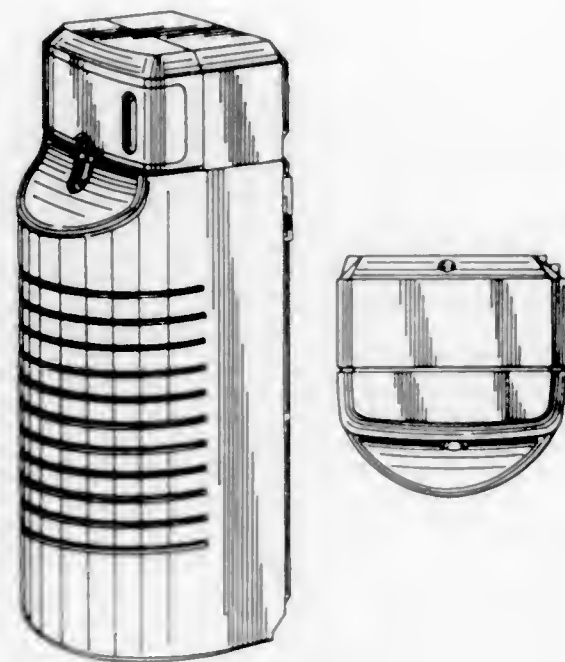
## AEROSOL DISPENSER FOR FRAGRANCE

Kenneth J. Maderlak, Shorewood, Wis., assignor to Technical Concepts L.P., Elk Grove Village, Ill.

Filed Nov. 4, 1993, Ser. No. 15,011

Term of patent 14 years

U.S. Cl. D23—366



357,979

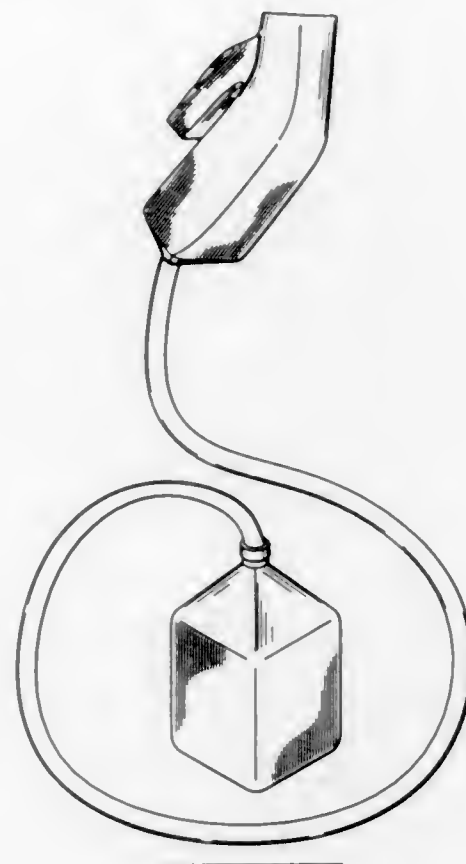
## COMBINED MALE URINAL AND URINE CONTAINER

Onelta A. Evans, and Orho N. Evans, both of 5477 Old Byram Rd., Jackson, Miss. 39212

Filed Jun. 29, 1993, Ser. No. 10,103

Term of patent 14 years

U.S. Cl. D24—122



357,978

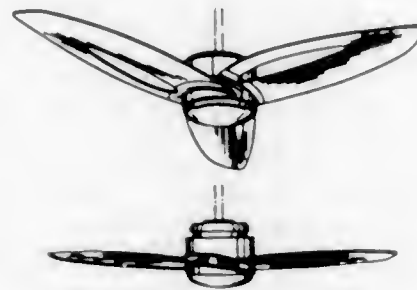
## COMBINED CEILING FAN AND LIGHT

Stanfield K. Young, Cypress, Calif., assignor to Casablanca Fan Company, City of Industry, Calif.

Filed Dec. 3, 1993, Ser. No. 15,958

Term of patent 14 years

U.S. Cl. D23—377



357,980

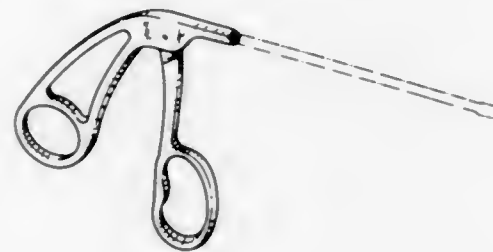
## SURGICAL INSTRUMENT HANDLE

Steven Ek, Bolton, Mass.; Brian Barlow, Newton, N.H., and David Sauvageau, Lowell, Mass., assignors to Smith & Nephew Dyonics, Inc., Andover, Mass.

Filed Nov. 15, 1993, Ser. No. 15,390

Term of patent 14 years

U.S. Cl. D24—143



357,981

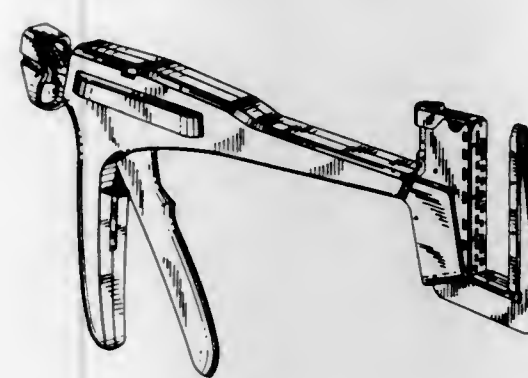
## SURGICAL STAPLER

David T. Green, Westport; Henry Bolanos, East Norwalk, and Paul O. Rawson, Easton, all of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Sep. 1, 1993, Ser. No. 12,430

Term of patent 14 years

U.S. Cl. D24—145



357,982

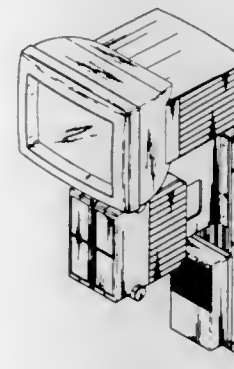
## MEDICAL MONITOR

James M. Dahl, Woodinville, and Robert B. Hubler, Seattle, both of Wash., assignors to SpaceLabs Medical, Inc., Redmond, Wash.

Filed Jan. 21, 1994, Ser. No. 17,741

Term of patent 14 years

U.S. Cl. D24—186



357,985

## MICROCOLLECTION TUBE

James A. Burns, Elizabeth, N.J., assignor to Becton Dickinson and Company, Franklin Lakes, N.J.

Filed May 27, 1993, Ser. No. 8,862

The portion of the term of this patent subsequent to Mar. 21, 2009, has been disclaimed.

Term of patent 14 years

U.S. Cl. D24—224



357,983

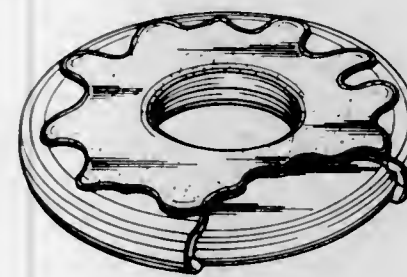
## TEETHER

Randy L. Abrams, Leominster, Mass., assignor to Safety 1st, Inc., Chestnut Hill, Mass.

Filed Mar. 18, 1994, Ser. No. 20,095

Term of patent 14 years

U.S. Cl. D24—195



357,986

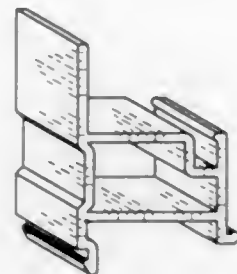
## WINDOW COMPONENT EXTRUSION

Robert A. Schrader, Tacoma, Wash., assignor to Mikron Industries, Kent, Wash.

Filed Jan. 31, 1994, Ser. No. 18,246

Term of patent 14 years

U.S. Cl. D25—124



357,987

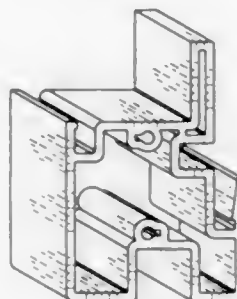
## WINDOW COMPONENT EXTRUSION

Jeffrey R. Franson, Kent, Wash., assignor to Mikron Industries, Kent, Wash.

Filed Feb. 8, 1994, Ser. No. 18,494

Term of patent 14 years

U.S. Cl. D25—124

357,988  
POST

Jesus M. Sosa, Rio Piedras, Puerto Rico, assignor to Sosa Architectural Metal Corporation, Gurabo, Puerto Rico

Filed Dec. 7, 1993, Ser. No. 16,106

Term of patent 14 years

U.S. Cl. D25—126



357,989

## HEAD LAMP FOR A BICYCLE

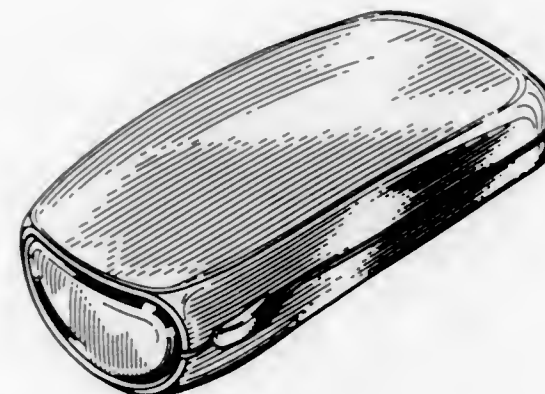
Toshiyuki Nagano, Takarazuka, Japan, assignor to Cateye Co., Ltd., Osaka, Japan

Filed Jul. 19, 1994, Ser. No. 26,074

Claims priority, application Japan, Jul. 1, 1994, 6-19635

Term of patent 14 years

U.S. Cl. D26—28



357,990

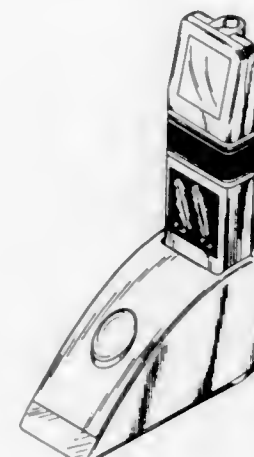
## COMBINED MULTIPURPOSE PORTABLE LIGHT AND RECHARGER THEREFOR

Hsiang-Ta Cheng, Tamsui, and Shih-Ping Lee, Taipei, both of Taiwan, Prov. of China, assignors to Darjung Industries, Co., Ltd., Tamsui, Taiwan, Prov. of China

Filed May 11, 1993, Ser. No. 8,134

Term of patent 14 years

U.S. Cl. D26—38



357,991

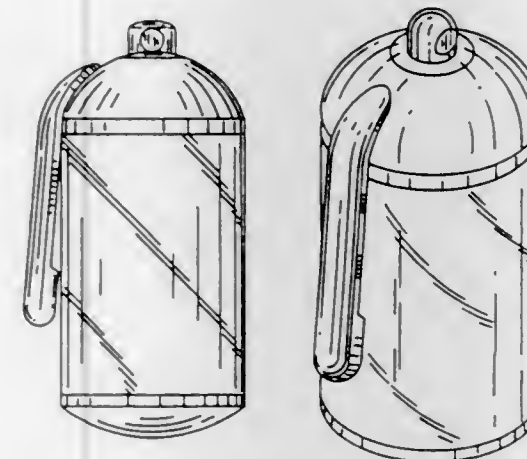
## FLASHLIGHT

Li-Fong Chen, Tainan Hsien, Taiwan, Prov. of China, assignor to Co-Union Industry Co, Ltd., Tainan Hsien, Taiwan, Prov. of China

Filed Apr. 30, 1993, Ser. No. 7,671

Term of patent 14 years

U.S. Cl. D26—40



357,993

## ADJUSTABLE DESK LAMP

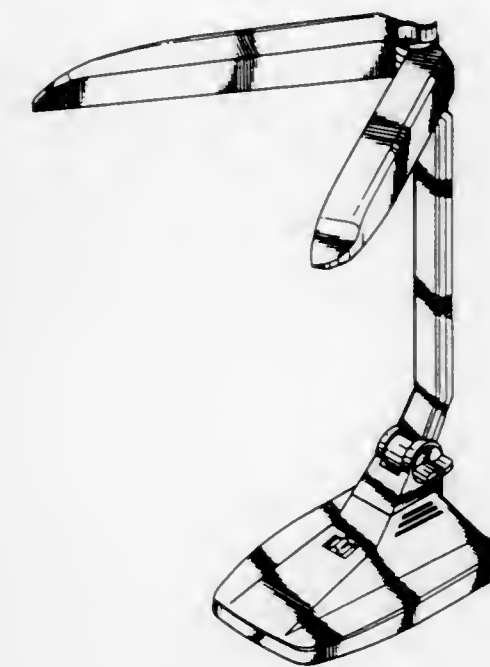
Se Kit Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong

Filed Jun. 29, 1994, Ser. No. 25,309

Claims priority, application United Kingdom, Mar. 8, 1994, 2037619

Term of patent 14 years

U.S. Cl. D26—65



357,992

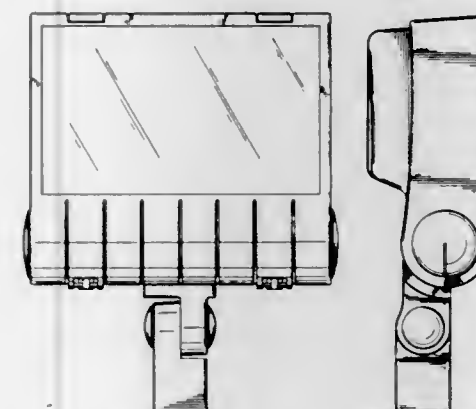
## ADJUSTABLE FLOODLIGHT

David E. Mehaffey, Vicksburg, Miss., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 12, 1993, Ser. No. 11,693

Term of patent 14 years

U.S. Cl. D26—63



357,994

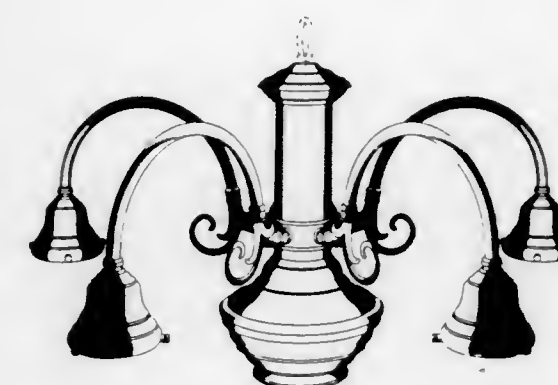
## CHANDELIER

Patrick Dolan, 1020 SW. Westwood Ct., Portland, Ore. 97201

Filed Jul. 7, 1994, Ser. No. 25,141

Term of patent 14 years

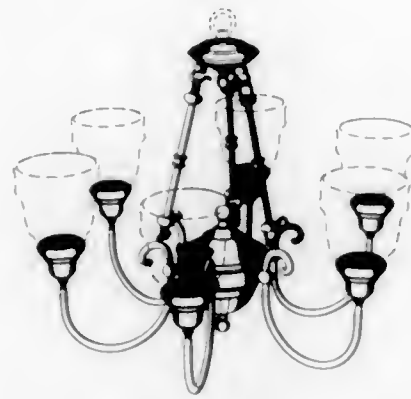
U.S. Cl. D26—81





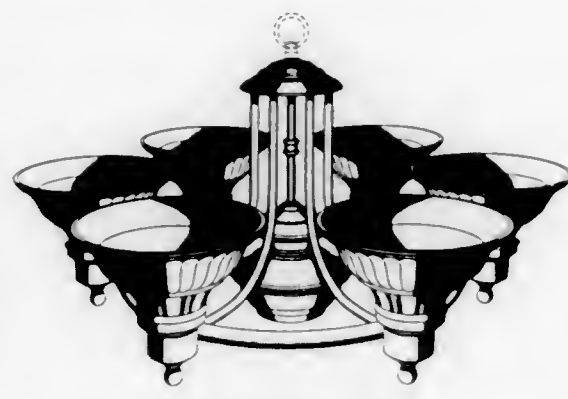
357,995  
CHANDELIER

Patrick Dolan, 1020 SW. Westwood Ct., Portland, Oreg. 97201  
Filed Jul. 7, 1994, Ser. No. 25,143  
Term of patent 14 years  
U.S. Cl. D26—81



357,996  
CHANDELIER

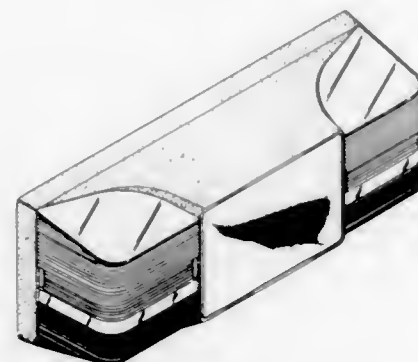
Patrick Dolan, 1020 SW. Westwood Ct., Portland, Oreg. 97201  
Filed Jul. 7, 1994, Ser. No. 25,142  
Term of patent 14 years  
U.S. Cl. D26—86



357,997

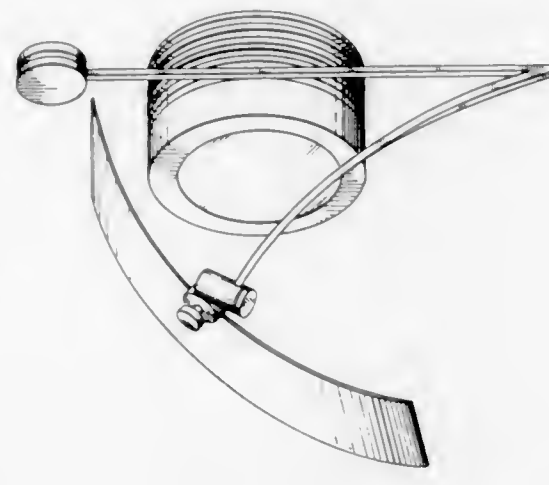
FIXED LENS EMERGENCY LIGHTING UNIT

Joseph S. Wegrzyn, Stratford; Charles Ruskowski, Danbury, and Donald C. Crescenzi, Killingworth, all of Conn., assignors to General Signal Corporation, Stamford, Conn.  
Filed Nov. 17, 1993, Ser. No. 15,453  
Term of patent 14 years  
U.S. Cl. D26—85



357,998  
CEILING LAMP

Martin Kania, Fischenbergstrasse 15 b, 58455 Witten, Germany  
Filed Oct. 8, 1993, Ser. No. 14,018  
Claims priority, application Germany, Apr. 8, 1993, 93 03 078.9  
Term of patent 14 years  
U.S. Cl. D26—88



357,999

FLASHLIGHT MOUTHPIECE

John C. Weis, 1191 Southerland Rd., Dickson, Tex. 37055  
Filed Dec. 28, 1993, Ser. No. 16,836  
Term of patent 14 years  
U.S. Cl. D26—138



358,000  
HAIR PICK

Barbara J. Molenaar, 9201 North Shore Dr., Spicer, Minn. 56288  
Filed May 24, 1993, Ser. No. 8,631  
Term of patent 14 years  
U.S. Cl. D28—22



358,002

POWER DRIVEN FLOSSING DEVICE

William J. Rakocy, Madison, Conn., assignor to Ohio Health Care Products, Inc., North Bergen, N.J.  
Filed Nov. 5, 1993, Ser. No. 14,961  
Term of patent 14 years  
U.S. Cl. D28—64



358,001

FLOSS STICKS

Barbara J. Ramsey, 3048 Live Oak Ave., Fullerton, Calif. 92635-2240  
Filed Jun. 17, 1993, Ser. No. 9,530  
Term of patent 14 years  
U.S. Cl. D28—64



358,003

TODDLER SAFETY HELMET

Raymond Losi, II, Thousand Oaks, Calif., assignor to Variflex, Inc., Moorpark, Calif.  
Filed Jul. 20, 1993, Ser. No. 10,822  
Term of patent 14 years  
U.S. Cl. D29—102



358,004

## SAFETY HELMET

Raymond Lost, II, Thousand Oaks, Calif., assignor to Variflex, Inc., Moorpark, Calif.

Filed Jul. 20, 1993, Ser. No. 10,825

Term of patent 14 years

U.S. Cl. D29—102



358,005

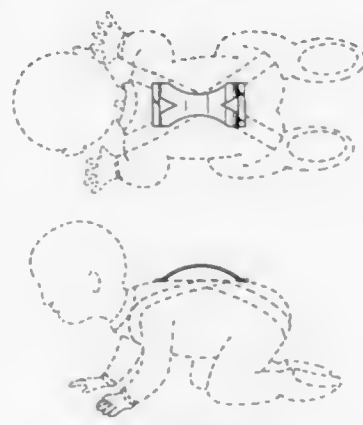
## INFANT HOLDING DEVICE

Kenneth C. Fording, 9102 Alden Dr., Los Angeles, Calif. 90048

Filed Feb. 5, 1992, Ser. No. 831,285

Term of patent 14 years

U.S. Cl. D29—122



358,006

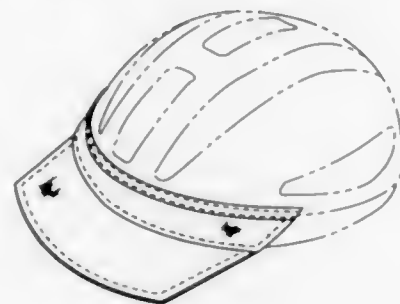
## DETACHABLE VISOR FOR APPLICATION TO A HELMET

Beirne Chisolm, 1500 S. 2400 East, Salt Lake City, Utah 84108, and Gregg Chisolm, 2770 S. Melbourne, Salt Lake City, Utah 84106

Filed Mar. 16, 1993, Ser. No. 5,997

Term of patent 14 years

U.S. Cl. D29—122



358,007

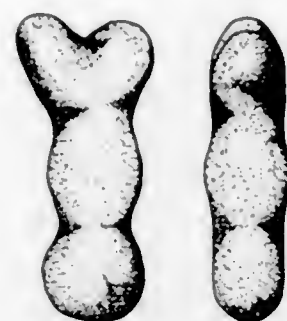
## CHEW TOY FOR DOGS

Herbert R. Axelrod, 6 Marine Pl., Deal, N.J. 07753

Filed Jul. 25, 1994, Ser. No. 26,305

Term of patent 14 years

U.S. Cl. D30—160



358,008

## CAT SHAPED LITTER PAN

Steven F. Keller, and Karen S. Keller, both of 8721 Golden Gardens Dr., N.W. Seattle, Wash. 98117

Filed Sep. 25, 1992, Ser. No. 950,056

Term of patent 14 years

U.S. Cl. D30—161



358,009

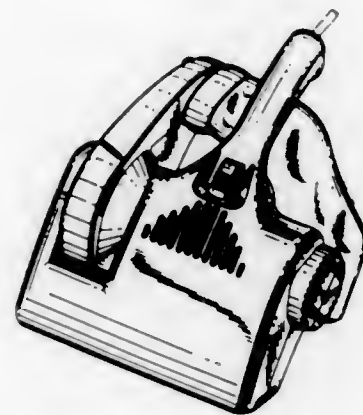
## HANDHELD VACUUM CLEANER

Robert W. Burkhardt, Bristol, Tenn., assignor to Electrolux Corporation, Atlanta, Ga.

Filed Sep. 16, 1993, Ser. No. 13,050

Term of patent 14 years

U.S. Cl. D32—18



358,010

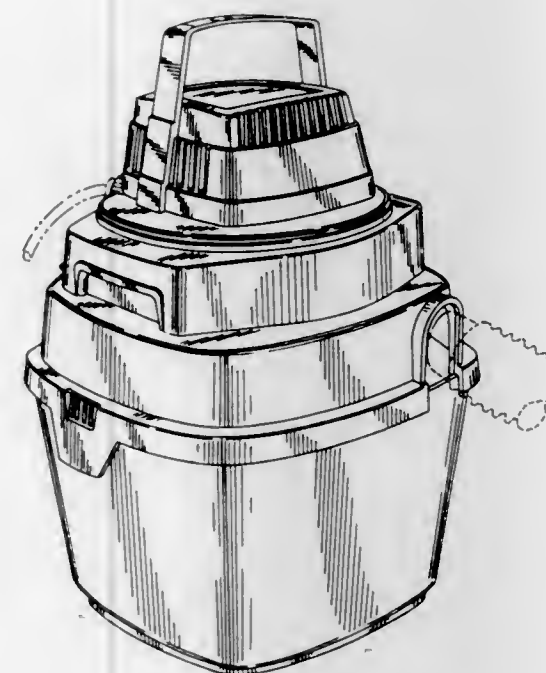
## COMBINED WET AND DRY VACUUM CLEANER

Robert C. Berfield, Jersey Shore, and Thomas S. Davy, Lock Haven, both of Pa., assignors to Shop Vac Corporation, Williamsport, Pa.

Filed Sep. 7, 1993, Ser. No. 12,656

Term of patent 14 years

U.S. Cl. D32—23



358,012

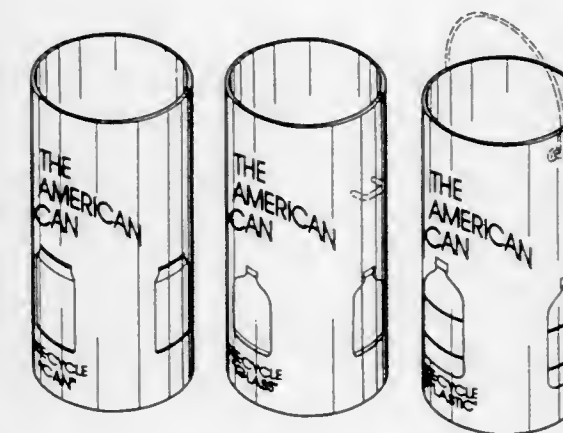
## RECYCLING CONTAINER

Kenneth W. Faulkner, 901 Second St., Delanco, N.J. 08075, and Jack Winkelspecht, 306 Orange Dr., Edgewater Park, N.J. 08010

Filed Oct. 18, 1993, Ser. No. 14,273

Term of patent 14 years

U.S. Cl. D34—1



358,013

## FORK LIFT TRUCK

Roland Heiler, Tiefenbronn, Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Germany

Filed May 24, 1994, Ser. No. 23,412

Claims priority, application Germany, Nov. 29, 1993, M 93 09 270.9

Term of patent 14 years

U.S. Cl. D34—34



358,011

## SCRAPING DEVICE

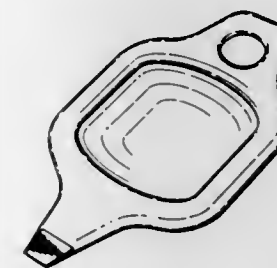
Lorraine M. Decarli, 323 Fifth Street, Midland Ontario, Canada L4R 3W7

Filed Dec. 20, 1993, Ser. No. 16,518

Claims priority, application Canada, Dec. 16, 1993, 16-12-93-3

Term of patent 14 years

U.S. Cl. D32—46





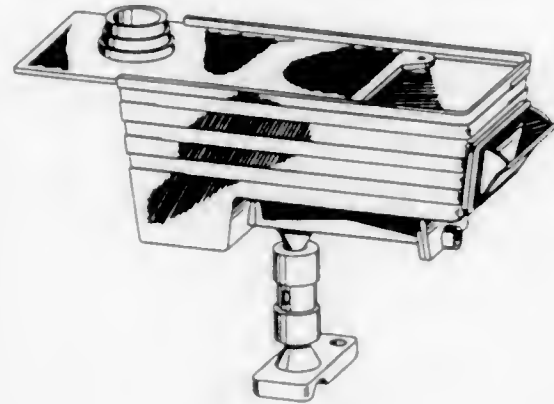
## LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 2ND DAY OF MAY, 1995

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

358,014  
ADJUSTABLE LOCK BOX  
Adolf Weigl, Zellweg 15, 83134 Prutting, Germany  
Filed Mar. 17, 1994, Ser. No. 20,074  
Claims priority, application Hague Agreement, Oct. 22, 1993,  
DM/027,657  
Term of patent 14 years  
U.S. Cl. D99—28



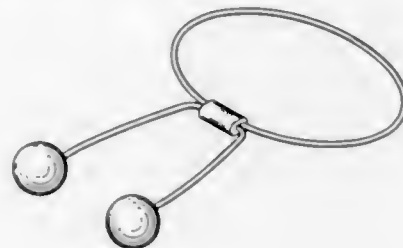
358,015  
COIN HOLDER  
Michael H. Baumgartner, and Mary Jo Doering, both of 403 N.  
10th St., Olivia, Minn. 56277  
Filed Mar. 23, 1994, Ser. No. 20,260  
Term of patent 14 years  
U.S. Cl. D99—34



358,016  
CONTAINER AND BANK  
Mitchell F. August, 7183 Hillside Dr., West Bloomfield, Mich.  
48322  
Filed Feb. 10, 1994, Ser. No. 18,598  
Term of patent 14 years  
U.S. Cl. D99—37



358,017  
OBJECT FOR USE IN MEDITATION AND  
TRANQUILIZATION  
Karen Clark, P.O. Box 351; Marilyn Stewart, Rte. 1 Box 185  
A-1, and Myne Denney, P.O. Box 351, all of Timpson, Tex.  
75975  
Filed Mar. 25, 1994, Ser. No. 20,371  
Term of patent 14 years  
U.S. Cl. D99—99



Aasmul-Olsen, Stig: See—  
Widmer, Fred; Gauri, Kailash K.; and Aasmul-Olsen, Stig,  
5,411,942, Cl. 514-17.000.  
ABB Management AG: See—  
Muller, Peter, 5,410,869, Cl. 60-39.020.  
Nazmy, Mohamed; Noseda, Corrado; and Staubli, Markus,  
5,411,702, Cl. 420-79.000.  
ABB Power T & D Company, Inc.: See—  
Yocom, Thomas M., 5,412,624, Cl. 368-156.000.  
Abbott, Kenneth E.; Lyons, Patrick J.; and Satariano, Richard M.  
Air-flow control for particle cleaning systems. 5,411,142, Cl.  
209-29.000.  
Abbott Laboratories: See—  
Cotter, Darlene L.; Abry, Barbara L.; and Weigand, Ray A.,  
5,411,894, Cl. 436-174.000.  
Goldhardt, Donald J.; and Hirsch, William H., 5,411,491, Cl.  
604-247.000.  
Morley, James A.; Bauer, John F.; Patel, Ramesh F.; Henry, Rod-  
ger E.; and Spanton, Stephen G., 5,412,095, Cl. 544-291.000.  
Abbott, Russell M., to Hughes Aircraft Company. Cooled primary of  
automobile battery charging transformer. 5,412,304, Cl. 320-2.000.  
Abdala, Julio: See—  
Suppelsa, Anthony J.; Darveaux, Robert F.; Goodwin, Thomas A.;  
Abdala, Julio; and Liebman, Henry F., 5,411,199, Cl.  
228-179.100.  
Abe, Masahiro; Mase, Yasukazu; and Yamamoto, Tomie, to Kabushiki  
Kaisha Toshiba. Method for patterning wirings of semiconductor  
integrated circuit device. 5,411,916, Cl. 437-189.000.  
Abe, Takao: See—  
Tamai, Satoshi; Abe, Takao; and Nagase, Yunusuke, 5,412,103, Cl.  
548-365.100.  
Abe, Yohji: See—  
Sakaguchi, Takahiro; Abe, Yohji; and Sugahara, Hiroshi, 5,412,273,  
Cl. 310-268.000.  
Abegglen, Hans: See—  
Henz, Jurg; Abegglen, Hans; and Zesch, Manfred, 5,410,974, Cl.  
112-83.000.  
Abekas Video Systems, Inc.: See—  
Wolf, Bruno; and Kulmacezewski, Linda M., 5,412,401, Cl.  
345-139.000.  
Abele, Manlio G.; and Rusinek, Henry, to New York University. High  
field magnets for medical applications. 5,412,365, Cl. 335-306.000.  
Aberg, Robert O.; and Hoeland, Stephen J., to AlliedSignal Inc. Gas  
turbine engine failure detection system. 5,411,364, Cl. 415-9.000.  
Abidin, Michael R.; and Lehmbeck, Steven P., to Bloom, Leonard, a  
part interest. Guarded surgical scalpel. 5,411,512, Cl. 606-167.000.  
Abou-Gharbia, Magid A.: See—  
Kao, Wenling; Skotnicki, Jerauld S.; Abou-Gharbia, Magid A.; and  
Palmer, Yvette L., 5,411,967, Cl. 514-291.000.  
Aboul-Magd, Osama S.: See—  
Giroux, Nathalie; Morin, Marianne J.; Lemay, Marcel; Kosit-  
paiboon, Rungroj; and Aboul-Magd, Osama S., 5,412,647, Cl.  
370-60.000.  
Abrams, Robert M.; and Fariabi, Sepehr, to Advanced Cardiovascular  
Systems, Inc. Superelastic guiding member. 5,411,476, Cl. 604-95.000.  
Abry, Barbara L.: See—  
Cotter, Darlene L.; Abry, Barbara L.; and Weigand, Ray A.,  
5,411,894, Cl. 436-174.000.  
Abuto, Frank P.: See—  
Tanzer, Richard W.; Abuto, Frank P.; Kellenberger, Stanley R.;  
Laux, Daniel R.; Nortman, Brian K.; Pomplun, William S.; Rippl,  
Carl G.; Robinson, Mark L.; Sallee, Lorry F.; Yarbrough, Sandra  
M.; and Zenker, David L., 5,411,497, Cl. 604-368.000.  
Acer Peripherals, Inc.: See—  
Hsu, Hung H., 5,411,620, Cl. 156-230.000.  
Acovic, Alexandre; and Wu, Ben S., to International Business Machines  
Corporation. Method of making trench EEPROM structure on SOI  
with dual channels. 5,411,905, Cl. 437-43.000.  
Actel Corporation: See—  
Forouhi, Abdul R.; McCollum, John L.; and Chen, Shih-Oh,  
5,411,917, Cl. 437-195.000.  
Handy, Esmat Z.; Mohsen, Amr M.; McCollum, John L.; Chen,  
Shih-Oh; and Chiang, Steve S., 5,412,244, Cl. 257-530.000.  
ActiMed Laboratories, Inc.: See—  
Law, Wai T.; and Ertingshausen, Gerhard, 5,411,870, Cl.  
435-11.000.  
McGeehan, John K.; Ertingshausen, Gerhard; and Meluch, Timo-  
thy B., 5,411,858, Cl. 435-4.000.  
Adamczyk, Andrew A., Jr.; Montreuil, Clifford N.; and Williams, Scott  
C., to Ford Motor Company. Automotive engine having catalytic  
exhaust aftertreatment device and secondary air injection control  
system for minimum catalyst light-off time. 5,410,872, Cl. 60-274.000.  
Adams, Kenneth M.: See—  
Fucci, Joseph; Dinger, Fred B., III; Trott, A. Frank; Adams,  
Kenneth M.; and Mazurek, William F., 5,411,514, Cl.  
606-180.000.  
Adams, Macie G. Portable vehicle window wiper. 5,410,774, Cl.  
15-250.300.  
Adams, Robert W.: See—  
Vincelette, Scott; Ferguson, Paul F., Jr.; and Adams, Robert W.,  
5,412,387, Cl. 341-150.000.  
Adams, Robin M.; Power, Scott D.; Powers, David B.; Wells, James A.;  
and Yansura, Daniel G., to Genencor, Inc. Process for producing  
heterologous polypeptides. 5,411,873, Cl. 435-69.100.  
Adams, Steve M.: See—  
Martin, Charles W.; Reid, Frederick S.; Forbus, Gary L.; Adams,  
Steve M.; Shannon, C. Pat; and Pirpich, Eric A., 5,412,791, Cl.  
395-425.000.  
Adams, Theodore P.: See—  
Kroll, Mark W.; Supino, Charles G.; Adams, Theodore P.; and  
Brumwell, Dennis A., 5,411,526, Cl. 607-5.000.  
Adler-Moore, Jill: See—  
Moore, Larry J.; and Adler-Moore, Jill, 5,411,743, Cl. 424-450.000.  
Adler, Randy W.: See—  
Wilson, Robert J.; Sperduti, David; and Adler, Randy W.,  
5,411,110, Cl. 180-247.000.  
Adsett, Willie, to Taphorn, Joseph B., a part interest. Ink vibrator.  
5,410,960, Cl. 101-363.000.  
Advance Car Wash Equipment, Inc.: See—  
Nittoli, Frank J., 5,410,770, Cl. 15-97.300.  
Advanced Cardiovascular Systems, Inc.: See—  
Abrams, Robert M.; and Fariabi, Sepehr, 5,411,476, Cl. 604-95.000.  
Advanced Deposition Technologies, Inc.: See—  
Walters, Glenn J.; and McCormick, John A., 5,412,187, Cl.  
219-728.000.  
Advanced Interventional Systems, Inc.: See—  
Laudenslager, James B.; Kinley, Fred G.; and Tzeng, Shing-Wu P.,  
5,412,682, Cl. 372-65.000.  
Advanced Micro Devices, Inc.: See—  
Kromer, Stephen C.; and Ganapathy, Gopi, 5,412,663, Cl.  
371-22.100.  
Moyal, Miki; Brennan, Thomas; and Vance, Gene, 5,412,594, Cl.  
365-96.000.  
Advanced Semiconductor Materials America, Inc.: See—  
Hawkins, Mark R.; and Robinson, McDonald, 5,411,590, Cl.  
118-715.000.  
Advantest Corporation: See—  
Honma, Tatsuya; Kinugasa, Tatsuo; and Imai, Minoru, 5,412,662,  
Cl. 371-21.100.  
Affymax Technologies N.V.: See—  
McGill, Glenn H.; Fodor, Stephen P. A.; and Sheldon, Edward L.,  
5,412,087, Cl. 536-24.300.  
Afonso, Adriano; Weinstein, Jay; and Gentles, Margaret J., to Schering  
Corporation. Ester and alkoxy substituted benzopyrans. 5,412,104,  
Cl. 548-525.000.  
Agar, Joseph T. H.; and Fraser, Douglas G., to Procter & Gamble  
Company, The. Peroxyacid bleach precursor compositions.  
5,411,673, Cl. 252-95.000.  
Agdelo, Luis F.: See—  
Basaly, Mores A.; Massad, Suhail K.; and Agdelo, Luis F.,  
5,411,607, Cl. 148-272.000.  
Agency Of Industrial Science And Technology: See—  
Yamashita, Juli; and Fukui, Yukio, 5,412,770, Cl. 395-142.000.  
AGFA-Gevaert, N.V.: See—  
Marien, August; Stevens, Marc; and Verheijen, Joannes, 5,411,843,  
Cl. 430-501.000.  
Agrawal, Rakesh; Gehani, Narain H.; and Srinivasan, Jagannathan, to  
AT&T Corp. Apparatus for and method of displaying a data item of  
a database using the display function of a selected data item.  
5,412,774, Cl. 395-157.000.  
Agrawal, Rakesh: See—  
Watson, Charles F.; Whitley, Roger D.; Agrawal, Rakesh; and  
Kumar, Ravi, 5,411,578, Cl. 95-101.000.  
Ahari, Frederick F.: See—  
Allen, William J.; Jessup, George; Ahari, Frederick F.; Rabiner,  
Robert A.; and Burbank, John E., III, 5,411,481, Cl. 606-144.000.  
Ahern, Brian S.; Johnson, Keith H.; and Clark, Harry R., Jr., to Massa-  
chusetts Institute of Technology. Method of maximizing anharmonic  
oscillations in deuterated alloys. 5,411,654, Cl. 204-242.000.  
Ahlwalia, Gurpreet S.: See—  
Shander, Douglas; Ahluwalia, Gurpreet S.; and Grosso, Diana  
M-D., 5,411,991, Cl. 514-665.000.  
Ahmed, A. Mateen. Medical valve. 5,411,473, Cl. 604-8.000.

- Ahmed, Iqbal; and Hsieh, Henry L., to Phillips Petroleum Company. Grafted copolymers highly absorbent to aqueous electrolyte solutions. 5,412,052, Cl. 527-300,000.
- Aiken, Robert B., Sr., to Milwaukee Sign Co. Scrolling sign for menu display unit. 5,410,830, Cl. 40-518,000.
- Ainslie, Benjamin J.; and Craig-Ryan, Susan P., to British Telecommunications public limited company. Wave-guiding structure with lasing properties. 5,412,672, Cl. 372-6,000.
- Air Liquide America Corp.: See—  
Connors, Robert W.; Giacobbe, Frederick W.; Jurcik, Benjamin; and McKean, Kevin P., 5,411,200, Cl. 228-219,000.
- Air Products and Chemicals, Inc.: See—  
Watson, Charles F.; Whitley, Roger D.; Agrawal, Rakesh; and Kumar, Ravi, 5,411,578, Cl. 95-101,000.
- Aisin AW Co., Ltd.: See—  
Ando, Masahiko; Noda, Koji; Yamamoto, Yoshihisa; Hayabuchi, Masahiro; Tsukamoto, Kazumasa; Hojo, Yasuo; Taga, Yutaka; Oba, Hidehiro; and Kubo, Seitoku, 5,411,451, Cl. 477-144,000.
- Akashira, Nobuo: See—  
Ohno, Eiji; Nishiuchi, Kenichi; Nagata, Kenichi; Yamada, Noboru; and Akahira, Nobuo, 5,412,626, Cl. 369-13,000.
- Akhtar, Masood. Sensing algorithm for anti-tachycardia devices using dual chamber sensing. 5,411,530, Cl. 607-14,000.
- Akinmade, Ademola O.; and Braybrook, Julian H., to British Technology Group Limited. Dental cement. 5,411,584, Cl. 106-35,000.
- Akiyama, Koichi; Miyashita, Hiromu; Aoki, Sanji; Hatta, Ken; Ino, Takashi; and Mishima, Yasuhiro, to Takeda Chemical Industries, Ltd.; and Toyota Jidosha Kabushiki Kaisha. Unsaturated polyester resin compositions, molding materials, and molded products. 5,412,003, Cl. 523-513,000.
- Akkerman, Neil H. Surface controlled, subsurface tubing safety valve. 5,411,096, Cl. 166-321,000.
- aktual Bauteile und Umweltschutz Systeme, GmbH & Co. KG: See—  
Loesken, Gilbert, 5,410,840, Cl. 47-58,000.
- Akuta, Yasuo, to Furukawa Electric Co., Ltd., The. Method for disposing of enameled wire scraps. 5,411,214, Cl. 241-19,000.
- Akzo Nobel N.V.: See—  
Hanna, Paul K.; and Cheron, Teresa M., 5,412,070, Cl. 528-392,000.
- Albany International Corp.: See—  
Brookstein, David S., 5,411,463, Cl. 492-38,000.
- Albemarle Corporation: See—  
Sangokoya, Samuel A., 5,412,131, Cl. 556-175,000.
- Albrecht, Peter; Linke, Michael; and Peterko, Marek, to Krupp Corporation Maschinenbau GmbH. Prestress device. 5,411,391, Cl. 425-451,900.
- Alcatel Italia S.p.A.: See—  
Bolla, Maurizio; Gelicchi, Massimo; Guglielmi, Franco; and Leurratti, Nino, 5,412,693, Cl. 375-326,000.
- Alcatel N.V.: See—  
Rossberg, Rolf; Fritsch, Rainer; Otterbach, Jürgen; and Heidemann, Rolf, 5,412,746, Cl. 385-48,000.
- Alcatel N.V.: See—  
Alston, Andrew; Delory, Jean-Michel; Gandara, Marc; and Laasri, Hassan, 5,412,753, Cl. 395-12,000.
- Alcon Laboratories, Inc.: See—  
Nixon, Jon C.; and York, Billie M., 5,411,940, Cl. 514-12,000.
- Alderman, Richard L.; and Hue, Donald C. Wheels that provide lateral friction on ice. 5,411,320, Cl. 301-5,300.
- Alexander, Willard E.; Chau, Chieh-Chun; and Faley, Timothy L., to Dow Chemical Company, The. Process for post-spin finishing of polybenzoxazole fibers. 5,411,694, Cl. 264-184,000.
- Alexandre, Francois: See—  
Dubon-Chevallier, Chantal; Dangla, Jean; Benchimol, Jean-Louis; and Alexandre, Francois, 5,412,233, Cl. 257-197,000.
- Alfred Teves GmbH: See—  
Zydek, Michael; and Fey, Wolfgang, 5,411,324, Cl. 303-92,000.
- Ali-Safai, Mohammad: See—  
McVicar, David N., and Ali-Safai, Mohammad, 5,412,205, Cl. 250-234,000.
- Alig, Robert J.; Raitzer, Gerald A.; and Shinsky, Michael, to Digital F/X, Inc. Computer generated wipes for video editing systems. 5,412,479, Cl. 348-594,000.
- Allaire, Marc-Andre: See—  
LaForté, Jean-Louis; Allaire, Marc-Andre; and Farzeneh, Masoud, 5,411,121, Cl. 191-33,0PM.
- Allen-Bradley Company, Inc.: See—  
Koziczowski, Joseph E.; Annis, Jeffrey R.; Krieger, Roland L.; and Stache, Jerome P., 5,411,162, Cl. 220-320,000.
- Allen, Donald W.; and Henning, Dean L., to Shell Oil Company. Small fixed teardrop fairings for vortex induced vibration suppression. 5,410,979, Cl. 114-243,000.
- Allen, Fred M.: See—  
Willis, Mitchell J.; Canavan, Patrick D.; Allen, Fred M.; and Lampert, Jordan K., 5,411,587, Cl. 106-486,000.
- Allen, James D.: See—  
Stork, David G.; and Allen, James D., 5,412,670, Cl. 371-49,200.
- Allen, John J., Jr.: See—  
Root, Kevin B.; Allen, John J., Jr.; and Newton, Ronald O., 5,412,572, Cl. 364-426,010.
- Allen, Rebecca L.; and Lonsdale, David M., to Pioneer Hi-Bred International Inc. Pollen-specific promoter from maize. 5,412,085, Cl. 536-24,100.
- Allen, William J.; Jessup, George; Ahari, Frederick F.; Rabiner, Robert A.; and Burbank, John E., III, to American Cyanamid Co. Surgical purse string suturing instrument and method. 5,411,481, Cl. 606-144,000.
- Allergan, Inc.: See—  
Gerace, John D.; and Christ, F. Richard, 5,411,553, Cl. 623-6,000.
- AlliedSignal Europe Services Techniques: See—  
Kervagoret, Gilbert, 5,410,943, Cl. 91-459,000.
- AlliedSignal Inc.: See—  
Aberg, Robert O.; and Hoeland, Stephen J., 5,411,364, Cl. 415-9,000.
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- Collins, Cecil A.; and Fisher, Alfred J., III, 5,411,221, Cl. 242-372,000.
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- Applied Medical Resources Corporation: See—  
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- Arima, Takafumi, to Fujitsu General Limited. Control apparatus of air-conditioner. 5,410,890, Cl. 62-228,400.
- Arimoto, Akira: See—  
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Baker Hughes Incorporated: See—  
Kennedy, Brian S., 5,411,082, Cl. 166-181.000.

LeBlanc, Kenneth J.; and Rudd, Kenneth R., 5,411,088, Cl. 166-265.000.

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Bakermans, Johannes C. W.; and Poplaski, Daniel E., to Whitaker Corporation. The Scrap removal system for a stamping and forming machine, 5,410,928, Cl. 83-155.000.

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Balaban, Alvin R.: See—  
Ko, Jung W.; Balaban, Alvin R.; and Strolle, Christopher H., 5,412,481, Cl. 358-320.000.

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Roders, George W.; and Banks, Stewart, 5,411,178, Cl. 222-105.000.

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Bapst, Mark V., to VLSI Technology, Inc. Schematic compiler for a multi-format high speed multiplier, 5,412,591, Cl. 364-757.000.

Baran, John S.: See—  
Hanson, Gunnar J.; and Baran, John S., 5,411,957, Cl. 514-216.000.

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Bottomley, Stephen E.; Lundy, Daniel E.; Dadah, Betsy; and Barr, Robert K., 5,411,837, Cl. 430-281.000.

Barrett, Raymond L., Jr.; Herold, Barry W.; and Pajunen, Grazyna A., to Motorola, Inc. Self-biasing boot-strapped cascode amplifier, 5,412,336, Cl. 327-560.000.

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Wilkerson, John M., III; Verstrat, Daniel W.; and Barron, Milagros C., 5,412,142, Cl. 560-33.000.

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Barlow, Neil G.; Brown, Paul J.; Capowski, Robert S.; Fasano, Louis T.; Gregg, Thomas A.; Salyer, Gregory; and Westcott, Douglas W., to International Business Machines Corporation. Communications system having plurality of originator and corresponding recipient buffers with each buffer having three different logical areas for transmitting messages in single transfer, 5,412,803, Cl. 395-575.000.

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Barud, Sigvard, to Siemens Elema AB. Examination table connected to a floor stand via an articulated lever arrangement, 5,410,767, Cl. 5-601.000.

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Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,411,936, Cl. 504-244.000.

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Dix, Johannes P.; Lamm, Gunther; Reichelt, Helmut; and Zeidler, Georg, 5,411,556, Cl. 8-437.000.

Bashir, Rashid; Hebert, Francois; and Chen, Datong, to National Semiconductor Corporation. Simple planarized trench isolation and field oxide formation using poly-silicon, 5,411,913, Cl. 437-67.000.

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Bass, Mark; Caillat, Jean-Luc; and Anderson, Gary J., to Copeland Corporation. Scroll compressor having upper and lower bearing housings and a method of testing and assembling the compressor, 5,411,384, Cl. 418-55.100.

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Basstein, Augustinus F. H.; and Uittenbogaart, Gustaaf A., to Crown Gear, B.V. Method for crown gear grinding by generation, 5,411,431, Cl. 451-47.000.

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Bates, Scott B.; and Haghani, Jean E., to Avery Dennison. Tamper-evident label. 5,411,295, Cl. 283-81.000.

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Lee, James A., Jr.; Wickham, Douglas L.; Eilers, Gregory L.; Batterson, William D.; and Stapleton, Craig A., 5,411,196, Cl. 224-321.000.

Bauer, Eric J., to AT&T Corp. System for parsing extended file names in an operating system. 5,412,808, Cl. 395-600.000.

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Bauman, Douglas A.; Lowenfeld, Simon; Schultz, Brian A.; and Thompson, Robert W., Jr., to Mitsubishi Denki Kabushiki Kaisha. Artificial intelligence software shell for plant operation simulation. 5,412,756, Cl. 395-50.000.

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Bulan, Andreas; Weher, Rainer; Block, Hans-Dieter; and Moretto, Hans-Heinrich, 5,411,726, Cl. 423-484.000.

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Goldmann, Siegfried; Boshagen, Horst; Stoltefuss, Jurgen; Straub, Alexander; Gross, Rainer; Hutter, Joachim; Heibisch, Siegfried; and Bechem, Martin, 5,412,099, Cl. 548-180.000.

Kellerhof, Ingo; Pfeil, Hans-Dieter; and Krippel, Kurt, 5,411,389, Cl. 425-4.000.

Klausener, Alexander; Kleefeld, Gerd; Brandes, Wilhelm; Dutzmann, Stefan; and Hansler, Gerd, 5,412,100, Cl. 548-187.000.

Kuhnt, Dietmar; Gayer, Herbert; and Gerdes, Peter, 5,412,149, Cl. 560-35.000.

Landscheidt, Heinz; Wagner, Paul; and Klausener, Alexander, 5,412,147, Cl. 558-488.000.

Schwenner, Eckhard; Ladouceur, Gaetan; Kabbe, Hans-Joachim; and Aune, Thomas M., 5,411,960, Cl. 514-230.500.

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Zwiener, Christian; Sonntag, Michael; Margotte, Dieter; Pedain; Blum, Harald; and Schneider, Volker, 5,412,056, Cl. 528-73.000.

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Mueller, Robert W.; Sisson, Glen C.; Maloney, James G.; Parks, David A.; Carothers, Arthur D.; and Beatty, William E., Jr., 5,412,167, Cl. 200-43.140.

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Beeghly, Richard M.; Montgomery, Edward L.; Legas, William H.; Crump, Robert L.; and Schad, Deloris J., to Goodyear Tire & Rubber Company, The. Pneumatic tire for use on agricultural tractors and other like vehicles. 5,411,067, Cl. 152-209.000.

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King, Roger M.; and King, Whitney M., 5,411,157, Cl. 215-330.000.

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Beguvin, Francois: See—  
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Belec, Eric A.; and Toth, William D., to Pitney Bowes Inc. Turn-up and alignment apparatus. 5,411,250, Cl. 271-185.000.

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Below, Randy: See—  
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Bennett, Kendrick R.: See—  
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Benton, Michael Edward: See—  
Benton, Michael E.; and Brown, Robert C., 5,410,834, Cl. 42-75.020.

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Bentz, Joseph C.; Carroll, John T., III; and Shinosawa, Katsuhiko, to Cummins Engine Company, Inc. Valve crosshead assembly with wear-reducing contact pad. 5,410,995, Cl. 123-90.220.

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Tsao, Fu-Pao; Littlefield, Susan A.; and Stone, John H., 5,411,598,  
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Civarolo, Marcelo F.: See—  
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AlliedSignal, Inc: Seat belt system with locking guide loop assembly.  
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Crockett, Michael I.: See—  
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Culp, Joel B. Portable containment device for contaminated medical objects. 5,411,193, Cl. 224-252.000.

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Cupo, Albert: See—  
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Ehlinger, Jeffrey C.; and Cole, Frank, 5,411,095, Cl. 166-317.000.

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Dix, Johannes P.; Lamm, Gunther; Reichelt, Helmut; and Zeidler, Georg, to BASF Aktiengesellschaft. Dyeing leather with a red azo dye. 5,411,556, Cl. 8-437.000.

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Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, to International Business Machines Corporation. Low temperature plasma oxidation process. 5,412,246, Cl. 257-632.000.

Dockstader, Robert K., Jr.: See—  
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Sommer, Oswin; Dubois, Michel; Dorsch, Norman; and Strasser, Alois, 5,412,015, Cl. 524-425.000.

Dorschner, Terry A.: See—  
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Dorsemaen, Bernardus H. M. A.; and Westemeyer, Manfred, to U.S. Philips Corporation. Capped electric lamp with connection conductor butt welded to a lamp vessel current conductor. 5,412,275, Cl. 313-318.010.

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Plagge, Heinrich; Krause, Hans-Joachim; Oberdorfer, Dietmar; and Pluquett, Ulrich, 5,412,470, Cl. 356-338.000.

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Izu, Masatsugu; Dotter, Buddie R., II; Ovshinsky, Stanford R.; and Hasegawa, Wataru, 5,411,591, Cl. 118-718.000.

Dougherty, Robert G. Golf cart umbrella holder. 5,411,237, Cl. 248-534.000.

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Alexander, Willard E.; Chau, Chieh-Chun; and Faley, Timothy L., 5,411,694, Cl. 264-184.000.

Cowley, Terry W.; and White, Mary L. N., 5,412,010, Cl. 524-109.000.

Hefner, Robert E., Jr.; and Earls, Jimmy D., 5,412,044, Cl. 525-523.000.

Hefner, Robert E., Jr.; and Earls, Jimmy D., 5,412,057, Cl. 528-96.000.

Imekparia, Daniel D.; Schmidt, Creston D.; and Suh, Kyung W., 5,411,687, Cl. 264-50.000.

Osby, John O.; and Sekinger, John K., 5,412,064, Cl. 528-298.000.

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Downton, Galen E.; Maxwell, Michael W.; Harper, Heather J.; Mohlenkamp, M. Joseph, Jr.; Rizzi, George P.; Litke, Manfred; Romer, Karin; and Engel, Ruediger, to Procter & Gamble Company, The. Process and composition for sweet juice from cucurbitaceae fruit. 5,411,755, Cl. 426-599.000.

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Drake, John L., Jr.: See—  
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Drappel, Stephan V.: See—  
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Dreyfus, Thierry; and Le Bour, Noel, to CECA S.A. Novolaks of the phenol-thienic aldehyde type. 5,412,058, Cl. 528-129.000.

Driver, Richard C., to Timken Company, The. Bearing with dual ring seats. 5,411,335, Cl. 384-448.000.

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Droghini, Roberto: See—  
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Duchek, Donna. Structural graphic display. 5,412,625, Cl. 368-223.000.

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Lauw, Hian K., 5,412,557, Cl. 363-37,000.  
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Elgee, Steven B., to Hewlett-Packard Company. "Milepost" single-channel encoder, scale, and method, for midscan turn around in a scanning-head printer or reader. 5,411,340, Cl. 400-279,000.  
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Elizabeth Arden Company, Division of Conopco, Inc.: See—  
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Ellis, James S., to Pheno Imaging, Inc. Three-dimensional phenotypic measuring system for animals. 5,412,420, Cl. 348-135,000.  
Ellis, Martin J. Universal one man brake bleeding apparatus. 5,410,881, Cl. 60-584,000.  
Ellis, Thomas J. Drawer and insert for rapid removal of valuables. 5,411,165, Cl. 220-404,000.  
Ellsworth, Lynn K.; and Shaneyfelt, John D., to 2TEK Corporation. The Musical instrument bridge. 5,410,936, Cl. 84-298,000.  
Ellsworth, Mark W.: See—  
Novak, Bruce M.; and Ellsworth, Mark W., 5,412,043, Cl. 525-479,000.  
Ellwood, Derek C.; Evans, Charles G. T.; Dunn, Geoffrey M.; McInnes, Neil; Yeo, Richard G.; and Smith, Keith J., to Fermentech Medical Limited. Production of hyaluronic acid. 5,411,874, Cl. 435-84,000.  
Elm, Rainer; Kehr, Helmut; Kuhnle, Adolf; and Schleinzner, Matthias, to Huels Aktiengesellschaft. Protective material capable of application in molten form. 5,412,029, Cl. 525-71,000.  
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Elson, Clive M.; Curran, Dennis T.; and Henderson, Susan E., to Nova Chem. Limited. N-O-carboxymethylchitosonium carboxylate salts. 5,412,084, Cl. 536-20,000.  
Elwell, Dennis F.; Crumly, William R.; and Bowers, Harold C., to Hughes Aircraft Company. Multichip module with a mandrel-produced interconnecting decal. 5,412,539, Cl. 361-792,000.  
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Fadavi-Ardekani, Jalil, to AT&T Corp. Signal processing system having reduced memory space. 5,412,740, Cl. 382-293.000.

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Foley, James P.: See—  
Jones, Ernest R.; Foley, James P.; and Dockstader, Robert K., Jr., 5,411,226, Cl. 244-158.00R.

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Kaiser, Lawrence R.; Shipley, Kenneth R.; and Whipple, Robert Z., 5,410,888, Cl. 62-136.000.

Forbus, Gary L.: See—  
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Jones, James V., 5,411,922, Cl. 501-71.000.

Rej, Dawn A.; and Fendt, Carlton J., Jr., 5,411,123, Cl. 192-85.0AA.

Schechter, Michael M., 5,410,994, Cl. 123-90.120.

Shapona, Mark G., 5,411,612, Cl. 148-567.000.

Shimmell, Roger A.; Gibboney, Donald L.; and Salisbury, Roy S., Jr., 5,411,311, Cl. 296-194.000.

Sickafus, Edward N., 5,412,265, Cl. 310-40.0MM.

Simko, Aladar O., 5,410,876, Cl. 60-288.000.

Forget, Ken M.: See—  
Gray, Mark F.; and Forget, Ken M., 5,411,222, Cl. 242-375.300.

Forkner, Irvine H. Pipe paint roller. 5,410,773, Cl. 15-230.110.

Forman, John S.: See—  
DeLuca, Raymond F.; and Forman, John S., 5,410,930, Cl. 83-335.000.

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Forrest, Melody L. One-piece cloth hair curler and method of using. 5,411,040, Cl. 132-211.000.

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Gohara, Wadie F.; Forrester, David A.; and Feeney, Steve, 5,410,909, Cl. 73-198.000.

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Caille, Jean C.; Corbier, Alain; Fortin, Michel; Hamon, Gilles; Jouquey, Simone; and Vevet, Jean, 5,412,101, Cl. 548-253.000.

Foster, Charles H.: See—  
Heidt, Philip C.; Foster, Charles H.; Witzeman, J. Stewart; and Crain, Allen L., 5,412,151, Cl. 560-145.000.

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Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 5,411,455, Cl. 482-54.000.

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Frames Design & Build Limited: See—  
Andrews, Rupert I., 5,411,073, Cl. 160-135.000.

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Dubon-Chevallier, Chantal; Dangla, Jean; Benchimol, Jean-Louis; and Alexandre, Francois, 5,412,233, Cl. 257-197.000.

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Nakajima, Hisao; and Derouiche, Radhouane, 5,412,496, Cl. 359-152.000.

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Kobayashi, Hisashi; and Francis, Arthur W., Jr., 5,411,395, Cl. 431-187.000.

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Frank, Stephen J., to GEC Plessey Semiconductor, Inc. Class AB amplifier with improved phase margin. 5,412,344, Cl. 330-255.000.

Frank, Lee F., to Eastman Kodak Company. Captive vortex high agitation device. 5,411,650, Cl. 204-182.400.

Frank, Richard D. Dispensing device for adhesive-backed articles. 5,411,169, Cl. 221-73.000.

Fraser, Douglas G.: See—  
Agar, Joseph T. H.; and Fraser, Douglas G., 5,411,673, Cl. 252-95.000.

Frater, Robert L.: See—  
Moradian, Ali; Jenkins, Maurice A.; and Frater, Robert L., 5,412,252, Cl. 290-40.00R.

Frazier, Thomas N. Apparatus for powered collection of loose-fill packaging material. 5,410,775, Cl. 15-338.000.



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Morawa, Joseph E.; Frederiksen, Bjarne; Lannert, George Z.; and Masghati, Mohammad, 5,411,228, Cl. 248-74.500.

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Freeman, Gregory L.: Caster wheel axle extraction apparatus, 5,410,792, Cl. 29-252.000.

Frei, Siegfried, to ATD S.A.R.L.: Method of and implement for extraction of dental prostheses, 5,411,396, Cl. 433-153.000.

Freiburger, Cletus N.: Inflatable well seal, 5,411,083, Cl. 166-187.000.

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Quirling, Jens; and Frerichs, Hejo, 5,411,171, Cl. 222-1.000.

Fresh Logic Ltd.: See—  
Wilson, Gordon; Lowe, Danny; and Baker, Michael, 5,411,258, Cl. 273-86.00B.

Freund, Peter W.: See—  
Sjoholm, Lars I.; Erickson, Lee J.; and Freund, Peter W., 5,410,889, Cl. 62-160.000.

Fries, Richard W., to Quantum Chemical Corporation: Method to reactor-fill polyolefins by formation of a dual catalyst system causing compatibilization of the filler with the matrix polymer, 5,412,001, Cl. 523-344.000.

Fries, Richard W., to Quantum Chemical Corporation: Method to reactor-fill polyolefins by employing a sticky prepolymer as a blending and compatibilizing agent, 5,412,025, Cl. 524-765.000.

Friske, Craig A.: See—  
Chang, Chung-Chia; Davoll, Gregory L.; El-Ruby, Mohamed H.; Friske, Craig A.; Iyer, Balakrishna R.; Lazarus, John P.; Wilhite, David; and Plambeck, Kenneth E., 5,412,384, Cl. 341-79.000.

Fritschi, Rainer: See—  
Rossberg, Rolf; Fritschi, Rainer; Otterbach, Jurgen; and Heide-mann, Rolf, 5,412,746, Cl. 385-48.000.

Frost, Barry L., to New Venture Gear, Inc.: Full-time integrated planetary four-wheel drive transfer case with traction, 5,411,447, Cl. 475-223.000.

Fucci, Joseph; Dinger, Fred B., III; Trott, A. Frank; Adams, Kenneth M.; and Mazurek, William F., to Linvatec Corporation: Bendable variable angle rotating shaver, 5,411,514, Cl. 606-180.000.

Fudanoki, Fumio: See—  
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Fuerst, Robert M.: See—  
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Fuji Electric Co., Ltd.: See—  
Kawashima, Tomoyuki; Kato, Hisato; Shibata, Kazuyoshi; and Taniguchi, Harutaka, 5,411,759, Cl. 427-58.000.

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Fuji Photo Film Co., Ltd.: See—  
Kitagawa, Kiichiro, 5,411,220, Cl. 242-348.300.

Nakamura, Takayuki; and Ono, Tsukasa, 5,411,444, Cl. 474-148.000.

Seto, Nobuo; Yoshioka, Yasuhiro; and Morigaki, Masakazu, 5,411,846, Cl. 430-546.000.

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Fuji Xerox Co., Ltd.: See—  
Furuki, Makoto; and Pu, Lyong S., 5,411,709, Cl. 422-91.000.

Kido, Mamoru; Kanzaki, Kenji; Sato, Noribumi; Kasama, Minoru; and Anzai, Tosio, 5,412,302, Cl. 318-685.000.

Yashiki, Yuichi, 5,411,826, Cl. 430-41.000.

Fujii, Junji: See—  
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Fujii, Shigeki: See—  
Kageyama, Yasuo; Fujii, Shigeki; and Obata, Yasushi, 5,412,152, Cl. 84-607.000.

Fujii, Tadashi; and Ishida, Shinji, to Terumo Kabushiki Kaisha: Cardiac pacemaker using wireless transmission, 5,411,535, Cl. 607-32.000.

Fujiki, Hideshi: See—  
Nishimura, Toshihiro; Hayashi, Toshio; Kawano, Hirotaka; and Fujiki, Hideshi, 5,412,418, Cl. 348-14.000.

Fujiki, Hironao: See—  
Fukuda, Kenichi; Yamaguchi, Kouichi; Sato, Shinichi; Kishita, Hirofumi; Arai, Masatoshi; and Fujiki, Hironao, 5,412,135, Cl. 556-448.000.

Fujimori, Masato: See—  
Yoshida, Makoto; Shimizu, Kazuyuki; Morita, Eiichi; Fujimori, Masato; and Tanaka, Hiromi, 5,411,589, Cl. 118-688.000.

Fujimori, Motoyoshi, to Sony Corporation: Magnetic tape recording/playback device with playback monitoring, 5,412,517, Cl. 360-64.000.

Fujimoto, Hiroaki: See—  
Hirose, Taro; Kishida, Hiroshi; Saito, Shigeru; and Fujimoto, Hiroaki, 5,411,979, Cl. 514-374.000.

Fujimoto, Hisayoshi, to Rohm Co., Ltd.: Line head driving with batch-printing, 5,412,406, Cl. 347-180.000.

Fujinami, Tsutomu; Inoue, Kouji; Tsuji, Hiroshi; Renge, Keiichi; Moriyama, Kenzo; and Tozuka, Kenji, to Hitachi, Ltd.; and Hitachi Touhoku Software, Ltd.: Reasoning method and fault diagnosis

method and system implementing the same, 5,412,802, Cl. 395-575.000.

Fujisawa Pharmaceutical Co., Ltd.: See—  
Yasuhiro, Kuramoto; Shuichiro, Noda; Maruyama, Shinobu; Hatono, Shunso; Mochizuki, Haruyo; and Yazaki, Akira, 5,412,098, Cl. 546-156.000.

Fujita, Masashi; and Harada, Toshihiro, to NEC Corporation: Inter-cellular interference detection by canceling data corruption events reported by mobile stations, 5,412,659, Cl. 370-95.100.

Fujita, Oriya: See—  
Omata, Hitoshi; and Fujita, Oriya, 5,410,927, Cl. 83-139.000.

Fujita, Tokio: See—  
Nakajima, Toshio; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Honda, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, 5,411,779, Cl. 428-36.910.

Fujitsu General Limited: See—  
Arima, Takafumi, 5,410,890, Cl. 62-228.400.

Fujitsu Limited: See—  
Chujo, Takafumi; Komine, Hiroaki; Miyazaki, Keiji; Ogura, Takao; and Soejima, Tetsuo, 5,412,376, Cl. 340-825.010.

Hattori, Hiroshi; and Sugiyama, Junich, 5,412,611, Cl. 365-221.000.

Hayashi, Masami, 5,412,711, Cl. 379-67.000.

Kaetsu, Mitsuo; Nakama, Noboru; and Kashiwada, Kazuaki, 5,412,497, Cl. 359-163.000.

Kamaji, Hideki; Ikeda, Masae; Hirose, Kazunori; and Nishio, Yukio, 5,412,458, Cl. 355-259.000.

Kumakura, Sinsuke, 5,412,337, Cl. 327-566.000.

Kusano, Yoshihiro, 5,412,786, Cl. 395-375.000.

Murata, Hiroyasu, 5,412,695, Cl. 375-344.000.

Nonomura, Tomohiro; and Kishimoto, Hiroshi, 5,411,246, Cl. 271-117.000.

Noro, Hiromi; Kamata, Shinnosuke; and Okajima, Yoshinori, 5,412,615, Cl. 365-233.000.

Odagawa, Tetsufumi, 5,412,675, Cl. 372-29.000.

Sato, Shinichi, 5,412,202, Cl. 250-214.00A.

Sawa, Kazuhiro, 5,412,566, Cl. 364-419.140.

Tanaka, Hidemasa, 5,412,710, Cl. 379-67.000.

Fujiwara, Kazunori: See—  
Takagi, Yoichi; and Fujiwara, Kazunori, 5,412,578, Cl. 364-474.340.

Fukaya, Masuhiro: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masuhiro; Ohmura, Keichi; Yamana, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.

Fukuda, Kenichi; Yamaguchi, Kouichi; Sato, Shinichi; Kishita, Hirofumi; Arai, Masatoshi; and Fujiki, Hironao, to Shin-Etsu Chemical Co., Ltd.: Organic silicon compounds and curable organopolysiloxane compositions, 5,412,135, Cl. 556-448.000.

Fukuda, Tatsuya; and Kajimoto, Takeshi, to Mitsubishi Denki Kabushiki Kaisha: Semiconductor device using boosted signal, 5,412,604, Cl. 365-189.110.

Fukue, Ichiro; Mandai, Shigemi; Tanaka, Katsunori; Kawabata, Hito-shi; Sato, Nobuo; Nishida, Hiroaki; and Gora, Tetsuo, to Mitsubishi Jukogyo Kabushiki Kaisha: Combustor for gas turbines with diverging pilot nozzle cone, 5,410,884, Cl. 60-747.000.

Fukui, Yukio: See—  
Yamashita, Juli; and Fukui, Yukio, 5,412,770, Cl. 395-142.000.

Fukunaga, Keizo: See—  
Kido, Eiichi; Yui, Yui; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326.000.

Fukunaga, Satoru; Hisatomi, Junichiro; Nakamura, Kazuhiro; Ohi, Ken'ichi; Tanaka, Hideki; and Tabuchi, Masayuki, to Sharp Kabushiki Kaisha: Testing apparatus for semiconductor device formed on tape carrier, 5,412,314, Cl. 324-158.100.

Fukuoka, Hirofumi: See—  
Kanatani, Yoshiharu; Fukuoka, Hirofumi; and Orii, Yoshihiko, 5,412,397, Cl. 345-99.000.

Fukutomi, Norihisa: See—  
Munezane, Tsuyoshi; Fukutomi, Norihisa; and Matsumoto, Osamu, 5,411,212, Cl. 239-408.000.

Fukuyama, Hirotaka: See—  
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Fukuzawa, Nobumasa; Kimura, Akiyoshi; and Kutsuwada, Satoru, to Canon Kabushiki Kaisha: Image reading apparatus with split position detection, 5,412,201, Cl. 250-208.100.

Fulcomer, James L.; and Farwell, William D., to Hughes Aircraft Company: Pseudo-random vector generated testable counter, 5,412,580, Cl. 364-489.000.

Fuldner, Friedrich; Kuhn, Hans-Robert; and Storz, Dieter, to Deutsche Thomson-Brandt GmbH: Method for measuring and regulating the radial and tangential angles of a light beam, 5,412,640, Cl. 369-100.000.

Fuller, Timothy J.; Larson, James R.; Spiewak, John W.; Pan, David H.; Mosher, Ralph A.; and Bonsignore, Frank J., to Xerox Corporation: Liquid developer compositions with fluoroalkyl groups, 5,411,834, Cl. 430-115.000.

Fulton, Stanley E., to D D Stud, Inc.: Method of playing a poker-type game and apparatus therefor, 5,411,257, Cl. 273-85.0CP.

Fulton, Stephen D.: See—  
Leard, Thomas M.; and Fulton, Stephen D., 5,412,382, Cl. 340-974.000.

Fumihiko, Ojima: See—  
Takeda, Fumiteru; and Fumihiko, Ojima, 5,412,154, Cl. 84-622.000.

Funae, Akihiro: See—  
Shinoda, Hisei; Ohtaguro, Masami; Funae, Akihiro; and Iimuro, Shigeru, 5,412,067, Cl. 528-361.000.

Funae, Haruyoshi; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills Limited: Magnetic recording sheet comprising a gel binder, 5,411,798, Cl. 428-341.000.

Funakoshi, Masahiro: See—  
Okubo, Akio; Hayashi, Toshiyuki; and Funakoshi, Masahiro, 5,412,407, Cl. 342-215.000.

Funk, Erwin: See—  
Phillips, Joseph R.; Greenwood, Brian F.; Funk, Erwin; and Dunn, Stephen, 5,411,633, Cl. 162-52.000.

Funk, Erwin D.: See—  
Henricson, Kaj; Phillips, Joseph; Greenwood, Brian F.; Funk, Erwin D.; and Dunne, Stephen J., 5,411,634, Cl. 162-52.000.

Fuquen, Orlando: See—  
Martel, Gonzalo U.; Herrera, Maria H. G.; Saa, Federico H.; Ceguera, Maria E. H.; Gonzalez, Leopoldo J. S.; and Fuquen, Orlando, 5,411,182, Cl. 222-386.000.

Furubayashi, Tadashi: See—  
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Furukawa Electric Co., Ltd.: See—  
Akuta, Yasuo, 5,411,214, Cl. 241-19.000.

Furukawa, Junji; Okamoto, Hiroshi; Onouchi, Yoshio; Andoh, Takashi; and Urano, Satoshi, to Nippon Paint Co., Ltd.: Liquid crystal monomer compound and polymer obtained therefrom, 5,412,079, Cl. 534-732.000.

Furukawa, Osamu: See—  
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Furukawa, Yasuhiro: See—  
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Furuki, Makoto; and Pu, Lyong S., to Fuji Xerox Co., Ltd.: Gas detector, 5,411,709, Cl. 422-91.000.

Furuno Electric Company, Limited: See—  
Morimatsu, Hideharu; and Sasakura, Toyoki, 5,412,617, Cl. 367-88.000.

Furutani, Masayuki; and Nii, Yoshihide, to Toyota Jidosha Kabushiki Kaisha: Controller of an engine driving generator for an electric vehicle, 5,412,251, Cl. 290-16.000.

Furuya, Kazuhito, to Tokyo Institute of Technology: Semiconductor device having organically doped structure, 5,412,231, Cl. 257-192.000.

Furuyama, Hideto; Hamasaki, Hiroshi; and Kobayashi, Tamon, to Kabushiki Kaisha Toshiba: Optical semiconductor module, 5,412,748, Cl. 385-92.000.

Fusion Systems Corporation: See—  
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G. D. Searle & Co.: See—  
Hanson, Gunnar J.; and Manning, Robert E., 5,411,950, Cl. 514-183.000.

Hanson, Gunnar J.; and Manning, Robert E., 5,411,953, Cl. 514-211.000.

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Hanson, Gunnar J.; and Baran, John S., 5,411,957, Cl. 514-216.000.

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Hanson, Gunnar J.; and Manning, Robert E., 5,411,975, Cl. 514-365.000.

Partis, Richard A.; Koszyk, Francis J.; and Mueller, Richard A., 5,411,970, Cl. 514-315.000.

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Neri, Armando; and Turra, Mario, 5,411,362, Cl. 414-796.900.

Osti, Roberto; and Gamberini, Antonio, 5,410,858, Cl. 53-477.000.

G.P. Industries, Inc.: See—  
Geppelt, Elmo W.; Poore, William H.; and Smith, Mark A., 5,410,808, Cl. 29-890.036.

Gaffney, Barbara L.: See—  
Jones, Roger A.; Fathip, Reza; and Gaffney, Barbara L., 5,412,088, Cl. 536-27.810.

Gagne, Mary L.: Safety marking pen for small children, 5,411,344, Cl. 401-202.000.

Gagnieu, Christian, to Flamel Technologies: Crosslinkable collagen derivatives, process for their production and their application to the preparation of biomaterials, 5,412,076, Cl. 530-356.000.

Gaillard-Kelly, Martine; Goubet, Francois; Philibert, Daniel; and Teutsch, Jean-Georges, to Roussel Uclaf: Phenylimidazolidines having antiandrogenic activity, 5,411,981, Cl. 514-386.000.

Gainer, James: See—  
Schneider, Michael J.; and Gainer, James, 5,412,009, Cl. 524-109.000.

Galbi, Duane E.; Clinton, Michael P.; and Kellogg, Mark W., to International Business Machines Corporation: Memory device having asymmetrical CAS to data input/output mapping and applications thereof, 5,412,613, Cl. 365-230.030.

Gale, Richard O., to Texas Instruments Incorporated: Elimination of sticking of micro-mechanical devices, 5,412,186, Cl. 219-679.000.

Galen Medical, Inc.: See—  
Steg, Robert F., Jr.; Peterson, Dean M.; and Cusi, Dante S., 5,411,472, Cl. 604-4.000.

Galli, Paolo; DeNicola, Anthony J., Jr.; and Smith, Jeanine A., to Himont Incorporated: Graft copolymers of polyolefins and a method of producing same, 5,411,994, Cl. 521-50.500.

Gallucci, Robert R., to General Electric Company: Epoxy-polyester, polycarbonate, metal phosphate and rubbery modifier, 5,411,999, Cl. 523-436.000.

Gamberini, Antonio: See—  
Osti, Roberto; and Gamberini, Antonio, 5,410,858, Cl. 53-477.000.

Gamelin, Christian, to Societe Anonyme dite: Aerospatiale Societe Nationale: Device and installation for crystal growth having observation means, 5,410,983, Cl. 117-202.000.

Gammack, Richard J.; Barnaby, Catherine L.; and Stansfield, Anthony I., to Inmos Limited: Digital signal comparison circuitry, 5,412,368, Cl. 340-146.200.

Ganapathy, Gopi: See—  
Kromer, Stephen C.; and Ganapathy, Gopi, 5,412,663, Cl. 371-22.100.

Gandara, Marc: See—  
Alston, Andrew; Delory, Jean-Michel; Gandara, Marc; and Laasri, Hassan, 5,412,753, Cl. 395-12.000.

Gardner, Joseph G.: See—  
Pauer, Lyle A.; McCannon, Thomas E.; and Gardner, Joseph G., 5,412,622, Cl. 367-154.000.

Gardner, Steven H.: See—  
Chaplik, Naom; Gardner, Steven H.; and Kasmir, Seton P., 5,412,353, Cl. 332-127.000.

Gareiss, Brigitte; Baierweck, Petra; Plachetta, Christoph; and Ullmerich, Karlheinz, to BASF Aktiengesellschaft: Flameproofed thermoplastic molding materials based on polyamides, 5,412,017, Cl. 524-436.000.

Garney, John I., to Intel Corporation: System for enabling access to device driver residing in resource memory corresponding to coupled resource by allowing memory mapping to device driver to be executed, 5,412,798, Cl. 395-500.000.

Garnjost, Kenneth D., to Moog Inc.: Volume-compensated low-wear reciprocating seal assemblies, 5,410,947, Cl. 92-80.000.

Garric, George; and Lafond, Andre, to International Business Machines Corporation: Dispatching apparatus with a gas supply distribution system for handling and storing pressurized sealable transportable containers, 5,411,358, Cl. 414-277.000.

Gartsman, Konstantin: See—  
Cahen, David; Gartsman, Konstantin; and Lyubomirsky, Igor, 5,412,242, Cl. 257-442.000.

Gas Research Institute: See—  
McGaffigan, Thomas H., 5,412,184, Cl. 219-643.000.

Gaston County Dyeing Machine Company: See—  
Catoe, Robert L.; Meeker, Matthew A.; Turner, James K.; and Van Seyoc, Thomas W., 5,410,892, Cl. 68-189.000.

Gatteschi, Emanuele, to OCME S.r.l.: Device for joining films of heat-shrinkable plastic material in a machine using said film, 5,411,223, Cl. 242-551.000.

Gaudette, Marvin F.; Weatherhead, Bruce R.; and Cacciatore, Joseph J., to Eaton Corporation: Appliance temperature sensor having noise filtering, 5,412,590, Cl. 364-728.070.

Gaunt, David: See—  
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Gauri, Kailash K.: See—  
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Gayer, Herbert: See—  
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Gebr. Happich GmbH: See—  
Viertel, Lothar; and Welter, Patrick, 5,411,310, Cl. 296-97.900.

Gebrosky, Jerry W.: See—  
Kimmell, Bruce A.; and Gebrosky, Jerry W., 5,410,854, Cl. 52-712.000.

GEC-Marconi Limited: See—  
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GEC Plessey Semiconductor, Inc.: See—  
Franck, Stephen J., 5,412,344, Cl. 330-255.000.

Geerts, Rolf L.; Kufeld, Scott E.; and Hill, Tara G., to Phillips Petroleum Company: Organo-aluminox product and use, 5,411,925, Cl. 502-117.000.

Gehani, Narain H.: See—  
Agrawal, Rakesh; Gehani, Narain H.; and Srinivasan, Jagannathan, 5,412,774, Cl. 395-157.000.

Gelichi, Massimo: See—  
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Geller, William L.: See—  
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Anderson, Stephen; Bennett, William F.; Botstein, David; Higgins, Deborah L.; Paoni, Nicholas F.; and Zoller, Mark J., 5,411,871, Cl. 435-23.000.

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Knoploch, Jerome; Prevost, Guy; and Treil, Nicolas, 5,412,763, Cl. 395-124.000.

General Electric Company: See—  
Borowiec, Joseph C.; and Cocoma, John P., 5,412,288, Cl. 315-248.000.

Butcher, James A.; and Pitzer, Michael A., 5,412,270, Cl. 310-68.00R.

Cline, Harvey E.; and Lorensen, William E., 5,412,563, Cl. 364-413.220.

Corby, Nelson R., Jr.; Meenan, Peter M.; Solanas, Claude H., III; Vickerman, David C.; and Nafis, Christopher A., 5,412,569, Cl. 364-424.010.

Crivello, James V.; and Fan, Ming-Xin, 5,412,054, Cl. 528-15.000.

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Eckberg, Richard P., 5,412,133, Cl. 556-427.000.

Gallucci, Robert R., 5,411,999, Cl. 523-436.000.

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Longley, Kathryn L.; and Schmidhauser, John C., 5,412,048, Cl. 526-212.000.

Lucarelli, Michael A.; Raleigh, William J.; and Lewis, Larry N., 5,412,132, Cl. 556-414.000.

Mazzola, Mano A.; Fanneau, Thomas J.; Schlottner, George; and Brinkman, Earl H., 5,411,365, Cl. 415-93.000.

Parham, Thomas G., 5,412,274, Cl. 313-112.000.

Patel, Gautam A.; and Kubisen, Steven J., 5,411,807, Cl. 428-412.000.

Payne, Thomas R.; and Rice, Steven A., 5,412,291, Cl. 318-102.000.

Scott, Curtis E.; Arsenia, Vito J.; Vamvakas, Spiro; and Oberle, Joseph C., 5,412,280, Cl. 313-573.000.

Sturman, Philip C., Jr.; and Gray, Robert A., 5,412,185, Cl. 219-651.000.

Thomas, Robert J.; and Chang, Hsueh-Rong, 5,412,289, Cl. 315-248.000.

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General Hospital Corporation, The: See—  
Seed, Brian; and Peterson, Andrew, 5,411,861, Cl. 435-6.000.

General Motors Corporation: See—  
Conway, Michael E.; and Penn, Samuel E., 5,412,164, Cl. 200-1.00B.

Genesseeux, Andre., to Hutchison. Hydraulic antivibration devices, 5,411,243, Cl. 267-140.140.

Gentile, Robert A.: See—  
Viscio, Donald P.; Gentile, Robert A.; and Kraus, Peter E., 5,411,357, Cl. 411-110.000.

Gentles, Margaret J.: See—  
Afonso, Adriano; Weinstein, Jay; and Gentles, Margaret J., 5,412,104, Cl. 548-525.000.

Gentry, Cecil C., to Phillips Petroleum Company. Baffle rings for retrofit of existing shell-and-tube heat exchangers, 5,411,080, Cl. 165-162.000.

George, Billy L.; Williams, Donald R.; and Babirad, Stefan A., to Minnesota Mining and Manufacturing Company. Granular materials having an improved ceramic coating, methods of preparing same, and composite sheets including same, 5,411,803, Cl. 428-403.000.

Georges, Michael K.; Saban, Marko D.; Kazmaier, Peter M.; Veregin, Richard P. N.; Hamer, Gordon K.; and Moffat, Karen A., to Xerox Corporation. Homocacrylate polymerization processes with oxonitroxides, 5,412,047, Cl. 526-204.000.

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DeLuca, Raymond F.; and Forman, John S., 5,410,930, Cl. 83-335.000.

Geppeli, Elmo W.; Poore, William H.; and Smith, Mark A., to G.P. Industries, Inc. Method of making a double wall twist tube, 5,410,808, Cl. 29-890.036.

Gerace, John D.; and Christ, F. Richard, to Allergan, Inc. Cross-linked silicone polymers, fast curing silicone precursor compositions, and injectable intracocular lenses, 5,411,553, Cl. 623-6.000.

Gerdes, Peter: See—  
Kuhnt, Dietmar; Gayer, Herbert; and Gerdes, Peter, 5,412,149, Cl. 560-35.000.

Gerhard, George H., Jr., to Whitaker Corporation. The. Feed mechanism in a tool for terminating ribbon cable to a connector, 5,410,803, Cl. 29-753.000.

Gesley, Mark A.; and Colby, David H., to ETEC Systems, Inc. Differential virtual ground beam blanker, 5,412,218, Cl. 250-396.00R.

Ghosh, Syamal K.; Chatterjee, Dilip K.; and Koziol, Dennis R., to Eastman Kodak Company. Process for producing a tetragonal phase zirconia ceramic, 5,411,690, Cl. 264-63.000.

Giacobbe, Frederick W.: See—  
Connors, Robert W.; Giacobbe, Frederick W.; Jurcik, Benjamin; and McKean, Kevin P., 5,411,200, Cl. 228-219.000.

Giamati, Michael J., to B. F. Goodrich Company. The. Variable power density heating using stranded resistance wire, 5,412,181, Cl. 219-548.000.

Giannessi, Fabio; Bolognesi, Maria L.; Tinti, Maria O.; and De Angelis, Francesco, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A. Process for manufacturing L-(-)-carnitine from a waste product having opposite configuration, 5,412,113, Cl. 549-328.000.

Giat Industries: See—  
Begneu, Michel, 5,410,942, Cl. 89-27.140.

Gibboney, Donald L.: See—  
Shimmell, Roger A.; Gibboney, Donald L.; and Salisbury, Roy S., Jr., 5,411,311, Cl. 296-194.000.

Gibson, Danuta: See—  
Goddard, John D.; and Gibson, Danuta, 5,411,848, Cl. 430-557.000.

Gibson, Keith H.: See—  
Russell, Keith; Empfield, James R.; Ohnmacht, Cyrus J.; and Gibson, Keith H., 5,411,973, Cl. 514-347.000.

Giese, Roger W.; Guan, Kailin; and Cecchini, Douglas J., to Northeastern University. Carbohydrate heterobifunctional cross-linking reagent, 5,412,083, Cl. 536-20.000.

Giglia, Salvatore: See—  
Nicolas, Patrick S., Jr.; Bikson, Benjamin; Giglia, Salvatore; and Thompson, David R., 5,411,662, Cl. 210-321.800.

Gillespie, George T.; Belt, Fletcher C.; and Petersen, H. Norman, to Outboard Marine Corporation. Two-stroke internal combustion engine with improved air intake system, 5,410,999, Cl. 123-403.000.

Gillett, James E.; and Meuschke, Robert E., to United States of America, Energy. Reactor refueling containment system, 5,412,700, Cl. 376-263.000.

Gillette Company, The: See—  
Gillibrand, Robert, 5,410,810, Cl. 30-41.000.

Gillibrand, Robert, to Gillette Company, The. Safety razors, 5,410,810, Cl. 30-41.000.

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Lichtenhan, Joseph D.; Vu, Ngo Q.; Gilman, Jeffrey W.; and Feher, Frank J., 5,412,053, Cl. 528-9.000.

Gilmour, George A., to Westinghouse Electric Corporation. Spotlight-mode synthetic aperture side-look sonar, 5,412,618, Cl. 367-88.000.

Gimple, James J.; Hamilton, David L.; Hughey, Daniel C.; Jamison, Chris M.; and Seitz, David M., to Ransburg Corporation. Automatic coating using conductive coating materials, 5,411,210, Cl. 239-110.000.

Ginot, Frederic: See—  
Ruggiu, Gilles; and Ginot, Frederic, 5,411,862, Cl. 435-6.000.

Ginzburg, Simon A.; Gustafson, Roy W.; and Newman, David S., to Digital Equipment Corporation. Method and apparatus for equalization for transmission over a band-limited channel, 5,412,691, Cl. 375-296.000.

Giordano, Claudio; Coppi, Laura; and Minisci, Francesco, to Zambon Group S.p.A. Process for the preparation of 5-(2,4-difluorophenyl)-salicylic acid, 5,412,143, Cl. 558-298.000.

Giroux, Nathalie; Morin, Marianne J.; Lemay, Marcel; Kositpaiboon, Rungraj; and Aboul-Magd, Osama S., to Northern Telecom Limited. Rate enforcement for frame relay networks, 5,412,647, Cl. 370-60.000.

Giust, Jeffrey. Angled track squat exercise apparatus, 5,411,458, Cl. 482-101.000.

Given, Peter S., Jr.: See—  
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GKN Automotive AG: See—  
Bensinger, Jorg; Werner, Krude; and Jost, Dieter, 5,411,440, Cl. 464-111.000.

GKN Automotive, Inc.: See—  
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Glad, Paul H.: See—  
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Gladden, Michael E.: See—  
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Glaser, Helmut: See—  
Stehr, Michael; Otte, Adelbert; Glaser, Helmut; Ratajczak, Hans-Josef; and Schulze, Klaus, 5,412,136, Cl. 558-43.000.

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Chiu, Tien-Heng; Glass, Alastair M.; and Partovi, Afshin, 5,412,499, Cl. 359-248.000.

Glass, Robert A.: See—  
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Glaxo Group Limited: See—  
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Glazman, Jerry S.; Davis, Mark K.; and VanSaun, Philip A., to Combustion Engineering, Inc. Internal fuel rod coating comprising metal silicate, 5,412,701, Cl. 376-419.000.

Gleason, Donald A. Gear shift knob locking device, 5,410,896, Cl. 70-202.000.

Gleb, Anatoly K.: See—  
Esman, Igor I.; and Gleb, Anatoly K., 5,410,779, Cl. 16-370.000.

Glen, Jeffrey J.: See—  
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Glen, Stefan J.; and Carstens, Bradley D., to Beckman Instruments, Inc. Segmented composite centrifuge rotor with a support ring interference fit about core segments, 5,411,465, Cl. 494-16.000.

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Glomb, John W.; and Tramount, Yvette A., to Westvaco Corporation. Method for producing high pressure laminates, 5,411,637, Cl. 162-135.000.

Glover, Daniel R., to United States of America, National Aeronautics and Space Administration. Picture data compression coder using subband/transform coding with a Lempel-Ziv-based coder, 5,412,429, Cl. 348-398.000.

Glycomed Incorporated: See—  
Rao, Narasinga; Tang, Peng C.; and Musser, John H., 5,412,123, Cl. 552-209.000.

GMT Gesellschaft Fur Medizinische Technik GmbH: See—  
Nieder, Elmar, 5,411,555, Cl. 623-20.000.

Gnazzo, Angelantonio: See—  
Cognolato, Livio; and Gnazzo, Angelantonio, 5,411,565, Cl. 65-386.000.

Goble, E. Marlowe; Chervitz, Alan; Luman, David P.; and Jensen, Kenneth L., to Mitek Surgical Products, Inc. Anchor driver, 5,411,506, Cl. 606-104.000.

Goble, E. Marlowe, to Mitek Surgical Products, Inc. Suture anchor and driver combination, 5,411,523, Cl. 606-232.000.

Goddard, John D.; and Gibson, Danuta, to Eastman Kodak Company. Photographic color couplers and photographic materials containing them, 5,411,848, Cl. 430-557.000.

Godfrey, Martin R.: See—  
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Goetz, Norbert: See—  
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Gohara, Wadie F.; Forrester, David A.; and Feeney, Steve, to Babcock & Wilcox Company, The. Plug proof simple device to measure liquid flow in flue gas desulfurization systems using nozzle pressure as an input, 5,410,909, Cl. 73-198.000.

Golden, Jo-Ann; Squatrito, Angelo; Brown, Thomas J.; Yates, Lawrence J.; and Elfman, Kenneth, to Jeff Industries, Inc. Adjustable work station for the handicapped, 5,410,971, Cl. 108-6.000.

Goldhardt, Donald J.; and Hirsch, William H., to Abbott Laboratories. Low profile gastrostomy device with one-way cross-slit valve, 5,411,491, Cl. 604-247.000.

Goldman, Ira B.; Rosen, Louis A.; Marshall, Edward J.; Fredrickson, James E.; and Young, Charles L., to General Electric Company. Apparatus and method for calibrating electric bus bar insulating coatings, 5,412,324, Cl. 324-551.000.

Goldmann, Siegfried; Boshagen, Horst; Stoltefuss, Jurgen; Straub, Alexander; Gross, Rainer; Hutter, Joachim; Heibisch, Siegfried; and Bechem, Martin, to Bayer Aktiengesellschaft. Intermediate benzothiazolyl- and benzoxazolyl-aldehyde compounds, 5,412,099, Cl. 548-180.000.

Goldstar Co., Ltd.: See—  
Hong, Sung H., 5,412,432, Cl. 348-625.000.

Kang, Seong T., 5,412,282, Cl. 315-39.510.

Goldstein, Gary W.; and Tedeschi, Jeffrey B., to Design +3, Incorporated. Medical tourniquet apparatus, 5,411,518, Cl. 606-202.000.

Goldstein, Jonathan, to Electric Fuel (E.F.L.) Ltd. Transport and storage vessel for electric fuel, 5,411,815, Cl. 429-50.000.

Golledge, Ian: See—  
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Golubchik, Arkadiy Y.; Harper, Donald K., Jr.; Laub, Michael F.; and McMullen, David W., to Whitaker Corporation, The. Apparatus for removably applying a flat-pack to a socket, 5,412,540, Cl. 361-807.000.

Gonda, Yoshiharu: See—  
Takaya, Hidemasa; Ohta, Tetsuo; Kumabayashi, Hidenori; Okeda, Yoshiki; and Gonda, Yoshiharu, 5,412,109, Cl. 549-263.000.

Gonyea, Stephen G.; Lake, James K.; Long, Randy C.; and Wild, Roger N., to International Business Machines Corporation. Lead-free, tin, antimony, bismuth, copper solder alloy, 5,411,703, Cl. 420-561.000.

Gonzalez, Ernest R. Safety monitoring and control system, 5,412,616, Cl. 367-13.000.

Gonzalez, Joseph L.: See—  
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Gonzalez, Leopoldo J. S.: See—  
Marte, Gonzalo U.; Herrera, Maria H. G.; Saa, Federico H.; Ceguera, Maria E. H.; Gonzalez, Leopoldo J. S.; and Fuquen, Orlando, 5,411,182, Cl. 222-386.000.

Goodenough, David J.; and Edwards, Warren S., to Institute for Radiological Image Science, Inc. Reduced partial volume artifacts in image

reconstruction, with application to X-ray computed tomography, 5,412,703, Cl. 378-8.000.

Gooding, Richard D.: See—  
Scopelanos, Angelo G.; Bezwada, Rao S.; Arnold, Stephen C.; and Gooding, Richard D., 5,411,554, Cl. 623-8.000.

Goodman, Michael C. Hinged shoe sole assembly for fixed and variable heel height shoes, 5,410,820, Cl. 36-25.00R.

Goodwin, Thomas A.: See—  
Suppella, Anthony J.; Darveau, Robert F.; Goodwin, Thomas A.; Abdala, Julio; and Liebman, Henry F., 5,411,199, Cl. 228-179.100.

Goodyear Tire & Rubber Company, The: See—  
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Gora, Tetsuo: See—  
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Gordon, Charles B.: See—  
Gordon, Rinda M.; and Gordon, Charles B., 5,411,155, Cl. 215-11.100.

Gordon, Rinda M.; and Gordon, Charles B. Baby bottle storage cover, 5,411,155, Cl. 215-11.100.

Gordon, Virginia C.; Mirhashemi, Soheila; and Wei, Rosalind W., to Invitro International. In vitro test for dermal corrosive properties, 5,411,888, Cl. 436-5.000.

Goretta, Kenneth C.: See—  
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Gorislavskaya, Lyudmila A. (born Ryabokoni): See—  
Arutyunov, Yury A. (born Ryabokoni); and Gorislavskaya, Lyudmila A. (born Ryabokoni), 5,411,330, Cl. 366-270.000.

Goronkin, Herbert; Shen, Jun; and Tehrani, Saied, to Motorola, Inc. Field effect transistor with non-linear transfer characteristic, 5,412,224, Cl. 257-15.000.

Gorshe, Steven S., to NEC America, Inc. Structure and method for combining PCM and common control data on a backplane bus, 5,412,651, Cl. 370-85.900.

Gosnell, Raymond H.; and Cannon, Daniel A. Utility vehicle bed partition, 5,411,355, Cl. 410-139.000.

Gossett, Robert M.; Baach, Michael K.; Dong, Dennis F.; and Loftfield, Richard E., to Corpro Companies, Inc. Cathodic protection anode and systems, 5,411,646, Cl. 204-147.000.

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Goto, Noriatsu, to Matsushita Electric Industrial Co., Ltd. Motor bearing device, 5,411,338, Cl. 384-537.000.

Gotoh, Mitsumasa: See—  
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Gotterba, James A.: See—  
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Gouldson, Stanley, to Spotless Plastics Pty. Ltd. Garment hanger, 5,411,189, Cl. 223-85.000.

Goulet, Jean-Francois; Labrie, Sylvain; and Lesquir, Dominique, to IPL, Inc. Child resistant closure, 5,411,160, Cl. 220-182.000.

Govrin, Omri, to Scitex Corporation Ltd. Method for identifying film type, 5,412,737, Cl. 382-168.000.

Grabowski, Wayne B.; and Rumennik, Vladimir, to Power Integrations, Inc. Method of making high voltage transistor, 5,411,901, Cl. 437-40.000.

Graf, Felix; and Arnosti, Vittorino, to Maschinenfabrik Rieter AG. Apparatus for stretching a synthetic yarn in a stretching bath, 5,410,787, Cl. 28-246.000.

Graham, Hatch, to Stanford Telecommunications, Inc. Modulator having direct digital synthesis for broadband RF transmission, 5,412,352, Cl. 332-103.000.

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Graham, Peter L.: See—  
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Graham, Steven J.: See—  
Chan, Sek K.; Graham, Steven J.; Kirby, Ian J.; and Leiper, Graeme A., 5,411,290, Cl. 280-737.000.

Graham, William H.: See—  
Sumrail, Theodore S.; Graham, William H.; Rector, Carl M.; and Reed, Joey M., 5,411,615, Cl. 149-47.000.

Gram, Anker, to Process Systems International, Inc. Cryogenic fluid pump system and method of pumping cryogenic fluid, 5,411,374, Cl. 417-53.000.

Granger, Hugh A. Christmas tree watering funnel with indicating light and float, 5,410,839, Cl. 47-40.500.



Gratton, Andrew B.; Bachhuber, Anthony A.; Maxfield, LeRoy A.; and Miller, Jeffrey M., to Oshkosh Truck Corporation. Transit clutchless shifting of an auxiliary transmission. 5,411,450, Cl. 477-124.000.

Grau, Juan G., Jr.: See—  
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Gray, Benjamin, to Kidco Resources Ltd. Drilling a well gas supply in the drilling liquid. 5,411,105, Cl. 175-69.000.

Gray, Ian J. S.; and Brumwell, Peter J., to ITT Corporation. Component mounting arrangement. 5,411,409, Cl. 439-329.000.

Gray, Kenneth P., to Carrier Corporation. Tube expander with rod support apparatus. 5,410,800, Cl. 29-727.000.

Gray, Mark F.; and Forget, Ken M., to TRW Vehicle Safety Systems Limited. Seat belt retractor with tension controller. 5,411,222, Cl. 242-375.300.

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Gray, Robert L.: See—  
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Gray, Rory: See—  
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Greason, Jeffrey K.: See—  
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Green, Michael L.: See—  
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Greene, Don. Apparatus for the magnetic treatment of fluids. 5,411,143, Cl. 210-222.000.

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Greenlee, William J.: See—  
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Chakravarty, Prasun K.; Greenlee, William J.; Kim, Dooeop; Mantlo, Nathan B.; Patchett, Arthur A.; and Rivero, Ralph A., 5,412,097, Cl. 546-118.000.

Greenwood, Brian F.: See—  
Hennison, Kaj; Phillips, Joseph; Greenwood, Brian F.; Funk, Erwin D.; and Dunne, Stephen J., 5,411,634, Cl. 162-52.000.

Phillips, Joseph R.; Greenwood, Brian F.; Funk, Erwin; and Dunne, Stephen, 5,411,633, Cl. 162-52.000.

Greenwood, Mark H., to Children On The Go, Inc. Infant bounce chair. 5,411,315, Cl. 297-440.240.

Gregg, Thomas A.: See—  
Bartow, Neil G.; Brown, Paul J.; Capowski, Robert S.; Fasano, Louis T.; Gregg, Thomas A.; Salyer, Gregory; and Westcott, Douglas W., 5,412,803, Cl. 395-575.000.

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Greve, Christopher, to Laitram Corporation, The. Rolling stairway. 5,411,111, Cl. 182-17.000.

Grice, Gordon J.: See—  
Travis, Harry; and Grice, Gordon J., 5,411,356, Cl. 411-85.000.

Griffin, Rodney L., to Westinghouse Electric Corporation. Device for promoting gravity flow of non-free-flowing solids. 5,411,331, Cl. 366-286.000.

Grimes, Robert W., III; Fischer, Douglas A.; Smith, Nels R.; and Mathias, Larry E., to Prince Corporation. Vehicle coat hook assembly. 5,411,233, Cl. 248-305.000.

Grunna, Lynn; Theofan, Georgia; and Parsons, Thomas F., to XOMA Corporation. Heterodimeric osteogenic factor. 5,411,941, Cl. 514-12.000.

Grodin, Aaron A.: See—  
Matamoros, Brian S.; and Grodin, Aaron A., 5,410,939, Cl. 84-458.000.

Groen, Wilhelm A.; Kraan, Marcellinus J.; and De With, Gijsbertus, to U.S. Philips Corporation. Ceramic body. 5,411,924, Cl. 501-97.000.

Gross, Herbert: See—  
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Goldmann, Siegfried; Boshagen, Horst; Stoltefuss, Jurgen; Straub, Alexander; Gross, Rainer; Hutter, Joachim; Heibisch, Siegfried; and Bechem, Martin, 5,412,099, Cl. 548-180.000.

Grosso, Diana M.-D.: See—  
Shander, Douglas; Ahluwalia, Gurpreet S.; and Grosso, Diana M.-D., 5,411,991, Cl. 514-665.000.

Grot, Walther G.: See—  
Fleming, Christopher A.; Grot, Walther G.; and Thorpe, John A., 5,411,575, Cl. 75-743.000.

Gruber, Rudolf, to Multimatic Inc. Automatic checking mechanism. 5,410,777, Cl. 16-58.000.

Gruher, Martin; Bacic, Helmut; and Schultze, Hartmut, to Mannesmann Kienzle GmbH. Apparatus for recording driving data with a temporal resolution adapted to the signal shape of analog measurement signals. 5,412,570, Cl. 364-424.040.

Grundig Aktiengesellschaft: See—  
Meyer, Piotr J.; and Ripoll-Ensenat, Noel, 5,412,300, Cl. 318-568.110.

Gruodis, Algirdas J.; Patel, Piyushkumar C.; and Szabo, Kurt P., to International Business Machines Corporation. Parallel operation linear feedback shift register. 5,412,665, Cl. 371-27.000.

Gruson, Paulus W. T.: See—  
Bowmer, Geoffrey M.; and Gruson, Paulus W. T., 5,411,347, Cl. 403-305.000.

Guan, Kailin: See—  
Giese, Roger W.; Guan, Kailin; and Cecchini, Douglas J., 5,412,083, Cl. 536-20.000.

Guarrera, Donna J.: See—  
Ford, Maureen F.; Guarrera, Donna J.; Mischke, Mark R.; Pai, Ramdas P.; and Warner, John C., 5,411,929, Cl. 503-210.000.

Gueret, Jean-Louis H., to L'Oreal. Case provided with a closure device not including a movable member. 5,411,163, Cl. 220-326.000.

Guerin, Jean-Michel; and Wechsler, Erwin R., to Xerox Corporation. Data-insensitive laser diode power control. 5,412,677, Cl. 372-38.000.

Guglielmi, Franco: See—  
Bolla, Maurizio; Gelichi, Massimo; Guglielmi, Franco; and Leurrati, Nino, 5,412,693, Cl. 375-326.000.

Guignard, Mireille. Cannula for use during arthroscopic procedures. 5,411,517, Cl. 606-198.000.

Gundlach, Peter: See—  
Clausen, Edwin L.; and Gundlach, Peter, 5,410,855, Cl. 52-747.000.

Gustafson, Roy W.: See—  
Ginzburg, Simon A.; Gustafson, Roy W.; and Newman, David S., 5,412,691, Cl. 375-296.000.

Gustafsson, Lars-Erik, to Sandvik AB. Tool provided with an insert for cut-off or similar turning operations, and spacer element for an insert in such a tool. 5,411,354, Cl. 407-110.000.

Guthrie, Joe M., to Pro Gruv, Inc. Alignment and setup device for golf training activities. 5,411,266, Cl. 273-187.000.

Gutstein, Jacqueline; and Leon, Omayra. Anchoring kit for use with a flotation device. 5,410,981, Cl. 114-294.000.

Guy, David W.: See—  
Mainwaring, David E.; and Guy, David W., 5,411,560, Cl. 44-592.000.

Gwinner, Werner: See—  
Braun, Thomas; and Gwinner, Werner, 5,411,174, Cl. 222-77.000.

Haber, Terry M.; Smedley, William H.; and Foster, Clark B. User propelled treadmill. 5,411,455, Cl. 482-54.000.

Haber, Terry M.; Smedley, William H.; and Foster, Clark B., to Habley Medical Technology Corporation. Obturator with rotating, self-locking and resettable safety shield. 5,411,515, Cl. 606-184.000.

Haberey, Martin: See—  
Neef, Gunter; Steinmeyer, Andreas; Kirsch, Gerald; Schwarz, Katka; Haberey, Martin; Thieroff-Ekerdt, Ruth; and Rach, Petra, 5,411,949, Cl. 514-167.000.

Habley Medical Technology Corporation: See—  
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 5,411,515, Cl. 606-184.000.

Hacker, Hans-Eugen; Hofstetter, Edgar; and Kaminski, Eckhard, to Novatech GmbH. Seam-weaving machine with fringe catcher. 5,411,063, Cl. 139-383.0AA.

Hadjipanayis, George: See—  
Hazelton, Robert; and Hadjipanayis, George, 5,411,608, Cl. 148-302.000.

Haegele, Richard P. Non-synchronous conveyor system for assembly operations. 5,411,131, Cl. 198-572.000.

Haghani, Jean E.: See—  
Bates, Scott B.; and Haghani, Jean E., 5,411,295, Cl. 283-81.000.

Hagiwara, Shigemi: See—  
Kojima, Tetsuji; Miyashita, Hiromi; Hagiwara, Shigemi; and Sunaga, Naoki, 5,412,490, Cl. 358-473.000.

Hailey, Charles D.; and Beagle, Ronald M. Coil tubing hydraulic jar device. 5,411,107, Cl. 175-296.000.

Halcomb, Randall L.: See—  
Wittman, Mark D.; Danishefsky, Samuel J.; and Halcomb, Randall L., 5,412,082, Cl. 536-17.200.

Hale Fire Pump Company: See—  
Laskaris, Michael A.; and Teske, Richard E., 5,411,100, Cl. 169-14.000.

Hale, Robert A.; and Nathanson, Harvey C., to Westinghouse Electric Corporation. Motion compensated sensor. 5,412,421, Cl. 348-208.000.

Hall, Gary W. Method and device for determining placement of keratotomy incisions. 5,411,511, Cl. 606-166.000.

Halliburton Company: See—  
Manke, Kevin R.; and Ringgenberg, Paul, 5,411,097, Cl. 166-324.000.

Schultz, Roger L., 5,412,568, Cl. 364-422.000.

Walker, Michael L., 5,411,670, Cl. 507-117.000.

Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, to Sanyo Electric Co., Ltd. Method of manufacturing a single crystal layers. 5,411,915, Cl. 437-129.000.

Hamada, Suguru: See—  
Ide, Tsutomu; Hamada, Suguru; and Kawai, Masahiro, 5,411,793, Cl. 428-215.000.

Hamamoto, Nobuo; Onishi, Tadashi; Suzuki, Tatsundo; Nagata, Minoru; Mizuishi, Kenichi; and Tyojamori, Yosuke, to Hitachi, Ltd. Radio paging system with voice transfer function and radio pager. 5,412,719, Cl. 380-9.000.

Hamamura, Kimio; Seki, Chiaki; and Konishi, Masayuki, to Eisai Chemical Co., Ltd. Preparation process of naphthoquinone derivative and intermediate for the preparation thereof. 5,412,124, Cl. 552-299.000.

Hamasaki, Hiroshi: See—  
Furuyama, Hideto; Hamasaki, Hiroshi; and Kobayashi, Tamon, 5,412,748, Cl. 385-92.000.

Hamdy, Esmat Z.; Mohsen, Amr M.; McCollum, John L.; Chen, Shih-Ou; and Chiang, Steve S., to Actel Corporation. Electrically-programmable low-impedance anti-fuse element. 5,412,244, Cl. 257-530.000.

Hameen Autosistamo Oy: See—  
Kuiri, Teijo, 5,411,319, Cl. 297-483.000.

Hamer, Gordon K.: See—  
Georges, Michael K.; Saban, Marko D.; Kazmaier, Peter M.; Veregin, Richard P. N.; Hamer, Gordon K.; and Moffat, Karen A., 5,412,047, Cl. 526-204.000.

Hamilton, David L.: See—  
Gimple, James J.; Hamilton, David L.; Hughey, Daniel C.; Jamison, Chris M.; and Seitz, David M., 5,411,210, Cl. 239-110.000.

Hamilton, Robert S.: See—  
Rego, James M.; Hamilton, Robert S.; Hannaway, Patricia A.; and Reno, James R., 5,412,452, Cl. 355-203.000.

Hamilton, Scott L.; and Naddor, David J. Ultrasonic control disk drive system. 5,412,585, Cl. 364-569.000.

Hamon, Gilles: See—  
Caille, Jean C.; Corbier, Alain; Fortin, Michel; Hamon, Gilles; Jouquey, Simone; and Vever, Jean, 5,412,101, Cl. 548-253.000.

Hamper, Albert: See—  
Cutts, Stanley J.; Gaunt, David; Golledge, Ian; Hamper, Albert; Johnson, Eric; Newmarch, David; and Veal, John, 5,412,534, Cl. 361-695.000.

Hanai, Ryo: See—  
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Hanamura, Yoshihiko: See—  
Katsuragi, Kenjiro; and Hanamura, Yoshihiko, 5,412,442, Cl. 351-206.000.

Hanausek-Walaszek, Margaret; and Coghlan, Lezlee, to Board of Regents, The University of Texas System. Diagnostic and premonitoring uses of a 65 kDa tumor-associated protein in companion and domestic animal malignancy. 5,411,868, Cl. 435-7.230.

Handi-Pac, Inc.: See—  
Klawiter, Ronald R., 5,411,138, Cl. 206-459.100.

Klawiter, Ronald R., 5,411,429, Cl. 446-242.000.

Hane, Thomas H.: See—  
McGraw, Peter S.; Drake, John L., Jr.; and Hane, Thomas H., 5,411,697, Cl. 264-294.000.

Hanes, Gary R.: See—  
Schnier, Dietmar; Madej, Alan A.; and Hanes, Gary R., 5,412,676, Cl. 372-32.000.

Hanna, Paul K.; and Cheron, Teresa M., to Akzo Nobel N.V. Polyketone copolymers of high bulk density and non-reactivity. 5,412,070, Cl. 528-392.000.

Hannaway, Patricia A.: See—  
Rego, James M.; Hamilton, Robert S.; Hannaway, Patricia A.; and Reno, James R., 5,412,452, Cl. 355-203.000.

Hansen, David R.; and Dillman, Steven H., to Shell Oil Company. High molecular weight low coupled linear styrene-isoprene-styrene block copolymer composition and adhesives made therefrom. 5,412,032, Cl. 525-98.000.

Hansen, Gary L., to Honeywell Inc. Selective assembly of component kits. 5,412,576, Cl. 364-468.000.

Hansler, Gerd: See—  
Klausener, Alexander; Kleefeld, Gerd; Brandes, Wilhelm; Dutzmann, Stefan; and Hansler, Gerd, 5,412,100, Cl. 548-187.000.

Hanson, Gunnar J.; and Manning, Robert E., to G. D. Searle & Co. Benzo-fused oxazocinyl terminated alkylamino ethynyl alanine amino diol compounds for treatment of hypertension. 5,411,950, Cl. 514-183.000.

Hanson, Gunnar J.; and Manning, Robert E., to G. D. Searle & Co. Oxazopyrrol terminated alkylamino ethynyl alanine amino diol compounds for treatment of hypertension. 5,411,953, Cl. 514-211.000.

Hanson, Gunnar J.; and Manning, Robert E., to G. D. Searle & Co. Benzo-fused oxazopyrrol-terminated alkylamino ethynyl alanine amino diol compounds for treatment of hypertension. 5,411,954, Cl. 514-211.000.

Hanson, Gunnar J.; and Baran, John S., to G.D. Searle & Co. 3-azabicyclo[3.2.1]nonanyl-terminated non-peptidyl alpha-succinamidoacyl aminodiols as anti-hypertensive agents. 5,411,957, Cl. 514-216.000.

Hanson, Gunnar J.; and Baran, John S., to G. D. Searle & Co. Benzothiomorpholinyl-terminated non-peptidyl alpha-succinamidoacyl aminodiols as anti-hypertensive agents. 5,411,958, Cl. 514-224.200.

Hanson, Gunnar J.; and Manning, Robert E., to G. D. Searle & Co. 1,4-Thiomorpholino-terminated alkylamino ethynyl alanine amino diol compounds for treatment of hypertension. 5,411,959, Cl. 514-227.500.

Hanson, Gunnar J.; and Manning, Robert E., to G. D. Searle & Co. Benzo-fused morpholinyl terminated alkylamino ethynyl alanine amino diol compounds for treatment of hypertension. 5,411,961, Cl. 514-230.500.

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Hanson, Gunnar J.; and Manning, Robert E., to G. D. Searle & Co. Thiazolidinyl terminated alkylamino ethynyl alanine amino diol compounds for treatment of hypertension. 5,411,975, Cl. 514-365.000.

Hao, Hsieh T.; and Ng, Spencer W., to International Business Machines Corporation. Two-dimensional disk array. 5,412,661, Cl. 371-10.100.

Hara, Takehiko: See—  
Takei, Seiji; and Hara, Takehiko, 5,411,334, Cl. 384-45.000.

Hara, Zenichiro, to Mitsubishi Denki Kabushiki Kaisha. Image output control apparatus. 5,412,399, Cl. 345-113.000.

Harada, Chiaki: See—  
Nakajima, Toshio; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Hondo, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, 5,411,779, Cl. 428-36.910.

Harada, Hiroyuki: See—  
Matsuo, Takeshi; Takeda, Yoshiyuki; Yoshida, Takeshi; Kakuta, Masayuki; Kida, Yasuhiko; and Harada, Hiroyuki, 5,412,462, Cl. 355-308.000.

Harada, Masatomi: See—  
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 5,412,096, Cl. 546-16.000.

Harada, Toshitaro: See—  
Fujita, Masashi; and Harada, Toshitaro, 5,412,659, Cl. 370-95.100.

Harbin, Kenneth L. Tilt trailer stabilizer apparatus. 5,411,284, Cl. 280-656.000.

Harbison, Kenneth G.: See—  
Riecke, Edgar E.; and Harbison, Kenneth G., 5,411,856, Cl. 430-622.000.

Harbuck, Edwin S.: See—  
Strom, Hans; Ekdahl, Roy; and Harbuck, Edwin S., 5,410,907, Cl. 73-23.310.

Hardee, Kim C.: See—  
Cordoba, Michael V.; and Hardee, Kim C., 5,412,257, Cl. 327-536.000.

Harder, John W.; Burns, Paul A.; Vargas, J. Ramon; Bowne, Arlyce T.; Knight, Philip D.; Begley, William J.; and Ling, Hans G., to Eastman Kodak Company. Image formation in color reversal materials using strong inhibitors. 5,411,839, Cl. 430-379.000.

Hardouin, Larry J.: See—  
Bogart, Frank J.; Butterfield, Bruce D.; Chavez, David L., Jr.; Dittmer, Henry C.; Fix, Frederick R.; Hardouin, Larry J.; Schmidt, Nancy K.; and Thomson, Linda L., 5,412,714, Cl. 379-221.000.

Hardy Manufacturing, Inc.: See—  
Vargo, William R., 5,411,154, Cl. 211-189.000.

Hardy, Richard A. Fly fisherman's lure holder. 5,410,836, Cl. 43-57.100.

Hari, Todd N. Top garment patterned with sleeves above the head. 5,410,759, Cl. 2-108.000.

Harichian, Bijan: See—  
Vermeer, Robert; Harichian, Bijan; and Au, Van, 5,412,118, Cl. 549-417.000.

Harlan, Tod M.: See—  
Korsunsky, Iosif; Harlan, Tod M.; and Shipe, Joanne E., 5,411,404, Cl. 439-108.000.

Harmon, David L.: See—  
Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, 5,412,246, Cl. 257-632.000.

Harmony Products Inc.: See—  
Moore, William P., 5,411,568, Cl. 71-22.000.

Harms, Wolfgang: See—  
Eizenhofer, Thomas; Harms, Wolfgang; and Herd, Karl-Josef, 5,412,078, Cl. 534-635.000.

Harness, Harry N. Towed vehicle brake control. 5,411,321, Cl. 303-7.000.

Harnischfeger Corporation: See—  
Immel, Darryl R.; Dretzka, Andrew P.; and Kallenberger, Harvey J., 5,410,826, Cl. 37-457.000.

Harper, Donald K., Jr.: See—  
Golubchik, Arkadiy Y.; Harper, Donald K., Jr.; Laub, Michael F.; and McMullen, David W., 5,412,540, Cl. 361-807.000.

Harper, Heather J.: See—  
Downton, Galen E.; Maxwell, Michael W.; Harper, Heather J.; Mohlenkamp, M. Joseph, Jr.; Rizzi, George P.; Litke, Manfred; Romer, Karin; and Engel, Ruediger, 5,411,755, Cl. 426-599.000.

Harreus, Albrecht: See—  
Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,411,936, Cl. 504-244.000.

Harris Corporation: See—  
Totty, Ronald E., 5,412,426, Cl. 348-385.000.

Harris, Hollis A.: See—  
Derrick, Donald E.; Harris, Hollis A.; Marion, Robert H.; Tower, William A.; and Towle, L. Christopher, 5,412,544, Cl. 362-84.000.

Harris, Maureen A.: See—  
Harris, Patrick W.; and Harris, Maureen A., 5,410,841, Cl. 49-67.000.

Harris, Patrick W.; and Harris, Maureen A. Sliding door and window security means. 5,410,841, Cl. 49-67.000.

Harris, Rodney M.: See—  
Shalati, Mohamad D.; Marquart, James A.; Petty, John L.; and Harris, Rodney M., 5,411,809, Cl. 428-480.000.

Hartdegen, George, III, personal representative: See—  
Hartdegen, George, III; and Hartdegen, George, Jr., deceased, 5,411,457, Cl. 482-96.000.

Hartdegen, George, Jr., deceased: See—  
Hartdegen, George, III; and Hartdegen, George, Jr., deceased, 5,411,457, Cl. 482-96.000.

Hartdegen, George, III; and Hartdegen, George, Jr., deceased (by Hartdegen, George, III, personal representative). Infant exercise and entertainment device. 5,411,457, Cl. 482-96.000.

Hartleif, Karl-Heinz, to Hartleif Metalldecken GmbH. Ceiling lining. 5,410,853, Cl. 52-773.000.



Hartleif Metalldecken GmbH: See—  
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Hartman, Nile F.: See—  
Giversen, Terri; Stratton, Mark; and Hartman, Nile F., 5,410,917, Cl. 73-800.000.

Hartwell, David W.: See—  
Collins, Hansel A.; and Hartwell, David W., 5,412,788, Cl. 395-425.000.

Harvey, David S.; Danielson, Scott E.; and Dacey, John W., to Mobil Solar Energy Corporation. Machine and method for applying solder paste to electronic devices such as solar cells. 5,411,897, Cl. 437-8.000.

Hasegawa, Isao, to NEC Corporation. Method and arrangement for controlling memory bank access requests in data processing system. 5,412,792, Cl. 395-425.000.

Hasegawa, Takuji, to Konica Corporation. Silver halide photographic light-sensitive material. 5,411,849, Cl. 430-567.000.

Hasegawa, Wataru: See—  
Izu, Masatsugu; Dotter, Buddie R., II; Ovshinsky, Stanford R.; and Hasegawa, Wataru, 5,411,591, Cl. 118-718.000.

Hasenkam, John M.: See—  
Andersen, Henning R.; Hasenkam, John M.; and Knudsen, Lars L., 5,411,552, Cl. 623-2.000.

Hashimoto, Hiroshi: See—  
Uehara, Masayuki; Hashimoto, Hiroshi; and Furubayashi, Tadashi, 5,411,218, Cl. 242-245.000.

Hashimoto, Keitaro; and Aoki, Takashi, to Olympus Optical Co., Ltd. Apparatus for servo-controlling objective lens in recording and/or reproducing apparatus using optical record medium. 5,412,636, Cl. 369-44.320.

Hashizume, Hiroshi: See—  
Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hirohisa; Kabai, Takahito; Satou, Kouichirou; Nakamura, Tetsuya; and Katagata, Satoshi, 5,412,364, Cl. 355-260.000.

Hastings, Roger N.: See—  
Kume, Stewart M.; Le, Trac; and Hastings, Roger N., 5,411,016, Cl. 128-6.000.

Hata, Masaharu, to Kao Corporation. Method and apparatus for controlling injection molding. 5,411,686, Cl. 264-40.600.

Hatono, Shunso: See—  
Yasuhiro, Kuramoto; Shuichi, Noda; Maruyama, Shinobu; Hatono, Shunso; Mochizuki, Haruyo; and Yazaki, Akira, 5,412,098, Cl. 546-156.000.

Hatta, Ken: See—  
Akiyama, Koichi; Miyashita, Hiromu; Aoki, Sanji; Hatta, Ken; Ino, Takashi; and Mishima, Yasuhiro, 5,412,003, Cl. 523-513.000.

Hatton, Gregory J.: See—  
Marrelli, John D.; Durrett, Michael G.; Helms, David A.; Pepin, Lisa L.; and Hatton, Gregory J., 5,412,326, Cl. 324-640.000.

Hattori, Hiroshi; and Sugiyama, Junich, to Fujitsu, Limited. FIFO memory device capable of writing contiguous data into rows. 5,412,611, Cl. 365-221.000.

Hattori, Kei: See—  
Hori, Masaru; Okano, Haruo; Aoyama, Michishige; Ito, Masao; Hattori, Kei; Higuchi, Fumihiko; and Tahara, Yoshifumi, 5,411,631, Cl. 216-72.000.

Hattori, Masao: See—  
Hozumi, Toyoharu; Matsumoto, Takao; Ooyama, Haruo; Namba, Tsuneo; Shiraki, Kimiyasu; Hattori, Masao; Kurokawa, Masahiko; and Kadota, Shigetoshi, 5,411,733, Cl. 424-195.100.

Hauser Chemical Research, Inc.: See—  
Murray, Christopher K.; Beckvermit, Jeffrey T.; Bailey, David T.; and Peterson, S. Kent, 5,412,116, Cl. 549-379.000.

Hausman, Richard; Sherer, Paul W.; Rivers, James P.; Zikmund, Cynthia; Connerly, Glenn W.; Strohl, Niles E.; and Reid, Richard S., to 3COM Corporation. Programmed I/O ethernet adapter with early interrupts for accelerating data transfer. 5,412,782, Cl. 395-250.000.

Havas, Janos, to Perfect Products Pty. Ltd. Apparatus and method for identifying musical chords. 5,410,940, Cl. 84-473.000.

Havasy, Charles: See—  
Lee, Hyong Y.; Johnson, Belinda; Reston, Rocky; Ito, Chris; Trombley, Gerald; and Havasy, Charles, 5,411,902, Cl. 437-40.000.

Havemose, Allan, to Commodore Electronics Limited. Decoder for cross interleaved error correcting encoded data. 5,412,667, Cl. 371-37.500.

Havens, Stephen J.: See—  
Hergenrother Paul M.; Bryant, Robert G.; Jensen, Brian J.; and Havens, Stephen J., 5,412,066, Cl. 528-353.000.

Hawkins, Mark R.; and Robinson, McDonald, to Advanced Semiconductor Materials America, Inc. Gas injectors for reaction chambers in CVD systems. 5,411,590, Cl. 118-715.000.

Hawthorne, V. Terrey; Marlborough, Donald J.; and Nassar, Rami V., to Amsted Industries Incorporated. Lightweight fatigue resistant railcar truck sideframe with tapering I-beam construction. 5,410,968, Cl. 105-206.100.

Hayabuchi, Masahiro: See—  
Ando, Masahiko; Noda, Koji; Yamamoto, Yoshihisa; Hayabuchi, Masahiro; Tsukamoto, Kazumasa; Hojo, Yasuo; Taga, Yutaka; Oba, Hidehiro; and Kubo, Seitoku, 5,411,451, Cl. 477-144.000.

Hayasaka, Hiroshi: See—  
Okawa, Yasuo; Ito, Akiyoshi; Hayasaka, Hiroshi; Saeki, Toshio; Tanaka, Naoki; and Sugawara, Kiyobumi, 5,410,847, Cl. 52-272.000.

Hayashi, Isamu: See—  
Matsuda, Yoshio; Kondoh, Harufusa; Notani, Hiromi; and Hayashi, Isamu, 5,412,380, Cl. 340-825.850.

Hayashi, Katsuhiko: See—  
Orii, Makoto; and Hayashi, Katsuhiko, 5,411,428, Cl. 446-90.000.

Hayashi, Masami, to Fujitsu Limited. Electronic exchange having function of calling number delivery service and blocking. 5,412,711, Cl. 379-67.000.

Hayashi, Toshio: See—  
Nishimura, Toshihiro; Hayashi, Toshio; Kawano, Hirohisa; and Fujiki, Hideshi, 5,412,418, Cl. 348-14.000.

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Hayden, Richard C. Dumbbell rack attachment for exercise weight bench column. 5,411,459, Cl. 482-104.000.

Hayes, Donald J., to MicroFab Technologies, Inc. Solder compositions and methods of making same. 5,411,602, Cl. 148-23.000.

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Collins, George L.; Pleban, William M.; and Hayes, Milton J., Jr., 5,412,042, Cl. 525-403.000.

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Parikh, Himanshu; and Healey, Fritz W., 5,410,815, Cl. 33-234.000.

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Kumar, Prabhat; Huber, Louis; Engleman, Robert; and Heatley, Charles, 5,411,611, Cl. 148-557.000.

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Evans, Benjamin F.; and Heep, Jerry J., 5,412,377, Cl. 340-825.220.

Heeringa, Schelte; and Bosscha, Geert J., to U. S. Philips Corporation. Drive circuit for a flyback converter with switching transistors in bridge arrangement. 5,412,332, Cl. 327-110.000.

Hefner, Robert E., Jr.; and Earls, Jimmy D., to Dow Chemical Company. The Nitro group terminated mesogenic epoxy resin adducts. 5,412,044, Cl. 525-523.000.

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Rossberg, Rolf; Fritsch, Rainer; Otterbach, Jurgen; and Heidemann, Rolf, 5,412,746, Cl. 385-48.000.

Heidt, Philip C.; Foster, Charles H.; Witzeman, J. Stewart; and Crain, Allen L., to Eastman Chemical Company. Thermosetting coating compositions. 5,412,151, Cl. 560-145.000.

Heiligman, Randy B., to UltraPure Systems, Inc. Water filter module. 5,411,661, Cl. 210-264.000.

Hejazi, Shahram, to Eastman Kodak Company. Storage phosphor reader having erase lamp feature failure detection. 5,412,222, Cl. 250-588.000.

Helfrich, Kenneth J., to Thomson Consumer Electronics, Inc. 50 Hz parabolic signal filter. 5,412,290, Cl. 315-371.000.

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Miller, Leslie S.; and Helland, John R., 5,411,528, Cl. 607-5.000.

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Hellmann, Udo; Stephan, Werner; and Sadowski, Fritz, to Herberts Gesellschaft mit beschränkter Haftung. Plastic primer coating of EVA, chlorinated polyolefin and epoxy resin. 5,412,000, Cl. 523-437.000.

Hellstrom, Ingegerd; Hellstrom, Karl E.; Marquardt, Hans; and Johnston, Janet, to Oncogen Limited Partnership. Monoclonal antibody L53 which recognizes a human tumor-associated antigen. 5,411,884, Cl. 435-240.270.

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Hendrix, Randall R.; Wilburn, Bruce E.; and Cooney, Aidan P., to Pennzoil Products Company. Stable petroleum resin-water emulsion. 5,412,007, Cl. 524-72.000.

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Hepp, John S., to Whitehall Corporation. Encapsulated hydrophone element for towed hydrophone array. 5,412,621, Cl. 367-154.000.

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Herberts Gesellschaft mit beschränkter Haftung: See—  
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Hergenrother Paul M.; Bryant, Robert G.; Jensen, Brian J.; and Havens, Stephen J., to United States of America, National Aeronautics and Space Administration. Phenylethynyl terminated imide oligomers. 5,412,066, Cl. 528-353.000.

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Heritier, Jean-Marc: See—  
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Hermans, Michael A.; Chen, Fung-Jou; Spiegelberg, Larry L.; Kressner, Bernhard E.; and Neilson, Janice G., to Kimberly-Clark. Method for increasing the internal bulk of wet-pressed tissue. 5,411,636, Cl. 162-109.000.

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Herrera, Maria H. G.: See—  
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Hess, Heinrich; Krause, Wolfgang; and Bauerfeind, Hans B., to Bauerfeind GmbH & Co. Elastic knee-joint bandage. 5,411,037, Cl. 128-882.000.

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Hester, Todd A.: See—  
Comerci, Joseph D.; DeRoss, Robert; Fuerst, Robert M.; Hester, Todd A.; and Sommer, Edward S., 5,412,169, Cl. 200-339.000.

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Constant, Amanda L.; Webb, David W.; Withers-Miklos, Katherine Z.; Lannen, Kay C.; Turner, Ted T.; and Hong-Kiat Leong, Amos, 5,412,575, Cl. 364-464.010.

Du, Weimin; Krishnamurthy, Ravi; and Shan, Ming-Chien, 5,412,806, Cl. 395-600.000.

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Forsyth, Mark; and Knebel, Patrick, 5,412,787, Cl. 395-400.000.

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Higuchi, Hiroshi; Arita, Takashi; Kitamura, Sotoyuki; and Murozono, Mikio, to Matsushita Electric Industrial Co., Ltd. Substrate for solar cell and solar cell employing the substrate. 5,411,601, Cl. 136-256.000.

Higuchi, Koichi: See—  
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Higuchi, Noriaki: See—  
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Hikichi, Toichiro: See—  
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Hilal, Said, to Applied Medical Resources Corporation. Embolectomy catheter. 5,411,509, Cl. 606-159.000.

Hildebrandt, Bodo, to Wella Aktiengesellschaft. Liquid spray or foam dispensing apparatus. 5,411,183, Cl. 222-399.000.

Hilgendorf, Eric. Shoe with interchangeable soles. 5,410,821, Cl. 36-100.000.

Hill, Frank J.: See—  
Focke, Heinz; Mehner, Uwe; and Hill, Frank J., 5,411,625, Cl. 156-359.000.

Hill, Jeffrey S. Replaceable buoy cover. 5,411,424, Cl. 441-11.000.

Hill, Michael R. S.; and Mehra, Rahul, to Medtronic, Inc. Method and apparatus for control of A-V interval. 5,411,531, Cl. 607-14.000.

Hill, Randal M.; and Snow, Steven A., to Dow Corning Corporation. Silicone vesicles and entrapment. 5,411,744, Cl. 424-450.000.

Hill, Tara G.: See—  
Geerts, Rolf L.; Kufeld, Scott E.; and Hill, Tara G., 5,411,925, Cl. 502-117.000.

Hille, Hans-Dieter; and Massone, Matthias, to Bollig & Kemper KG. Aqueous dispersions of cross-linked polymer microparticles. 5,412,023, Cl. 524-539.000.

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Van Brunt, Roger; Hillman, Daniel L.; Nilson, Christopher; Opreescu, Florin; and Teener, Michael D., 5,412,698, Cl. 375-373.000.

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Hind Health Care, Inc.: See—  
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Hirabayashi, Yasuji: See—  
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Hirai, Masaaki, to Nihon Kohden Corporation. Biological signal measuring device. 5,411,029, Cl. 128-696.000.

Hirai, Takami; and Yano, Shinsuke, to NGK Insulators, Ltd. Layered stripline filter. 5,412,358, Cl. 333-204.000.

Hiraishi, Shigetoshi: See—  
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Hirano, Yoshihisa; Takara, Yoshifumi; and Ogasawara, Masahiro, to Tokyo Electron Limited. Magnetron plasma processing apparatus. 5,411,624, Cl. 156-345.000.

Hirashima, Hidenori: See—  
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Hiratani, Kazuhisa; Surigihara, Hideki; and Kasuga, Kazuyuki, to Director-General of Agency of Industrial Science and Technology. Method of selectively separating lead ions. 5,411,667, Cl. 210-638.000.

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Ichikawa, Wataru; Matsuki, Yuji; and Hirohashi, Seiji, 5,412,172, Cl. 219-86.410.

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Hamamoto, Nobuo; Onishi, Tadashi; Suzuki, Tatsundo; Nagata, Minoru; Mizushima, Kenichi; and Tyojiamori, Yosuke, 5,412,719, Cl. 380-9.000.

Ichikawa, Atsushi; Yamauchi, Yoshiaki, and Saito, Akira, 5,412,633, Cl. 369-44.140.

Kogure, Makoto, 5,412,643, Cl. 370-24.000.

Maeda, Miyuki; Yamashita, Khotaro; and Maeda, Akira, 5,412,775, Cl. 395-158.000.

Makio, Satoshi; Nitanda, Fumio; Furukawa, Yasuhiro; Ito, Kohei; Sato, Masazumi; Kawamoto, Kazutami; and Ito, Kenchi, 5,412,502, Cl. 359-332.000.

Maruoka, Tetsuya; and Masui, Shoichi, 5,412,769, Cl. 395-140.000.

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Nagase, Norikazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, 5,411,630, Cl. 216-22.000.

Nigawara, Seitsu; Namba, Shigeaki; and Kohmoto, Hiroshi, 5,410,883, Cl. 60-646.000.

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Ogino, Masanori; Iwahara, Yoshiaki; and Sakamoto, Syuichi, 5,412,437, Cl. 348-781.000.

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Otake, Tadashi; Okura, Akimitsu; Iwamoto, Hiroshi; Todokoro, Hideo; Komoda, Tsutomu; and Tobita, Issei, 5,412,209, Cl. 250-310.000.

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Urata, Kazumoto; Oguni, Kensaku; Ishibane, Kyuhei; and Katsumata, Naoto, 5,410,887, Cl. 62-129.000.

Hitachi Metals, Ltd.: See—  
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Karoake, Takao; Nakamura, Ken; and Kashiwagi, Iwao, 5,411,609, Cl. 148-325.000.

Makio, Satoshi; Nitanda, Fumio; Furukawa, Yasuhiro; Ito, Kohei; Sato, Masazumi; Kawamoto, Kazutami; and Ito, Kenchi, 5,412,502, Cl. 359-332.000.

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Hitachi Software Engineering Co., Ltd.: See—  
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Hlavka, Edwin J.: See—  
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Hoarty, W. Leo, to ICTV, Inc. Interactive home information system. 5,412,720, Cl. 380-15.000.

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Hoechst Celanese Corp.: See—  
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Hoefkes, Heiner. Bag holder. 5,411,229, Cl. 248-97.000.

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Hollitt, Michael J.; and O'Brien, Brian A., to Wimmera Industrial Minerals Pty. Ltd. Production of acid soluble titania. 5,411,719, Cl. 423-69.000.

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Hong, Sung H., to Goldstar Co., Ltd. Apparatus and method for enhancing transient edge of video signal. 5,412,432, Cl. 348-625.000.

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Hood, David W.: See—  
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Yahagi, Hideo; Takaoka, Masahiko; Hoshikawa, Shingo; Miyoshi, Takeshi; and Okada, Keiji, 5,411,274, Cl. 277-203.000.

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Hoss, Robert J., to American Express Company. Radio frequency activated charge card. 5,412,192, Cl. 235-380.000.

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Hotta, Harumichi; Suzuki, Akira; and Tozuka, Akira, to Yamaha Corporation. Electronic musical instrument having an external memory device. 5,410,941, Cl. 84-601.000.

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Houlachi, George; Janjua, M. Barakat I.; Kitzinger, Frank; Wint, Gregory A.; and Labuc, Vladimir M., to Noranda Inc. Method and apparatus for on-line monitoring the quality of a purified metal sulphate solution. 5,411,648, Cl. 204-153.190.



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Hsu, Adam C., to Rohm & Haas Company. Bromopropargyl quaternary ammonium compounds having antimicrobial activity. 5,411,933, Cl. 504-156,000.

Hsu, Chung-Hung; and Lin, Yung-Ta. U-shaped lock. 5,410,895, Cl. 70-39,000.

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Hsu, Tsung-Yuan, to United States of America, Air Force. Hybrid multiple quantum well spatial light modulator. 5,411,895, Cl. 437-3,000.

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Huang, Chen S. Power wrench. 5,412,546, Cl. 362-119,000.

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Hyundai Electronics Industries Co., Ltd.: See—  
Son, Kwang S., 5,411,910, Cl. 437-52,000.

Hyundai Motor Company: See—  
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I. Fusanori: See—  
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Iasys Corporation: See—  
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Ichikawa, Atsushi; Yamauchi, Yoshiaki; and Saito, Akira, to Hitachi, Ltd. Optical disk apparatus with galvanomirror having movable reflecting surfaces cooperating with fixed reflecting surfaces. 5,412,633, Cl. 369-44,140.

Ichikawa, Wataru; Matsuki, Yuji; and Hirohashi, Seiji, to Kabushiki Kaisha SG. Spot welding machine. 5,412,172, Cl. 219-86,410.

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ICI Pharma: See—  
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ICTV, Inc.: See—  
Hoarty, W. Leo, 5,412,720, Cl. 380-15,000.

Ide, Tsutomu; Hamada, Suguru; and Kawai, Masahiro, to Kabushiki Kaisha Osaka Packing Seizosho. Molded boards of calcium silicate and process for producing the same. 5,411,793, Cl. 428-215,000.

Ideker, Raymond E.: See—  
Swanson, David K.; Ideker, Raymond E.; and Walcott, Greg, 5,411,525, Cl. 607-5,000.

Idemitsu Kosan Co., Ltd.: See—  
Okada, Akihiko; and Machida, Shuji, 5,412,024, Cl. 524-577,000.

Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hiroaki; Kabai, Takahito; Satou, Kouichi; Nakamura, Tetsuya; and Katagata, Satoshi, to Kabushiki Kaisha Toshiba. Toner pack and development device for use in electrophotographic apparatus. 5,412,364, Cl. 355-260,000.

Ihara Chemical Industry Co., Ltd.: See—  
Yoshimura, Takumi; Toriyabe, Keiji; Masuda, Katsumi; and Hanai, Ryo, 5,411,934, Cl. 504-239,000.

Ihara, Hirofumi: See—  
Kawano, Yuzo; and Ihara, Hirofumi, 5,412,457, Cl. 355-245,000.

Ii, Hidehiro: See—  
Mizuno, Yoshiyuki; Ii, Hidehiro; Suzuki, Satoshi; and Tonooka, Yukihisa, 5,412,271, Cl. 310-71,000.

Iijima, Naoto: See—  
Kohno, Satoru; and Iijima, Naoto, 5,412,321, Cl. 324-309,000.

Iimuro, Shigeru: See—  
Shinoda, Hosei; Ohtaguro, Masami; Funae, Akihiro; and Iimuro, Shigeru, 5,412,067, Cl. 528-361,000.

Iino, Shinji; Kubota, Tamio; and Yokota, Keiichi, to Tokyo Electron Yamanashi Limited. Probe card. 5,412,329, Cl. 324-754,000.

Iizuka, Masanori: See—  
Taniguchi, Takao; Iizuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shinichi; and Yamashita, Tadakazu, 5,411,558, Cl. 44-301,000.

Iizuka, Takashi; Arai, Yasunori; and Yamazaki, Yoshihiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Imaging optical system for compensating change of temperature. 5,412,510, Cl. 359-820,000.

Ijiri, Makoto: See—  
Eto, Shinya; Okawa, Yoichi; Simada, Shoichi; and Ijiri, Makoto, 5,411,385, Cl. 418-96,000.

Ikeda, Masae: See—  
Kamaji, Hideki; Ikeda, Masae; Hirose, Kazunori; and Nishio, Yukio, 5,412,458, Cl. 355-259,000.

Ikeda, Norihiro; and Taketa, Kaoru, to Sanyo Electric Co., Ltd. Process for producing DRAM semiconductor devices. 5,411,911, Cl. 437-52,000.

Ikeda, Takashi; and Suzuki, Satoshi, to Yamaha Corporation. Automatic accompaniment device having a function for controlling accompaniment tone on the basis of musical key detection. 5,412,156, Cl. 84-635,000.

Ikeuchi, Hiroshi, to Murata Mfg. Co., Ltd. Deflection coil and fabrication method thereof. 5,412,362, Cl. 335-213,000.

Ikeya, Masahisa; Saito, Tadashi; and Inokuchi, Kazuyuki, to Oki Electric Industry Co., Ltd. Compound semiconductor device and method of making it. 5,412,236, Cl. 257-282,000.

Ilg, Gregory R. S.: See—  
Jarvis, J. Michael; Bass, Andrew F.; and Ilg, Gregory R. S., 5,412,709, Cl. 379-28,000.

Illinois Tool Works Inc.: See—  
Morawa, Joseph E.; Frederiksen, Bjarne; Lannert, George Z.; and Masghati, Mohammad, 5,411,228, Cl. 248-74,500.

Imagawa, Shinji: See—  
Kido, Eiichi; Yui, Yui; Anzai, Shunju; Yoshiura, Syoichi; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326,000.

Image Technology International, Inc.: See—  
Lam, Nicholas L., 5,412,449, Cl. 355-22,000.

Image Transform Inc.: See—  
Holland, David E.; and Schutz, Gavin W., 5,412,433, Cl. 348-650,000.

Imai, Minoru: See—  
Honma, Tatsuya; Kinugasa, Tatsuo; and Imai, Minoru, 5,412,662, Cl. 371-21,100.

Imaide, Takuya: See—  
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Imazumi, Tatsuya: See—  
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Imanishi, Ryozo: See—  
Yamashita, Nobuyuki; Imanishi, Ryozo; and Uemura, Katsuhiko, 5,410,923, Cl. 74-474,000.

Imeokparia, Daniel D.; Shmidt, Creston D.; and Suh, Kyung W., to Dow Chemical Company. The extruded, open-cell alkenyl aromatic polymer foam and process for making. 5,411,687, Cl. 264-50,000.

Immel, Darryl R.; Dretzka, Andrew P.; and Kallenberger, Harvey J., to Harnischfeger Corporation. Assembly and method for tooth tip retention. 5,410,826, Cl. 37-457,000.

Imodco, Inc.: See—  
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Imperial Chemical Industries PLC: See—  
Chan, Sek K.; Graham, Steven J.; Kirby, Ian J.; and Leiper, Graeme A., 5,411,290, Cl. 280-737,000.

Robinson, Julian N., 5,411,845, Cl. 430-531,000.

Roulstone, Brian J.; and Waters, Julian A., 5,412,019, Cl. 524-497,000.

Implex GmbH Spezialhorgerate: See—  
Hornmann, Gunter; and Leysieffer, Hans, 5,411,467, Cl. 600-25,000.

Imuta, Junichi; Saito, Junji; Ueda, Takashi; and Mukaiyama, Teruaki, to Mitsui Petrochemical Industries, Ltd. Catalyst for olefin polymerization, process for the polymerization of olefin, and transition metal compound employable for the catalyst. 5,412,128, Cl. 556-11,000.

Inada, Hiroshi, to Sumitomo Electric Industries, Ltd. Semiconductor device and method of manufacturing the same. 5,411,919, Cl. 437-209,000.

InControl, Inc.: See—  
Yomtov, Barry M., 5,411,031, Cl. 128-706,000.

Indelicato, Joseph M.: See—  
Amos, Jane G.; Indelicato, Joseph M.; Pasini, Carol E.; and Reutzel, Susan M., 5,412,094, Cl. 540-301,000.

Industrial Technology Research Institute: See—  
Lin, Chieh-Yu, 5,412,508, Cl. 359-692,000.

Wang, Hui-Po; Lee, On; and Fan, Chin-Tsai, 5,412,112, Cl. 549-328,000.

Yeh, Tsung-Shou; Lin, Jane-Chyi; and Hwang, Shiang-Po, 5,411,563, Cl. 65-17,300.

Infra-Temp Inc.: See—  
Esseff, George J.; and Steiker, Earl, 5,411,032, Cl. 128-736,000.

Infusion Technologies Corporation: See—  
Campbell, Robert E., 5,411,482, Cl. 604-153,000.

Ing. Rauch Fertigungstechnik Gesellschaft m.b.H.: See—  
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Inland Steel Company: See—  
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Inmos Limited: See—  
Gammack, Richard J.; Barnaby, Catherine L.; and Stansfield, Anthony I., 5,412,368, Cl. 340-146,200.

Innovative Technology Sales, Inc.: See—  
Dumelle, John F., 5,411,180, Cl. 222-137,000.

Ino, Takashi: See—  
Akiyama, Koichi; Miyashita, Hiromu; Aoki, Sanji; Hatta, Ken; Ino, Takashi; and Mishima, Yasuhiro, 5,412,003, Cl. 523-513,000.

Inokuchi, Kazuyuki: See—  
Ikeya, Masahisa; Saito, Tadashi; and Inokuchi, Kazuyuki, 5,412,236, Cl. 257-282,000.

Inokuchi, Yoshinori; and Kuwata, Satoshi, to Shin-Etsu Chemical Co., Ltd. Process of producing hydrophobic titanium oxide fine particle. 5,411,761, Cl. 427-220,000.

Inokuti, Yukio; Suzuki, Kazuhiro; and Hina, Eiji, to Kawasaki Steel Corporation. Method of producing low iron loss, low-noise grain-oriented silicon steel sheet, and low-noise stacked transformer. 5,411,604, Cl. 148-112,000.

Inomata, Youichi: See—  
Nagase, Norikazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, 5,411,630, Cl. 216-22,000.

Inoue, Hajime: See—  
Watanabe, Noriyoshi; Morishige, Kiyoshi; and Inoue, Hajime, 5,412,013, Cl. 524-413,000.

Inoue, Kouji: See—  
Fujinami, Tsutomu; Inoue, Kouji; Tsuji, Hiroshi; Renge, Keiichi; Moriyama, Kenzo; and Tozuka, Kenji, 5,412,802, Cl. 395-575,000.

Inoue, Masayuki: See—  
Pikus, Ilya; Kimball, Greg J.; and Inoue, Masayuki, 5,410,984, Cl. 117-206,000.

Inoue, Shohei: See—  
Sakurai, Yasuhisa; Okano, Teruo; Kataoka, Kazunori; Yamada, Noriko; Inoue, Shohei; and Yokoyama, Masayuki, 5,412,072, Cl. 530-322,000.

Inoue, Shunsuke; Koizumi, Toru; Miyawaki, Mamoru; and Sugawa, Shigetoshi, to Canon Kabushiki Kaisha. Silicon-on-insulator CMOS



device and a liquid crystal display with controlled base insulator thickness. 5,412,240, Cl. 257-347.000.

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Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Institut Nationale de la Sante: See—  
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Institut Pasteur: See—  
Beaudenon, Sylvie; Kremsdorf, Dina; Croissant, Odile; and Orth, Gerard, 5,411,857, Cl. 435-5.000.

Institute for Radiological Image Science, Inc.: See—  
Goodenough, Davil J.; and Edwards, Warren S., 5,412,703, Cl. 378-8.000.

Institute of Systems Science: See—  
Narasimhan, Arcot D.; Wang, Weiguo; and Kankanhali, Mohen S., 5,412,718, Cl. 380-4.000.

Intel Corporation: See—  
Garney, John I., 5,412,798, Cl. 395-500.000.

Kreifels, Jerry; Fandrich, Mickey L.; and Smith, William, 5,412,793, Cl. 395-425.000.

Young, Ian; Wong, Keng L.; and Greason, Jeffrey K., 5,412,349, Cl. 331-34.000.

Intermedics, Inc.: See—  
Alt, Eckhard, 5,411,527, Cl. 607-5.000.

Armstrong, Randolph K., 5,411,536, Cl. 607-32.000.

Lin, Jack H., 5,411,538, Cl. 607-33.000.

Munshi, Mohammed Z.; and Nedungadi, Ashok P., 5,411,537, Cl. 607-33.000.

Intermedics Orthopedics, Inc.: See—  
Mumme, Charles W., 5,411,505, Cl. 606-88.000.

International Business Machine Corporation: See—  
Chan, Byron K.; and Scott, Terrence R., 5,412,689, Cl. 375-288.000.

International Business Machines Corporation: See—  
Acovic, Alexandre; and Wu, Ben S., 5,411,905, Cl. 437-43.000.

Anderson, Timothy M.; Chrysler, Gregory M.; Chu, Richard C.; and Simons, Robert E., 5,412,536, Cl. 361-700.000.

Bartow, Neil G.; Brown, Paul J.; Capowski, Robert S.; Fasano, Louis T.; Gregg, Thomas A.; Salyer, Gregory; and Westcott, Douglas W., 5,412,803, Cl. 395-575.000.

Bloomfield, Marc A.; and Andrew, Christopher A. H., 5,412,776, Cl. 395-160.000.

Bross, Arthur; and Walsh, Thomas J., 5,410,807, Cl. 29-843.000.

Buettner, Donald C.; Rothschild, Wayne J.; and Smith, Gordon J., 5,412,519, Cl. 360-73.030.

Canetti, Ran; and Herzberg, Amir, 5,412,723, Cl. 380-21.000.

Chang, Chung-Chia; Davoli, Gregory L.; El-Ruby, Mohamed H.; Friske, Craig A.; Iyer, Balakrishna R.; Lazarus, John P.; Wilhite, David; and Plambeck, Kenneth E., 5,412,384, Cl. 341-79.000.

Christner, Jodie A.; Cunningham, Earl A.; Kerwin, Gregory J.; and Poss, Joe M., 5,412,518, Cl. 360-66.000.

Cragun, Brian J., 5,412,189, Cl. 235-379.000.

Cutts, Stanley J.; Gaunt, David; Gollidge, Ian; Hamper, Albert; Johnson, Eric; Newmarch, David; and Veal, John, 5,412,534, Cl. 361-695.000.

Dewey, Douglas W., 5,412,668, Cl. 371-40.100.

Diaz, Arthur F.; and Baum, Thomas H., 5,411,778, Cl. 428-35.700.

Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, 5,412,246, Cl. 257-632.000.

Galbi, Duane E.; Clinton, Michael P.; and Kellogg, Mark W., 5,412,613, Cl. 365-230.030.

Garric, George; and Lafond, Andre, 5,411,358, Cl. 414-277.000.

Gonya, Stephen G.; Lake, James K.; Long, Randy C.; and Wild, Roger N., 5,411,703, Cl. 420-561.000.

Gruodis, Algirdas J.; Patel, Piyushkumar C.; and Szabo, Kurt P., 5,412,665, Cl. 371-27.000.

Hao, Hsieh T.; and Ng, Spencer W., 5,412,661, Cl. 371-10.100.

Hoppe, Karl H.; McGooagan, Laura H.; Skarshinski, Leon; and Underkoffler, Michael E., 5,412,653, Cl. 370-58.200.

Jordan, Lloyd E., II; Shi, Shaw-Ben; Sirkin, Martin J.; and Stephens, Paul E., 5,412,805, Cl. 395-600.000.

Kagami, Naoyuki; Nakase, Kohji; and Kubo, Hiroaki, 5,412,637, Cl. 369-44.320.

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Rechtschaffen, Rudolph N.; and Ekanadham, Kattamuri, 5,412,784, Cl. 395-375.000.

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International Business Machines Incorporated: See—  
Pietras, Mark A.; and Rodriguez, Arturo A., 5,412,766, Cl. 395-131.000.

Inui, Tetsuya: See—  
Deguchi, Toshihisa; Inui, Tetsuya; Ohta, Kenji; and Katoh, Shohichi, 5,412,630, Cl. 369-44.320.

Invitro International: See—  
Gordon, Virginia C.; Mirhashemi, Soheila; and Wei, Rosalind W., 5,411,888, Cl. 436-5.000.

IPL, Inc.: See—  
Goulet, Jean-Francois; Labrie, Sylvain; and Lesquir, Dominique, 5,411,160, Cl. 220-182.000.

Ireland, Dan D.; and Miller, Michael E., to Danek Medical, Inc. Trans-mission mechanism for a surgical cutting instrument. 5,411,513, Cl. 606-171.000.

Irwin, Craig W.: See—  
Chase, Donna J.; Fang, Ho T.; Irwin, Craig W.; and Schienle, James L., 5,411,368, Cl. 415-189.000.

Isabelle, Charles J.: See—  
Kish, Jules G.; Sammataro, Stephen R.; and Isabelle, Charles J., 5,411,116, Cl. 184-6.120.

Iscor Limited: See—  
Fourie, Louis J., 5,411,570, Cl. 75-10.150.

Ishibane, Kyuhei: See—  
Urata, Kazumoto; Oguni, Kensaku; Ishibane, Kyuhei; and Katsumata, Naoto, 5,410,887, Cl. 62-129.000.

Ishibashi, Akira; and Ogawa, Masamichi, to Sony Corporation. Semiconductor device exploiting a quantum interference effect. 5,412,223, Cl. 257-14.000.

Ishida, Shinji: See—  
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Ishihara, Hideaki; Tsuji, Kiyoshi; and Miyashita, Akihiro, to Olympus Optical Co., Ltd. Endoscope system which changes over switches in interlocking relation to each other within video processor and image display apparatus to perform display of endoscope image. 5,412,478, Cl. 348-72.000.

Ishihara Sangyo Kaisha Ltd.: See—  
Yoshida, Tsuneo; Kuriyama, Yasuhide; and Kanbayashi, Shigehisa, 5,411,932, Cl. 504-132.000.

Ishii, Hiroaki: See—  
Kagaya, Mineo; Ishimaru, Mitsuaki; and Ishii, Hiroaki, 5,411,672, Cl. 252-56.005.

Ishii, Kazuhiko: See—  
Takahara, Kazuko; Ishii, Kazuhiko; and Sato, Hideyuki, 5,412,400, Cl. 345-119.000.

Ishii, Toru. Case unloading apparatus. 5,411,363, Cl. 414-797.500.

Ishikawa, Kiichiro: See—  
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Ishikawa, Masaaki: See—  
Kobayashi, Shoji; Ohshio, Hirohiko; Ishikawa, Masaaki; and Uchida, Hideki, 5,412,543, Cl. 362-66.000.

Ishimaru, Mitsuaki: See—  
Kagaya, Mineo; Ishimaru, Mitsuaki; and Ishii, Hiroaki, 5,411,672, Cl. 252-56.005.

Ishiwata, Kazuya; Enomoto, Takashi; and Yoshioka, Toshifumi, to Canon Kabushiki Kaisha. Liquid crystal device with metal oxide masking films with breaks between films under metal lead electrodes. 5,412,494, Cl. 359-67.000.

Ishizaka, Hitoshi: See—  
Nakajima, Toshio; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Honda, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, 5,411,779, Cl. 428-36.910.

Ishizuka, Mitsuru: See—  
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Isobe, Kazuo: See—  
Taniguchi, Takao; Izuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shinichi; and Yamashita, Tadakazu, 5,411,558, Cl. 44-301.000.

Isobe, Kenichi: See—  
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Isono, Yoshinobu: See—  
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Istituto Trentino Di Cultura: See—  
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Isuzu Motors Limited: See—  
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Itak, Jeanne A.; Fleeker, James R.; and Herzog, David P., to Ohmicron Corporation. Immunological analogs for captan. 5,411,869, Cl. 435-7.930.

Ito, Akira: See—  
Sakamoto, Hironori; Ito, Akira; and Nojima, Toshio, 5,412,342, Cl. 330-149.000.

Ito, Akiyoshi: See—  
Okawa, Yasuo; Ito, Akiyoshi; Hayasaka, Hiroshi; Saeki, Toshio; Tanaka, Naoki; and Sugawara, Kiyobumi, 5,410,847, Cl. 52-272.000.

Ito, Chris: See—  
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Ito, Keiji, to Asahi Kogaku Kogyo Kabushiki Kaisha. Structure of the distal end portion of an endoscope. 5,411,020, Cl. 128-4.000.

Ito, Kenchi: See—  
Makio, Satoshi; Nitanda, Fumio; Furukawa, Yasuhiro; Ito, Kohei; Sato, Masazumi; Kawamoto, Kazutami; and Ito, Kenchi, 5,412,502, Cl. 359-332.000.

Ito, Kiichi: See—  
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Ito, Kohei: See—  
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Ito, Masao: See—  
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Ito, Shigenori: See—  
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Ito, Tatsuya: See—  
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Ito, Toshikazu; and Suita, Yoshihiro, to Tokai Kogyo Kabushiki Kaisha. Process of making a panel unit. 5,411,696, Cl. 264-252.000.

Ito, Yoshihiko; Tamao, Kohei; Yamaguchi, Shigehiro; and Nakagawa, Yoshiaki, to Shin-Etsu Chemical Co., Ltd. Thiophene-silole copolymer and its method of manufacture. 5,412,105, Cl. 549-4.000.

Ito, Yuki: See—  
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Itoh, Michio; and Yamada, Hiromichi, to Canon Kabushiki Kaisha. Beam recording apparatus with intensity control. 5,412,408, Cl. 347-132.000.

ITT Automotive Europe GmbH: See—  
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ITT Corporation: See—  
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Iwama, Norio: See—  
Umeno, Takaji; Asano, Katsuhiko; and Iwama, Norio, 5,412,584, Cl. 364-558.000.

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Iwamoto, Toshiaki: See—  
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Iwamura, Masahiro: See—  
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Iwanaga, Masao, to I.T.M. Corporation. Ozone generating apparatus. 5,411,713, Cl. 422-186.150.

Iwanaga, Takeshi: See—  
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Iwasaki, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Cathode-ray tube with anti-reflective coating. 5,412,278, Cl. 313-478.000.

Iwase, Nobuo: See—  
Yasumoto, Takaaki; Iwase, Nobuo; Koiwa, Kaoru; Yamakawa, Koji; and Iyogi, Kiyoshi, 5,412,160, Cl. 174-258.000.

Iwasyk, John M., to Du Pont de Nemours, E. I., and Company. Apparatus for processing materials. 5,411,710, Cl. 422-137.000.

IXYS Corporation: See—  
Zommer, Nathan, 5,412,227, Cl. 257-133.000.

Iyer, Balakrishna R.: See—  
Chang, Chung-Chia; Davoli, Gregory L.; El-Ruby, Mohamed H.; Friske, Craig A.; Iyer, Balakrishna R.; Lazarus, John P.; Wilhite, David; and Plambeck, Kenneth E., 5,412,384, Cl. 341-79.000.

Iyogi, Kiyoshi: See—  
Yasumoto, Takaaki; Iwase, Nobuo; Koiwa, Kaoru; Yamakawa, Koji; and Iyogi, Kiyoshi, 5,412,160, Cl. 174-258.000.

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Jake's Machining & Rebuilding Service, Inc.: See—  
Krippeel, Jacob, 5,410,934, Cl. 83-820.000.

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James, Simon M.: See—  
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Williams, William J.; and Jeong, Jechang, 5,412,589, Cl. 364-728.060.

Jephcott, David L. Apparatus for escalading. 5,411,112, Cl. 182-84.000.

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Cho, Cheon-Gyu; Posner, Gary H.; Talalay, Paul; and Zhang, Yuesheng, 5,411,986, Cl. 514-514.000.

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Ravel, Mihir K.; Jones, Michael D.; and Pepper, Steven H., 5,412,330, Cl. 324-753.000.

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Ide, Tsutomu; Hamada, Suguru; and Kawai, Masahiro, 5,411,793, Cl. 428-215.000.

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Sakamoto, Mitsuo; Koshika, Norihide; Nishimura, Isao; Sasaki, Katsuyasu; and Orui, Satoshi, 5,410,845, Cl. 52-167.200.

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Kamaji, Hideki; Ikeda, Masae; Hirose, Kazunori; and Nishio, Yukio, to Fujitsu Limited. Developing apparatus having leaf spring member for regulating mono-component developer layer. 5,412,458, Cl. 355-259.000.

Kamata, Shinnosuke: See—  
Noro, Hiromi; Kamata, Shinnosuke; and Okajima, Yoshinori, 5,412,615, Cl. 365-233.000.

Kamei, Shinji; and Kawamura, Yasunori, to Rohm Co., Ltd. Signal line changeover circuit with emitter followers. 5,412,482, Cl. 358-335.000.

Kaminski, Eckhard: See—  
Hacker, Hans-Eugen; Hofstetter, Edgar; and Kaminski, Eckhard, 5,411,063, Cl. 139-383.0AA.

Kamler, Frank, to Babcock & Wilcox Company, The. Articulated annular sludge lance. 5,411,043, Cl. 134-167.00R.

Kamy, Inc.: See—  
Henricson, Kaj; Phillips, Joseph; Greenwood, Brian F.; Funk, Erwin D.; and Dunne, Stephen J., 5,411,634, Cl. 162-52.000.

Phillips, Joseph R.; Greenwood, Brian F.; Funk, Erwin; and Dunn, Stephen, 5,411,633, Cl. 162-52.000.

Kanai, Takao; Tanemoto, Kei; Yamazaki, Shuichi; and Nagashima, Takeo, to Nippon Steel Corporation. Oriented electrical steel sheet having low core loss and method of manufacturing same. 5,411,808, Cl. 428-472.000.

Kanakarajan, Kuppusamy; and Kreuz, John A., to Du Pont de Nemours, E. I., and Company. Flexible multi-layer polyimide film laminates and preparation thereof. 5,411,765, Cl. 427-385.500.

Kanetani, Yoshiharu; Fukuoka, Hirofumi; and Orii, Yoshihiko, to Sharp Kabushiki Kaisha. Driving circuit for a matrix type display device. 5,412,397, Cl. 345-99.000.

Kanbar, Maurice: See—  
Sturman, Martin; Kanbar, Maurice; Cohn, Robert J.; and Kolvites, Albert, 5,411,492, Cl. 604-263.000.

Kanbayashi, Shigehisa: See—  
Yoshida, Tsuneo; Kuriyama, Yasuhide; and Kanbayashi, Shigehisa, 5,411,932, Cl. 504-132.000.

Kanda, Yuji: See—  
Ohji, Toshio; and Kanda, Yuji, 5,412,366, Cl. 336-120.000.

Kane, Brian, to Mannesmann Aktiengesellschaft. Flow limiting throttle element. 5,411,055, Cl. 137-513.500.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: See—  
Yokoe, Masaaki; Yokoyama, Hiroshi; and Kashita, Yoshinori, 5,411,800, Cl. 428-362.000.

Kanero, Takahiro: See—  
Omori, Toshimichi; Suzuki, Haruo; Sampei, Tetsuya; Kanero, Takahiro; Nakagawa, Masayoshi; and Kurihara, Masayoshi, 5,411,605, Cl. 148-113.000.

Kaneshima, Hideto: See—  
Mayo, Susan K.; Namikawa, Reiko; Kaneshima, Hideto; and McCune, Joseph M., 5,411,749, Cl. 424-578.000.

Kanetake, Yasuo: See—  
Murayama, Tomohiro; and Kanetake, Yasuo, 5,412,533, Cl. 361-528.000.

Kaneto, Masayuki: See—  
Nakajima, Toshio; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Hondo, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, 5,411,779, Cl. 428-36.910.

Kang, En-Tang; Ting, Yen P.; Neoh, Koon G.; and Tan, Kuang L., to National University of Singapore. Recovery of precious metals from acid solutions by N-containing electroactive polymers. 5,411,573, Cl. 75-721.000.

Kang, Seong T., to Goldstar Co., Ltd. Radiation fin structure of a magnetron. 5,412,282, Cl. 315-39.510.

Kanishi, Kazuhiko; Nishimura, Yasushi; and Sugawara, Kazuaki, to Pioneer Electronic Corporation. Stereo surround system. 5,412,732, Cl. 381-18.000.



Kankanahali, Mohen S.: See—  
Narasimhalu, Arcot D.; Wang, Weiguo; and Kankanahali, Mohen S., 5,412,718, Cl. 380-4.000.

Kanno, Masaaki: See—  
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Kanno, Yasuyuki: See—  
Nakanishi, Masayuki; and Kanno, Yasuyuki, 5,411,398, Cl. 434-409.000.

Kanouda, Akihiko: See—  
Sakurai, Naoki; Mori, Mutsuhiro; Arakawa, Hidetoshi; Onda, Kenichi; Miyazaki, Hideki; and Kanouda, Akihiko, 5,412,558, Cl. 363-98.000.

Kanzaki, Kenji: See—  
Kido, Mamoru; Kanzaki, Kenji; Sato, Noribumi; Kasama, Minoru; and Anzai, Tosio, 5,412,302, Cl. 318-685.000.

Kao Corporation: See—  
Hata, Masaharu, 5,411,686, Cl. 264-40.600.  
Tagata, Shuji; and Sai, Fumio, 5,411,674, Cl. 252-117.000.  
Tanaka, Norihiro; Oku, Kazuyuki; Doi, Yasuhiro; Sato, Hirotsuka; and Yorozu, Hidenori, 5,411,731, Cl. 424-78.020.  
Taniguchi, Takao; Iizuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shinichi; and Yamashita, Tadakazu, 5,411,558, Cl. 44-301.000.

Kao, Wenling; Skotnicki, Jerauld S.; Abou-Gharbia, Magid A.; and Palmer, Yvette L., to American Home Products Corporation. Carbamates of rapamycin, 5,411,967, Cl. 514-291.000.

Kapa, Prasad K.: See—  
Prashad, Mahavir; and Kapa, Prasad K., 5,412,137, Cl. 558-146.000.

Kaplan, Jeffrey I. Currency dispenser, 5,411,436, Cl. 453-17.000.

Kaplan, Neil B. Detector arming vehicle security system, 5,412,371, Cl. 340-426.000.

Kapp, Wilhelm H.; Foster, Derek J.; and Derossset, Wayne R., to Square D Company. Surge arrester circuit and housing therefor, 5,412,526, Cl. 361-56.000.

Karani, Ron R.; and Tyrrell, Daniel E. Meter for comparing impact hammers, 5,410,905, Cl. 73-11.030.

Karasawa, Kunihiko, to Mitsubishi Denki Kabushiki Kaisha. Full wave rectifying circuit, 5,412,559, Cl. 363-127.000.

Karl Mayer Textilmaschinenfabrik GmbH: See—  
Bogucki-Land, Bogdan, 5,410,786, Cl. 28-191.000.

Karlson, Ricky; and Karlson, Robert. Modular exercise device with selectable resistance, 5,411,460, Cl. 482-112.000.

Karlson, Robert: See—  
Karlson, Ricky; and Karlson, Robert, 5,411,460, Cl. 482-112.000.

Karoake, Takao; Nakamura, Ken; and Kashiwagi, Iwao, to Hitachi Metals, Ltd. Section steel wire of oil ring, 5,411,609, Cl. 148-325.000.

Karol, Thomas J., to R. T. Vanderbilt Company, Inc. Method for preparation of organic molybdenum compounds, 5,412,130, Cl. 556-57.000.

Karttunen, Lauri, to Xerox Corporation. Augmenting a lexical transducer by analogy, 5,412,567, Cl. 364-419.190.

Karwoski, Theodore: See—  
Herweck, Steve A.; Karwoski, Theodore; and Martakos, Paul, 5,411,550, Cl. 623-1.000.

Kasama, Minoru: See—  
Kido, Mamoru; Kanzaki, Kenji; Sato, Noribumi; Kasama, Minoru; and Anzai, Tosio, 5,412,302, Cl. 318-685.000.

Kasha, Dan B.; and Kerth, Donald A., to Crystal Semiconductor, Inc. Compound triple cascaded mirror, 5,412,348, Cl. 330-288.000.

Kashita, Yoshinori: See—  
Yokoe, Masaaki; Yokoyama, Hiroshi; and Kashita, Yoshinori, 5,411,800, Cl. 428-362.000.

Kashiwada, Kazuaki: See—  
Kaetsu, Mitsuo; Nakama, Noboru; and Kashiwada, Kazuaki, 5,412,497, Cl. 359-163.000.

Kashiwagi, Iwao: See—  
Karoake, Takao; Nakamura, Ken; and Kashiwagi, Iwao, 5,411,609, Cl. 148-325.000.

Kashiwagi, Kazuo, to Canon Kabushiki Kaisha. Image processing apparatus capable of processing images on both side original, 5,412,485, Cl. 358-441.000.

Kashizaki, Yoshio, to Canon Kabushiki Kaisha. Electrophotographic photosensitive member, and electrophotographic apparatus, device unit and facsimile machine having the photosensitive member, 5,411,828, Cl. 430-58.000.

Kasi, Srinandan R.: See—  
Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, 5,412,246, Cl. 257-632.000.

Kasimir, Seton P.: See—  
Chaplik, Naomi; Gardner, Steven H.; and Kasimir, Seton P., 5,412,353, Cl. 332-127.000.

Kasper, Kent D.: See—  
Austin, Stephen A.; Hull, Andrew J.; Hurdie, David A.; and Kasper, Kent D., 5,410,906, Cl. 73-11.040.

Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerz, Bruno, to BASF Aktiengesellschaft. Cyclohexenone oxime ethers, and their use as herbicides, 5,411,936, Cl. 504-244.000.

Kasuga, Kazuyuki: See—  
Hirata, Kazuhisa; Suigihara, Hideki; and Kasuga, Kazuyuki, 5,411,667, Cl. 210-638.000.

Kasuya, Masayuki: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya,

Masubiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.

Kaswan, Renee, to University of Georgia Research Foundation, Inc. Ocular cyclosporine composition, 5,411,952, Cl. 514-11.000.

Katagata, Satoshi: See—  
Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hirotsuka; Kabai, Takahito; Saito, Kouichiro; Nakamura, Tetsuya; and Katagata, Satoshi, 5,412,364, Cl. 355-260.000.

Katahira, Masayuki, to NSK Ltd. Locating table apparatus, 5,410,922, Cl. 74-89.150.

Kataoka, Kazunori: See—  
Sakurai, Yasuhisa; Okano, Teruo; Kataoka, Kazunori; Yamada, Noriko; Inoue, Shohei; and Yokoyama, Masayuki, 5,412,072, Cl. 330-322.000.

Kataoka, Kousaku: See—  
Suzuki, Hajime; Kataoka, Kousaku; and Oonishi, Katsuji, 5,411,042, Cl. 134-57.00D.

Katayama Chemical Inc.: See—  
Tsuiji, Katsuji; and Hirashima, Hidenori, 5,411,990, Cl. 514-640.000.

Katayama, Kazuyori, to Mitsubishi Denki Kabushiki Kaisha. Running control apparatus for motor vehicle, 5,411,452, Cl. 477-206.000.

Kato, Hidetoshi; Mayumi, Nobuo; and Togawa, Masatoshi, to Nippondenso Co., Ltd. Battery condition detecting apparatus and charge control apparatus for automobile, 5,412,323, Cl. 324-429.000.

Kato, Hisato: See—  
Kawashima, Tomoyuki; Kato, Hisato; Shibata, Kazuyoshi; and Taniguchi, Harutaka, 5,411,759, Cl. 427-58.000.

Kato, Junichi: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Kato, Makoto: See—  
Komma, Yoshiaki; Nishino, Seiji; and Kato, Makoto, 5,412,631, Cl. 369-44.370.

Kato, Yoshiki: See—  
Nagase, Nonkazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, 5,411,630, Cl. 216-22.000.

Kato, Yuichi: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masahiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.

Katoh, Shohichi: See—  
Deguchi, Toshihisa; Inui, Tetsuya; Ohta, Kenji; and Katoh, Shohichi, 5,412,630, Cl. 369-44.320.

Katsumata, Naoto: See—  
Urata, Kazumoto; Oguni, Kensaku; Ishibane, Kyuhei; and Katsumata, Naoto, 5,410,887, Cl. 62-129.000.

Katsura, Joji, to Matsushita Electric Industrial Co., Ltd. Semiconductor, integrated circuit device having dynamic circuits with floating gates, 5,412,334, Cl. 327-387.000.

Katsuragi, Kenjiro; and Hanamura, Yoshihiko, to Kabushiki Kaisha Topcon. Apparatus for photographing a corneal endothelium, 5,412,442, Cl. 351-206.000.

Katz, Ronald A. Videophone system for scrutiny monitoring with computer control, 5,412,708, Cl. 348-14.000.

Katz, Teresa. Interchangeable clasp, 5,410,784, Cl. 24-589.000.

Kaufhold, Manfred; and Feld, Marcel, to Huels Aktiengesellschaft. Process for the preparation of 2-cyanoacetoxypionic esters, 5,412,146, Cl. 558-442.000.

Kaufman, Jack W.: See—  
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Kawabata, Hirosuke: See—  
Shinkai, Seiji; Matsuda, Tsutomu; Arimura, Takashi; Kawabata, Hirosuke; and Tachibana, Kozo, 5,412,114, Cl. 549-354.000.

Kawabata, Hitoshi: See—  
Fukue, Ichiro; Mandai, Shigemi; Tanaka, Katsumori; Kawabata, Hitoshi; Sato, Nobuo; Nishida, Hiroyuki; and Gora, Tetsuo, 5,410,884, Cl. 60-747.000.

Kawabata, Itaru: See—  
Kido, Eiichi; Yui, Yuh; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326.000.

Kawabe, Satomi; Suzuki, Katsuhiko; Nakayama, Tomoyuki; and Hoshino, Hiroyuki, to Konica Corporation. Silver halide photographic light-sensitive material, 5,411,850, Cl. 430-567.000.

Kawabe, Takako: See—  
Niimura, Koichi; Kawabe, Takako; Ando, Takao; and Saito, Kenichi, 5,411,964, Cl. 514-269.000.

Kawada, Haruki: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Kawade, Hisaaki: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Kawagishi, Hideyuki: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Kawaguchi, Jun; Kobayashi, Hiroaki; and Nakai, Hidemi, to Nippon Sheet Glass Co., Ltd. Heat-screening glass, 5,411,794, Cl. 428-216.000.

Kawai, Masahiro: See—  
Ide, Tsutomu; Hamada, Suguru; and Kawai, Masahiro, 5,411,793, Cl. 428-215.000.

Kawakami, Hiroshi: See—  
Matsumoto, Katsuya; Ebata, Takashi; Koseki, Koshi; Okano, Koji; Kawakami, Hiroshi; and Matsushita, Hajime, 5,412,111, Cl. 549-313.000.

Kawakami, Hiroyoshi: See—  
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Kawamoto, Kazutami: See—  
Makio, Satoshi; Nitanda, Fumio; Furukawa, Yasuhiro; Ito, Kohei; Sato, Masazumi; Kawamoto, Kazutami; and Ito, Kenchi, 5,412,502, Cl. 359-332.000.

Kawamoto, Masao: See—  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryo-suke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hirokuni, 5,410,988, Cl. 122-250.00R.

Kawamura, Yasunori: See—  
Kamei, Shinji; and Kawamura, Yasunori, 5,412,482, Cl. 358-335.000.

Kawano, Hirotsuka: See—  
Nishimura, Toshihiro; Hayashi, Toshio; Kawano, Hirotsuka; and Fujiki, Hideshi, 5,412,418, Cl. 348-14.000.

Kawano, Yuzo; and Ihara, Hirofumi, to Matsushita Electric Industrial Co., Ltd. Control of torque application in electrophotographic color imaging apparatus, 5,412,457, Cl. 355-245.000.

Kawasaki Jukogyo Kabushiki Kaisha: See—  
Yano, Tatsu; Watanabe, Masayuki; Ota, Kouji; and Matsumoto, Tadayuki, 5,412,759, Cl. 395-83.000.

Kawasaki, Shinji: See—  
Soma, Takao; Kawasaki, Shinji; Ito, Shigenori; and Yoshioka, Katsuki, 5,411,767, Cl. 429-453.000.

Kawasaki Steel Corporation: See—  
Inokuti, Yukio; Suzuki, Kazuhiro; and Hina, Eiji, 5,411,604, Cl. 148-112.000.

Kawasaki, Yoshiaki: See—  
Tamura, Hiroshi; Mishima, Naoshi; and Kawasaki, Yoshiaki, 5,411,827, Cl. 430-58.000.

Kawasaki, Yoshikazu: See—  
Kido, Eiichi; Yui, Yuh; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326.000.

Kawase, Toshimitsu: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Shinjo, Katsuhiko; Miyazaki, Toshihiko; Kuroda, Ryo; Yamamoto, Keisuke; and Kawase, Toshimitsu, 5,412,641, Cl. 369-126.000.

Kawashima, Tomoyuki; Kato, Hisato; Shibata, Kazuyoshi; and Taniguchi, Harutaka, to Fuji Electric Co., Ltd. Electro-luminescence indicating panel and method of manufacture, 5,411,759, Cl. 427-58.000.

Kawashima, Toru: See—  
Mita, Seiichi; Kawashima, Toru; and Kaku, Toshimitsu, 5,412,632, Cl. 369-48.000.

Kawata, Kazuhide: See—  
Nishizawa, Kazuyuki; and Kawata, Kazuhide, 5,412,403, Cl. 345-192.000.

Kawata, Munekazu: See—  
Yukinobu, Masaya; Kawata, Munekazu; and Tsukui, Yasuo, 5,411,792, Cl. 428-212.000.

Kay, Robert W.: See—  
Hunt, Charles S.; Kay, Robert W.; Patrick, David T.; Schmidt, Robert L.; and Shembekar, Ajit R., 5,410,992, Cl. 123-41.490.

Kaya, Cetin: See—  
Schreck, John F.; Kaya, Cetin; and McElroy, David J., 5,412,603, Cl. 365-189.010.

Kays Engineering: See—  
McGoan, David B.; and Kirby, Charles R., 5,411,434, Cl. 452-166.000.

Kays, Jerry W.; Reynolds, John W.; and Wilson, Alan T., to Oklahoma Safety Equipment Co. Rupture disk construction, 5,411,158, Cl. 220-89.200.

Kazama, Satoshi; and Imaizumi, Tatsuya, to Taiyo Yuden Co., Ltd. Coaxial dielectric filter having adjacent resonators disposed in opposite directions, 5,412,359, Cl. 333-206.000.

Kazami, Kazuyuki, to Nikon Corporation. Information recording control apparatus in a camera, 5,412,444, Cl. 354-106.000.

Kazen, Gaius D. Flue insert to control exhaust gases, 5,411,013, Cl. 126-307.00R.

Kazi, Ashfaq; and Hussain, Syed M. A., to American Power Products, Inc. Variable voltage ballast system for mini-fluorescent lamp, 5,412,286, Cl. 315-242.000.

Kazmaier, Peter M.: See—  
Georges, Michael K.; Saban, Marko D.; Kazmaier, Peter M.; Vergin, Richard P. N.; Hamer, Gordon K.; and Moffat, Karen A., 5,412,047, Cl. 526-204.000.

Kazzyk, Charles. One way animal pest tunnel, 5,410,837, Cl. 43-66.000.

Keana, John F. W., to State of Oregon Acting by and Through the State Board of Higher Education on Behalf of the University of Oregon. The. Amplifier molecules derived from diethylene triaminepentaa-cetic acid for enhancement of diagnosis and therapy, 5,412,148, Cl. 560-35.000.

Keating, Kenneth B.: See—  
Trainham, James A., III; Law, Clarence G., Jr.; Newman, John S.; Keating, Kenneth B.; and Eames, Douglas J., 5,411,641, Cl. 204-59.00R.

Keeler, Stanton M.: See—  
Squires, John P.; Sander, Charles M.; Keeler, Stanton M.; and Clay, Donald W., 5,412,666, Cl. 371-37.400.

Keenan, Patrick J., to Massachusetts Institute of Technology. Method and apparatus for thermal insulation of wet shielded metal arc welds, 5,412,176, Cl. 219-137.00R.

Keevert, John E., Jr.: See—  
Wrathall, Donald P.; Keevert, John E., Jr.; Hider, Gregg C.; and Brand, John S., 5,412,075, Cl. 530-355.000.

Kehr, Helmut: See—  
Elm, Rainer; Kehr, Helmut; Kuhnle, Adolf; and Schleizer, Matthias, 5,412,029, Cl. 525-71.000.

Keible, Edward A.; and Smith, Nicholas J. G., to Raychem Limited. Processing microchips, 5,411,918, Cl. 437-209.000.

Keirstead, Mark S.: See—  
Nighan, William L., Jr.; and Keirstead, Mark S., 5,412,683, Cl. 372-75.000.

Kelebek, Sadan; Wells, Peter F.; and Fekete, Simon O., to Falconbridge Ltd. Selective flotation process for separation of sulphide minerals, 5,411,148, Cl. 209-166.000.

Keliliki, Shawn P. Personal audio system and earphone for same, 5,412,736, Cl. 381-187.000.

Kellar, Paul R. N.: See—  
Searby, Anthony D.; and Kellar, Paul R. N., 5,412,402, Cl. 345-153.000.

Kellenberger, Stanley R.: See—  
Tanzer, Richard W.; Abuto, Frank P.; Kellenberger, Stanley R.; Laux, Daniel R.; Nortman, Brian K.; Pomplun, William S.; Rippl, Carl G.; Robinson, Mark L.; Sallee, Lorry F.; Yarbrough, Sandra M.; and Zenker, David L., 5,411,497, Cl. 604-368.000.

Keller, Robert L., to Dynabrade, Inc. Dust-collecting apparatus, 5,411,433, Cl. 451-451.000.

Keller, Urs: See—  
Jornot, Erich; and Keller, Urs, 5,412,301, Cl. 318-640.000.

Kellerhof, Ingo; Pfeil, Hans-Dieter; and Krippl, Kurt, to Bayer Aktiengesellschaft. Apparatus for the continuous production of foamed plastics, 5,411,389, Cl. 425-4.00C.

Kellogg, Larry D., to Tull, Fred A.; and Tull, Rosa B. Combustion heater, 5,411,012, Cl. 126-59.500.

Kellogg, Mark W.: See—  
Galbi, Duane E.; Clinton, Michael P.; and Kellogg, Mark W., 5,412,613, Cl. 365-230.030.

Kelly, Stephen; and Leenhouts, Frans, to Hoffmann-La Roche Inc. Chiral dopants for liquid crystalline mixtures, 5,411,676, Cl. 252-299.630.

Kemira Oy: See—  
Vienamo, Teppo T.; Saari, Pauli J.; Holmlund, Timo E.; and Jaarvinen, Jyrki H. V., 5,410,757, Cl. 2-9.000.

Kemiron, Inc.: See—  
Hjersted, Lawrence N., 5,411,569, Cl. 71-24.000.

Kemp, Richard A.: See—  
Wilson, Stanley E.; and Kemp, Richard A., 5,411,926, Cl. 502-117.000.

Kendall, Robert M.; Pam, Richard L.; Minden, Andrew C.; Saito, Nathan; and Gotterba, James A., to Alzeta Corporation. Radiant cell watertube boiler and method, 5,410,989, Cl. 122-367.100.

Kennedy, Brian S., to Baker Hughes Incorporated. Scoophead running tool, 5,411,082, Cl. 166-181.000.

Kennedy, Ronald R.; and Curran, Daniel J., to Hewlett-Packard Company. Data storage system with a dual-gap head using a dual-mode flexible disk controller, 5,412,516, Cl. 360-62.000.

Kenney, Donald M.: See—  
Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, 5,412,246, Cl. 257-632.000.

Kensley Nash Corporation: See—  
Nash, John; and Evans, Douglas, 5,411,520, Cl. 606-213.000.

Kerneur, Christiane M.: See—  
Ladislav, Robert; Moczar, Elemer; Hornebeck, William Georges; and Kerneur, Christiane M., 5,411,978, Cl. 514-373.000.

Kerschbaum, Walter: See—  
Werner, Johannes; Hufendick, Ernst-Wilhelm; and Kerschbaum, Walter, 5,411,001, Cl. 123-456.000.

Kerth, Donald A.: See—  
Kasha, Dan B.; and Kerth, Donald A., 5,412,348, Cl. 330-288.000.

Kervagoret, Gilbert, to AlliedSignal Europe Services Techniques. Pressure regulation device for hydraulic system, 5,410,943, Cl. 91-459.000.

Kerwin, Gregory J.: See—  
Christner, Jodie A.; Cunningham, Earl A.; Kerwin, Gregory J.; and Poss, Joe M., 5,412,518, Cl. 360-66.000.



Khoury, John M.: See—  
Burger, Harley F., Jr.; Khoury, John M.; and Viswanathan, Tandur L., 5,412,346, Cl. 330-282.000.

Kida, Tomoyuki, to NEC Corporation. Apparatus for measuring bend amount of IC leads. 5,412,477, Cl. 356-394.000.

Kida, Yasuhiko: See—  
Matsuo, Takeshi; Takeda, Yoshiyuki; Yoshida, Takeshi; Kakuta, Masayuki; Kida, Yasuhiko; and Harada, Hiroyuki, 5,412,462, Cl. 355-308.000.

Kideo Resources Ltd.: See—  
Gray, Benjamin, 5,411,105, Cl. 175-69.000.

Kido, Eiichi; Yui, Yuh; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, to Sharp Kabushiki Kaisha. Charger for performing a corona discharge. 5,412,213, Cl. 250-326.000.

Kido, Mamoru; Kanzaki, Kenji; Sato, Noribumi; Kasama, Minoru; and Anzai, Tosio, to Fuji Xerox Co., Ltd. Rotary body drive control apparatus capable of compensating for variations of transfer characteristics. 5,412,302, Cl. 318-685.000.

Kienemann, Alain: See—  
Roussy, Georges; Marchand, Christophe; Thiebaut, Jean-Marie; Souiri, Mina; Kienemann, Alain; Petit, Corinne; and Maire, Gilbert, 5,411,649, Cl. 204-157.430.

Kikinis, Dan; and Sella, William J., to Cordata, Inc. Space-saving memory module. 5,412,538, Cl. 361-792.000.

Kikitsu, Akira: See—  
Ichihara, Katsutaro; Ashida, Sumio; Kikitsu, Akira; and Mizusawa, Yumi, 5,412,627, Cl. 369-13.000.

Kikukawa, Hirokuni: See—  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryo-suke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hirokuni, 5,410,988, Cl. 122-250.00R.

Kim, Dong-hun, to Samsung Electronics Co., Ltd. Low frequency oscillator using capacitive charging/discharging. 5,412,350, Cl. 331-111.000.

Kim, Doo-seop: See—  
Chakravarty, Prasan K.; Greenlee, William J.; Kim, Doo-seop; Mantlo, Nathan B.; Patchett, Arthur A.; and Rivero, Ralph A., 5,412,097, Cl. 546-118.000.

Kim, Kwang-su, to Samsung Display Devices Co., Ltd. Liquid crystal display system having an anti-static electricity structure. 5,412,495, Cl. 359-88.000.

Kim, Moon G.: See—  
Jun, Dong S.; Oh, Seung C.; Kim, Moon G.; and Lee, Sung G., 5,412,331, Cl. 326-105.000.

Kimball, Greg J.: See—  
Pikus, Ilya; Kimball, Greg J.; and Inoue, Masayuki, 5,410,984, Cl. 117-206.000.

Kimberly-Clark: See—  
Hermans, Michael A.; Chen, Fung-Jou; Spiegelberg, Larry L.; Kressner, Bernhardt E.; and Neilson, Janice G., 5,411,636, Cl. 162-109.000.

Kimberly-Clark Corporation: See—  
Fahrenkrug, Anne M.; Rollins, Neal A.; Morris, Marion C.; Rooyackers, John A.; and Winters, Cathy L., 5,411,498, Cl. 604-385.200.

Tanzer, Richard W.; Abuto, Frank P.; Kellenberger, Stanley R.; Laux, Daniel R.; Nortman, Brian K.; Pomplun, William S.; Rippl, Carl G.; Robinson, Mark L.; Sallee, Lorry F.; Yarbrough, Sandra M.; and Zenker, David L., 5,411,497, Cl. 604-368.000.

Kimble, Robert L. Putting training method. 5,411,253, Cl. 273-32.00H.

Kimmell, Bruce A.; and Gebrosky, Jerry W. Connector brackets. 5,410,854, Cl. 52-712.000.

Kimura, Akiyoshi: See—  
Fukuzawa, Nobumasa; Kimura, Akiyoshi; and Kutsuwada, Satoru, 5,412,201, Cl. 250-208.100.

Kimura, Takashi: See—  
Sekiya, Takuro; Kimura, Takashi; Honke, Masanori; Watanabe, Yoshio; Motomura, Shuji; Suzuki, Eiko; Yamaguchi, Takayuki; and Kadonaga, Masami, 5,412,413, Cl. 347-46.000.

Kindel, William J., to Dana Innovations. Pre-formed speaker grille cloth. 5,412,162, Cl. 181-150.000.

King, C. Judson; and Poole, Loree J., to University of California, The Regents of the. Carboxylic acid sorption regeneration process. 5,412,126, Cl. 554-185.000.

King, Joseph A., Jr., and McCloskey, Patrick J., to General Electric Company. Polycarbonate melt condensation synthesis using a tetraorganophosphonium carboxylate salt catalyst. 5,412,061, Cl. 528-198.000.

King Printing Co., Ltd.: See—  
Terada, Yukio, 5,411,557, Cl. 8-444.000.

King, Roger M.; and King, Whitney M., to Beeson and Sons Limited. Container and the manufacture thereof. 5,411,157, Cl. 215-330.000.

King, Whitney M.: See—  
King, Roger M.; and King, Whitney M., 5,411,157, Cl. 215-330.000.

Kingston, David G. I.; and Liang, Jingyu, to Virginia Tech Intellectual Properties, Inc. Water soluble analogs and prodrugs of taxol. 5,411,984, Cl. 514-449.000.

Kinley, Fred G.: See—  
Laudenslager, James B.; Kinley, Fred G.; and Tzeng, Shing-Wu P., 5,412,682, Cl. 372-65.000.

Kinoshita, Yasushi; and Niwano, Kazuhito, to Mitsubishi Denki Kabushiki Kaisha. Method of manufacturing a complementary bipolar transistor. 5,411,898, Cl. 437-31.000.

Kinugasa, Tatsuo: See—  
Honma, Tatsuya; Kinugasa, Tatsuo; and Imai, Minoru, 5,412,662, Cl. 371-21.100.

Kinzler, Kenneth W.: See—  
Vogelstein, Bert; and Kinzler, Kenneth W., 5,411,860, Cl. 435-6.000.

Kirby, Charles R.: See—  
McGoon, David B.; and Kirby, Charles R., 5,411,434, Cl. 452-166.000.

Kirby, Ian J.: See—  
Chan, Sek K.; Graham, Steven J.; Kirby, Ian J.; and Leiper, Graeme A., 5,411,290, Cl. 280-737.000.

Kirchner, Jack R., to Du Pont de Nemours, E. I., and Company. Substrates treated with polyfluoro nitrogen containing organic compounds. 5,411,766, Cl. 427-393.400.

Kirchner, Robert D. Two-wire control system. 5,412,369, Cl. 340-310.030.

Kirsch, Gerald: See—  
Neef, Gunter; Steinmeyer, Andreas; Kirsch, Gerald; Schwarz, Katia; Haberey, Martin; Thieroff-Ekerdt, Ruth; and Rach, Petra, 5,411,949, Cl. 514-167.000.

Kirson, Allan: See—  
Barnea, Michael; and Kirson, Allan, 5,412,573, Cl. 364-449.000.

Kish, Jules G.; Sammataro, Stephen R.; and Isabelle, Charles J., to United Technologies Corporation. Self-scavenging, hybrid lubrication subsystem. 5,411,116, Cl. 184-6.120.

Kish, William S. Measuring tool with concentric point. 5,410,817, Cl. 33-559.000.

Kishi, Yoshito; and Tse, Bruno, to President and Fellow of Harvard College. Enterobactin compounds. 5,412,080, Cl. 536-4.100.

Kishimoto, Hiroshi: See—  
Nonomura, Tomohiro; and Kishimoto, Hiroshi, 5,411,246, Cl. 271-117.000.

Kishita, Hirofumi: See—  
Fukuda, Kenichi; Yamaguchi, Kouichi; Sato, Shinichi; Kishita, Hirofumi; Arai, Masatoshi; and Fujiki, Hironao, 5,412,135, Cl. 556-448.000.

Kisida, Hiroshi: See—  
Hirose, Taro; Kisida, Hiroshi; Saito, Shigeru; and Fujimoto, Hiroaki, 5,411,979, Cl. 514-374.000.

Kitagawa, Kiichiro, to Fuji Photo Film Co., Ltd. Film cassette with film separating claw. 5,411,220, Cl. 242-348.300.

Kitamura, Sotoyuki: See—  
Higuchi, Hiroshi; Arita, Takashi; Kitamura, Sotoyuki; and Murozono, Mikio, 5,411,601, Cl. 136-256.000.

Kittelberger, J. Stephen: See—  
Sacripante, Guerino G.; Yeung, B. W. Anissa; McAneney, T. Brian; and Kittelberger, J. Stephen, 5,411,829, Cl. 430-106.000.

Kitzinger, Frank: See—  
Houlachi, George; Janjua, M. Barakat I.; Kitzinger, Frank; Wint, Gregory A.; and Labuc, Vladimir M., 5,411,648, Cl. 204-153.190.

Kizawa, Satoru: See—  
Takemura, Susumu; Takano, Minoru; Kizawa, Satoru; and Saito, Kazuo, 5,411,935, Cl. 504-243.000.

Klausener, Alexander; Kleefeld, Gerd; Brandes, Wilhelm; Dutzmann, Stefan; and Hansler, Gerd, to Bayer Aktiengesellschaft. Fungicidal substituted acrylic esters. 5,412,100, Cl. 548-187.000.

Klausener, Alexander: See—  
Landscheidt, Heinz; Wagner, Paul; and Klausener, Alexander, 5,412,147, Cl. 558-488.000.

Klauser, Rainer J.: See—  
Strasser, Rupert; Zeiller, Peter; and Klausner, Rainer J., 5,411,955, Cl. 514-214.000.

Klawiter, Ronald R., to Handi-Pac, Inc. Packaging for a toy. 5,411,138, Cl. 206-459.100.

Klawiter, Ronald R., to Handi-Pac, Inc. Light display apparatus for a child's toy. 5,411,429, Cl. 446-242.000.

Kleefeld, Gerd: See—  
Klausener, Alexander; Kleefeld, Gerd; Brandes, Wilhelm; Dutzmann, Stefan; and Hansler, Gerd, 5,412,100, Cl. 548-187.000.

Klein, James A.: See—  
Lasch, James E.; Kaczmarczik, James M.; Klein, James A.; and Jonza, James M., 5,411,351, Cl. 404-14.000.

Klein, Robert-Peter: See—  
Jaeger, Halvor; Hoffmann, Hans-Ranier; Meconi, Reinhold; and Klein, Robert-Peter, 5,411,739, Cl. 424-448.000.

Klemann, Lawrence P.: See—  
Wheeler, Edward L.; O'Amelia, Ronald P.; Leveille, Gilbert A.; Otterburn, Michael S.; Klemann, Lawrence P.; Finley, John W.; Roden, Allan D.; Chrysam, Michael M.; Pellosso, Turiddu A.; and Given, Peter S., Jr., 5,411,756, Cl. 426-607.000.

Kline, Daniel: See—  
Lafferty, Michael; Kline, Daniel; and Slemon, Charles S., 5,411,500, Cl. 606-2.000.

Klink, Josef: See—  
Faust, Eberhard; Maier, Ulrich; Speck, Volker; and Klink, Josef, 5,411,317, Cl. 297-452.300.

Klopotek, Peter J., to Summit Technology, Inc. Laser reprofiling system for correction of astigmatism. 5,411,501, Cl. 606-4.000.

Knappe & Vogt Manufacturing Company: See—  
Hoffman, Keith A., 5,411,333, Cl. 384-18.000.

Knappe, Wolfram: See—  
Deynet, Rolf; Knappe, Wolfram; and Michel, Peter, 5,410,921, Cl. 74-89.140.

Knauf, Thomas F.: See—  
Osman, Akhtar; and Knauf, Thomas F., 5,412,045, Cl. 526-133.000.

Knebel, Patrick: See—  
Forsyth, Mark; and Knebel, Patrick, 5,412,787, Cl. 395-400.000.

Knell, Timothy A.; and Burkhardt, Gilbert B., III, to Cerdec Corporation. Thermoplastic/thermoset table coatings or inks for glass ceramic and other hard surfaces. 5,411,768, Cl. 427-386.000.

Knickerbocker, Michael G. Variable restrictor for a manually actuated pump. 5,411,181, Cl. 222-309.000.

Knight, Philip D.: See—  
Harder, John W.; Burns, Paul A.; Vargas, J. Ramon; Bowne, Arlyce T.; Knight, Philip D.; Begley, William J.; and Ling, Hans G., 5,411,839, Cl. 430-379.000.

Knoploch, Jerome; Prevost, Guy; and Treil, Nicolas, to General Electric CGR S.A. Method for displaying an image of a portion of the inside of a three-dimensional physical structure. 5,412,763, Cl. 395-124.000.

Knorr Brake Holding Corp.: See—  
Root, Kevin B.; Allen, John J., Jr.; and Newton, Ronald O., 5,412,572, Cl. 364-426.010.

Knowles, W. Ralph, to ElectroScan Corporation. Environmental scanning electron microscope. 5,412,211, Cl. 250-310.000.

Knudsen, Lars L.: See—  
Andersen, Henning R.; Hasenkam, John M.; and Knudsen, Lars L., 5,411,552, Cl. 623-2.000.

Ko, Jung W.; Balaban, Alvin R.; and Strolle, Christopher H., to Samsung Electronics Co., Ltd. Time-base correction in a video recording/playback system. 5,412,481, Cl. 358-320.000.

Kobayashi, Hiroaki: See—  
Kawaguchi, Jun; Kobayashi, Hiroaki; and Nakai, Hidemi, 5,411,794, Cl. 428-216.000.

Kobayashi, Hiroshi, to Sony Corporation. Apparatus for recording and/or reproducing a video signal. 5,412,514, Cl. 360-35.100.

Kobayashi, Hisashi; and Francis, Arthur W., Jr., to Praxair Technology, Inc. Fuel jet burner. 5,411,395, Cl. 431-187.000.

Kobayashi, Masaki; and Sato, Tatuya, to Toshiba Tungalay Co., Ltd. Hard sintered alloy having fine pores and process for preparing the same. 5,411,571, Cl. 75-232.000.

Kobayashi, Shoji; Ohshio, Hirohiko; Ishikawa, Masaaki; and Uchida, Hideki, to Koito Manufacturing Co., Ltd. Variable light distribution type headlamp. 5,412,543, Cl. 362-66.000.

Kobayashi, Tamon: See—  
Furuyama, Hideto; Hamasaki, Hiroshi; and Kobayashi, Tamon, 5,412,748, Cl. 385-92.000.

Kodama, Toshiaki: See—  
Miyazaki, Toshiyuki; Motoi, Hirofumi; Kodama, Toshiaki; Maeda, Tatsuhiro; Tsujita, Takahiro; and Okuda, Hiromichi, 5,411,956, Cl. 514-15.000.

Koelsch, Kevin W., to Dynamic Dies, Inc. Lead edge strip. 5,410,964, Cl. 101-378.000.

Koenig, Robbie C.: See—  
Moore, Martha H.; and Koenig, Robbie C., 5,412,284, Cl. 315-155.000.

Koflach Sport Gesellschaft m.b.H. & Co. KG.: See—  
Wittmann, Walter, 5,411,278, Cl. 280-11.220.

Koga, Hiroshi; and Nabata, Hiroyuki, to Chugai Seiyaku Kabushiki Kaisha. Benzopyran derivatives. 5,412,117, Cl. 549-404.000.

Kogure, Makoto, to Hitachi, Ltd. Duplex field bus system. 5,412,643, Cl. 370-24.000.

Kogure, Tomohiko, to Yokohama Rubber Co., Ltd., The. Pneumatic radial tire with reduced tread weight. 5,411,068, Cl. 152-209.00R.

Kohmoto, Hiroshi: See—  
Nigawara, Seitsuo; Namba, Shigeaki; and Kohmoto, Hiroshi, 5,410,883, Cl. 60-646.000.

Kohno, Satoru; and Iijima, Naoto, to Shimadzu Corporation. Magnetic resonance imaging method and apparatus. 5,412,321, Cl. 324-309.000.

Koito Manufacturing Co., Ltd.: See—  
Kobayashi, Shoji; Ohshio, Hirohiko; Ishikawa, Masaaki; and Uchida, Hideki, 5,412,543, Cl. 362-66.000.

Koiwa, Kaoru: See—  
Yasumoto, Takaaki; Iwase, Nobuo; Koiwa, Kaoru; Yamakawa, Koji; and Iyogi, Kiyoshi, 5,412,160, Cl. 174-258.000.

Koizumi, Toru: See—  
Inoue, Shunsuke; Koizumi, Toru; Miyawaki, Mamoru; and Sugawa, Shigetoshi, 5,412,240, Cl. 257-347.000.

Kojima, Masayuki, to Noritsu Koki Co., Ltd. Photographic printer. 5,412,450, Cl. 355-43.000.

Kojima, Tetsuji; Miyashita, Hiromi; Hagiwara, Shigemi; and Sunaga, Naoki, to Oki Electric Industry Co., Ltd. Printer provided with an image reading unit. 5,412,490, Cl. 358-473.000.

Koksang, Rene, to Valence Technology, Inc. Method of making lithium electrode. 5,411,764, Cl. 427-383.700.

Kokusai Denshin Denwa Kabushiki Kaisha: See—  
Nakajima, Yasuyuki, 5,412,435, Cl. 348-699.000.

Kolassa, Dieter: See—  
Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochem; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,411,936, Cl. 504-244.000.

Kollmorgen Corp.: See—  
Hazelton, Robert; and Hadjipanayis, George, 5,411,608, Cl. 148-302.000.

Kolvites, Albert: See—  
Sturman, Martin; Kanbar, Maurice; Cohn, Robert J.; and Kolvites, Albert, 5,411,492, Cl. 604-263.000.

Komatsu, Hiroshi, to Seiko Epson Corporation. Linear amplifier incorporating a field emission device having specific gap distances between gate and cathode. 5,412,285, Cl. 315-169.100.

Komemushi, Masakazu: See—  
Ueji, Kenji; Ito, Kiichi; and Komemushi, Masakazu, 5,411,345, Cl. 401-206.000.

Komine, Hiroaki: See—  
Chujo, Takafumi; Komine, Hiroaki; Miyazaki, Keiji; Ogura, Takao; and Soejima, Tetsuo, 5,412,376, Cl. 340-825.010.

Komma, Yoshiaki; Nishino, Seiji; and Kato, Makoto, to Matsushita Electric Industrial Co., Ltd. Optical head apparatus for storing, reading or erasing information, and optical information reproducing method and optical information apparatus for optically reading information stored in an optical memory. 5,412,631, Cl. 369-44.370.

Komoda, Tsutomu: See—  
Otaka, Tadashi; Okura, Akimitsu; Iwamoto, Hiroshi; Todokoro, Hideo; Komoda, Tsutomu; and Tobita, Issei, 5,412,209, Cl. 250-310.000.

Komori Corporation: See—  
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Komori, Shigeki; and Tsukamoto, Katsuhiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device with improved element isolation and operation rate. 5,412,237, Cl. 257-306.000.

Komoto, Teruo; Hirota, Hiroyuki; Sato, Susumu; Ohtsuka, Mari; Koya, Hidehiko; Mizuno, Hiroyuki; and Kuraishi, Tadayuki, to SS Pharmaceutical Co., Ltd. Arylamide derivatives for treating hyperlipemia. 5,411,972, Cl. 514-330.000.

Kondo, Hiroki, to Yazaki Corporation. Electrical connector requiring low insertion force. 5,411,406, Cl. 439-263.000.

Kondo, Kazuhiko: See—  
Sakata, Shinji; Miyashita, Takanori; and Kondo, Kazuhiko, 5,412,089, Cl. 536-28.500.

Kondo, Koichi, to Kabushiki Kaisha Toshiba. Geometric modeling method and apparatus therefor. 5,412,762, Cl. 395-120.000.

Kondo, Yoshimasa: See—  
Nishimura, Takashi; Arimoto, Akira; Miyamura, Yoshinori; Anzai, Yumiko; Kondo, Yoshimasa; Uchida, Fumihiko; and Moriyama, Shigeo, 5,411,430, Cl. 451-1.000.

Kondoh, Harufusa: See—  
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Kondrats, Nicholas: See—  
Woodhall, Edward W.; and Kondrats, Nicholas, 5,411,760, Cl. 427-156.000.

Kone Elevator GmbH: See—  
Hayrinen, Seppo, 5,411,117, Cl. 187-360.000.

Konica Corporation: See—  
Hasegawa, Takuji, 5,411,849, Cl. 430-567.000.

Kawabe, Satomi; Suzuki, Katsuhiko; Nakayama, Tomoyuki; and Hoshino, Hiroyuki, 5,411,850, Cl. 430-567.000.

Maruyama, Kazuhisa; Ushio, Masaru; Sato, Junji; Sakata, Satoshi; Kudo, Tomoo; Matsudaira, Tadashi; Watanabe, Hiroyuki; and Maekawa, Yoshikazu, 5,412,295, Cl. 318-434.000.

Yoshida, Makoto; Shimizu, Kazuyuki; Morita, Eiichi; Fujimori, Masato; and Tanaka, Hiromi, 5,411,589, Cl. 118-688.000.

Konishi Co., Ltd.: See—  
Ueji, Kenji; Ito, Kiichi; and Komemushi, Masakazu, 5,411,345, Cl. 401-206.000.

Konishi, Masayuki: See—  
Hamamura, Kimio; Seki, Chiaki; and Konishi, Masayuki, 5,412,124, Cl. 552-299.000.

Koo, Eun H.: See—  
Yeo, Jong K.; Chang, Suk K.; Koo, Eun H.; and Lee, Min H., 5,412,028, Cl. 525-65.000.

Koopman, Nicholas G.: See—  
Magill, Paul A.; Koopman, Nicholas G.; and Rinne, Glenn A., 5,412,537, Cl. 361-777.000.

Kopesc, Michael F.: See—  
Josephson, Stanley M.; Kopesc, Michael F.; Royal, P. Darrell; Stephens, Thomas S.; and Thompson, Mitchell D., 5,412,190, Cl. 235-379.000.

Korb, William B.: See—  
Holston, James R.; and Korb, William B., 5,410,935, Cl. 83-851.000.

Kori, Yukiko: See—  
Takeda, Kinji; and Kori, Yukiko, 5,412,440, Cl. 351-110.000.

Korsunsky, Iosif; Harlan, Tod M.; and Shipe, Joanne E., to Whitaker Corporation, The. Electrical connector having bus bars providing circuit board retention. 5,411,404, Cl. 439-108.000.

Kortenbrede, Ludger, to Aug. Winkhaus GmbH & Co. KG. Luggage carrier for a two-wheeled vehicle. 5,411,190, Cl. 224-39.000.

Kose Corporation: See—  
Tachibana, Kiyomi; Sakuta, Koji; and Isobe, Kenichi, 5,412,004, Cl. 524-27.000.

Koseki, Hideaki: See—  
Kuhara, Yoshiki; Koseki, Hideaki; Michikoshi, Hisato; and Tonai, Ichiro, 5,412,229, Cl. 257-183.000.

Koseki, Koshi: See—  
Matsumoto, Katsuya; Ebata, Takashi; Koseki, Koshi; Okano, Koji; Kawakami, Hiroshi; and Matsushita, Hajime, 5,412,111, Cl. 549-313.000.

Koshika, Norihide: See—  
Sakamoto, Mitsuo; Koshika, Norihide; Nishimura, Isao; Sasaki, Katsuyasu; and Orui, Satoshi, 5,410,845, Cl. 52-167.200.

Kositpaiboon, Rungroj: See—  
Giroux, Nathalie; Morin, Marianne J.; Lemay, Marcel; Kositpaiboon, Rungroj; and Aboul-Magd, Osama S., 5,412,647, Cl. 370-60.000.

Koski, Richard D.: See—  
Dumais, Arthur; and Koski, Richard D., 5,412,316, Cl. 324-207.130.



Kossila, Pekka, to Liftec Products OY. Transport trailer for lifting and moving a load and method for effecting such movements. 5,411,359, Cl. 414-498.000.

Kosugi, Taichi, to Kabushiki Kaisha Kawai Gakki Seisakusho. Envelope generator for electronic musical instrument. 5,412,155, Cl. 84-627.000.

Koszyk, Francis J.: See—  
Partis, Richard A.; Koszyk, Francis J.; and Mueller, Richard A., 5,411,970, Cl. 514-315.000.

Kotzin, Michael D.; and Schuler, Joseph, to Motorola, Inc. Method and apparatus for receiving electromagnetic radiation within a frequency band. 5,412,690, Cl. 375-256.000.

Kouloupoulos, Michael A.; Jain, Praduman; and Jayasimha, Sriram, to Vimak Corporation. Method for correcting errors in digital audio data. 5,412,638, Cl. 369-59.000.

Kouno, Takayuki: See—  
Ogawa, Masahiko; Isobe, Koukichi; and Kouno, Takayuki, 5,410,956, Cl. 100-90.000.

Kowalik, Andre: See—  
Rebre, Shu R.; Collette, Christian; and Kowalik, Andre, 5,412,037, Cl. 525-301.000.

Koya, Hidehiko: See—  
Komoto, Teruo; Hirota, Hiroyuki; Sato, Susumu; Ohtsuka, Mari; Koya, Hidehiko; Mizuno, Hiroyuki; and Kuraishi, Tadayuki, 5,411,972, Cl. 514-330.000.

Koziczowski, Joseph E.; Annis, Jeffrey R.; Krieger, Roland L.; and Stache, Jerome P., to Allen-Bradley Company, Inc. V-band coupling for an explosion-proof enclosure. 5,411,162, Cl. 220-320.000.

Kozio, Dennis R.: See—  
Ghosh, Syamal K.; Chatterjee, Dilip K.; and Kozio, Dennis R., 5,411,690, Cl. 264-63.000.

Kozlowski, Mark, to Siemens Stromberg-Carlson. Blind cable tie cut-out. 5,411,346, Cl. 403-6.000.

Kraan, Marcellinus J.: See—  
Groen, Wilhelm A.; Kraan, Marcellinus J.; and De With, Gysbertus, 5,411,924, Cl. 501-97.000.

Krambeck, Dagoberto: See—  
Collins, Cecil A.; Krambeck, Dagoberto; and Richter, Steven J., 5,411,292, Cl. 280-806.000.

Kraska, Robert E.: See—  
Breyer, Mark D.; Istephanous, Naim S.; Kraska, Robert E.; Lessar, Joseph F.; and Miller, Jennifer P., 5,411,545, Cl. 607-122.000.

Krasnov, Igor. Shear gripping apparatus and method. 5,410,924, Cl. 81-57.330.

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Fournier, Kirk D.; Kuenzli, Ronald B.; and Tuckey, Charles H., 5,411,376, Cl. 417-312.000.

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Kulmacezewski, Linda M.: See—  
Wolf, Bruno; and Kulmacezewski, Linda M., 5,412,401, Cl. 345-139.000.

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Tanaka, Keishin; Hikichi, Toichiro; and Kumagai, Chiaki, 5,411,325, Cl. 303-100.000.

Kumakura, Sinsuke, to Fujitsu Limited. Semiconductor device providing reliable conduction test of all terminals. 5,412,337, Cl. 327-566.000.

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Hostetler, Karl Y.; and Kumar, Raj, 5,411,947, Cl. 514-43.000.

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Kumobayashi, Hidenori: See—  
Takaya, Hidemasa; Ohta, Tetsuo; Kumobayashi, Hidenori; Okeda, Yoshiaki; and Gonda, Yoshiharu, 5,412,109, Cl. 549-263.000.

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Kunishige, Keiji, to Olympus Optical Co., Ltd. Temperature compensation apparatus for camera. 5,412,448, Cl. 354-400.000.

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Kuo, Shin C., to Ta Yen Paper Box Container Co., Ltd. Corrugated board-made scaffold board structure with high strength. 5,411,786, Cl. 428-184.000.

Kuper, Douglas D.: See—  
Carlucci, John B.; Graham, Jon E.; Kuper, Douglas D.; Uenaka, Kathryn K.; and Collier, David C., 5,412,773, Cl. 395-156.000.

Kupferman, Hanan: See—  
Tam, Karman; Moe, Erik; and Kupferman, Hanan, 5,412,809, Cl. 395-750.000.

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Komoto, Teruo; Hirota, Hiroyuki; Sato, Susumu; Ohtsuka, Mari; Koya, Hidehiko; Mizuno, Hiroyuki; and Kuraishi, Tadayuki, 5,411,972, Cl. 514-330.000.

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Taniguchi, Junko; Yamaguchi, Noriyuki; Kurashita, Takuji; Ishizuka, Mitsuru; and Yao, Masaharu, 5,412,434, Cl. 348-669.000.

Kure, Tokuo: See—  
Todokoro, Hideo; Takamoto, Kenji; Otaka, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiko; Ninomiya, Ken; and Kure, Tokuo, 5,412,210, Cl. 250-310.000.

Kureha Chemical Industry Co., Ltd.: See—  
Nimura, Koichi; Kawabe, Takako; Ando, Takao; and Saito, Kenichi, 5,411,964, Cl. 514-269.000.

Kurihara, Masayoshi: See—  
Omori, Toshimichi; Suzuki, Haruo; Sampei, Tetsuya; Kanero, Takahiro; Nakagawa, Masayoshi; and Kurihara, Masayoshi, 5,411,605, Cl. 148-113.000.

Kurita, Kozaburo: See—  
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Shinjo, Katsuhiko; Miyazaki, Toshihiko; Kuroda, Ryo; Yamamoto, Keisuke; and Kawase, Toshimitsu, 5,412,641, Cl. 369-126.000.

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Hozumi, Toyoharu; Matsumoto, Takao; Ooyama, Haruo; Namba, Tsuneo; Shiraki, Kimiyasu; Hattori, Masao; Kurokawa, Masahiko; and Kadota, Shigetoshi, 5,411,733, Cl. 424-195.100.

Kurosaki, Makoto; and Gotoh, Mitsumasa, to Yamaha Corporation. Drum employing a double type screw unit for drum head tension. 5,410,938, Cl. 84-411.00R.

Kurrie, Frederick L., to Westvaco Corporation. Process for enhancing sizing efficiency in filled papers. 5,411,639, Cl. 162-175.000.

Kusaba, Susumu, to Oki Electric Industry Co., Ltd. Semiconductor memory device. 5,412,607, Cl. 365-208.000.

Kusano, Yoshihiro, to Fujitsu Limited. Data pre-fetch control device. 5,412,786, Cl. 395-375.000.

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Kuwata, Satoshi: See—  
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Meador, James W.; Miller, Thomas G.; Nikirk, Christopher T.; Waters, Louis A., Jr.; and Donnelly, Sean M., 5,411,065, Cl. 141-1.000.

Kwon, Jun-Tae: See—  
Yi, Gil-Goo; Kwon, Jun-Tae; and Yoon, Duk-Kyoon, 5,411,219, Cl. 242-347.000.

Kyoizumi, Kozo, to Santest Co., Ltd. Position detector utilizing absolute and incremental position sensors in combination. 5,412,317, Cl. 324-207.140.

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Yamazaki, Nobuto; and Kyomasu, Ryuichi, 5,411,195, Cl. 228-1.100.

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Labrie, Sylvain: See—  
Goulet, Jean-Francois; Labrie, Sylvain; and Lesquir, Dominique, 5,411,160, Cl. 220-182.000.

Labuc, Vladimir M.: See—  
Houlachi, George; Janjua, M. Barakat I.; Kitzinger, Frank; Wint, Gregory A.; and Labuc, Vladimir M., 5,411,648, Cl. 204-153.190.

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Ladouceur, Gaetan: See—  
Schwenner, Eckhard; Ladouceur, Gaetan; Kabbe, Hans-Joachim; and Aune, Thomas M., 5,411,960, Cl. 514-230.500.

Lafferty, Michael; Kline, Daniel; and Slemmon, Charles S., to Sofamor Danek Properties, Inc. Portable arthroscope with disposable probe. 5,411,500, Cl. 606-2.000.

La Fiandra, Carlo, to Hughes Aircraft Company. Method for use in fabricating and/or testing a thin mirror. 5,411,617, Cl. 156-154.000.

Lafond, Andre: See—  
Garric, George; and Lafond, Andre, 5,411,358, Cl. 414-277.000.

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Malone, Peter G.; and Lai, Louis C., 5,412,165, Cl. 200-5.00R.

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Tsai, Wen-Ta; Lee, Ju-Tung; and Lai, Tai-Hwang, 5,411,770, Cl. 427-556.000.

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Brugierolle, Jean-Renaud; and Robin, Alain, 5,411,172, Cl. 222-4.000.

Moreau, Serge; Sardan, Bernard; and Ehrburger, Pierre, 5,411,577, Cl. 95-96.000.

Laitram Corporation, The: See—  
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Ledet, Brent A.; and Johnson, David A., 5,410,951, Cl. 99-443.00C.

Lajoie, M. Stephen; and Winston, Anthony E., to Church & Dwight Co., Inc. Ultrafine sodium bicarbonate powder. 5,411,750, Cl. 424-717.000.

Lake, James K.: See—  
Gonya, Stephen G.; Lake, James K.; Long, Randy C.; and Wild, Roger N., 5,411,703, Cl. 420-561.000.

Lam, Nicholas L., to Image Technology International, Inc. Single-stage 3D photographic printer with a key-subject alignment method. 5,412,449, Cl. 355-22.000.

Lam, William C.: See—  
Chen, David T.; Everoski, Ronald A.; and Lam, William C., 5,412,660, Cl. 370-110.100.

Lamm, Gunther: See—  
Dix, Johannes P.; Lamm, Gunther; Reichelt, Helmut; and Zeidler, Georg, 5,411,556, Cl. 8-437.000.

Lampert, Jordan K.: See—  
Willis, Mitchell J.; Canavan, Patrick D.; Allen, Fred M.; and Lampert, Jordan K., 5,411,587, Cl. 106-486.000.

Lance, Wayne E.: See—  
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Lancet S.A.: See—  
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Landec Corporation: See—  
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Landis & Gyr Business Support AG: See—  
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Landscheidt, Heinz; Wagner, Paul, and Klausener, Alexander, to Bayer Aktiengesellschaft. Process for the continuous preparation of alkyl nitrates, 5,412,147, Cl. 558-488.000.

Langevin, Yves. Crank handle for window pane or the like, 5,410,778, Cl. 16-115.000.

Lannen, Kay C.: See—  
Constant, Amanda L.; Webb, David W.; Withers-Miklos, Katherine Z.; Lannen, Kay C.; Turner, Ted T.; and Hong-Kiat Leong, Amos, 5,412,575, Cl. 364-464.010.

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Morawa, Joseph E.; Frederiksen, Bjørne; Lannert, George Z.; and Masghati, Mohammad, 5,411,228, Cl. 248-74.500.

Lannon, Robert G.; and Weldon, William F. Reusable non-pyrotechnic countermeasure dispenser cartridge for aircraft, 5,411,225, Cl. 244-137.100.

Larew, Hiram G., III: See—  
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Schmitt, Edward E.; Clarke, Raymond; Larson, Andrew W.; Bitler, Steven P.; Tsugita, Ross S.; and Schultz, Donald A., 5,412,035, Cl. 525-93.000.

Larson, James R.: See—  
Fuller, Timothy J.; Larson, James R.; Spiewak, John W.; Pan, David H.; Mosher, Ralph A.; and Bonsignore, Frank J., 5,411,834, Cl. 430-115.000.

Larson, Ronald J.; to Micral, Inc. State machine having a variable timing mechanism for varying the duration of logical output states of the state machine based on variation in the clock frequency, 5,412,795, Cl. 395-500.000.

Larsson, Thomas: See—  
Hesthamar, Tore; Althoff, Fredrik, and Larsson, Thomas, 5,412,582, Cl. 364-508.000.

Lasch, James E.; Kaczmarczik, James M.; Klein, James A.; and Jonza, James M., to Minnesota Mining and Manufacturing Company. Conforming a microporous sheet to a solid surface, 5,411,351, Cl. 404-14.000.

Laser Industries, Ltd.: See—  
Zair, Eliezer, 5,411,502, Cl. 606-10.000.

Laskaris, Michael A.; and Teske, Richard E., to Hale Fire Pump Company. Compressed air foam system, 5,411,100, Cl. 169-14.000.

Latham, Thomas C.; and Majerowski, Ronald J. Self-righting protective structural device for a rural mailbox, 5,411,206, Cl. 232-39.000.

Lattice Semiconductor Corporation: See—  
Tsui, Cyrus Y.; Chan, Albert L.; Shankar, Kapil; and Shen, Ju, 5,412,260, Cl. 326-39.000.

Lau, Shany: See—  
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Laub, Michael F.: See—  
Golubchik, Arkady Y.; Harper, Donald K., Jr.; Laub, Michael F.; and McMullen, David W., 5,412,540, Cl. 361-807.000.

Laudenslager, James B.; Kinley, Fred G.; and Tzeng, Shing-Wu P., to Advanced Interventional Systems, Inc. Halogen compatible laser head, 5,412,682, Cl. 372-65.000.

Lauw, Hian K., to Electronic Power Conditioning, Inc. Unipolar series resonant converter, 5,412,557, Cl. 363-37.000.

Laux, Daniel R.: See—  
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Laver, Hugh S.: See—  
Leppard, David G.; and Laver, Hugh S., 5,411,847, Cl. 430-551.000.

Law, Clarence G., Jr.: See—  
Trainham, James A., III; Law, Clarence G., Jr.; Newman, John S.; Keating, Kenneth B.; and Eames, Douglas J., 5,411,641, Cl. 204-59.000.

Law, Ignace K. Extended ventilating seat covering assembly, 5,411,318, Cl. 297-452.450.

Law, Wai T.; and Ertingshausen, Gerhard, to ActiMed Laboratories, Inc. Process and apparatus for direct determination of low density lipoprotein, 5,411,870, Cl. 435-11.000.

Lay, Kenneth G. Foot cradle exercise apparatus, 5,411,456, Cl. 482-79.000.

Lay, Steven H.: See—  
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Lazarus, John P.: See—  
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Le, Trac: See—  
Kume, Stewart M.; Le, Trac; and Hastings, Roger N., 5,411,016, Cl. 128-6.000.

Leard, Thomas M.; and Fulton, Stephen D., to Honeywell Inc. Integrated electronic primary flight display, 5,412,382, Cl. 340-974.000.

LeBlanc, Kenneth J.; and Rudd, Kenneth R., to Baker Hughes Incorporated. Filter with gas separator for electric setting tool, 5,411,088, Cl. 166-265.000.

Le Bour, Noel: See—  
Dreyfus, Thierry; and Le Bour, Noel, 5,412,058, Cl. 528-129.000.

LeCompte, Robert A.; and Moninghoff, Scott S., to Rutgers, The State University of New Jersey. Two-part polysulfide molding composition and process, 5,412,069, Cl. 528-374.000.

Lectron Products, Inc.: See—  
Waraksa, Thomas J.; Michaels, Paul A.; Slaughter, Sherri A.; Poirier, James A.; and Rea, Irvin B., 5,412,379, Cl. 340-825.720.

Le Cun, Yann A.; and Simard, Patrice Y., to AT&T Corp. Reverse time delay neural network for pattern generation, 5,412,754, Cl. 395-24.000.

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Tamai, Satoshi; Abe, Takao; and Nagase, Yunosuke, 5,412,103, Cl. 548-365.100.

Ledet, Brent A.; and Johnson, David A., to Laitram Corporation. The Apparatus and method for continuous high-volume steam cooking, 5,410,951, Cl. 99-443.00C.

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Bauer, Herbert E.; Clarke, Michael G.; Lovas, John E.; Narath, William R.; and Williams, Andrew N., 5,411,671, Cl. 252-8.600.

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Kane, Brian, 5,411,055, Cl. 137-513.500.  
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operation each mode selected in dependence on the power to be supplied at the output. 5,412,556, Cl. 363-21.000.

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Marte, Gonzalo U.; Herrera, Maria H. G.; Saa, Federico H.; Cequera, Maria E. H.; Gonzalez, Leopoldo J. S.; and Fuquen, Orlando, to Colgate-Palmolive Co. Dispensing device for viscous materials. 5,411,182, Cl. 222-386.000.

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Higuchi, Hiroshi; Arita, Takashi; Kitamura, Sotoyuki; and Murozono, Mikio, 5,411,601, Cl. 136-256.000.

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Kendall, Robert M.; Pam, Richard L.; Minden, Andrew C.; Saito, Nathan; and Gotterba, James A., 5,410,989, Cl. 122-367.100.

Mine Safety Appliances Company: See—  
Pouchot, Thomas D., 5,411,057, Cl. 137-550.000.

Mine, Tadashi: See—  
Muto, Yoshitaka; and Mine, Tadashi, 5,411,304, Cl. 294-2.000.

Minezawa, Yukihiro; and Dohkoshi, Hitoshi, to Kabushiki Kaisha Equos Research. Power supply for motor usable with an electric vehicle. 5,412,293, Cl. 318-376.000.

Minisci, Francesco: See—  
Giordano, Claudio; Coppi, Laura; and Minisci, Francesco, 5,412,143, Cl. 558-298.000.

Minnesota Mining and Manufacturing Company: See—  
Dahlquist, John C., 5,411,806, Cl. 428-411.100.

Dieken, Alan P.; Fischer, David J.; Platt, Jonathan C.; and Sondermann, William L., 5,411,534, Cl. 607-31.000.

George, Billy L.; Williams, Donald R.; and Babirad, Stefan A., 5,411,803, Cl. 428-403.000.

Hyde, Patrick D.; and Ouderkirk, Andrew J., 5,411,788, Cl. 428-200.000.

Jones, Marvin E.; and Rousseau, Alan D., 5,411,576, Cl. 95-57.000.

Kulkarni, Subodh K.; Chang, Jeffrey C.; Henry, Robert M.; Martinson, Robert E.; and Stofko, John J., Jr., 5,411,787, Cl. 428-195.000.

Kumar, Kanta; Davis, Robert A.; Nichols, Sheila M.; and Buttery, Howard J., 5,411,802, Cl. 428-402.000.

Lasch, James E.; Kaczmarczik, James M.; Klein, James A.; and Jonza, James M., 5,411,351, Cl. 404-14.000.

Ma, Jingjing; and Nestegard, Mark K., 5,412,031, Cl. 525-98.000.

Mertens, Timothy A.; Miles, Alden R.; Darvell, Wayne K.; and Windorski, David C., 5,411,168, Cl. 221-22.000.

Mizobuchi, Yoshikazu, 5,411,930, Cl. 503-227.000.

Scholz, Matthew T.; Tochacek, Miroslav; and Edgar, Jason L., 5,411,796, Cl. 428-231.000.

Tousignant, Lew A., 5,411,077, Cl. 165-104.330.

Weaver, Billy L.; McLaughlin, Jerry C.; and Stinton, David P., 5,411,763, Cl. 427-249.000.

Minnis, Brian J., to U.S. Philips Corporation. Compact cascaded microwave amplifier circuits. 5,412,347, Cl. 330-286.000.



Minolta Camera Kabushiki Kaisha: See—  
Hirota, Yoshihiko, 5,412,489, Cl. 358-461.000.  
Yamaguchi, Takeshi, 5,411,248, Cl. 271-171.000.  
Miragliotta, Michael A.: See—  
Bottiglieri, Michael P.; Brolin, Stephen J.; Miragliotta, Michael A.; and Sarkar, Chandan, 5,412,657, Cl. 370-66.000.  
Mirando, Salvatore, to Coastal Amusement Distributors, Inc. Electronic video match game, 5,411,271, Cl. 273-434.000.  
Mirhashemi, Soheila: See—  
Gordon, Virginia C.; Mirhashemi, Soheila; and Wei, Rosalind W., 5,411,888, Cl. 436-5.000.  
Mischke, Mark R.: See—  
Ford, Maureen F.; Guarrera, Donna J.; Mischke, Mark R.; Pai, Ramdas P.; and Warner, John C., 5,411,929, Cl. 503-210.000.  
Mishima, Naoshi: See—  
Tamura, Hiroshi; Mishima, Naoshi; and Kawasaki, Yoshiaki, 5,411,827, Cl. 430-58.000.  
Mishima, Yasuhiro: See—  
Akiyama, Koichi; Miyashita, Hiromu; Aoki, Sanji; Hatta, Ken; Ino, Takashi; and Mishima, Yasuhiro, 5,412,003, Cl. 523-513.000.  
Mita Industrial Co., Ltd.: See—  
Matsuo, Takeshi; Takeda, Yoshiyuki; Yoshida, Takeshi; Kakuta, Masayuki; Kida, Yasuhiko; and Harada, Hiroyuki, 5,412,462, Cl. 355-308.000.  
Okazaki, Noriaki; Wataki, Ryui; Nimura, Eiji; Uchida, Michio; and Ito, Yuki, 5,412,460, Cl. 355-274.000.  
Mita, Seiichi; Kawashima, Toru; and Kaku, Toshimitsu, to Hitachi Ltd.; and Hitachi Video & Information System, Inc. Information reproducing apparatus with a DC level correcting capability, 5,412,632, Cl. 369-48.000.  
Mitani, Satoru: See—  
Nagata, Yuji; Mitani, Satoru; and Nakamura, Kazuo, 5,412,524, Cl. 360-113.000.  
Mitchell, James W., to Monsanto Company. Prolonged release of biologically active somatotropin, 5,411,951, Cl. 514-12.000.  
Mitek Surgical Products, Inc.: See—  
Goble, E. Marlowe; Chervitz, Alan; Luman, David P.; and Jensen, Kenneth L., 5,411,506, Cl. 606-104.000.  
Goble, E. Marlowe, 5,411,523, Cl. 606-232.000.  
Mitsubishi Denki Kabushiki Kaisha: See—  
Anzai, Kiyoharu, 5,412,294, Cl. 318-432.000.  
Bauman, Douglas A.; Lowenfeld, Simon; Schultz, Brian A.; and Thompson, Robert W., Jr., 5,412,756, Cl. 395-50.000.  
Fukuda, Tatsuya; and Kajimoto, Takeshi, 5,412,604, Cl. 365-189.110.  
Hara, Zenichiro, 5,412,399, Cl. 345-113.000.  
Iwasaki, Yasuo, 5,412,278, Cl. 313-478.000.  
Karasawa, Kunihiko, 5,412,559, Cl. 363-127.000.  
Katayama, Kazuyori, 5,411,452, Cl. 477-206.000.  
Kinoshita, Yasushi; and Niwano, Kazuhito, 5,411,898, Cl. 437-31.000.  
Komori, Shigeki; and Tsukamoto, Katsuhiro, 5,412,237, Cl. 257-306.000.  
Matsuda, Yoshio; Kondoh, Harufusa; Notani, Hiromi; and Hayashi, Isamu, 5,412,380, Cl. 340-825.850.  
Munezane, Tsuyoshi; Fukutomi, Norihisa; and Matsumoto, Osamu, 5,411,212, Cl. 239-408.000.  
Nakajima, Moriyoshi, 5,412,600, Cl. 365-185.000.  
Nakajima, Yasuharu; and Matsubayashi, Hiroto, 5,412,235, Cl. 257-272.000.  
Ooishi, Tsukasa, 5,412,605, Cl. 365-203.000.  
Suzuki, Katsunori, 5,412,610, Cl. 365-219.000.  
Taniguchi, Junko; Yamaguchi, Noriyuki; Kurashita, Takuji; Ishizuka, Mitsuru; and Yao, Masaharu, 5,412,434, Cl. 348-669.000.  
Tsuiji, Shintaro, 5,412,163, Cl. 187-382.000.  
Uda, Nobuyasu, 5,412,264, Cl. 327-389.000.  
Wakimoto, Kingo, 5,412,777, Cl. 395-166.000.  
Yagoura, Hideya; Higuchi, Noriaki; and Shimamoto, Haruo, 5,412,157, Cl. 174-52.400.  
Yamamoto, Masahiro, 5,410,915, Cl. 73-517.00R.  
Mitsubishi Gas Chemical Company, Inc.: See—  
Ohya, Kazuyuki; and Shinohara, Shunichi, 5,411,773, Cl. 428-1.000.  
Watanabe, Noriyoshi; Morishige, Kiyoshi; and Inoue, Hajime, 5,412,013, Cl. 524-413.000.  
Mitsubishi Jukogyo Kabushiki Kaisha: See—  
Fukue, Ichiro; Mandai, Shigemi; Tanaka, Katsunori; Kawabata, Hitoshi; Sato, Nobuo; Nishida, Hiroyuki; and Gora, Tetsuo, 5,410,884, Cl. 60-747.000.  
Mitsubishi Paper Mills Limited: See—  
Funae, Haruyoshi; and Hiraishi, Shigetoshi, 5,411,798, Cl. 428-341.000.  
Mitsubishi Precision Co., Ltd.: See—  
Tada, Hirohiko; and Kurokawa, Akihiro, 5,412,471, Cl. 356-350.000.  
Mitsui, Kenichi, to Toyota Gosei Co., Ltd. Hose connecting assembly, 5,411,300, Cl. 285-292.000.  
Mitsui, Kenji: See—  
Yamada, Shigeru; Tsuji, Masataka; and Mitsui, Kenji, 5,412,422, Cl. 348-218.000.  
Mitsui Petrochemical Industries, Ltd.: See—  
Imuta, Junichi; Saito, Junji; Ueda, Takashi; and Mukaiyama, Teruaki, 5,412,128, Cl. 556-11.000.  
Yamamoto, Akihiko; Zenitani, Yurimasa; and Yamaguchi, Masayoshi, 5,412,020, Cl. 524-505.000.

Mitsui Toatsu Chemicals, Inc.: See—  
Shinoda, Hosen; Ohtaguro, Masami; Funae, Akihiro; and Imuro, Shigeru, 5,412,067, Cl. 528-361.000.  
Mitsumi Electric Co., Ltd.: See—  
Tam, Karman; Moe, Erik; and Kupferman, Hanan, 5,412,809, Cl. 395-750.000.  
Uchida, Tetsuro, 5,412,692, Cl. 375-317.000.  
Miyake, Toshio: See—  
Ozaki, Yoshihide; Nomura, Tatsuo; and Miyake, Toshio, 5,411,945, Cl. 514-23.000.  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryosuke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hirokuni, to Nippon Furnace Kogyo Kabushiki Kaisha; and Chiyoda Corporation. Tubular furnace and method of controlling combustion thereof, 5,410,988, Cl. 122-250.00R.  
Miyamoto, Junichi: See—  
Ohtsuka, Nobuaki; and Miyamoto, Junichi, 5,412,609, Cl. 365-218.000.  
Miyamoto, Kouichi; and Takahashi, Shoji, to Ryobi Limited. Fret-saw machine, 5,410,933, Cl. 83-783.000.  
Miyamoto, Toshio: See—  
Ono, Kazuaki; Tanigawa, Koichi; Takeuchi, Akihiko; Motoyama, Hajime; and Miyamoto, Toshio, 5,412,455, Cl. 355-219.000.  
Miyamura, Yoshinori: See—  
Nishimura, Takashi; Arimoto, Akira; Miyamura, Yoshinori; Anzai, Yumiko; Kondo, Yoshimasa; Uchida, Fumihiko; and Moriyama, Shigeo, 5,411,430, Cl. 451-1.000.  
Miyazaka, Takeshi; and Ueno, Katsumi, to Citizen Watch Co., Ltd. Method and apparatus for retaping electronic parts, 5,411,622, Cl. 156-265.000.  
Miyashita, Akihiro: See—  
Ishihara, Hideaki; Tsuji, Kiyoshi; and Miyashita, Akihiro, 5,412,478, Cl. 348-72.000.  
Miyashita, Hiromi: See—  
Kojima, Tetsuji; Miyashita, Hiromi; Hagiwara, Shigemi; and Sunaga, Naoki, 5,412,490, Cl. 358-473.000.  
Miyashita, Hiromu: See—  
Akiyama, Koichi; Miyashita, Hiromu; Aoki, Sanji; Hatta, Ken; Ino, Takashi; and Mishima, Yasuhiro, 5,412,003, Cl. 523-513.000.  
Miyashita, Kyoichi; and Ogawa, Junichi, to Earthlines Corporation. Density-moisture measuring apparatus, 5,412,217, Cl. 250-390.050.  
Miyashita, Takanori: See—  
Sakata, Shinji; Miyashita, Takanori; and Kondo, Kazuhiko, 5,412,089, Cl. 536-28.500.  
Miyashita, Yukio; Yotani, Hiroshi; and Ito, Tatsuya, to Honda Giken Kogyo Kabushiki Kaisha. Ignition timing control system for internal combustion engine, 5,411,000, Cl. 123-425.000.  
Miyawaki, Mamoru: See—  
Inoue, Shunsuke; Koizumi, Toru; Miyawaki, Mamoru; and Sugawa, Shigetoshi, 5,412,240, Cl. 257-347.000.  
Miyazaki, Hideki: See—  
Sakurai, Naoki; Mori, Mutsuhiro; Arakawa, Hidetoshi; Onda, Kenichi; Miyazaki, Hideki; and Kanouda, Akihiko, 5,412,558, Cl. 363-98.000.  
Miyazaki, Jiro: See—  
Noto, Kazuyuki; Miyazaki, Jiro; Hino, Taketoshi; and Kugou, Daisaku, 5,410,789, Cl. 29-25.350.  
Miyazaki, Keiji: See—  
Chujo, Takafumi; Komine, Hiroaki; Miyazaki, Keiji; Ogura, Takao; and Soejima, Tetsuo, 5,412,376, Cl. 340-825.010.  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, to Canon Kabushiki Kaisha. Slope detection method, and information detection/writing apparatus using the method, 5,412,597, Cl. 365-174.000.  
Miyazaki, Toshihiko: See—  
Shinjo, Katsuhiko; Miyazaki, Toshihiko; Kuroda, Ryo; Yamamoto, Keisuke; and Kawase, Toshimitsu, 5,412,641, Cl. 369-126.000.  
Miyazaki, Toshiyuki; Motoi, Hirofumi; Kodama, Toshiaki; Maeda, Tatsu; Tsujita, Takahiro; and Okuda, Hiromichi, to Nisshin Flour Milling Co., Ltd. Lipolytic enzyme inhibitors, 5,411,956, Cl. 514-15.000.  
Miyazawa, Kazutoshi; and Yoshida, Naoyuki, to Chisso Corporation. Optically active compounding having plural chiral centers and production thereof, 5,411,877, Cl. 435-125.000.  
Miyoshi, Takeshi: See—  
Yahagi, Hideo; Takaoka, Masahiko; Hoshikawa, Shingo; Miyoshi, Takeshi; and Okada, Keiji, 5,411,274, Cl. 277-203.000.  
Mizobuchi, Yoshikazu, to Minnesota Mining and Manufacturing Company. Image-receiving element for production of dye diffusion type thermal transfer image, 5,411,930, Cl. 503-227.000.  
Mizohata, Yasuhiro: See—  
Matsunaga, Minobu; and Mizohata, Yasuhiro, 5,411,076, Cl. 165-80.200.  
Mizuhashi, Tohru: See—  
Matsuoka, Yoshihiro; Takeda, Nobutoshi; and Mizuhashi, Tohru, 5,412,747, Cl. 385-85.000.  
Mizuishi, Kenichi: See—  
Hamamoto, Nobuo; Onishi, Tadashi; Suzuki, Tatsundo; Nagata, Minoru; Mizuishi, Kenichi; and Tyojamaro, Yosuke, 5,412,719, Cl. 380-9.000.  
Mizuno, Fumio: See—  
Todokoro, Hideo; Takamoto, Kenji; Otaka, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiro; Ninomiya, Ken; and Kure, Tokuo, 5,412,210, Cl. 250-310.000.

Mizuno, Hiroyuki: See—  
Komoto, Teruo; Hirota, Hiroyuki; Sato, Susumu; Ohtsuka, Mari; Koya, Hidehiko; Mizuno, Hiroyuki; and Kuraishi, Tadayuki, 5,411,972, Cl. 514-330.000.  
Mizuno, Yoshiyuki; Ii, Hidehiro; Suzuki, Satoshi; and Tonooka, Yukihisa, to Molex Incorporated - Mabuchi Motor Co., Ltd. Small sized electric motor equipped with an electric connector, 5,412,271, Cl. 310-71.000.  
Mizusawa, Yumi: See—  
Ichihara, Katsutaro; Ashida, Sumio; Kikitsu, Akira; and Mizusawa, Yumi, 5,412,627, Cl. 369-13.000.  
MKS Japan, Inc.: See—  
Suzuki, Isao, 5,410,912, Cl. 73-204.150.  
Mobil Oil Corporation: See—  
Burcham, Christopher; Fast, Robert E.; Murer, Anthony S.; and Northrop, Paul S., 5,411,086, Cl. 166-245.000.  
Chawla, Birbal; Mazzone, Dominik N.; Sarli, Michael S.; Shih, Stuart S.; and Timken, Hye Kyung C., 5,411,658, Cl. 208-89.000.  
Jennings, Alfred R., Jr., 5,411,091, Cl. 166-280.000.  
Jennings, Alfred R., Jr., 5,411,093, Cl. 166-300.000.  
Northrop, Paul S., 5,411,094, Cl. 166-303.000.  
Mobil Solar Energy Corporation: See—  
Harvey, David S.; Danielson, Scott E.; and Dacey, John W., 5,411,897, Cl. 437-8.000.  
Mochizuki, Haruyo: See—  
Yasuhiro, Kuramoto; Shuichiro, Noda; Maruyama, Shinobu; Hatono, Shunso; Mochizuki, Haruyo; and Yazaki, Akira, 5,412,098, Cl. 546-156.000.  
Moczar, Elemer: See—  
Ladislav, Robert; Moczar, Elemer; Hornebeck, William Georges; and Kerneur, Christiane M., 5,411,978, Cl. 514-373.000.  
Modern Carpet Tools Ltd.: See—  
Sergeier, Fernand; Sergeier, Robert; and Sergeier, Luc, 5,411,781, Cl. 428-57.000.  
Moe, Erik: See—  
Tam, Karman; Moe, Erik; and Kupferman, Hanan, 5,412,809, Cl. 395-750.000.  
Moellering, David J. Ball lock punch retainer, 5,410,932, Cl. 83-698.310.  
Moerk, John S.: See—  
Curtis, Ihlefeld M.; Youngquist, Robert C.; Moerk, John S.; and Rose, Kenneth A., III, 5,412,221, Cl. 250-573.000.  
Moffat, Karen A.: See—  
Georges, Michael K.; Saban, Marko D.; Kazmaier, Peter M.; Veregin, Richard P. N.; Hamer, Gordon K.; and Moffat, Karen A., 5,412,047, Cl. 526-204.000.  
Mohlenkamp, M. Joseph, Jr.: See—  
Downton, Galen E.; Maxwell, Michael W.; Harper, Heather J.; Mohlenkamp, M. Joseph, Jr.; Rizzi, George P.; Litke, Manfred; Romer, Karin; and Engel, Ruediger, 5,411,755, Cl. 426-599.000.  
Mohsen, Amr M.: See—  
Hamdy, Esmat Z.; Mohsen, Amr M.; McCollum, John L.; Chen, Shih-ou; and Chiang, Steve S., 5,412,244, Cl. 257-530.000.  
Moldenhauer, Paul G., to Rollerblade, Inc. Roller skate brake, 5,411,276, Cl. 280-11.200.  
Molex Incorporated: See—  
Comerci, Joseph D.; DeRoss, Robert; Fuerst, Robert M.; Hester, Todd A.; and Sommer, Edward S., 5,412,169, Cl. 200-339.000.  
DiViesti, Anthony M.; and Regnier, Kent E., 5,411,408, Cl. 439-326.000.  
Molex Incorporated - Mabuchi Motor Co., Ltd.: See—  
Mizuno, Yoshiyuki; Ii, Hidehiro; Suzuki, Satoshi; and Tonooka, Yukihisa, 5,412,271, Cl. 310-71.000.  
Mollendorf, Joseph C.; Catipovic, Robert M.; and Pascale, Lillian A., to Research Foundation of Suny, The. Method of using a cervical orthosis, 5,411,038, Cl. 128-898.000.  
Mollet, Beat: See—  
Hottinger, Herbert; Mollet, Beat; and Pilloud, Nathalie, 5,412,086, Cl. 536-24.320.  
Moninghoff, Scott S.: See—  
LeCompte, Robert A.; and Moninghoff, Scott S., 5,412,069, Cl. 528-374.000.  
Mono Pumps Limited: See—  
Parnell, Aron T.; and Thomas, Gareth D., 5,411,383, Cl. 418-48.000.  
Monsanto Company: See—  
Mitchell, James W., 5,411,951, Cl. 514-12.000.  
Silverman, Bernard, 5,411,795, Cl. 428-229.000.  
Monson, Lynn T., to Novell, Inc. System for permitting a view of an object or a user interface to be exchanged between operating system environments, 5,412,772, Cl. 395-155.000.  
Montgomery, Edward L.: See—  
Beeghly, Richard M.; Montgomery, Edward L.; Legas, William H.; Crump, Robert L.; and Schad, Deloris J., 5,411,067, Cl. 152-209.00B.  
Montino, Alessandro: See—  
Bastoli, Catia; Bellotti, Vittorio; Montino, Alessandro; Tredici, Gianfranco D.; Lombi, Roberto; and Ponti, Roberto, 5,412,005, Cl. 524-47.000.  
Montreuil, Clifford N.: See—  
Adamczyk, Andrew A., Jr.; Montreuil, Clifford N.; and Williams, Scott C., 5,410,872, Cl. 60-274.000.  
Monzyk, Debra, to American Trading and Production Corporation. Double cover ring binder, 5,411,293, Cl. 281-31.000.  
Moog Inc.: See—  
Garnjost, Kenneth D., 5,410,947, Cl. 92-80.000.

Moore, Brian K.; and Pringle, Ronald E., to Camco International Inc. Spoolable flexible hydraulically set, straight pull release well packer, 5,411,081, Cl. 166-120.000.  
Moore, Brian K.; and Pringle, Ronald E., to Camco International Inc. Spoolable coiled tubing completion system, 5,411,085, Cl. 166-242.000.  
Moore, Christopher P.: See—  
Ridgway, Michael; Edwards, Stephen J.; and Moore, Christopher P., 5,411,817, Cl. 429-90.000.  
Moore, Larry J.; and Adler-Moore, Jill, to Vestar, Inc. Prevention of synovial adhesions, 5,411,743, Cl. 424-450.000.  
Moore, Martha H.; and Koenig, Robbie C. Two photocell controlled lighting system employing filters for the two photocells that control on/off operation for the system, 5,412,284, Cl. 315-155.000.  
Moore, Stuart G., to United Industrial Products, Ltd. Optical scanning device for lumber, 5,412,220, Cl. 250-563.000.  
Moore, William P., to Harmony Products Inc. Highly available waste based nitrogen fertilizer, 5,411,568, Cl. 71-22.000.  
Moradian, Ali; Jenkins, Maurice A.; and Frater, Robert L., to Westinghouse Electric Corporation. System and method for controlling turbine-generators based on whether cooling regulators are off-line, 5,412,252, Cl. 290-40.00R.  
Morawa, Joseph E.; Frederiksen, Bjarne; Lannert, George Z.; and Masghati, Mohammad, to Illinois Tool Works Inc. Cable clip, 5,411,228, Cl. 248-74.500.  
Morbiter, Hans-Peter: See—  
Nowak, Gerhard; Winter, Alfred; Theurer, Rudolf; Morbiter, Hans-Peter; Kruschik, Klaus; and Wieser, Peter, 5,411,283, Cl. 280-618.000.  
Moreau, Serge; Sardan, Bernard; and Ehrburger, Pierre, to l'Air Liquide, Societe Anonyme Pour l'Etude et l'Exploitation des Procédes Georges Claude. Method for separating gases using a particulate composite material with carbon matrix, 5,411,577, Cl. 95-96.000.  
Moreland, Bruce, to Microsoft Corporation. System and method for text searching using an n-ary search tree, 5,412,807, Cl. 395-600.000.  
Morella, Roger J., Jr.: See—  
Cameron, Wayne B.; Morella, Roger J., Jr.; and Davis, Donald W., 5,412,583, Cl. 364-508.000.  
Moretto, Hans-Heinrich: See—  
Bulan, Andreas; Weher, Rainer; Block, Hans-Dieter; and Moretto, Hans-Heinrich, 5,411,726, Cl. 423-484.000.  
Mori, Hiroshi: See—  
Tanaka, Masakazu; Mori, Hiroshi; and Mabuchi, Mamoru, 5,410,875, Cl. 60-288.000.  
Mori, Mutsuhiro: See—  
Sakurai, Naoki; Mori, Mutsuhiro; Arakawa, Hidetoshi; Onda, Kenichi; Miyazaki, Hideki; and Kanouda, Akihiko, 5,412,558, Cl. 363-98.000.  
Mori, Ryuichi; and Osawa, Keiji, to Nikon Corporation. Power focus device for a camera, 5,412,445, Cl. 354-195.100.  
Mori, Toyokazu: See—  
Kido, Eiichi; Yui, Yuh; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326.000.  
Morigaki, Masakazu: See—  
Seto, Nobuo; Yoshioka, Yasuhiro; and Morigaki, Masakazu, 5,411,846, Cl. 430-546.000.  
Moriguchi, Yoshihiro: See—  
Nagase, Norikazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, 5,411,630, Cl. 216-22.000.  
Morimatsu, Hideharu; and Sasakura, Toyoki, to Furuno Electric Company, Limited. High resolution measuring method and apparatus, 5,412,617, Cl. 367-88.000.  
Morimoto, Yasuaki: See—  
Buchler, Christian; and Morimoto, Yasuaki, 5,412,634, Cl. 369-44.230.  
Morin, Marianne J.: See—  
Giroux, Nathalie; Morin, Marianne J.; Lemay, Marcel; Kositpaiboon, Rungroj; and Aboul-Magd, Osama S., 5,412,647, Cl. 370-60.000.  
Morin, Robert L.: See—  
Stephens, Michael W.; Riley, William M.; Morin, Robert L.; and Bumbera, Steven A., 5,411,442, Cl. 473-54.000.  
Moriniere, Jean-Pierre: See—  
Bochet, Thierry; and Moriniere, Jean-Pierre, 5,411,203, Cl. 229-104.000.  
Morishige, Kiyoshi: See—  
Watanabe, Noriyoshi; Morishige, Kiyoshi; and Inoue, Hajime, 5,412,013, Cl. 524-413.000.  
Morishita, Masakazu, to Canon Kabushiki Kaisha. Photoelectric conversion apparatus, 5,412,243, Cl. 257-462.000.  
Morita, Eiichi: See—  
Yoshida, Makoto; Shimizu, Kazuyuki; Morita, Eiichi; Fujimori, Masato; and Tanaka, Hiromi, 5,411,589, Cl. 118-688.000.  
Morita, Shigehiro; and Shirai, Akira, to Hirose Electric Co., Ltd. Reinforcing metal fitting for surface mount connector, 5,411,236, Cl. 248-500.000.  
Moriyama, Kenzo: See—  
Fujinami, Tsutomu; Inoue, Kouji; Tsuji, Hiroshi; Renge, Keiichi; Moriyama, Kenzo; and Tozuka, Kenji, 5,412,802, Cl. 395-575.000.



Moriyama, Shigeo: See—  
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Bottomley, Stephen E.; Lundy, Daniel E.; Dadah, Betsy; and Barr, Robert K., 5,411,837, Cl. 430-281.000.

Schmidt, Gerald; and Jung, Rainer, 5,411,776, Cl. 428-34.000.

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Zebold, David F.; and Mathes, A. Wayne, Jr., 5,412,512, Cl. 359-878.000.

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Walczak, Thomas J., 5,412,341, Cl. 330-138.000.

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Attwood, Stanley W., 5,412,388, Cl. 342-357.000.

Bank, Douglas, 5,412,664, Cl. 371-22.600.

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Skrubak, Robert J.; and Gladden, Michael E., 5,412,785, Cl. 395-375.000.

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Suppelsa, Anthony J.; Darveau, Robert F.; Goodwin, Thomas A.; Abdala, Julio; and Liebman, Henry F., 5,411,199, Cl. 228-179.100.

Warfield, Timothy J., 5,411,629, Cl. 216-34.000.

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Wood, Daniel E., 5,412,375, Cl. 340-825.030.

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Fan, Sophie S.; Ben-David, Daniel; Colella, Gregory M.; Cupo, Albert; Fischer, Gena; and Ornstein, Leonard, 5,411,891, Cl. 436-63.000.

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Moyal, Miki; Brennan, Thomas; and Vance, Gene, to Advanced Micro Devices, Inc. Fuse trimming in plastic package devices. 5,412,594, Cl. 365-96.000.

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MTD Products Inc.: See—  
Plamper, Gerhard; and Ciavarella, Nick E., 5,410,867, Cl. 56-320.200.

MTL Instruments Group plc, The: See—  
Derrick, Donald E.; Harris, Hollis A.; Marion, Robert H.; Tower, William A.; and Towle, L. Christopher, 5,412,544, Cl. 362-84.000.

Muehlberger, Stephan E., to Electro-Plasma, Inc. High temperature plasma gun assembly. 5,412,173, Cl. 219-121.470.

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Singh, Janak; Bisacchi, Gregory S.; and Mueller, Richard H., 5,412,134, Cl. 556-437.000.

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Imuta, Junichi; Saito, Junji; Ueda, Takashi; and Mukaiyama, Teruaki, 5,412,128, Cl. 556-11.000.

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Muller, Rudiger: See—  
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Mullins, Richard M.; and Glen, Jeffrey J., to Olin Corporation. Method for the dissolution of calcium carbonate solids in the presence of aqueous chlorine solutions. 5,411,727, Cl. 423-658.500.

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Gruber, Rudolf, 5,410,777, Cl. 16-58.000.

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Mummenhoff, Heinrich. Base blade of fiber-reinforced plastic for circular saw blades and/or abrasive cutting disks. 5,411,010, Cl. 125-15.000.

Munezane, Tsuyoshi; Fukutomi, Norihisa; and Matsumoto, Osamu, to Mitsubishi Denki Kabushiki Kaisha. Fuel injection valve. 5,411,212, Cl. 239-408.000.

Munshi, Mohammed Z.; and Nedungadi, Ashok P., to Intermedics, Inc. Rechargeable biomedical battery powered devices with recharging and control system therefor. 5,411,537, Cl. 607-33.000.

Murabayashi, Fumio: See—  
Nishio, Yoji; Murabayashi, Fumio; Kurita, Kozaburo; and Iwamura, Masahiro, 5,412,262, Cl. 326-64.000.

Murakami, Yasuo: See—  
Takemura, Hiromichi; and Murakami, Yasuo, 5,411,336, Cl. 384-492.000.

Murari, Bruno; and Libretti, Giuseppe, to SGS-Thomson Microelectronics, S.r.l. Semiconductor device package with shaped parts for direct coupling to standard connectors. 5,412,248, Cl. 257-693.000.

Murata, Hiroyasu, to Fujitsu Limited. Method and device for removing frequency offset. 5,412,695, Cl. 375-344.000.

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Ikeuchi, Hiroshi, 5,412,362, Cl. 335-213.000.

Nakamura, Kazutaka; Tani, Hiroji; Yoneda, Yasunobu; and Sakabe, Yukio, 5,412,357, Cl. 333-181.000.

Nakamura, Takeshi, 5,412,204, Cl. 250-231.120.

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Murata Manufacturing Co., Ltd.: See—  
Noto, Kazuyuki; Miyazaki, Jiro; Hino, Taketoshi; and Kugou, Daisaku, 5,410,789, Cl. 29-25.350.

Murata, Wataru: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masahiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.

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Burcham, Christopher; Fast, Robert E.; Murer, Anthony S.; and Northrop, Paul S., 5,411,086, Cl. 166-245.000.

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Higuchi, Hiroshi; Arita, Takashi; Kitamura, Sotoyuki; and Murozono, Mikio, 5,411,601, Cl. 136-256.000.

Murray, Charles G., to Fisher & Paykel Limited. Liquid supply apparatus. 5,411,052, Cl. 137-392.000.

Murray, Christopher K.; Beckvermit, Jeffrey T.; Bailey, David T.; and Peterson, S. Kent, to Hauser Chemical Research, Inc. Oxidation of glycoside substituted taxanes to taxol or taxol precursors and new taxane compounds formed as intermediates. 5,412,116, Cl. 549-379.000.

Murray, James S.: See—  
Clark, John E.; and Murray, James S., 5,412,297, Cl. 318-468.000.

Murray, Rex E.; Eaton, Robert F.; Upshaw, Thomas A.; Taylor, James W.; Bassett, David R.; and Lincoln, David M., to Union Carbide Chemicals & Plastics Technology Corporation. Process utilizing alkenylcarboxylate crosslinkers. 5,412,038, Cl. 525-303.000.

Musser, John H.: See—  
Rao, Narasinga; Tang, Peng C.; and Musser, John H., 5,412,123, Cl. 552-209.000.

Musto, Dominick J.: See—  
Rogers, William; Ernst, James J.; Williamson, Steven; and Musto, Dominick J., 5,411,397, Cl. 434-226.000.

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Jarecki, James J.; Mylander, Paul; and Wiest, James L., 5,411,146, Cl. 211-59.200.

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Koga, Hiroshi; and Nabata, Hiroyuki, 5,412,117, Cl. 549-404.000.

Nabisco, Inc.: See—  
Wheeler, Edward L.; O'Amelia, Ronald P.; Leveille, Gilbert A.; Otterburn, Michael S.; Klemann, Lawrence P.; Finley, John W.; Roden, Allan D.; Chrysam, Michael M.; Pelloso, Turiddu A.; and Given, Peter S., Jr., 5,411,756, Cl. 426-607.000.

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Hamilton, Scott L.; and Naddor, David J., 5,412,585, Cl. 364-569.000.

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McDaniels, Steve R.; Glad, Paul H.; Naegle, David; and Hinto, Jon R., 5,411,405, Cl. 439-131.000.

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Corby, Nelson R., Jr.; Meenan, Peter M.; Solanas, Claude H., III; Vickerman, David C.; and Nafis, Christopher A., 5,412,569, Cl. 364-424.010.

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Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatoshi; and Tamura, Toshinari, 5,412,096, Cl. 546-16.000.

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Nagasawa, Mitsuru; Tate, John; and Trojan, R. Joseph. Shoulder strap assembly. 5,411,194, Cl. 224-254.000.

Nagase, Norikazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, to Hitachi, Ltd. Magnetic disk manufacturing method. 5,411,630, Cl. 216-22.000.

Nagase, Yunosuke: See—  
Tamai, Satoshi; Abe, Takao; and Nagase, Yunosuke, 5,412,103, Cl. 548-365.100.

Nagashima, Hideyuki, to Nok Corporation. Method and apparatus for detecting the position of defect in a hollow fiber membrane module. 5,411,682, Cl. 264-36.000.

Nagashima, Takeo: See—  
Kanai, Takao; Tanemoto, Kei; Yamazaki, Shuichi; and Nagashima, Takeo, 5,411,808, Cl. 428-472.000.

Nagata, Atsushi, to Matsushita Electric Industrial Co., Ltd. Image coding method and image coding apparatus. 5,412,430, Cl. 348-402.000.

Nagata, Kenichi: See—  
Ohno, Eiji; Nishiuchi, Kenichi; Nagata, Kenichi; Yamada, Noboru; and Akahira, Nobuo, 5,412,626, Cl. 369-13.000.

Nagata, Minoru: See—  
Hamamoto, Nobuo; Onishi, Tadashi; Suzuki, Tatsundo; Nagata, Minoru; Mizuishi, Kenichi; and Tjojamori, Yosuke, 5,412,719, Cl. 380-9.000.

Nagata, Yuji; Mitani, Satoru; and Nakamura, Kazuo, to Matsushita Electric Industrial Co., Ltd. Magneto-resistive head. 5,412,524, Cl. 360-113.000.

Nagayoshi, Atsushi; Higuchi, Koichi; Yamaguchi, Kazutoshi; Takakura, Eiichi; Saito, Masataka; and I. Fusanori, to Matsushita Electric Industrial Co., Ltd. Acoustic reproducing apparatus. 5,412,733, Cl. 381-74.000.

Nagel, Juergen, to Deutsche ITT Industries, GmbH. Method of fabricating a monolithic integrated circuit with at least one CMOS field-effect transistor and one NPN bipolar transistor. 5,411,900, Cl. 437-34.000.

Naito, Yutaka: See—  
Yano, Akihiro; Naito, Yutaka; Yamada, Kunitaka; and Ohtsuru, Masaaki, 5,412,046, Cl. 526-171.000.

Naka, Yuji; and Yamamoto, Masanobu, to Sega of America, Inc. Split-screen video game with character playfield position exchange. 5,411,270, Cl. 273-434.000.

Naka, Yuji; and Yamamoto, Masanobu, to Sega of America, Inc. Video game with spiral loop graphics. 5,411,272, Cl. 273-437.000.

Nakagawa, Masayoshi: See—  
Omori, Toshimichi; Suzuki, Haruo; Sampei, Tetsuya; Kanero, Takahiro; Nakagawa, Masayoshi; and Kurihara, Masayoshi, 5,411,605, Cl. 148-113.000.

Nakagawa, Tatsuo: See—  
Yamada, Kenji; and Nakagawa, Tatsuo, 5,412,655, Cl. 370-60.100.

Nakagawa, Yoshikazu, to Rohm Co., Ltd. High electron mobility transistor having improved electron controllability. 5,412,230, Cl. 257-191.000.

Nakagawa, Yoshiki: See—  
Ito, Yoshihiko; Tamao, Kohei; Yamaguchi, Shigehiro; and Nakagawa, Yoshiki, 5,412,105, Cl. 549-4.000.

Nakai, Hidemi: See—  
Kawaguchi, Jun; Kobayashi, Hiroaki; and Nakai, Hidemi, 5,411,794, Cl. 428-216.000.

Nakai, Kazuo: See—  
Asada, Masaaki; and Nakai, Kazuo, 5,412,623, Cl. 367-190.000.

Nakajima, Hisao; and Derouiche, Radhouane, to France Telecom Etablissement Autonome de Droit Public. Transmitter/receiver for frequency-modulated optical signals and optical link corresponding thereto. 5,412,496, Cl. 359-152.000.

Nakajima, Moriyo, to Mitsubishi Denki Kabushiki Kaisha. Non-volatile semiconductor device with selecting transistor formed between adjacent memory transistors. 5,412,600, Cl. 365-185.000.

Nakajima, Toshio; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Hondo, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, to Nitto Denko Corporation. Composite tubular article and process for producing the same. 5,411,779, Cl. 428-36.910.

Nakajima, Yasuharu; and Matsubayashi, Hiroto, to Mitsubishi Denki Kabushiki Kaisha. Monolithic integrated circuit including gate bias transistor controlling the gate bias applied to an amplifying transistor. 5,412,235, Cl. 257-272.000.

Nakajima, Yasuyuki, to Kokusai Denshin Denwa Kabushiki Kaisha. Interlaced video signal motion compensation prediction system. 5,412,435, Cl. 348-699.000.

Nakama, Noboru: See—  
Kaetsu, Mitsuo; Nakama, Noboru; and Kashiwada, Kazuaki, 5,412,497, Cl. 359-163.000.

Nakamura, Atunori: See—  
Uriya, Susumu; and Nakamura, Atunori, 5,412,696, Cl. 375-354.000.

Nakamura, Hideki; and Ogawa, Tadamichi, to Senju Metal Industry Co., Ltd. Soldering pot. 5,411,197, Cl. 228-34.000.

Nakamura, Kazuhiro: See—  
Fukunaga, Satoru; Hisatomi, Junichiro; Nakamura, Kazuhiro; Ohii, Ken'ichi; Tanaka, Hideki; and Tabuchi, Masayuki, 5,412,314, Cl. 324-158.100.

Nakamura, Kazuo: See—  
Nagata, Yuji; Mitani, Satoru; and Nakamura, Kazuo, 5,412,524, Cl. 360-113.000.

Nakamura, Kazutaka; Tani, Hiroji; Yoneda, Yasunobu; and Sakabe, Yukio, to Murata Mfg. Co., Ltd. Noise filter having non-linear voltage-dependent resistor body with a resistive layer. 5,412,357, Cl. 333-181.000.

Nakamura, Ken: See—  
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Nakamura, Masanori: See—  
Hirakouchi, Hiroshi; Nakamura, Masanori; Yatsuka, Takeshi; and Kadowaki, Nobuo, 5,411,810, Cl. 428-480.000.

Nakamura, Masao: See—  
Nakajima, Toshio; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Hondo, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, 5,411,779, Cl. 428-36.910.

Nakamura, Michihisa: See—  
Masuda, Tatsuyuki; Maebashi, Kousei; Nakamura, Michihisa; and Suhara, Hidenori, 5,410,993, Cl. 123-65.0PE.

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Nakamura, Takeshi, to Murata Manufacturing Co., Ltd. Method for detecting an output of a gyroscope with dual synchronized detection circuit and dual smoothing circuit. 5,412,204, Cl. 250-231.120.

Nakamura, Tetsuya: See—  
Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hirotaka; Kabai, Takahito; Satou, Kouichirou; Nakamura, Tetsuya; and Katagata, Satoshi, 5,412,364, Cl. 355-260.000.

Nakamura, Yusuke: See—  
White, Raymond L.; Nakamura, Yusuke; O'Connell, Peter; Midvale, and Leppert, Mark F., 5,411,859, Cl. 435-6.000.



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Nakanishi, Mikihiro, to Sakura Color Products Corporation. Water-base erasable ink composition for use in marking pens. 5,412,021, Cl. 524-523,000.

Nakase, Kohji: See—  
Kagami, Naoyuki; Nakase, Kohji; and Kubo, Hiroaki, 5,412,637, Cl. 369-44,320.

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Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masuhiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542,000.

Nakayama, Tomoyuki: See—  
Kawabe, Satomi; Suzuki, Katsuhiko; Nakayama, Tomoyuki; and Hoshino, Hiroyuki, 5,411,850, Cl. 430-567,000.

Nalco Chemical Company: See—  
Hoots, John E.; and Godfrey, Martin R., 5,411,889, Cl. 436-6,000.

Namba, Shigeaki: See—  
Nigawara, Seitsui; Namba, Shigeaki; and Kohmoto, Hiroshi, 5,410,883, Cl. 60-646,000.

Namba, Tsuneo: See—  
Hozumi, Toyoharu; Matsumoto, Takao; Ooyama, Haruo; Namba, Tsuneo; Shiraki, Kimiyasu; Hattori, Masao; Kurokawa, Masahiko; and Kadota, Shigetoshi, 5,411,733, Cl. 424-195,100.

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Namikawa, Reiko: See—  
Mayo, Susan K.; Namikawa, Reiko; Kaneshima, Hideto; and McCune, Joseph M., 5,411,749, Cl. 424-578,000.

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Narath, Josef, to Andritz-Patentverwaltungs-Gesellschaft m.b.H. Process and apparatus for treating pre-concentrated solid-liquid mixture streams. 5,411,669, Cl. 210-744,000.

Narath, William R.: See—  
Bauer, Herbert E.; Clarke, Michael G.; Lovas, John E.; Narath, William R.; and Williams, Andrew N., 5,411,671, Cl. 252-8,600.

Narita, Masaki, to Suzuki Motor Corporation. Air-fuel ratio control apparatus of internal combustion engine. 5,411,007, Cl. 123-690,000.

Narusawa, Sadayuki: See—  
Yamazaki, Shohei; Honda, Kazuhiko; and Narusawa, Sadayuki, 5,412,628, Cl. 369-32,000.

Naruse, Eiji; and Nishida, Tadashi, to Sintokogio Ltd. Method of controlling temperature of metallic mold in permanent mold casting facility and apparatus therefor. 5,411,074, Cl. 164-4,100.

Nascom, Inc.: See—  
Combest, Randy L.; and Beck, John O., 5,412,361, Cl. 335-205,000.

Nash, John; and Evans, Douglas, to Kensey Nash Corporation. Hemostatic vessel puncture closure system utilizing a plug located within the puncture tract spaced from the vessel, and method of use. 5,411,520, Cl. 606-213,000.

Naslund, Jonas; Johansson, Thomas; and Dahlstrom, Johan, to Telefonaktiebolaget LM Ericsson. Authentication for analog communication systems. 5,412,725, Cl. 380-23,000.

Naso, Giovanni: See—  
Santin, Giovanni; Naso, Giovanni; D'Arrigo, Sebastiano; and Smayling, Michael C., 5,411,908, Cl. 437-52,000.

Nassar, Rami V.: See—  
Hawthorne, V. Terrey; Marlborough, Donald J.; and Nassar, Rami V., 5,410,968, Cl. 105-206,100.

Nath, Guenther. Liquid-core light guide illuminator apparatus. 5,412,750, Cl. 385-125,000.

Nathanson, Harvey C.: See—  
Hale, Robert A.; and Nathanson, Harvey C., 5,412,421, Cl. 348-208,000.

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Luong, John H. T.; Male, Keith B.; and Cattaneo, Maurice V., 5,411,866, Cl. 435-14,000.

Schnier, Dietmar; Madej, Alan A.; and Hanes, Gary R., 5,412,676, Cl. 372-32,000.

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Tsai, Wen-Ta; Lee, Ju-Tung; and Lai, Tai-Hwang, 5,411,770, Cl. 427-556,000.

National Semiconductor Corporation: See—  
Bashir, Rashid; Hebert, Francois; and Chen, Datong, 5,411,913, Cl. 437-67,000.

Chang, Ming-Bing, 5,412,238, Cl. 257-321,000.

Thomas, Michael E., 5,410,799, Cl. 29-622,000.

Ueuntun, Paul T., 5,412,309, Cl. 323-316,000.

National Starch and Chemical Investment Holding Corporation: See—  
Margolin, Keith J., 5,411,789, Cl. 428-209,000.

Wilkerson, John M., III; Verstrat, Daniel W.; and Barron, Milagros C., 5,412,142, Cl. 560-33,000.

National Tank Company: See—  
Yamaguchi, Manabu; and Kanno, Masaaki, 5,411,651, Cl. 204-186,000.

National University of Singapore: See—  
Kang, En-Tang; Ting, Yen P.; Neoh, Koon G.; and Tan, Kuang L., 5,411,573, Cl. 75-721,000.

Nazmy, Mohamed; Nosedá, Corrado; and Staubli, Markus, to ABB Management AG. Iron-aluminum alloy for use as thermal-shock resistance material. 5,411,702, Cl. 420-79,000.

NBL Communications, Inc.: See—  
Nemirofsky, Frank R., 5,412,416, Cl. 348-10,000.

NEC America, Inc.: See—  
Gorshe, Steven S., 5,412,651, Cl. 370-85,900.

Lu, Tsu-Kai, 5,412,652, Cl. 370-85,120.

NEC Corporation: See—  
Ando, Yuji, 5,412,232, Cl. 257-194,000.

Fan, Ruixue, 5,412,648, Cl. 370-60,000.

Fujita, Masashi; and Harada, Toshitaro, 5,412,659, Cl. 370-95,100.

Hasegawa, Isao, 5,412,792, Cl. 395-425,000.

Kida, Tomoyuki, 5,412,477, Cl. 356-394,000.

Nishizawa, Kazuyuki; and Kawata, Kazuhide, 5,412,403, Cl. 345-192,000.

Okamura, Atsushi, 5,412,790, Cl. 395-425,000.

Okunaga, Kazuo, 5,412,333, Cl. 327-198,000.

Oyama, Ken-ichi, 5,412,608, Cl. 365-218,000.

Oyama, Yukihiko, 5,412,612, Cl. 365-228,000.

Sakamoto, Mitsuru, 5,411,912, Cl. 437-60,000.

Sato, Toshifumi; Shibata, Takayuki; and Ohmura, Hideo, 5,412,694, Cl. 375-330,000.

Takano, Isamu, 5,412,339, Cl. 330-54,000.

Tsuda, Noriko, 5,412,315, Cl. 324-158,100.

Uriya, Susumu; and Nakamura, Atunori, 5,412,696, Cl. 375-354,000.

Yamada, Kenji; and Nakagawa, Tatsuo, 5,412,655, Cl. 370-60,100.

Nedberge, Diane E.: See—  
Lee, Eun S.; Nedberge, Diane E.; and Yum, Su I., 5,411,740, Cl. 424-448,000.

Nederlof, Frank, to U.S. Philips Corporation. Specimen holder for a particle beam optical apparatus. 5,412,503, Cl. 359-393,000.

Nedungadi, Ashok P.: See—  
Munshi, Mohammed Z.; and Nedungadi, Ashok P., 5,411,537, Cl. 607-33,000.

Neef, Gunter; Steinmeyer, Andreas; Kirsch, Gerald; Schwarz, Katia; Haberey, Martin; Thieroff-Ekerdt, Ruth; and Rach, Petra, to Schering Aktiengesellschaft. 23-oxa-derivatives in the vitamin D series, process for their production, pharmaceutical preparations containing these derivatives as well as their use pharmaceutical agents. 5,411,949, Cl. 514-167,000.

Neet, John M.: See—  
Winston, Thomas R.; and Neet, John M., 5,411,551, Cl. 623-1,000.

Negoro, Atsuhito, to Rohm Co., Ltd. Semiconductor chip die bonding using a double-sided adhesive tape. 5,411,921, Cl. 437-217,000.

Neilson, Janice G.: See—  
Hermans, Michael A.; Chen, Fung-Jou; Spiegelberg, Larry L.; Kressner, Bernhard E.; and Neilson, Janice G., 5,411,636, Cl. 162-109,000.

Neisz, Hans J., to Medtronic, Inc. Active can emulator and method of use. 5,411,539, Cl. 607-36,000.

Nelson, Allan L.; Sarakbi, Ron; and Miller, Russell L., Jr., to Norman-die Casino. Game of skill and chance. 5,411,268, Cl. 273-292,000.

Nelson, David C.; Waldo, Robert L.; and Meluch, Martin A., to Premium Balloon Accessories. Balloon wieght and latch assembly. 5,411,427, Cl. 446-71,000.

Nelson, Elizabeth H.: See—  
Horn, Stuart B.; and Nelson, Elizabeth H., 5,411,599, Cl. 136-203,000.

Nelson, Terence J., to Bell Communications Research, Inc. Driver circuit for shutters of a flat panel display. 5,412,396, Cl. 345-89,000.

Nemirofsky, Frank R., to NBL Communications, Inc. Video media distribution network apparatus and method. 5,412,416, Cl. 348-10,000.

Neoh, Koon G.: See—  
Kang, En-Tang; Ting, Yen P.; Neoh, Koon G.; and Tan, Kuang L., 5,411,573, Cl. 75-721,000.

Neri, Armando; and Cesari, Verter, to G.D. S.p.A. Truck for handling pallets. 5,411,361, Cl. 414-664,000.

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Nestec S.A.: See—  
Hottinger, Herbert; Mollet, Beat; and Pilloud, Nathalie, 5,412,086, Cl. 536-24,320.

Nestegard, Mark K.: See—  
Ma, Jingjing; and Nestegard, Mark K., 5,412,031, Cl. 525-98,000.

Network Power Systems, Inc.: See—  
Eaton, Winston W.; Patehel, Thomas H.; Asaki, James T.; and Bentley, Donald L., 5,412,529, Cl. 361-90,000.

Neuber, Thomas: See—  
Gdulla, Manfred; Muller, Rudiger; and Neuber, Thomas, 5,411,021, Cl. 128-206,280.

Neuhaus, Dietmar, to Deutsche Forschungsanstalt für Luft- und Raumfahrt, e.V. Method and device for the separation and conveyance of gases and/or of gas molecule fragments generated by dissociation on surfaces by surface diffusion. 5,411,720, Cl. 423-210,000.

Neukermans, Armand P. Method of generating dual pump getter and oxidant sensor and regulator. 5,411,644, Cl. 204-130,000.

Nevoux, Rola; and Hiolle, Philippe, to Telecom Etablissement autonome de droit public et la Poste-Etablissement autonome de droit public. Telecommunication installation with secure remote loading of prepayment means and corresponding remote loading process. 5,412,726, Cl. 380-24,000.

New England Pharmaceuticals, Inc.: See—  
Armstrong, John C.; and Venus, Frank, Jr., 5,411,175, Cl. 222-83,500.

New Venture Gear, Inc.: See—  
Frost, Barry L., 5,411,447, Cl. 475-223,000.

Wilson, Robert J.; Sperduti, David; and Adler, Randy W., 5,411,110, Cl. 180-247,000.

New York Blood Center, Inc.: See—  
Marx, Gerard, 5,411,885, Cl. 435-240,200.

New York University: See—  
Abele, Manlio G.; and Rusinek, Henry, 5,412,365, Cl. 335-306,000.

Newbold, Ronald C.; and Shih, Thomas L., to Merck & Co., Inc. Avermectin derivatives. 5,411,946, Cl. 514-30,000.

Newell, Alan A., to Mark Lighting Co., Inc. Luminaire fixture. 5,412,551, Cl. 362-241,000.

Newell Operating Company: See—  
Jarecki, James J.; Mylander, Paul; and Wiest, James L., 5,411,146, Cl. 211-59,200.

Newman, David S.: See—  
Ginzburg, Simon A.; Gustafson, Roy W.; and Newman, David S., 5,412,691, Cl. 375-296,000.

Newman, John S.: See—  
Trainham, James A., III; Law, Clarence G., Jr.; Newman, John S.; Keating, Kenneth B.; and Eames, Douglas J., 5,411,641, Cl. 204-59,000.

Newman, Robert G.: See—  
Borsuk, John E.; Cheng, Kuangti T.; Moss, Joe D.; Newman, Robert G.; and Sharma, Pramod K., 5,412,459, Cl. 355-273,000.

Newmarch, David: See—  
Cutts, Stanley J.; Gaunt, David; Golledge, Ian; Hamper, Albert; Johnson, Eric; Newmarch, David; and Veal, John, 5,412,534, Cl. 361-695,000.

Newmiller, Robert J.: See—  
Brust, Thomas B.; and Newmiller, Robert J., 5,411,854, Cl. 430-572,000.

Newton, Ronald O.: See—  
Root, Kevin B.; Allen, John J., Jr.; and Newton, Ronald O., 5,412,572, Cl. 364-426,010.

Ng, Spencer W.: See—  
Hao, Jisieh T.; and Ng, Spencer W., 5,412,661, Cl. 371-10,100.

NGK Insulators, Ltd.: See—  
Hirai, Takami; and Yano, Shinsuke, 5,412,358, Cl. 333-204,000.

Soma, Takao; Kawasaki, Shinji; Ito, Shigenori; and Yoshioka, Katsuki, 5,411,767, Cl. 429-453,000.

NGK Spark Plug Co., Ltd.: See—  
Suzuki, Junichiro, 5,411,923, Cl. 501-97,000.

Nguyen, Dzien D.: See—  
Holt, Frederick B.; and Nguyen, Dzien D., 5,412,587, Cl. 364-717,000.

Nguyen, Frank: See—  
Truckai, Csaba; Jaraczewski, Richard S.; Nguyen, Frank; and West, Scott H., 5,411,543, Cl. 607-122,000.

Nguyen, Son V.: See—  
Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, 5,412,246, Cl. 257-632,000.

Nguyen, Tue: See—  
Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.; Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan, Pai-Hung, 5,412,246, Cl. 257-632,000.

Niagara Mohawk Power Corporation: See—  
Federman, Glenn, 5,412,699, Cl. 376-260,000.

Nichols, Bret E. Reusable liquid filtering system. 5,411,659, Cl. 210-130,000.

Nichols, Sheila M.: See—  
Kumar, Kanta; Davis, Robert A.; Nichols, Sheila M.; and Buttery, Howard J., 5,411,802, Cl. 428-402,000.

Nickels, Dean R.; and Nickels, Norman R. Grader blade attachment for small tractors. 5,411,102, Cl. 172-781,000.

Nickels, Norman R.: See—  
Nickels, Dean R.; and Nickels, Norman R., 5,411,102, Cl. 172-781,000.

Nicolas, Patrick S., Jr.; Bikson, Benjamin; Giglia, Salvatore; and Thompson, David R., to Praxair Technology, Inc. Fluid separation assembly having an purge control valve. 5,411,662, Cl. 210-321,800.

Nieder, Elmar, to GMT Gesellschaft für Medizinische Technik GmbH. Knee joint prosthesis kit. 5,411,555, Cl. 623-20,000.

Nigawara, Seitsui; Namba, Shigeaki; and Kohmoto, Hiroshi, to Hitachi, Ltd. Control system for plant. 5,410,883, Cl. 60-646,000.

Nighan, William L., Jr.; and Keirstead, Mark S., to Spectra-Physics Lasers, Inc. Confocal diode pumped laser. 5,412,683, Cl. 372-75,000.

Nihon Kohden Corporation: See—  
Hirai, Masaaki, 5,411,029, Cl. 128-696,000.

Nihon Shokuhin Kako Co., Ltd.: See—  
Udaka, Shigezo; Sakaguchi, Kenji; Yamagata, Hideo; and Dekker, Koen, 5,411,886, Cl. 435-252,300.

Nihon Tenshinyaku Kenkyusho Co., Ltd.: See—  
Yamamoto, Tokihiko; Yamaoka, Tomoyuki; Yoshida, Yoshiaki; Shin, Kazuo; Aonuma, Hiromitsu; and Tanaka, Tutomu, 5,411,993, Cl. 514-766,000.

Nii, Yoshihide: See—  
Furutani, Masayuki; and Nii, Yoshihide, 5,412,251, Cl. 290-16,000.

Nimura, Koichi; Kawabe, Takako; Ando, Takao; and Saito, Kenichi, to Kureha Chemical Industry Co., Ltd. Phenylalanine-glycine compounds having anti-tumor activity, process for preparation thereof,

and pharmaceutical composition containing said compounds. 5,411,964, Cl. 514-269,000.

Nijander, Casimir R.: See—  
Feldblum, Avi Y.; Jahns, Jürgen; Nijander, Casimir R.; Sauer, Frank; and Townsend, Wesley P., 5,412,506, Cl. 359-569,000.

Nikirk, Christopher T.: See—  
Meador, James W.; Miller, Thomas G.; Nikirk, Christopher T.; Waters, Louis A., Jr.; and Donnelly, Sean M., 5,411,065, Cl. 141-1,000.

Nikon Corporation: See—  
Ejima, Satoshi; and Suzuki, Masahiro, 5,412,424, Cl. 348-252,000.

Kazami, Kazuyuki, 5,412,444, Cl. 354-106,000.

Mori, Ryuichi; and Osawa, Keiji, 5,412,445, Cl. 354-195,100.

Sato, Haruo, 5,412,507, Cl. 359-687,000.

Suzuki, Hiroyuki; and Furukawa, Osamu, 5,412,214, Cl. 250-548,000.

Nilson, Christopher: See—  
Van Brunt, Roger; Hillman, Daniel L.; Nilson, Christopher; Opre-scu, Florin; and Teener, Michael D., 5,412,698, Cl. 375-373,000.

Nilsson, Bjorn: See—  
Lowenadler, Bjorn; Holmgren, Erik; Uhlen, Mathias; and Nilsson, Bjorn, 5,411,732, Cl. 424-192,100.

Nilsson, Bo: See—  
Lingwood, Clifford A.; Krivan, Howard C.; and Nilsson, Bo, 5,411,948, Cl. 514-78,000.

Nilsson, Pekka W.; and Saarisalo, Risto A., to Oras Oy. Control valve for a faucet and use of ultrasonic motor. 5,411,241, Cl. 251-129,060.

Nimura, Eiji: See—  
Okazaki, Noritaka; Wataki, Ryuji; Nimura, Eiji; Uchida, Michio; and Ito, Yuki, 5,412,460, Cl. 355-274,000.

Ninomiya, Ken: See—  
Todokoro, Hideo; Takamoto, Kenji; Otaka, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiko; Ninomiya, Ken; and Kure, Tokuo, 5,412,210, Cl. 250-310,000.

Nippon Densan Corporation: See—  
Shibui, Seiki; and Sano, Masaaki, 5,412,367, Cl. 336-192,000.

Nippon Furnace Kogyo Kabushiki Kaisha: See—  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryo-suke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hirokuni, 5,410,988, Cl. 122-250,000.

Nippon Oil Co., Ltd.: See—  
Enomoto, Masami; Kubota, Susumu; Yuasa, Hitoshi; Oshimi, Fumiaki; and Otsuki, Yutaka, 5,412,002, Cl. 523-466,000.

Kagaya, Mineo; Ishimaru, Mitsuki; and Ishii, Hiroaki, 5,411,672, Cl. 252-56,000.

Taniguchi, Takao; Iizuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shimichi; and Yamashita, Tadakazu, 5,411,558, Cl. 44-301,000.

Yoda, Eiji; Sato, Haruyoshi; Yamasita, Yukio; Yuasa, Hitoshi; and Otsuki, Yutaka, 5,411,836, Cl. 430-190,000.

Nippon Paint Co., Ltd.: See—  
Furukawa, Junji; Okamoto, Hiroshi; Onouchi, Yoshio; Andoh, Takashi; and Urano, Satoshi, 5,412,079, Cl. 534-732,000.

Nippon Pillar Packing Co., Ltd.: See—  
Yahagi, Hideo; Takaoka, Masahiko; Hoshikawa, Shingo; Miyoshi, Takeshi; and Okada, Keiji, 5,411,274, Cl. 277-203,000.

Nippon Sheet Glass Co., Ltd.: See—  
Kawaguchi, Jun; Kobayashi, Hiroaki; and Nakai, Hidemi, 5,411,794, Cl. 428-216,000.

Nippon Steel Corporation: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masuhiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542,000.

Kanai, Takao; Tanemoto, Kei; Yamazaki, Shuichi; and Nagashima, Takeo, 5,411,808, Cl. 428-472,000.

Sawada, Kikuzo; and Wada, Toshio, 5,412,601, Cl. 365-185,000.

Nippon Steel Semiconductor Corp.: See—  
Cordoba, Michael V.; and Hardee, Kim C., 5,412,257, Cl. 327-536,000.

Nippon Telephone & Telephone Corporation: See—  
Sakamoto, Hironori; Ito, Akira; and Nojima, Toshio, 5,412,342, Cl. 330-149,000.

Nippon Thompson Co., Ltd.: See—  
Takei, Seiji; and Hara, Takehiko, 5,411,334, Cl. 384-45,000.

Nippondenso Co., Ltd.: See—  
Kato, Hidetoshi; Mayumi, Nobuo; and Togawa, Masatoshi, 5,412,323, Cl. 324-429,000.

Tanaka, Masakazu; Mori, Hiroshi; and Mabuchi, Mamoru, 5,410,875, Cl. 60-288,000.

Nisca Corporation: See—  
Ohsawa, Yukio, 5,411,247, Cl. 271-119,000.

Nishida, Hiroyuki: See—  
Fukue, Ichiro; Mandai, Shigemitsu; Tanaka, Katsunori; Kawabata, Hitoshi; Sato, Nobuo; Nishida, Hiroyuki; and Gora, Tetsuo, 5,410,884, Cl. 60-747,000.

Nishida, Tadashi: See—  
Naruse, Eiji; and Nishida, Tadashi, 5,411,074, Cl. 164-4,100.

Nishide, Hiroyuki: See—  
Tsuchida, Eishun; Nishide, Hiroyuki; Kawakami, Hiroyoshi; and Sasame, Yukiko, 5,411,580, Cl. 96-5,000.

Nishimori, Toshiyuki; and Asahara, Akinori, to Matsushita Electric Industrial Co., Ltd. Polycondensate capacitor. 5,412,532, Cl. 361-306,100.

Nishimura, Isao: See—  
Sakamoto, Mitsuo; Koshika, Norihide; Nishimura, Isao; Sasaki, Katsuyasu; and Orui, Satoshi, 5,410,845, Cl. 52-167,200.



Nishimura, Ryuji; Yamamoto, Mayuko; and Imaide, Takuya, to Hitachi, Ltd. Video camera and apparatus for extracting an object. 5,412,487, Cl. 358-452.000.

Nishimura, Takashi; Arimoto, Akira; Miyamura, Yoshinori; Anzai, Yumiko; Kondo, Yoshimasa; Uchida, Fumihiko; and Moriyama, Shigeo, to Hitachi Ltd.; and Hitachi Koki Co., Ltd. Scanning optical device and method for making a hybrid scanning lens used therefor. 5,411,430, Cl. 451-1.000.

Nishimura, Toshihiro; Hayashi, Toshio; Kawano, Hirotaka; and Fujiki, Hideshi, to Matsushita Electric Industrial Co., Ltd. Pictorial communication apparatus. 5,412,418, Cl. 348-14.000.

Nishimura, Yasushi: See—  
Kanishi, Kazuhiko; Nishimura, Yasushi; and Sugawara, Kazuaki, 5,412,732, Cl. 381-18.000.

Nishinaka, Shigeyuki: See—  
Matsuda, Haruo; Nishinaka, Shigeyuki; and Suzuki, Takashi, 5,411,881, Cl. 435-240.270.

Nishino, Seiji: See—  
Komma, Yoshiaki; Nishino, Seiji; and Kato, Makoto, 5,412,631, Cl. 369-44.370.

Nishino, Yukishige: See—  
Bohlmann, Rolf; Strehlke, Peter; Henderson, David; Schneider, Martin; and Nishino, Yukishige, 5,411,982, Cl. 514-397.000.

Nishio, Yoichi; Murabayashi, Fumio; Kurita, Kozaburo; and Iwamura, Masahiro, to Hitachi, Ltd. Semiconductor integrated circuit device having plurality of supply potential lines connected thereto, and system employing the same. 5,412,262, Cl. 326-64.000.

Nishio, Yukio: See—  
Kamaji, Hideki; Ikeda, Masae; Hirose, Kazunori; and Nishio, Yukio, 5,412,458, Cl. 355-259.000.

Nishiuchi, Kenichi: See—  
Ohno, Eiji; Nishiuchi, Kenichi; Nagata, Kenichi; Yamada, Noboru; and Akahira, Nobuo, 5,412,626, Cl. 369-13.000.

Nishizawa, Kazuyuki; and Kawata, Kazuhide, to NEC Corporation. Video display control circuit. 5,412,403, Cl. 345-192.000.

Nissan Motor Co., Ltd.: See—  
Eguchi, Takaaki; and Mouri, Hiroshi, 5,412,571, Cl. 364-424.050.

Takahashi, Hiroshi; and Sakaue, Shinsuke, 5,411,449, Cl. 477-120.000.

Nisshin Flour Milling Co., Ltd.: See—  
Miyazaki, Toshiyuki; Motoi, Hirofumi; Kodama, Toshiaki; Maeda, Tatsu; Tsujita, Takahiro; and Okuda, Hiromichi, 5,411,956, Cl. 514-15.000.

Nitanda, Fumio: See—  
Makio, Satoshi; Nitanda, Fumio; Furukawa, Yasuhiro; Ito, Kohei; Sato, Masazumi; Kawamoto, Kazutami; and Ito, Kenchi, 5,412,502, Cl. 359-332.000.

Nitschke, Werner: See—  
Smith, Bradley W.; Erickson, James D.; Jamison, Patrick D.; Tyroller, Peter A.; Bergfried, Dietrich; Mattes, Bernhard; and Nitschke, Werner, 5,411,289, Cl. 280-735.000.

Nitto Denko Corporation: See—  
Nakajima, Toshiro; Kaneto, Masayuki; Tomita, Toshihiko; Fujita, Tokio; Ishizaka, Hitoshi; Harada, Chiaki; Uemura, Gosei; Sasaki, Taizo; Nakamura, Masao; Hondo, Mamoru; Michimoto, Tadanori; and Iwamoto, Toshiaki, 5,411,779, Cl. 428-36.910.

Nittoli, Frank J., to Advance Car Wash Equipment, Inc. Automatic vehicle washing apparatus. 5,410,770, Cl. 15-97.300.

Nitzsche, Remi: See—  
Dubreuil, Anne; Nitzsche, Remi; and Wanderstok, Georges, 5,411,533, Cl. 607-28.000.

Niwano, Kazuhito: See—  
Kinoshita, Yasushi; and Niwano, Kazuhito, 5,411,898, Cl. 437-31.000.

Nixon, Jon C.; and York, Billie M., to Alcon Laboratories, Inc. Use of TGF- $\beta$  to reduce the formation of scar tissue in response to corneal trauma. 5,411,940, Cl. 514-12.000.

NKK Corporation: See—  
Matsuda, Haruo; Nishinaka, Shigeyuki; and Suzuki, Takashi, 5,411,881, Cl. 435-240.270.

Ogawa, Atsushi; Minakawa, Kuninori; and Takahashi, Kazuhide, 5,411,614, Cl. 148-670.000.

Omori, Toshimichi; Suzuki, Haruo; Sampei, Tetsuya; Kanero, Takahiro; Nakagawa, Masayoshi; and Kurihara, Masayoshi, 5,411,605, Cl. 148-113.000.

Noakes, Timothy J.: See—  
Greene, Robert H.; Outhwaite, Alan C.; Noakes, Timothy J.; Green, Michael L.; and Jones, Jonathan, 5,411,211, Cl. 239-708.000.

Noble, Gardiner A.; Kafka, Leonard; and Ciuffetelli, Mark, to Chrysler Corporation. Engine ignition and control system. 5,411,006, Cl. 123-634.000.

Nociolo, Lawrence J.: See—  
Cyr, Gregory J.; Hedlund, Kurt A.; Nociolo, Lawrence J.; Pashan, Mark A.; and Wong, Albert Kai-sun, 5,412,646, Cl. 370-56.000.

Noda, Isao: See—  
Shine, Annetta D.; Smith, Steven D.; and Noda, Isao, 5,412,027, Cl. 525-63.000.

Noda, Koji: See—  
Ando, Masahiko; Noda, Koji; Yamamoto, Yoshihisa; Hayabuchi, Masahiro; Tsukamoto, Kazumasa; Hojo, Yasuo; Taga, Yutaka; Oba, Hidehiro; and Kubo, Seitoku, 5,411,451, Cl. 477-144.000.

Shimada, Yuji; Takahashi, Yoichi; and Noda, Koji, 5,410,877, Cl. 60-302.000.

Noe, Joseph C.: See—  
Berman, Leonard C.; and Noe, Joseph C., 5,412,370, Cl. 340-426.000.

Noecker, Martin C.: See—  
Reasenber, Robert D.; Phillips, James D.; and Noecker, Martin C., 5,412,474, Cl. 356-349.000.

Noell Abfall- und Energietechnik GmbH: See—  
Kunstler, Hans; Wachter, Erwin; Nuesch, Peter; and Scholl, Kurt, 5,410,973, Cl. 110-246.000.

Noestheden, Andrew, to Valiant Machine & Tool, Inc. Conveyor system with turn table transferring means. 5,411,130, Cl. 198-457.000.

Noguchi, Akio: See—  
Serizawa, Yoichi; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Nojima, Toshio: See—  
Sakamoto, Hironori; Ito, Akira; and Nojima, Toshio, 5,412,342, Cl. 330-149.000.

Nok Corporation: See—  
Nagashima, Hideyuki, 5,411,682, Cl. 264-36.000.

NOMOS Corporation: See—  
Carol, Mark P., 5,411,026, Cl. 128-660.030.

Nomura, Tatsuo: See—  
Ozaki, Yoshihide; Nomura, Tatsuo; and Miyake, Toshio, 5,411,945, Cl. 514-23.000.

Nonomura, Chisato: See—  
Yamada, Toshiro; and Nonomura, Chisato, 5,411,695, Cl. 264-211.130.

Nonomura, Tomohiro; and Kishimoto, Hiroshi, to Fujitsu Limited. Paper feeder. 5,411,246, Cl. 271-117.000.

Noranda Inc.: See—  
Houlachi, George; Janjua, M. Barakat I.; Kitzinger, Frank; Wint, Gregory A.; and Labuc, Vladimir M., 5,411,648, Cl. 204-153.190.

Norco Industries, Inc.: See—  
Fox, Robert; Rose, Gary; and Shirley, Don, 5,410,894, Cl. 70-14.000.

Noritsu Koki Co., Ltd.: See—  
Kojima, Masayuki, 5,412,450, Cl. 355-43.000.

Normandie Casino: See—  
Nelson, Allan L.; Sarakbi, Ron; and Miller, Russell L., Jr., 5,411,268, Cl. 273-292.000.

Noro, Hiromi; Kamata, Shinnosuke; and Okajima, Yoshinori, to Fujitsu Limited. Semiconductor integrated circuit device. 5,412,615, Cl. 365-233.000.

Norsk Hydro a.s.: See—  
Clausen, Edvin L.; and Gundlach, Peter, 5,410,855, Cl. 52-747.000.

North American Drager: See—  
Smith, Jay A., 5,411,019, Cl. 128-203.250.

North Carolina State University: See—  
Baliga, Bantval J., 5,412,228, Cl. 257-133.000.

Northeastern University: See—  
Giese, Roger W.; Guan, Kailin; and Cecchini, Douglas J., 5,412,083, Cl. 536-20.000.

Northern Telecom Limited: See—  
Giroux, Nathalie; Morin, Marianne J.; Lemay, Marcel; Kositpaiboon, Rungroj; and Aboul-Magd, Osama S., 5,412,647, Cl. 370-60.000.

Magill, Paul A.; Koopman, Nicholas G.; and Rinne, Glenn A., 5,412,537, Cl. 361-777.000.

Northrop Grumman Corporation: See—  
Horn, Michael, 5,412,439, Cl. 351-45.000.

Northrop, Paul S., to Mobil Oil Corporation. Imbibition process using a horizontal well for oil production from low permeability reservoirs. 5,411,094, Cl. 166-303.000.

Northrop, Paul S.: See—  
Burcham, Christopher; Fast, Robert E.; Murer, Anthony S.; and Northrop, Paul S., 5,411,086, Cl. 166-245.000.

Nortman, Brian K.: See—  
Tanzer, Richard W.; Abuto, Frank P.; Kellenberger, Stanley R.; Laux, Daniel R.; Nortman, Brian K.; Pomplun, William S.; Rippl, Carl G.; Robinson, Mark L.; Sallee, Lorry F.; Yarbrough, Sandra M.; and Zenker, David L., 5,411,497, Cl. 604-368.000.

Norton, Allen, to Signore Incorporated. Lateral file anti-tilt mechanism with pivotal activator rail. 5,411,327, Cl. 312-221.000.

Norton Company: See—  
Carpenter, Robert E.; Santora, Scott; and Borgianini, Stephen A., 5,410,919, Cl. 73-864.630.

Simpson, Matthew, 5,411,758, Cl. 427-8.000.

Noseda, Corrado: See—  
Nazmy, Mohamed; Noseda, Corrado; and Staubli, Markus, 5,411,702, Cl. 420-79.000.

Notani, Hiromi: See—  
Matsuda, Yoshio; Kondoh, Harufusa; Notani, Hiromi; and Hayashi, Isamu, 5,412,380, Cl. 340-825.850.

Noto, Kazuyuki; Miyazaki, Jiro; Hino, Taketoshi; and Kugou, Daisaku, to Murata Manufacturing Co., Ltd. Method of manufacturing piezoelectric-resonator having vibrating spaces formed therein. 5,410,789, Cl. 29-25.350.

Nouno, Youzou: See—  
Ogawa, Kiichiro; Yamada, Hiroshi; Nouno, Youzou; and Kagami, Yasuo, 5,411,790, Cl. 428-209.000.

Nova Chem Limited: See—  
Elson, Clive M.; Curran, Dennis T.; and Henderson, Susan E., 5,412,084, Cl. 536-20.000.

Nova Manufacturing & Assembly, Inc.: See—  
Schaibbaum, Edward C., 5,410,972, Cl. 108-50.000.

Novak, Bruce M.; and Ellsworth, Mark W., to University of California. The Regents of the. Composite materials of interpenetrating inorganic and organic polymer networks. 5,412,043, Cl. 525-479.000.

Novamax Technologies Holdings, Inc.: See—  
Basaly, Mores A.; Massad, Suhail K.; and Agdelo, Luis F., 5,411,607, Cl. 148-272.000.

Novamont S.p.A.: See—  
Bastio, Catia; Bellotti, Vittorio; Montino, Alessandro; Tredici, Gianfranco D.; Lombi, Roberto; and Ponti, Roberto, 5,412,005, Cl. 524-47.000.

Novatech GmbH: See—  
Hacker, Hans-Eugen; Hofstetter, Edgar; and Kaminski, Eckhard, 5,411,063, Cl. 139-383.0AA.

Novicon Technologies, L.P.: See—  
Arutyunov, Yury A. (born Ryabokon); and Gorislavskaya, Lyudmila A. (born Ryabokon), 5,411,330, Cl. 366-270.000.

Novell, Inc.: See—  
Monson, Lynn T., 5,412,772, Cl. 395-155.000.

Nowak, Gerhard; Winter, Alfred; Theurer, Rudolf; Morbitzer, Hans-Peter; Kruschik, Klaus; and Wieser, Peter, to HTM Sport- und Freizeitgerate Aktiengesellschaft. Safety ski binding. 5,411,283, Cl. 280-618.000.

NSK Ltd.: See—  
Katahira, Masayuki, 5,410,922, Cl. 74-89.150.

Takemura, Hiromichi; and Murakami, Yasuo, 5,411,336, Cl. 384-492.000.

NTT Mobile Communication Network Inc.: See—  
Sakamoto, Hironori; Ito, Akira; and Nojima, Toshio, 5,412,342, Cl. 330-149.000.

NTT Mobile Communications Network, Inc.: See—  
Tsunekawa, Koichi, 5,412,392, Cl. 343-702.000.

Nuesch, Peter: See—  
Kunstler, Hans; Wachter, Erwin; Nuesch, Peter; and Scholl, Kurt, 5,410,973, Cl. 110-246.000.

Nugent, Richard A., to Upjohn Company, The. Bisphosphonic acid derivatives as anti-arthritis agents. 5,412,141, Cl. 558-214.000.

Null, Robert L. Trailer brake system with release apparatus. 5,411,120, Cl. 188-112.00R.

Numar Corporation: See—  
Coates, George R., 5,412,320, Cl. 324-303.000.

Nunokawa, Masakatsu, to Kabushiki Kaisha Toshiba. Method of absorbing delay fluctuation in cell transmission system and exchange utilizing the method. 5,412,642, Cl. 370-17.000.

Nureki, Shinji; and Oonishi, Kazuhisa, to Seiko Instruments Inc. Line thermal printer having power supply capacity matched to number of printing dots. 5,412,405, Cl. 347-182.000.

Nystrom, Christian; and Persico, Charles. Quadrature local oscillator network. 5,412,351, Cl. 332-103.000.

O'Amelia, Ronald P.: See—  
Wheeler, Edward L.; O'Amelia, Ronald P.; Leveille, Gilbert A.; Otterburn, Michael S.; Klemann, Lawrence P.; Finley, John W.; Roden, Allan D.; Chrysam, Michael M.; Pelloso, Turiddu A.; and Given, Peter S., Jr., 5,411,756, Cl. 426-607.000.

Oansh Designs Ltd.: See—  
Bell, Anthony H. G.; and Prindle, Carl E., 5,411,541, Cl. 607-104.000.

Oba, Hidehiro: See—  
Ando, Masahiko; Noda, Koji; Yamamoto, Yoshihisa; Hayabuchi, Masahiro; Tsukamoto, Kazumasa; Hojo, Yasuo; Taga, Yutaka; Oba, Hidehiro; and Kubo, Seitoku, 5,411,451, Cl. 477-144.000.

Oberdorfer, Dietmar: See—  
Plagge, Heinrich; Krause, Hans-Joachim; Oberdorfer, Dietmar; and Pluquett, Ulrich, 5,412,470, Cl. 356-338.000.

Oberle, Joseph C.: See—  
Scott, Curtis E.; Arsenia, Vito J.; Vamvakas, Spiro; and Oberle, Joseph C., 5,412,280, Cl. 313-573.000.

O'Brien, Brian A.: See—  
Hollitt, Michael J.; and O'Brien, Brian A., 5,411,719, Cl. 423-69.000.

O'Brien, Michael J.: See—  
Eckberg, Richard P.; and O'Brien, Michael J., 5,411,996, Cl. 522-31.000.

Obujen, Douglas M. Protective device with tubular construction for backside of wearer. 5,410,755, Cl. 2-2.000.

Ochi, Hiroyuki, to Sumitomo Wiring Systems, Ltd. Multipole connection terminal and method for producing same. 5,411,419, Cl. 439-787.000.

Ochiai, Yuji: See—  
Ohara, Kengo; Omori, Hirao; Michihiro, Osamu; Suga, Makoto; Shimomura, Kouji; Okada, Toshitake; and Ochiai, Yuji, 5,411,997, Cl. 523-145.000.

Ochmann, Harald: See—  
Schmid, Raimund; Mronga, Norbert; Ochmann, Harald; and Schwidetzky, Christoph, 5,411,586, Cl. 106-415.000.

OCME S.r.l.: See—  
Gatteschi, Emanuele, 5,411,223, Cl. 242-551.000.

O'Connell, Michael P.: See—  
Engelbreton, A. Maynard; and O'Connell, Michael P., 5,412,735, Cl. 381-94.000.

O'Connell, Peter: See—  
White, Raymond L.; Nakamura, Yusuke; O'Connell, Peter; Midvale; and Leppert, Mark F., 5,411,859, Cl. 435-6.000.

OD & ME B.V.: See—  
Diepens, Petrus J. F.; Van Erp, Joost; and Hompus, Michael A. T., 5,411,588, Cl. 118-666.000.

Oda, Kiyoshi, to Yoshida Kogyo K.K. Ball chain and splicing means therefor. 5,411,445, Cl. 474-154.000.

Odagawa, Tetsufumi, to Fujitsu Limited. Semiconductor optical source capable of compensating for temperature-induced variation of laser oscillation threshold. 5,412,675, Cl. 372-29.000.

Odemer, Michael: See—  
Wolf, Jurgen; and Odemer, Michael, 5,410,811, Cl. 30-43.900.

Odink, Karel G.; Tarcsay, Lajos; Bruggen, Josef; Wiesendanger, Walter; Cerletti, Nico; Sorg, Clemens; DeWolf-Peters, Christiane; and Delabie, Jan, to Ciba-Geigy Corporation. Cytokine which mediates inflammation. 5,411,882, Cl. 435-240.200.

Oery, Huba: See—  
Hornung, Ernst; Oery, Huba; Hornung, Stefan; and Rittweger, Andreas, 5,411,349, Cl. 403-338.000.

Ogasawara, Hiroyuki: See—  
Kurohara, Kazuaki; and Ogasawara, Hiroyuki, 5,410,865, Cl. 56-15.900.

Ogasawara, Masahiro: See—  
Hirano, Yoshihisa; Takara, Yoshifumi; and Ogasawara, Masahiro, 5,411,624, Cl. 156-345.000.

Ogata, Yukihiro, to Canon Kabushiki Kaisha. Data processing apparatus dual-bus data processing with reduced cpu and memory requirements. 5,412,488, Cl. 358-455.000.

Ogawa, Atsushi; Minakawa, Kuninori; and Takahashi, Kazuhide, to NKK Corporation. Method of making Ti-Al-V-Mo alloys. 5,411,614, Cl. 148-670.000.

Ogawa, Junichi: See—  
Miyashita, Kyoichi; and Ogawa, Junichi, 5,412,217, Cl. 250-390.050.

Ogawa, Kiichiro; Yamada, Hiroshi; Nouno, Youzou; and Kagami, Yasuo, to Toppan Moore Co., Ltd. Signal input sheet. 5,411,790, Cl. 428-209.000.

Ogawa, Masahiko; Isobe, Kouichi; and Kouno, Takayuki, to Meiki Co., Ltd. Vacuum hot platen press with airtight covers in sliding contact with tensile strength members. 5,410,956, Cl. 100-90.000.

Ogawa, Masamichi: See—  
Ishibashi, Akira; and Ogawa, Masamichi, 5,412,223, Cl. 257-14.000.

Ogawa, Shinji; and Matsumoto, Masayoshi, to Sumitomo Wiring Systems, Ltd.; and Ichikoh Industries, Ltd. Terminal. 5,411,410, Cl. 439-336.000.

Ogawa, Shinji; and Matsumoto, Masayoshi, to Sumitomo Wiring Systems, Ltd.; and Ichikoh Industries, Ltd. Bulb socket. 5,411,411, Cl. 439-336.000.

Ogawa, Shinji; and Matsumoto, Masayoshi, to Sumitomo Wiring Systems, Ltd.; and Ichikoh Industries, Ltd. Bulb socket and terminal installed thereon. 5,411,412, Cl. 439-336.000.

Ogawa, Tadamichi: See—  
Nakamura, Hideki; and Ogawa, Tadamichi, 5,411,197, Cl. 228-34.000.

Ogawa, Yoshikazu; and Ohashi, Kazuhiko, to Kabushiki Kaisha Toshiba. Integrated circuit testing device. 5,412,258, Cl. 327-170.000.

Ogez, John R.: See—  
Anicetti, Vincent R.; Builder, Stuart E.; Marks, Billie J.; Ogez, John R.; Patzer, Eric J.; and Vetterlein, David A., 5,411,864, Cl. 435-7.400.

Ogino, Masanori; Iwahara, Yoshiaki; and Sakamoto, Syuichi, to Hitachi, Ltd. Projection type display device. 5,412,437, Cl. 348-781.000.

Ogino, Shinichi, to Toa Medical Electronics Co., Ltd. Apparatus for forming flattened sample flow for analyzing particles. 5,412,466, Cl. 356-246.000.

Oguchi, Takahiro: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Oguni, Kensaku: See—  
Urata, Kazumoto; Oguni, Kensaku; Ishibane, Kyuhei; and Katsumata, Naoto, 5,410,887, Cl. 62-129.000.

Ogura, Takao: See—  
Chujo, Takafumi; Komine, Hiroaki; Miyazaki, Keiji; Ogura, Takao; and Soejima, Tetsuo, 5,412,376, Cl. 340-825.010.

Ogura, Taketsugu: See—  
Tanaka, Yukio; Yamada, Kenichi; and Ogura, Taketsugu, 5,410,957, Cl. 101-127.000.

Oh, Seung C.: See—  
Jun, Dong S.; Oh, Seung C.; Kim, Moon G.; and Lee, Sung G., 5,412,331, Cl. 326-105.000.

Ohara, Kengo; Omori, Hirao; Michihiro, Osamu; Suga, Makoto; Shimomura, Kouji; Okada, Toshitake; and Ochiai, Yuji, to Shinagawa Rozai Kabushiki Kaisha. Mud material used for iron tap hole in blast furnace. 5,411,997, Cl. 523-145.000.

Ohashi, Kazuhiko: See—  
Ogawa, Yoshikazu; and Ohashi, Kazuhiko, 5,412,258, Cl. 327-170.000.

Ohashi, Kazuhito, to Canon Kabushiki Kaisha. Still image recording apparatus which prevents aliasing distortion by forming color difference signals having respectively mixed and weighted luminance signals. 5,412,423, Cl. 348-234.000.

Ohi, Ken'ichi: See—  
Fukunaga, Satoru; Hisatomi, Junichiro; Nakamura, Kazuhiro; Ohi, Ken'ichi; Tanaka, Hideki; and Tabuchi, Masayuki, 5,412,314, Cl. 324-158.100.

Ohi Seisakusho Co., Ltd.: See—  
Shimada, Junichi, 5,411,302, Cl. 292-201.000.



Ohji, Toshio; and Kanda, Yuji, to Hitachi, Ltd. Rotary transformer. 5,412,366, Cl. 336-120.000.  
Ohki, Mitsuharu, to Sony Corporation. Multi-port memory with serially connected output elements. 5,412,789, Cl. 395-425.000.  
Ohki, Tetsuhiko: See—  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryo-suke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hirokuni, 5,410,988, Cl. 122-250.00R.  
Ohmicron Corporation: See—  
Itak, Jeanne A.; Flecker, James R.; and Herzog, David P., 5,411,869, Cl. 435-7.930.  
Ohmura, Hideo: See—  
Sato, Toshifumi; Shibata, Takayuki; and Ohmura, Hideo, 5,412,694, Cl. 375-330.000.  
Ohmura, Keiichi: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masuhiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.  
Ohnmacht, Cyrus J.: See—  
Russell, Keith; Empfield, James R.; Ohnmacht, Cyrus J.; and Gibson, Keith H., 5,411,973, Cl. 514-347.000.  
Ohno, Eiji; Nishiuchi, Kenichi; Nagata, Kenichi; Yamada, Noboru; and Akahira, Nobuo, to Matsushita Electric Industrial Co., Ltd. Method of recording optical information with selective correction in pulse waveform and a recording system therefor. 5,412,626, Cl. 369-13.000.  
Ohno, Hiroyuki: See—  
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 5,411,974, Cl. 514-365.000.  
Ohsawa, Yukio, to Nisca Corporation. Automatic document feeder with smooth sheet feeding mechanism. 5,411,247, Cl. 271-119.000.  
Ohshio, Hirohiko: See—  
Kobayashi, Shoji; Ohshio, Hirohiko; Ishikawa, Masaaki; and Uchida, Hideki, 5,412,543, Cl. 362-66.000.  
Ohta, Kenji: See—  
Deguchi, Toshihisa; Inui, Tetsuya; Ohta, Kenji; and Katoh, Shohichi, 5,412,630, Cl. 369-44.320.  
Ohta, Tetsuo: See—  
Takaya, Hidemasa; Ohta, Tetsuo; Kumobayashi, Hidenori; Okeda, Yoshiki; and Gonda, Yoshiharu, 5,412,109, Cl. 549-263.000.  
Ohtaguro, Masami: See—  
Shinoda, Hoser; Ohtaguro, Masami; Funae, Akihiro; and Jimuro, Shigeru, 5,412,067, Cl. 528-361.000.  
Ohtake, Yasuhisa; Sago, Seiji; and Magaki, Yasushi, to Kabushiki Kaisha Toshiba. Shadow mask for color cathode ray tube, shadow mask printing negative plate used for manufacture of the shadow mask, and method and manufacturing the negative plate. 5,411,822, Cl. 430-5.000.  
Ohtani, Yasushi: See—  
Kageyama, Yasuo; Fujii, Shigeki; and Ohtani, Yasushi, 5,412,152, Cl. 84-607.000.  
Ohtsuka, Mari: See—  
Komoto, Teruo; Hirota, Hiroyuki; Sato, Susumu; Ohtsuka, Mari; Koya, Hidehiko; Mizuno, Hiroyuki; and Kuraishi, Tadayuki, 5,411,972, Cl. 514-330.000.  
Ohtsuka, Nobuaki; and Miyamoto, Junichi, to Kabushiki Kaisha Toshiba. Nonvolatile semiconductor memory device. 5,412,609, Cl. 365-218.000.  
Ohtsuru, Masaaki: See—  
Yano, Akihiro; Naito, Yutaka; Yamada, Kunitaka; and Ohtsuru, Masaaki, 5,412,046, Cl. 526-171.000.  
Ohuchida, Shuichi: See—  
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 5,411,974, Cl. 514-365.000.  
Ohura, Masaki: See—  
Nagase, Norikazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, 5,411,630, Cl. 216-22.000.  
Ohya, Kazuyuki; and Shinohara, Shunichi, to Mitsubishi Gas Chemical Company, Inc. Friction material. 5,411,773, Cl. 428-1.000.  
Oiestad, Andrew: See—  
Lee, Shau-Tarng; and Oiestad, Andrew, 5,411,689, Cl. 264-53.000.  
Ojima, Masaki: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuo; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.  
Okada, Akihiko; and Machida, Shuji, to Idemitsu Kosan Co., Ltd. Thermoplastic resin composition. 5,412,024, Cl. 524-577.000.  
Okada, Hiroshi: See—  
Yokota, Junichi; Okada, Hiroshi; and Yoshioka, Hiroshi, 5,412,513, Cl. 360-32.000.  
Okada, Kazuo; Ebihara, Keisuke; and Saiga, Kazumasa, to Mabuchi Motor Co., Ltd. Miniature motor and method of making same. 5,412,267, Cl. 310-42.000.  
Okada, Keiji: See—  
Yahagi, Hideo; Takaoka, Masahiko; Hoshikawa, Shingo; Miyoshi, Takashi; and Okada, Keiji, 5,411,274, Cl. 277-203.000.  
Okada, Kenichi; and Usui, Ryuji, to Japan Aviation Electronics Industry Limited. Optical-interference type angular velocity or rate sensor having an output of improved linearity. 5,412,472, Cl. 356-350.000.  
Okada, Toshitake: See—  
Ohara, Kengo; Omori, Hirao; Michihiro, Osamu; Suga, Makoto; Shimomura, Kouji; Okada, Toshitake; and Ochiai, Yuji, 5,411,997, Cl. 523-145.000.

Okajima, Yoshinori: See—  
Noro, Hiromi; Kamata, Shinnosuke; and Okajima, Yoshinori, 5,412,615, Cl. 365-233.000.  
Okamoto, Hiroshi: See—  
Furukawa, Junji; Okamoto, Hiroshi; Onouchi, Yoshio; Andoh, Takushi; and Urano, Satoshi, 5,412,079, Cl. 534-732.000.  
Okamoto, Tomio; and Fujii, Junji, to Yamaha Corporation. Supporting mechanism for a sound generator of a musical instrument. 5,410,937, Cl. 84-403.000.  
Okamoto, Yoshihiko, to Hitachi, Ltd. Exposure method, phase shift mask used in the same, and process of fabricating semiconductor integrated circuit device using the same. 5,411,823, Cl. 430-5.000.  
Okamura, Atsushi, to NEC Corporation. High-throughput data processing system equipped with cache memory system for achieving high hit ratio. 5,412,790, Cl. 395-425.000.  
Okano, Haruo: See—  
Hori, Masaru; Okano, Haruo; Aoyama, Michishige; Ito, Masao; Hattori, Kei; Higuchi, Fumihiko; and Tahara, Yoshifumi, 5,411,631, Cl. 216-72.000.  
Okano, Koji: See—  
Matsumoto, Katsuya; Ebata, Takashi; Koseki, Koshi; Okano, Koji; Kawakami, Hiroshi; and Matsushita, Hajime, 5,412,111, Cl. 549-313.000.  
Okano, Teruo: See—  
Sakurai, Yasuhisa; Okano, Teruo; Kataoka, Kazunori; Yamada, Noriko; Inoue, Shohei; and Yokoyama, Masayuki, 5,412,072, Cl. 530-322.000.  
Okano, Yoshiaki: See—  
Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hirohiko; Kabei, Takahito; Satou, Kouichirou; Nakamura, Tetsuya; and Katagata, Satoshi, 5,412,364, Cl. 355-260.000.  
Okawa, Yasuo; Ito, Akiyoshi; Hayasaka, Hiroshi; Saeki, Toshio; Tanaka, Naoki; and Sugawara, Kiyobumi, to Kajima Corporation. Junction structure between steel member and structural member. 5,410,847, Cl. 52-272.000.  
Okawa, Yoichi: See—  
Eto, Shinya; Okawa, Yoichi; Simada, Shoichi; and Ijiri, Makoto, 5,411,385, Cl. 418-96.000.  
Okazaki, Akira; Matsuda, Shinichi; Lee, Takanobu; Matsushita, Ikuo; and Take, Masao, to Mabuchi Motor Co. Ltd. Miniature motor with magnetized rotor end faces forming axial magnetic attraction force between rotor and housing. 5,412,266, Cl. 310-40.0MM.  
Okazaki, Noritaka; Wataki, Ryuji; Nimura, Eiji; Uchida, Michio; and Ito, Yuki, to Mita Industrial Co., Ltd. Image transfer unit for image forming apparatus. 5,412,460, Cl. 355-274.000.  
Okeda, Yoshiki: See—  
Takaya, Hidemasa; Ohta, Tetsuo; Kumobayashi, Hidenori; Okeda, Yoshiki; and Gonda, Yoshiharu, 5,412,109, Cl. 549-263.000.  
O'Keefe, Dennis. Tire shredder and process for shredding tires. 5,411,216, Cl. 241-24.000.  
Okel, Timothy A.: See—  
Krivak, Thomas G.; Okel, Timothy A.; and Wagner, Melvin P., 5,412,018, Cl. 524-492.000.  
Oki Electric Industry Co., Ltd.: See—  
Ikeya, Masahisa; Saito, Tadashi; and Inokuchi, Kazuyuki, 5,412,236, Cl. 257-282.000.  
Kojima, Tetsuji; Miyashita, Hiromi; Hagihara, Shigemi; and Sunaga, Naoki, 5,412,490, Cl. 358-473.000.  
Kusaba, Susumu, 5,412,607, Cl. 365-208.000.  
Oklahoma Safety Equipment Co.: See—  
Kays, Jerry W.; Reynolds, John W.; and Wilson, Alan T., 5,411,158, Cl. 220-89.200.  
Oku, Yutaka, to Daiwa Golf Co., Ltd. Golf club head. 5,411,264, Cl. 273-169.000.  
Okubo, Akio; Hayashi, Toshiyuki; and Funakoshi, Masahiro, to Canon Kabushiki Kaisha. Heat transfer recording apparatus with common drive source for driving plural elements. 5,412,407, Cl. 342-215.000.  
Okuda, Hiromichi: See—  
Miyazaki, Toshiyuki; Motoi, Hirofumi; Kodama, Toshiaki; Maeda, Tatsu; Tsujita, Takahiro; and Okuda, Hiromichi, 5,411,956, Cl. 514-15.000.  
Okui, Kazuyuki: See—  
Tanaka, Norihiro; Okui, Kazuyuki; Doi, Yasuhiro; Sato, Hirohiko; and Yorozu, Hidenori, 5,411,731, Cl. 424-78.020.  
Okunaga, Kazuo, to NEC Corporation. Semiconductor device having bonding optional circuit. 5,412,333, Cl. 327-198.000.  
Okura, Akimitsu: See—  
Otaka, Tadashi; Okura, Akimitsu; Iwamoto, Hiroshi; Todokoro, Hideo; Komoda, Tsutomu; and Tobita, Issei, 5,412,209, Cl. 250-310.000.  
Okuyama, Hideki; Yamamoto, Masahiro; and Sonobe, Toshimitsu, to Thomas & Betts Corporation. Circuit board connector. 5,411,399, Cl. 439-67.000.  
Oldfather, William R., to Sharp Kabushiki Kaisha. Method and system for interfacing a computer processor with a calculator keyboard and calculator. 5,412,586, Cl. 364-709.120.  
Olds, Keith A., to Motorola, Inc. Multibeam position ambiguity resolution. 5,412,389, Cl. 342-357.000.  
O'Leary, Michael F.: See—  
O'Leary, Phyllis C.; and O'Leary, Michael F., 5,410,838, Cl. 47-40.500.  
O'Leary, Phyllis C.; and O'Leary, Michael F. Tree stand container. 5,410,838, Cl. 47-40.500.  
O'Lenick, Anthony J., Jr., to Siltech Inc. Silicone polyester polymers as durable humectants. 5,411,729, Cl. 424-70.120.

Olin Corporation: See—  
Cawfield, David W.; and Ward, Leslie R., 5,411,643, Cl. 204-115.000.  
Mullins, Richard M.; and Glen, Jeffrey J., 5,411,727, Cl. 423-658.500.  
Olive, Graham J., to Rediffusion Simulation Limited. Method and apparatus for generating images simulating non-homogeneous fog effects. 5,412,796, Cl. 395-500.000.  
Oliver, Anthony D.: See—  
Paterson, Douglas F.; Meissner, Konrad; Redd, William V.; Oliver, Anthony D.; Lipford, Michael S.; Perry, Don A.; and Schoner, C. Richard, 5,410,955, Cl. 99-543.000.  
Olivier, Annie A.: See—  
Jung, Frederic H.; and Olivier, Annie A., 5,412,093, Cl. 540-221.000.  
Ollivier, Gerald. Anti-hail shock wave generator. 5,411,209, Cl. 239-14.100.  
Olney, Ross D.; and Reeds, John W., to Hughes Aircraft Company. Bistable valve. 5,411,051, Cl. 137-225.000.  
Olson, David A.: See—  
Eberhard, Walter W.; McCosby, John J.; Free, Paul D.; Long, Jerome M.; and Olson, David A., 5,411,003, Cl. 123-502.000.  
Olson, Otis J., to Eaton Corporation. Method and apparatus for determining clutch touch point. 5,411,124, Cl. 192-103.00R.  
Olympus Optical Co., Ltd.: See—  
Hashimoto, Keitaro; and Aoki, Takashi, 5,412,636, Cl. 369-44.320.  
Ishihara, Hideaki; Tsuji, Kiyoshi; and Miyashita, Akihiro, 5,412,478, Cl. 348-72.000.  
Kunishige, Keiji, 5,412,448, Cl. 354-400.000.  
Omata, Hitoshi; and Fujita, Oriya, to Amada Company, Limited; and Amada Meirces Company, Limited. Low noise punch tool. 5,410,927, Cl. 83-139.000.  
Omori, Hirao: See—  
Ohara, Kengo; Omori, Hirao; Michihiro, Osamu; Suga, Makoto; Shimomura, Kouji; Okada, Toshitake; and Ochiai, Yuji, 5,411,997, Cl. 523-145.000.  
Omori, Takuro: See—  
Maeda, Hiroshi; and Omori, Takuro, 5,412,395, Cl. 345-89.000.  
Omori, Toshimichi; Suzuki, Haruo; Sampei, Tetsuya; Kanero, Takahiro; Nakagawa, Masayoshi; and Kurihara, Masayoshi, to NKK Corporation. Soft magnetic steel material having excellent DC magnetization properties and corrosion resistance and a method of manufacturing the same. 5,411,605, Cl. 148-113.000.  
Oncogen Limited Partnership: See—  
Hellstrom, Ingegerd; Hellstrom, Karl E.; Marquardt, Hans; and Johnston, Janet, 5,411,884, Cl. 435-240.270.  
Onda, Kenichi: See—  
Sakurai, Naoki; Mori, Mutsuhiro; Arakawa, Hidetoshi; Onda, Kenichi; Miyazaki, Hideki; and Kanouda, Akihiko, 5,412,558, Cl. 363-98.000.  
O'Neill, Thomas J., Jr.: See—  
Swirhun, Stanley E.; and O'Neill, Thomas J., Jr., 5,412,680, Cl. 372-45.000.  
Onishi, Tadashi: See—  
Hamamoto, Nobuo; Onishi, Tadashi; Suzuki, Tatsundo; Nagata, Minoru; Mizuishi, Kenichi; and Tyojatori, Yosuke, 5,412,719, Cl. 380-9.000.  
Ono, Kazuaki; Tanigawa, Koichi; Takeuchi, Akihiko; Motoyama, Hajime; and Miyamoto, Toshio, to Canon Kabushiki Kaisha. Charging device, image forming apparatus and detachably mountable process cartridge having a constant voltage power source feature. 5,412,455, Cl. 355-219.000.  
Ono, Nobutaka, to Osaka Bobbin Co., Ltd. Compressible bobbin for yarn treatment. 5,411,217, Cl. 242-118.110.  
ONO Pharmaceutical Co., Ltd.: See—  
Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, 5,411,974, Cl. 514-365.000.  
Ono, Reiji: See—  
Hyugaji, Masahiko; and Ono, Reiji, 5,412,249, Cl. 257-745.000.  
Ono, Tsukasa: See—  
Nakamura, Takayuki; and Ono, Tsukasa, 5,411,444, Cl. 474-148.000.  
Onouchi, Yoshio: See—  
Furukawa, Junji; Okamoto, Hiroshi; Onouchi, Yoshio; Andoh, Takushi; and Urano, Satoshi, 5,412,079, Cl. 534-732.000.  
Ooishi, Tsukasa, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device. 5,412,605, Cl. 365-203.000.  
Oonishi, Katsuji: See—  
Suzuki, Hajime; Kataoka, Kousaku; and Oonishi, Katsuji, 5,411,042, Cl. 134-57.00D.  
Oonishi, Kazuhisa: See—  
Nureki, Shinji; and Oonishi, Kazuhisa, 5,412,405, Cl. 347-182.000.  
Oosawa, Hidefumi: See—  
Bannai, Yuuichi; Yoshida, Tadashi; Hirabayashi, Yasuji; and Oosawa, Hidefumi, 5,412,486, Cl. 358-444.000.  
Ooyama, Haruo: See—  
Hozumi, Toyoharu; Matsumoto, Takao; Ooyama, Haruo; Namba, Tsuneo; Shiraki, Kimiyasu; Hattori, Masao; Kurokawa, Masahiko; and Kadota, Shigetoshi, 5,411,733, Cl. 424-195.100.  
Oprescu, Florin: See—  
Van Brunt, Roger; and Oprescu, Florin, 5,412,697, Cl. 375-360.000.  
Van Brunt, Roger; Hillman, Daniel L.; Nilson, Christopher; Oprescu, Florin; and Teener, Michael D., 5,412,698, Cl. 375-373.000.  
Optima Industries, Inc.: See—  
Marantette, William F., 5,412,476, Cl. 356-375.000.

Optima-Maschinenfabrik Dr. Buhler GmbH & Co.: See—  
Braun, Thomas; and Gwinner, Werner, 5,411,174, Cl. 222-77.000.  
Oracle Corporation: See—  
Krishna, Murali M., 5,412,804, Cl. 395-600.000.  
Oras Oy: See—  
Nilsson, Pekka W.; and Saaristo, Risto A., 5,411,241, Cl. 251-129.060.  
Orem, Michael W., to Eastman Kodak Company. Photographic element and coating composition therefor. 5,411,844, Cl. 430-527.000.  
Origin Medsystems, Inc.: See—  
Loomas, Bryan E.; Lunsford, John P.; and Hlavka, Edwin J., 5,411,483, Cl. 604-167.000.  
Orie, Makoto; and Hayashi, Katsuhiko, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Block units for a block toy. 5,411,428, Cl. 446-90.000.  
Orie, Yoshihiko: See—  
Kanatani, Yoshiharu; Fukuoka, Hirofumi; and Orie, Yoshihiko, 5,412,397, Cl. 345-99.000.  
Orns, Daryl L. Vehicular hood prop apparatus. 5,411,109, Cl. 180-69.200.  
Ornstein, Leonard: See—  
Fan, Sophie S.; Ben-David, Daniel; Colella, Gregory M.; Cupo, Albert; Fischer, Gena; and Ornstein, Leonard, 5,411,891, Cl. 436-63.000.  
O'Rourke, Patrick E.: See—  
Baylor, Lewis C.; Buchanan, Bruce R.; and O'Rourke, Patrick E., 5,412,465, Cl. 356-301.000.  
Orth, Gerard: See—  
Beaudenon, Sylvie; Kremsdorf, Dina; Croissant, Odile; and Orth, Gerard, 5,411,857, Cl. 435-5.000.  
Orui, Satoshi: See—  
Sakamoto, Mitsuo; Koshika, Norihide; Nishimura, Isao; Sasaki, Katsuyasu; and Orui, Satoshi, 5,410,845, Cl. 52-167.200.  
Osaka Bobbin Co., Ltd.: See—  
Ono, Nobutaka, 5,411,217, Cl. 242-118.110.  
Osawa, Keiji: See—  
Mori, Ryuichi; and Osawa, Keiji, 5,412,445, Cl. 354-195.100.  
Osby, John O.; and Sekinger, John K., to Dow Chemical Company. The Process for preparing polycarbonate from a bisphenoxy fluorene. 5,412,064, Cl. 528-298.000.  
Oshimi, Fumiaki: See—  
Enomoto, Masami; Kubota, Susumu; Yuasa, Hitoshi; Oshimi, Fumiaki; and Otsuki, Yutaka, 5,412,002, Cl. 523-466.000.  
Oshkosh Truck Corporation: See—  
Gratton, Andrew B.; Bachhuber, Anthony A.; Maxfield, LeRoy A.; and Miller, Jeffrey M., 5,411,450, Cl. 477-124.000.  
Oshlack, Benjamin; and Padi, Frank, Jr., to Euro-Celtique, S.A. Powder-layered morphine sulfate formulations. 5,411,745, Cl. 424-456.000.  
Osman, Akhtar; and Knauf, Thomas F., to Polysar Rubber Corporation. Preparation of high cis-1,4-polybutadiene with reduced gel. 5,412,045, Cl. 526-133.000.  
Osram Sylvania Inc.: See—  
Thomas, Ronald E., 5,411,407, Cl. 439-271.000.  
Osti, Roberto; and Gamberini, Antonio, to G.D. S.p.A. Device for sealing wrappers in machines for wrapping and/or overwrapping commodities, in particular packets. 5,410,858, Cl. 53-477.000.  
Osugi, Yukihiko: See—  
Tanuma, Chiaki; Saito, Mitsunaga; and Osugi, Yukihiko, 5,412,456, Cl. 355-245.000.  
Ota, Hitoshi: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masuhiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.  
Ota, Kouji: See—  
Yano, Tatsuo; Watanabe, Masayuki; Ota, Kouji; and Matsumoto, Tadayuki, 5,412,759, Cl. 395-83.000.  
Ota, Shuichi; Uetake, Akihiro; Sawada, Takashi; and Suzuki, Kazuyoshi, to Sony Corporation. Tape cassette having a rockable finger for latching a slidable shutter. 5,412,525, Cl. 360-132.000.  
Otaka, Tadashi; Okura, Akimitsu; Iwamoto, Hiroshi; Todokoro, Hideo; Komoda, Tsutomu; and Tobita, Issei, to Hitachi, Ltd. Electron beam apparatus. 5,412,209, Cl. 250-310.000.  
Otaka, Tadashi: See—  
Todokoro, Hideo; Takamoto, Kenji; Otaka, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiko; Ninomiya, Ken; and Kure, Tokuo, 5,412,210, Cl. 250-310.000.  
Otis Elevator Company: See—  
Thangavelu, Kandasamy; and Pulella, Venkataramana S., 5,411,118, Cl. 187-392.000.  
Otsuki, Yutaka: See—  
Enomoto, Masami; Kubota, Susumu; Yuasa, Hitoshi; Oshimi, Fumiaki; and Otsuki, Yutaka, 5,412,002, Cl. 523-466.000.  
Yoda, Eiji; Sato, Haruyoshi; Yamasita, Yukio; Yuasa, Hitoshi; and Otsuki, Yutaka, 5,411,836, Cl. 430-190.000.  
Ott, Douglas E.; Schaefer, John F.; and Gray, Robert I., to Ott, Douglas E. Method and apparatus for conditioning insufflation gas for laparoscopic surgery. 5,411,474, Cl. 604-26.000.  
Otte, Adelbert: See—  
Stehr, Michael; Otte, Adelbert; Glaser, Helmut; Ratajczak, Hans-Josef; and Schulze, Klaus, 5,412,136, Cl. 558-43.000.  
Otterbach, Jürgen: See—  
Rossberg, Rolf; Fritsch, Rainer; Otterbach, Jürgen; and Heide-mann, Rolf, 5,412,746, Cl. 385-48.000.



Otterburn, Michael S.: See—  
Wheeler, Edward L.; O'Amelia, Ronald P.; Leveille, Gilbert A.;  
Otterburn, Michael S.; Klemann, Lawrence P.; Finley, John W.;  
Roden, Allan D.; Chrysam, Michael M.; Pelloso, Turiddu A.;  
and Given, Peter S., Jr., 5,411,756, Cl. 426-607.000.

Ouderkerk, Andrew J.: See—  
Hyde, Patrick D.; and Ouderkerk, Andrew J., 5,411,788, Cl.  
428-200.000.

Outboard Marine Corporation: See—  
Gillespie, George T.; Belt, Fletcher C.; and Petersen, H. Norman,  
5,410,999, Cl. 123-403.000.

Outhwaite, Alan C.: See—  
Greene, Robert H.; Outhwaite, Alan C.; Noakes, Timothy J.;  
Green, Michael L.; and Jones, Jonathan, 5,411,211, Cl.  
239-708.000.

Outokumpu Research Oy: See—  
Tuovinen, Frans H.; and Metsarinta, Maija-Leena, 5,411,572, Cl.  
75-500.000.

Ouyang, Jiangbo: See—  
Morris, Brenda S.; Ouyang, Jiangbo; and Reichgott, David W.,  
5,412,011, Cl. 524-261.000.

Overfield, Norbert W.: Positive displacement compressor, 5,411,054, Cl.  
137-512.100.

Ovonic Battery Company, Inc.: See—  
Ovshinsky, Stanford R.; Ovshinsky, Herbert; and Young, Rosa,  
5,411,592, Cl. 118-718.000.

Ovshinsky, Herbert: See—  
Ovshinsky, Stanford R.; Ovshinsky, Herbert; and Young, Rosa,  
5,411,592, Cl. 118-718.000.

Ovshinsky, Stanford R.: See—  
Ovshinsky, Herbert; and Young, Rosa, 5,411,592, Cl. 118-718.000.

Ovshinsky, Stanford R.; Ovshinsky, Herbert; and Young, Rosa, to  
Ovonic Battery Company, Inc. Apparatus for deposition of thin-film,  
solid state batteries, 5,411,592, Cl. 118-718.000.

Ovshinsky, Stanford R.: See—  
Izu, Masatsugu; Dotter, Buddie R., II; Ovshinsky, Stanford R.; and  
Hasegawa, Wataru, 5,411,591, Cl. 118-718.000.

OY KWH Pipe AB: See—  
Sundqvist, Kristian; and Blomqvist, Gunnar, 5,411,619, Cl.  
156-187.000.

Oyama, Ken-ichi, to NEC Corporation. Method of erasing data on  
non-volatile semi-conductor memory, 5,412,608, Cl. 365-218.000.

Oyama, Yukihiko, to NEC Corporation. Semiconductor storage apparatus,  
5,412,612, Cl. 365-228.000.

Oyler, Edward N.; and Stover, Harold F., to S.O.B. Partnership. Self-  
contained beverage dispensing system, 5,411,179, Cl. 222-129.100.

Ozaki, Yoshihide; Nomura, Tatsuo; and Miyake, Toshio, to Kabushiki  
Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Pullulan binder and  
its uses, 5,411,945, Cl. 514-23.000.

Ozaki, Yutaka, to Matsushita Graphic Communication Systems, Inc.  
Method and apparatus for rotating an image, 5,412,768, Cl.  
395-137.000.

Pacesetter, Inc.: See—  
Causey, James D., III, 5,411,547, Cl. 607-129.000.

Miller, Leslie S.; and Helland, John R., 5,411,528, Cl. 607-5.000.

Mortazavi, Said, 5,411,532, Cl. 607-22.000.

Pacific Communication Sciences, Inc.: See—  
Chaplik, Naom; Gardner, Steven H.; and Kasmir, Seton P.,  
5,412,353, Cl. 332-127.000.

Packart Holding: See—  
Bochet, Thierry; and Moriniere, Jean-Pierre, 5,411,203, Cl.  
229-104.000.

Padden, James B., to Purolator Products N.A., Inc. Sand filter system  
for use in a well, 5,411,084, Cl. 166-230.000.

Pagay, Shrikant N.; Bachorik, Robert J., II; and Liebert, Richard T., to  
Sterling Winthrop Inc. Pre-filled syringe and pre-filled cartridge  
having an improved plunger and plunger rod for reducing syringing  
force, 5,411,488, Cl. 604-218.000.

Pagay, Shrikant N.; Bachorik, Robert J., II; and Liebert, Richard T., to  
Sterling Winthrop Inc. Pre-filled syringe and pre-filled cartridge  
having actuating cylinder/plunger rod combination for reducing  
syringing force, 5,411,489, Cl. 604-218.000.

Pagnini, Kristina: See—  
Peavey, David L.; Tieszen, Katherine A.; Pagnini, Kristina;  
Schader, Fred E.; Stephens, Timothy D.; Cianos, Nicholas; and  
Conkle, John R., 5,412,390, Cl. 342-417.000.

Pai, Ramdas P.: See—  
Ford, Maureen F.; Guarrera, Donna J.; Mischke, Mark R.; Pai,  
Ramdas P.; and Warner, John C., 5,411,929, Cl. 503-210.000.

Pajunen, Grazyna A.: See—  
Barrett, Raymond L., Jr.; Herold, Barry W.; and Pajunen, Grazyna  
A., 5,412,336, Cl. 327-560.000.

Pal-Borbely, Gabriella: See—  
Beyer, Herman K.; and Pal-Borbely, Gabriella, 5,411,724, Cl.  
423-328.200.

Palmer, Yvette L.: See—  
Kao, Wenling; Skotnicki, Jerauld S.; Abou-Gharbia, Magid A.; and  
Palmer, Yvette L., 5,411,967, Cl. 514-291.000.

Pam, Richard L.: See—  
Kendall, Robert M.; Pam, Richard L.; Minden, Andrew C.; Saito,  
Nathan; and Gotterba, James A., 5,410,989, Cl. 122-367.100.

Pamulapati, Jagadeesh: See—  
Dutta, Mitra; Zhou, Weimin; Shen, Hongen; and Pamulapati,  
Jagadeesh, 5,412,225, Cl. 257-18.000.

Pan, David H.: See—  
Fuller, Timothy J.; Larson, James R.; Spiewak, John W.; Pan,  
David H.; Mosher, Ralph A.; and Bonsignore, Frank J.,  
5,411,834, Cl. 430-115.000.

Pan, Pai-Hung: See—  
Dobuzinsky, David M.; Harmon, David L.; Kasi, Srinandan R.;  
Kenney, Donald M.; Nguyen, Son V.; Nguyen, Tue; and Pan,  
Pai-Hung, 5,412,246, Cl. 257-632.000.

Panelfold, Inc.: See—  
Stark, Hans; and Dixon, Guy E., III, 5,411,072, Cl. 160-84.110.

Paoli, Thomas L.: See—  
Treat, David W.; Bour, David P.; and Paoli, Thomas L., 5,412,678,  
Cl. 372-45.000.

Paoni, Nicholas F.: See—  
Anderson, Stephen; Bennett, William F.; Botstein, David; Higgins,  
Deborah L.; Paoni, Nicholas F.; and Zoller, Mark J., 5,411,871,  
Cl. 435-23.000.

Papadopoulos, Gregory M., to Massachusetts Institute of Technology.  
Efficient data processor instrumentation for systematic program  
debugging and development, 5,412,799, Cl. 395-500.000.

Paper Converting Machine Company: See—  
Jocewicz, Frank F., Jr., 5,411,618, Cl. 156-164.000.

Papp, George J.: See—  
Piacente, Anthony N.; Papp, George J.; Whitehouse, Richard E.;  
and Mansolillo, Robert D., 5,411,811, Cl. 428-542.200.

Paquer, Daniel: See—  
Cerf, Martine; Mieloszynski, Jean-Luc; and Paquer, Daniel,  
5,412,138, Cl. 558-182.000.

Pareau, Dominique; Chesne, Andre; Durand, Gerard; and DeRuberby,  
Michel, to Societe Generale Pour les Techniques Nouvelles, SGN.  
Process for the continuous conversion of one hydroxylamine salt to  
another hydroxylamine salt, 5,411,725, Cl. 423-387.000.

Parham, Thomas G., to General Electric Company. Diffusely reflecting  
optical interference filters and articles including lamps reflectors and  
lenses, 5,412,274, Cl. 313-112.000.

Parkh, Himanshu; and Healey, Fritz W., to Cubic Defense Systems,  
Inc. Automatic player identification small arms laser alignment sys-  
tem, 5,410,815, Cl. 33-234.000.

Park, Chung P.: See—  
Tusim, Martin H.; and Park, Chung P., 5,411,684, Cl. 264-53.000.

Parker & Harper Companies, Inc.: See—  
Massey, Roger G., 5,411,048, Cl. 137-15.000.

Parkhurst, Larry E.; and Aten, Edward M., to Medical Microsystems,  
Inc. Article dispenser for monitoring dispensing times, 5,412,372, Cl.  
340-568.000.

Parks, Barber J.: Portable file organizing rack, 5,411,145, Cl. 211-50.000.

Parks, David A.: See—  
Mueller, Robert W.; Sisson, Glen C.; Maloney, James G.; Parks,  
David A.; Carothers, Arthur D.; and Beatty, William E., Jr.,  
5,412,167, Cl. 200-43.140.

Parks, Thomas R.: See—  
Bender, Douglas J.; Parks, Thomas R.; and Brozenec, Thomas F.,  
5,412,574, Cl. 364-455.000.

Parnell, Aron T.; and Thomas, Gareth D., to Mono Pumps Limited.  
Rotor and flexible drive shaft assembly, 5,411,383, Cl. 418-48.000.

Parsons, Thomas F.: See—  
Grinna, Lynn; Theofan, Georgia; and Parsons, Thomas F.,  
5,411,941, Cl. 514-12.000.

Partis, Richard A.; Koszyk, Francis J.; and Mueller, Richard A., to G.  
D. Searle & Co. Method of inhibiting lentivirus, 5,411,970, Cl.  
514-315.000.

Partovi, Afshin: See—  
Chiu, Tien-Heng; Glass, Alastair M.; and Partovi, Afshin,  
5,412,499, Cl. 359-248.000.

Pascale, Lillian A.: See—  
Mollendorf, Joseph C.; Catipovic, Robert M.; and Pascale, Lillian  
A., 5,411,038, Cl. 128-898.000.

Pasch, Nicholas F.; Sahakian, Vahak K.; and Dell'Oca, Conrad J., to  
LSI Logic Corporation. Method and apparatus for isolation of flux  
materials in "flip-chip" manufacturing, 5,410,805, Cl. 29-830.000.

Pashan, Mark A.: See—  
Cyr, Gregory J.; Hedlund, Kurt A.; Nociolo, Lawrence J.; Pashan,  
Mark A.; and Wong, Albert Kai-sun, 5,412,646, Cl. 370-56.000.

Pasini, Carol E.: See—  
Amos, Jane G.; Indelicato, Joseph M.; Pasini, Carol E.; and Reut-  
zel, Susan M., 5,412,094, Cl. 540-301.000.

Patchel, Thomas H.: See—  
Eaton, Winston W.; Patchel, Thomas H.; Asaki, James T.; and  
Bentley, Donald L., 5,412,529, Cl. 361-90.000.

Patchett, Arthur A.: See—  
Ashton, Wallace T.; Chang, Linda L.; MacCoss, Malcolm; Chakra-  
varty, Prasun K.; Greenlee, William J.; Patchett, Arthur A.; and  
Flanagan, Kelly, 5,411,980, Cl. 514-384.000.

Chakravarty, Prasun K.; Greenlee, William J.; Kim, Doo-seop;  
Mantlo, Nathan B.; Patchett, Arthur A.; and Rivero, Ralph A.,  
5,412,097, Cl. 546-118.000.

Patel, Gautam A.; and Kubisen, Steven J., to General Electric Com-  
pany. Heat curable primerless silicone hardcoat compositions,  
5,411,807, Cl. 428-412.000.

Patel, Kundanbhai M.: See—  
Tang, Reginald T.-H.; Mares, Frank; Boyle, William J., Jr.; Chiu,  
Tin-Ho; and Patel, Kundanbhai M., 5,412,068, Cl. 528-370.000.

Patel, Piyushkumar C.: See—  
Gruodis, Algirdas J.; Patel, Piyushkumar C.; and Szabo, Kurt P.,  
5,412,665, Cl. 371-27.000.

Patel, Ramesh F.: See—  
Morley, James A.; Bauer, John F.; Patel, Ramesh F.; Henry, Rod-  
ger E.; and Spanton, Stephen G., 5,412,095, Cl. 544-291.000.

Paterson, Douglas F.: Recoil absorbing firearm stock, 5,410,833, Cl.  
42-73.000.

Paterson, Douglas F.; Meissner, Konrad; Redd, William V.; Oliver,  
Anthony D.; Lipford, Michael S.; Perry, Don A.; and Schoner, C.  
Richard, to Atlas Pacific Engineering Company. Pear processing  
method and apparatus, 5,410,955, Cl. 99-543.000.

Patino, Joseph, to Motorola, Inc. Method and apparatus for determin-  
ing battery characteristics, 5,411,816, Cl. 429-7.000.

Patrick, David T.: See—  
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- Rowe, Christopher J.: See—  
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- Royal, P. Darrell: See—  
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- Rubin, William B.: to International Business Machines Corporation. Method for implementing one-to-many binary relations in object-oriented systems using doubly-linked rings. 5,412,797, Cl. 395-500.000.
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- Ruggiero, Joseph. Tile, angle-cutting gauge. 5,410,816, Cl. 33-527.000.
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- Rumennik, Vladimir: See—  
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- Rupp, Garry E.: See—  
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- Rushton, Nigel, to Hewlett-Packard Company. Data storage method and apparatus with adaptive buffer threshold control based upon buffer's waiting time and filling degree of previous data transfer. 5,412,780, Cl. 395-250.000.
- Rusinek, Henry: See—  
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- Rutgers, The State University of New Jersey: See—  
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- Ryobi Motor Products Corp.: See—  
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- S. C. Johnson & Son, Inc.: See—  
Avery, Richard W.; Martin, Frederick H.; Dwyer, Sean G.; and Brown, Colin W., 5,411,585, Cl. 106-287.100.
- S.O.B. Partnership: See—  
Oyler, Edward N.; and Stover, Harold F., 5,411,179, Cl. 222-129.100.
- Saa, Federico H.: See—  
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- Saari, Pauli J.: See—  
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- Saarisalo, Risto A.: See—  
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- Sab Wabco Holdings BV: See—  
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- Saban, Marko D.: See—  
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- Sacher, Christoph, to HURTH Getriebe und Zahnraeder G.m.b.H. Torsional vibration damper. 5,411,439, Cl. 464-67.000.
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Boser, Bernhard; and Sackinger, Eduard, 5,412,565, Cl. 364-600.000.
- Sacripante, Guerino G.; Yeung, B. W. Anissa; McAneney, T. Brian; and Kittelberger, J. Stephen, to Xerox Corporation. Polyimide toner compositions. 5,411,829, Cl. 430-106.000.
- Sacripante, Guerino G.; and Drappel, Stephan V., to Xerox Corporation. Toner with crosslinked polyimides obtained from the reaction of an unsaturated polyimide and a peroxide. 5,411,831, Cl. 430-107.000.
- Sadowski, Fritz: See—  
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- Saeda, Koichi; and Sakura, Shunji, to Tsubakimoto Chain, Co. Work rotating apparatus for beam machining having tilt limiting stops. 5,412,174, Cl. 219-121.820.
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- Sago, Seiji: See—  
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- Sai, Fumio: See—  
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- Sainio, Jeffrey W.; and Seymour, John C., to Quad/Tech International. Color registration system for a printing press. 5,412,577, Cl. 364-469.000.
- Saito, Akira: See—  
Ichikawa, Atsushi; Yamauchi, Yoshiaki; and Saito, Akira, 5,412,633, Cl. 369-44.140.
- Saito, Hiroshi, to Amada Metreco Company, Limited. Upper tool for a press. 5,410,926, Cl. 83-136.000.
- Saito, Isao, to Sony Corporation. Tracking control which avoids lock-up for rotary head reproducing apparatus and which senses whether a trucking control signal is absent for a predetermined time. 5,412,520, Cl. 360-77.150.
- Saito, Junji: See—  
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- Saito, Kazuo: See—  
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- Saito, Kenichi: See—  
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- Saito, Masataka: See—  
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- Saito, Mitsunaga: See—  
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- Saito, Nathan: See—  
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- Saito, Shigeru: See—  
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- Saito, Tsutomu, to Kabushiki Kaisha Kawai Gakki Seisakusho. Electronic musical instrument having independent pitch control for each key. 5,412,153, Cl. 84-619.000.
- Sakabe, Yukio: See—  
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- Sakaguchi, Kenji: See—  
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- Sakaguchi, Takahiro; Abe, Yohji; and Sugahara, Hiroshi, to TEAC Corporation. Motor having a disk-shaped rotor, a strength in a radial direction of the rotor being made strong. 5,412,273, Cl. 310-268.000.
- Sakai, Chinobu: See—  
Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hirotaka; Kabai, Takahito; Satou, Kouichirou; Nakamura, Tetsuya; and Katagata, Satoshi, 5,412,364, Cl. 355-260.000.
- Sakamoto, Hironori; Ito, Akira; and Nojima, Toshio, to Japan Radio Co., Ltd.; Nippon Telephone & Telephone Corporation; and NTT Mobile Communication Network Inc. Power amplifier device comprising a plurality of feedforward distortion compensating circuits in parallel. 5,412,342, Cl. 330-149.000.
- Sakamoto, Mitsuo; Koshika, Norihide; Nishimura, Isao; Sasaki, Katsuyasu; and Orui, Satoshi, to Kajima Corporation. Vibration control device for structure. 5,410,845, Cl. 52-167.200.
- Sakamoto, Mitsuru, to NEC Corporation. Method of making a semiconductor device comprising lower and upper silicon layers as capacitor. 5,411,912, Cl. 437-60.000.
- Sakamoto, Syuichi: See—  
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- Sakata, Satoshi: See—  
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- Sakata, Shinji; Miyashita, Takanori; and Kondo, Kazuhiko, to Yoshitomi Pharmaceutical Industries, Ltd.; and Yamasa Corporation. 2'-deoxy-2'-methylidenecytidine dihydrate, methods for its production and compositions. 5,412,089, Cl. 536-28.500.
- Sakaue, Shinsuke: See—  
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- Sakiyama, Keizo: See—  
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- Sakon, Yutaka, to Sumitomo Rubber Industries, Ltd. Tire cord and tire. 5,410,868, Cl. 57-213.000.
- Sakuma, Yuzuru; Minami, Keisuke; and Suda, Hiroyoshi, to Japan Tobacco Inc. Apparatus for automatically taking in smoke of rolled tobaccos and analyzing the same. 5,411,039, Cl. 131-330.000.
- Sakura Color Products Corporation: See—  
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- Sakura, Shunji: See—  
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- Sakurai, Naoki; Mori, Mutsuhiro; Arakawa, Hidetoshi; Onda, Kenichi; Miyazaki, Hideki; and Kanouda, Akihiko, to Hitachi, Ltd.; and Hitachi Haramachi Semiconductor, Ltd. Semiconductor integrated circuit unit. 5,412,558, Cl. 363-98.000.
- Sakurai, Yasuhisa; Okano, Teruo; Kataoka, Kazunori; Yamada, Noriko; Inoue, Shohsei; and Yokoyama, Masayuki, to Research Development Corp. of Japan. Water soluble high molecular weight polymerized drug preparation. 5,412,072, Cl. 530-322.000.
- Sakuta, Koji: See—  
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- Saletti, Hakan: See—  
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- Salgema Industrias Quimicas S.A.: See—  
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- Salisbury, Roy S., Jr.: See—  
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- Sallee, Lorry F.: See—  
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- Salvatore, Michael J.: See—  
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- Salyer, Gregory: See—  
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- Sammataro, Stephen R.: See—  
Kish, Jules G.; Sammataro, Stephen R.; and Isabelle, Charles J., 5,411,116, Cl. 184-6.120.
- Sampei, Tetsuya: See—  
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- Samsel, W. Scott: See—  
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- Samsung Display Devices Co., Ltd.: See—  
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- Samsung Electronics Co., Ltd.: See—  
Jun, Dong S.; Oh, Seung C.; Kim, Moon G.; and Lee, Sung G., 5,412,331, Cl. 326-105.000.
- Kim, Dong-hun, 5,412,350, Cl. 331-111.000.
- Ko, Jung W.; Balaban, Alvin R.; and Strolle, Christopher H., 5,412,481, Cl. 358-320.000.
- You, Hyun S., 5,411,328, Cl. 312-405.000.
- Samsung Heavy Industry Co., Ltd.: See—  
Lee, Chang-Soo; Cho, Jang-Wook; and Sin, Book-Ho, 5,410,878, Cl. 60-327.000.
- Sanden Corporation: See—  
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- Sander, Charles M.: See—  
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- Sanders, Robert: See—  
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- Sandia Corporation: See—  
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- Sandoz Ltd.: See—  
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- Sandvik AB: See—  
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- Holmberg, Hakan, 5,411,701, Cl. 420-48.000.
- Sangkoyka, Samuel A., to Albemarle Corporation. Teritary amino-aluminoxane halides. 5,412,131, Cl. 556-175.000.
- Sano, Masaaki: See—  
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- Santest Co., Ltd.: See—  
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- Santin, Giovanni; Naso, Giovanni; D'Arrigo, Sebastiano; and Smayling, Michael C., to Texas Instrument Incorporated. Flash EEPROM array with P-tank insulated from substrate by deep N-tank. 5,411,908, Cl. 437-52.000.
- Santora, Scott: See—  
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- Sanyo Electric Co., Ltd.: See—  
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- Ikeda, Norihiro; and Taketa, Kaoru, 5,411,911, Cl. 437-52.000.
- Suzuki, Hajime; Kataoka, Kousaku; and Oonishi, Katsuji, 5,411,042, Cl. 134-57.000.
- Saparpadeh, Daniel. Topiary watering system. 5,411,562, Cl. 47-58.000.
- Sarakbi, Ron: See—  
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- Sardan, Bernard: See—  
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- Sarkar, Chandan: See—  
Bottiglieri, Michael P.; Brolin, Stephen J.; Miragliotta, Michael A.; and Sarkar, Chandan, 5,412,657, Cl. 370-66.000.
- Sarli, Michael S.: See—  
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- Sarwinski, Raymond E.: See—  
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- Sasada, Yasuhiro, to Hitachi, Ltd. Automatic distribution center system. 5,411,151, Cl. 209-583.000.
- Sasaki, Hitoshi; Tokizaki, Eiji; and Terashima, Kazutaka, to Research Development Corporation of Japan; Sasaki, Hitoshi; and Terashima, Kazutaka. Measuring device for density of liquid or high-temperature melt without influence of surface tension. 5,410,914, Cl. 73-437.000.
- Sasaki, Katsuyasu: See—  
Sakamoto, Mitsuo; Koshika, Norihide; Nishimura, Isao; Sasaki, Katsuyasu; and Orui, Satoshi, 5,410,845, Cl. 52-167.200.
- Sasaki, Kenichi; and Chiba, Tomohiro, to Sanden Corporation. Heat exchanger and method for manufacturing the same. 5,411,079, Cl. 165-151.000.
- Sasaki, Taizo: See—  
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- Sasakura, Toyoki: See—  
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- Sasame, Yukiko: See—  
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- Sata, Shingo, to Kabushiki Kaisha Toshiba. X-ray computerized tomographic imaging method and imaging system capable of forming scanogram data from helically scanned data. 5,412,702, Cl. 378-4.000.
- Satake, Shinichi: See—  
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- Satariano, Richard M.: See—  
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- Sato, Haruo, to Nikon Corporation. Great aperture zoom lens. 5,412,507, Cl. 359-687.000.
- Sato, Haruyoshi: See—  
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- Sato, Hideyuki: See—  
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- Sato, Hirotaka: See—  
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- Sato, Junji: See—  
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- Sato, Masazumi: See—  
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- Sato, Nobuo: See—  
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- Sato, Noribumi: See—  
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- Sato, Shinichi, to Fujitsu Limited. Optical signal input-type amplifier circuit. 5,412,202, Cl. 250-214.00A.
- Sato, Shinichi: See—  
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Sato, Toshifumi; Shibata, Takayuki; and Ohmura, Hideo, to NEC Corporation. Data demodulator, 5,412,694, Cl. 375-330.000.

Satou, Kouichirou: See—  
Iguchi, Michihisa; Hashizume, Hiroshi; Arai, Seiji; Okano, Yoshiaki; Sakai, Chinobu; Fukuyama, Hirotaka; Kabai, Takahito; Satou, Kouichirou; Nakamura, Tetsuya; and Katagata, Satoshi, 5,412,364, Cl. 355-260.000.

Sauer, Frank: See—  
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Henz, Jürg; Abegglen, Hans; and Zesch, Manfred, 5,410,974, Cl. 112-83.000.

Savage, Louis E. Slapball hockey game, 5,411,256, Cl. 273-85.00A.

Saville, Eric J., to Pneu-Draulics, Inc. Capacity fuse valve, 5,411,050, Cl. 137-101.000.

Sawa, Kazuhiro, to Fujitsu Limited. Variable replacement apparatus, 5,412,566, Cl. 364-419.140.

Sawada, Kikuzo; and Wada, Toshio, to Nippon Steel Corporation. Non-volatile semiconductor memory device capable of storing multi-value data in each memory cell, 5,412,601, Cl. 365-185.000.

Sawada, Takashi: See—  
Ota, Shuichi; Uetake, Akihiro; Sawada, Takashi; and Suzuki, Kazuyoshi, 5,412,525, Cl. 360-132.000.

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Schafer, Volker: See—  
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Scheps, Richard, to United States of America, Navy. Compact rapidly modulatable diode-pumped visible laser, 5,412,674, Cl. 372-22.000.

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Schriever, Matthias P., to Boeing Company. The. Non-chromated oxide coating for aluminum substrates, 5,411,606, Cl. 148-240.000.

Schritz, Bryan J., to Chick Master Incubator Company. Poultry incubator and method, 5,410,985, Cl. 119-37.000.

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Kotzin, Michael D.; and Schuler, Joseph, 5,412,690, Cl. 375-256.000.

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Scott, Curtis E.; Arsena, Vito J.; Vamvakas, Spiro; and Oberle, Joseph C., to General Electric Company. Electrodeless lamp with external conductive coating, 5,412,280, Cl. 313-573.000.

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Seech, Alan G.; Cairns, James E.; and Marvan, Igor J., to W. R. Grace & Co.-Conn. Method for dehalogenation and degradation of halogenated organic contaminants, 5,411,664, Cl. 210-602.000.

Seed, Brian; and Peterson, Andrew, to General Hospital Corporation. The. Rapid mutational analysis method, 5,411,861, Cl. 435-6.000.

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Seidel, John G.; Ruddy, Frank H.; Gonzalez, Joseph L.; and Congedo, Thomas V., to Westinghouse Electric Company. Method and apparatus for determining the depth of a gamma emitting element beneath the surface, 5,412,206, Cl. 250-253.000.

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Seiko Seiki Co., Ltd.: See—  
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Sergerie, Robert: See—  
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Fukunaga, Satoru; Hisatomi, Junichiro; Nakamura, Kazuhiro; Ohi, Ken'ichi; Tanaka, Hideki; and Tabuchi, Masayuki, 5,412,314, Cl. 324-158.100.

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Sharpe, Gary D. Fabric printing process and apparatus. 5,410,958, Cl. 101-170.000.

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McGall, Glenn H.; Fodor, Stephen P. A.; and Sheldon, Edward L., 5,412,087, Cl. 536-24.300.

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Sherly, Mark J.; Sowa, Hans C.; and Bray, Michelle M., to Motorola, Inc. Encryption key management. 5,412,722, Cl. 380-21.000.

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Shalati, Mohamad D.; Marquart, James A.; Petty, John L.; and Harris, Rodney M., 5,411,809, Cl. 428-480.000.

Shi, Shaw-Ben: See—  
Jordan, Lloyd E., II; Shi, Shaw-Ben; Sirkin, Martin J.; and Stephens, Paul E., 5,412,805, Cl. 395-600.000.

Shibata, Kazutaka, to Rohm Co., Ltd. Lead frame, semiconductor device, and method of manufacturing same. 5,411,920, Cl. 437-217.000.

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Morris, G. Ronald, Sr.; Morris, G. Ronald, Jr.; and McMillen, Charles E., 5,411,023, Cl. 128-633.000.

Shiga, Toshizo: See—  
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Shih, Thomas L.: See—  
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Yagoura, Hideya; Higuchi, Noriaki; and Shimamoto, Haruo, 5,412,157, Cl. 174-52.400.

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Shimizu, Motoharu, to Hitachi Metals, Ltd. Phase detecting actuator. 5,412,530, Cl. 361-185.000.

Shimizu, Ryoosuke: See—  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryoosuke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hirokuni, 5,410,988, Cl. 122-250.000.

Shimmell, Roger A.; Gibboncy, Donald L.; and Salisbury, Roy S., Jr., to Ford Motor Company. Attachment apparatus for automotive structure brace. 5,411,311, Cl. 296-194.000.

Shimogama, Shigeru, to Matsushita Electric Industrial, Co., Ltd. Method of operating an arc welding apparatus. 5,412,175, Cl. 219-125.100.

Shimomura, Kouji: See—  
Ohara, Kengo; Omori, Hironao; Michihiro, Osamu; Suga, Makoto; Shimomura, Kouji; Okada, Toshitake; and Ochiai, Yuji, 5,411,997, Cl. 523-145.000.

Shin-Etsu Chemical Co., Ltd.: See—  
Fukuda, Kenichi; Yamaguchi, Kouichi; Sato, Shinichi; Kishita, Hirofumi; Arai, Masatoshi; and Fujiki, Hironao, 5,412,135, Cl. 556-448.000.

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Tachibana, Kiyomi; Sakuta, Koji; and Isobe, Kenichi, 5,412,004, Cl. 524-27.000.

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Watanabe, Osamu; Yamada, Motoyuki; Yagihashi, Fujio; Yamamoto, Akira; and Isono, Yoshinobu, 5,412,050, Cl. 526-313.000.

Shin, Kazuo: See—  
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Ohara, Kengo; Omori, Hironao; Michihiro, Osamu; Suga, Makoto; Shimomura, Kouji; Okada, Toshitake; and Ochiai, Yuji, 5,411,997, Cl. 523-145.000.

Shine, Annetta D.; Smith, Steven D.; and Noda, Isao, to Procter & Gamble Company, The; and Univ. of Delaware, The. Preparation of homogeneous polymers using supercritical fluid solutions. 5,412,027, Cl. 525-63.000.

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Shinohara, Shunichi: See—  
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Shinosawa, Katsuhiro: See—  
Bentz, Joseph C.; Carroll, John T., III; and Shinosawa, Katsuhiro, 5,410,995, Cl. 123-90.220.

Shinsky, Michael: See—  
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Shipe, Joanne E.: See—  
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Shirai, Akira: See—  
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Shiraishi, Mikio, to Kabushiki Kaisha Toshiba. Digital sine-wave generating circuit. 5,412,588, Cl. 364-721.000.

Shiraki, Kimiyasu: See—  
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Shirane, Kyoichi, to Sony Corporation. Method and apparatus for recording and/or reproducing data on a disk formatted in accordance with a constant linear velocity (CLV) system. 5,412,629, Cl. 369-32.000.

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Shmidt, Creston D.: See—  
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Shulman, David D., to University of British Columbia, The. Bistable four layer device, memory cell, and method for storing and retrieving binary information. 5,412,598, Cl. 365-174.000.

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Sibbald, Alastair; Jackson, Michael; Jackson, Elaine; and Dean, Terence, to Central Research Laboratories Limited. Finger guide with orthogonal guide surfaces. 5,412,463, Cl. 356-71.000.

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Embo, Georges; Schiefele, Horst; Schrocker, Anton; Voss, Hans; Wiedemann, Albert; and Reich, Reinhold, 5,411,415, Cl. 439-610.000.

Horbaschek, Heinz, 5,412,704, Cl. 378-98.200.

Hummel, Heinrich, 5,412,649, Cl. 370-60.100.

Lukas, Guenter; Ramberger, Friedrich; and Spahl, Siegfried, 5,412,781, Cl. 395-250.000.

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Siemens Elema AB: See—  
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Siemens Stromberg-Carlson: See—  
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Siemon Company, The: See—  
Siemon, John; Carlson, Robert; and Below, Randy, 5,412,751, Cl. 385-135.000.

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Signature Software, Inc.: See—  
Fenwick, Daniel J., 5,412,771, Cl. 395-150.000.

Signore Incorporated: See—  
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Sigurdsson, Steinn. Culling device for vacuum cleaners and other equipment. 5,411,150, Cl. 209-235.000.

Silagy, Howard. Round rotatable belt buckle. 5,410,780, Cl. 24-168.000.

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Williams, Richard K., 5,412,239, Cl. 257-343.000.

Siltek Corporation: See—  
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Siltech Inc.: See—  
O'Lenick, Anthony J., Jr., 5,411,729, Cl. 424-70.120.

Silverman, Bernard, to Monsanto Company. Electroless deposition of metal employing thermally stable carrier polymers. 5,411,795, Cl. 428-229.000.

Sim, Johnny O., to McGean-Rohco, Inc. Paint stripper. 5,411,678, Cl. 252-548.000.

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Simko, Aladar O., to Ford Motor Company. Catalytic converter assembly with bypass. 5,410,876, Cl. 60-288.000.

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Simmons, Harlan M. Animal waste disposal apparatus. 5,410,987, Cl. 119-166.000.

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Simonton, Thomas C.: See—  
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Simpson, Matthew, to Norton Company. Method of making synthetic diamond wear component. 5,411,758, Cl. 427-8.000.



- Sin, Book-Ho: See—  
Lee, Chang-Soo; Cho, Jang-Wook; and Sin, Book-Ho, 5,410,878, Cl. 60-327.000.
- Singer, Stephen P.; Merkel, Paul B.; Clark, Bernard A. J.; and Stanley, Paul L. R., to Eastman Kodak Company. Photographic elements containing magenta couplers and process for using same. 5,411,841, Cl. 430-387.000.
- Singh, Janak; Bisacchi, Gregory S.; and Mueller, Richard H., to E. R. Squibb & Sons, Inc. Process for preparing diprotected 2,3-hydroxymethyl cyclobutanol. 5,412,134, Cl. 556-437.000.
- Sintokogio Ltd.: See—  
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- SIP - Societa Italiana per L-Esercizio Delle Telecomunicazioni P.A.: See—  
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- Sipin, Anatole J. Orbiting fluid pump. 5,411,378, Cl. 417-360.000.
- Sirkin, Martin J.: See—  
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- Sirti S.p.A.: See—  
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- Sisson, Glen C.: See—  
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- Sjoholm, Lars J.; Erickson, Lee J.; and Freund, Peter W., to Thermo King Corporation. Methods and apparatus for operating a refrigeration system. 5,410,889, Cl. 62-160.000.
- Sjolander, Einar, to Collagen Casing Einar Sjolander AB. Method for the production of collagen: collagen produced through the method and use of collagen. 5,411,887, Cl. 435-273.000.
- Skarshinski, Leon: See—  
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- SKC Limited: See—  
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- Skokan, Zdenek E., to Hewlett-Packard Company. Method for efficient serialized transmission of handshake signal on a digital bus. 5,412,783, Cl. 395-325.000.
- Skotnicki, Jerauld S.: See—  
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- Skrubak, Robert J.; and Gladden, Michael E., to Motorola, Inc. Micro-programmed data processor which includes a microsequencer in which a next microaddress output of a microROM is connected to the or-plane of an entry PLA. 5,412,785, Cl. 395-375.000.
- Slangen, Hubertus J. M., to Holland Sweetener Company V.o.F. Process for the treatment of aspartame. 5,411,747, Cl. 424-489.000.
- Slaughter, Sherri A.: See—  
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- Slemon, Charles S.: See—  
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- Slotboom, Jan W.: See—  
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- Smayling, Michael C.: See—  
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- Smedley, William H.: See—  
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- Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 5,411,515, Cl. 606-184.000.
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- Smith, Barbara J.: See—  
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- Smith, Bradley W.; Erickson, James D.; Jamison, Patrick D.; Tyroller, Peter A.; Bergfried, Dietrich; Mattes, Bernhard; and Nitschke, Werner, to Morton International, Inc. Air bag system for a motor vehicle. 5,411,289, Cl. 280-735.000.
- Smith, Christopher E., to United Parcel Service of America, Inc. Method and apparatus for decoding bar code symbols using gradient signals. 5,412,197, Cl. 235-462.000.
- Smith, Craig M.: See—  
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- Smith, Frank W.: See—  
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- Smith, Gary C.: See—  
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- Smith, Gordon J.: See—  
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- Smith, Irl W.; and Dorschner, Terry A., to Raytheon Company. Diagonal pathlength control. 5,412,475, Cl. 356-350.000.
- Smith, Jay A., to North American Drager. Integrated oxygen ratio controller. 5,411,019, Cl. 128-203.250.
- Smith, Jeanine A.: See—  
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- Smith, Jeffrey A.: See—  
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- Smith, Jeffrey K.; and Stapulionis, Sean A., to AlliedSignal Inc. Optimum conversion chamber. 5,411,652, Cl. 204-224.00R.
- Smith, Jerry W.: See—  
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- Smith, Joseph G., Jr.: See—  
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- Smith, Judy F., to Dittler Brothers Incorporated. Game. 5,411,260, Cl. 273-139.000.
- Smith, Keith J.: See—  
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- Smith, Leslie P. Window badge. 5,410,827, Cl. 40-1.500.
- Smith, Mark A.: See—  
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- Smith, Michael R. Puzzles and toys (II). 5,411,262, Cl. 273-157.00R.
- Smith, Nels R.: See—  
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- Smith, Nicholas J. G.: See—  
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- Smith, Paul C.; and Smith, Barbara J. Laundry area organizer disposed between a clothes washer and dryer. 5,411,164, Cl. 220-334.000.
- Smith, Steven D.: See—  
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- Smith, William: See—  
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- Smitley, Marion L., to Potoroka, Walter, Sr. Internal combustion engine fuel injection apparatus and system. 5,411,002, Cl. 123-497.000.
- Smolarek, James; and Potempa, Kevin J. Cryogenic rectification system for lower pressure operation. 5,410,885, Cl. 62-25.000.
- Smrt, Thomas J. Actuator for aerosol containers and corresponding base. 5,411,184, Cl. 222-402.130.
- Snap-on Incorporated: See—  
Crass, Matthew M.; and Braun, Robert D., 5,412,312, Cl. 324-122.000.
- Snoeren, Rudolph M.; and Slotboom, Jan W., to U.S. Philips Corporation. X-ray examination apparatus with an imaging arrangement having a plurality of image sensors. 5,412,705, Cl. 378-98.300.
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- Societe Anonyme dite: Aerospatiale Societe Nationale: See—  
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- Societe Anonyme: Thermofroid: See—  
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- Societe European De Propulsion: See—  
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- Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA": See—  
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- Sofamor Danek Properties, Inc.: See—  
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- Softride, Inc.: See—  
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- Sogeval S.A.: See—  
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- Solanas, Claude H., III: See—  
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- Sollenberger, Nelson R.: See—  
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- Soma, Takao; Kawasaki, Shinji; Ito, Shigenori; and Yoshioka, Katsuki, to NGK Insulators, Ltd. Method for producing interconnector for solid electrolyte type fuel cell. 5,411,767, Cl. 429-453.000.
- Somatix Therapy Corporation: See—  
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- Sommer, Edward S.: See—  
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- Son, Sehwan: See—  
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- Song, Moon K. Prostate extract supplemented with zinc. 5,411,748, Cl. 424-559.000.
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- Sonobe, Toshimitsu: See—  
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- Sony Corporation: See—  
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- Ishibashi, Akira; and Ogawa, Masamichi, 5,412,223, Cl. 257-14.000.
- Kobayashi, Hiroshi, 5,412,514, Cl. 360-35.100.
- Kunii, Masafumi; and Hayashi, Yuji, 5,412,493, Cl. 359-59.000.
- Ohki, Mitsuharu, 5,412,789, Cl. 395-425.000.
- Ota, Shuichi; Uetake, Akihiro; Sawada, Takashi; and Suzuki, Kazuyoshi, 5,412,525, Cl. 360-132.000.
- Saito, Isao, 5,412,520, Cl. 360-77.150.
- Shirane, Kyoichi, 5,412,629, Cl. 369-32.000.
- Tahara, Katsumi, 5,412,428, Cl. 348-396.000.
- Yokota, Junichi; Okada, Hiroshi; and Yoshioka, Hiroshi, 5,412,513, Cl. 360-32.000.
- Yoshimatsu, Morio, 5,412,307, Cl. 320-44.000.
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- Sorensen, Erling A., to Delta-P Engineering, Inc. Valve actuator. 5,411,239, Cl. 251-58.000.
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- Souiri, Mina: See—  
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- Southwire Company: See—  
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- Sowa, Hans C.: See—  
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- Spahl, Siegfried: See—  
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- Spanton, Stephen G.: See—  
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- Spazierer, Hubert: See—  
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- Specht, Steven J.: See—  
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- Specialty Adhesive Film Co.: See—  
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- Speck, Volker: See—  
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- Spector, Dennis H.: See—  
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- Spector, George: See—  
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- Spectra-Physics Lasers, Inc.: See—  
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- Speece, Richard E.: See—  
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- Spiegelberg, Larry L.: See—  
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- Spiewak, John W.: See—  
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- Spillman, William B., Jr., to Simmonds Precision Products, Inc. Optical spectrum analyzer and encoder using a modulated phase grating wherein said grating diffracts the wavelength as a function of the magnetic field. 5,412,469, Cl. 356-328.000.
- Sporleder, Dirk: See—  
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- Springer, Johannes; and Wickenheisser, Volker, to Heidelberger Druckmaschinen AG. Folding apparatus with rotating vacuum roller. 5,411,245, Cl. 270-20.100.
- Spurr, Robert N.: See—  
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- Square D Company: See—  
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- Squarmount, Inc.: See—  
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- Squatrito, Angelo: See—  
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- Srinivasan, Jagannathan: See—  
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- Stache, Jerome P.: See—  
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- Standard-Thomson Corporation: See—  
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- Stanford Telecommunications, Inc.: See—  
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- Stanley Home Automation: See—  
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- Stanley, Matthew L., to Conoco Inc. Coalbed methane drilling. 5,411,104, Cl. 175-65.000.
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- Starck, Hans; and Dixon, Guy E., III, to Panelfold, Inc. Foldable partition. 5,411,072, Cl. 160-84.110.
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Sumitomo Chemical Company, Limited: See—  
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Takemura, Susumu; Takano, Minoru; Kizawa, Satoru; and Saito, Kazuo, 5,411,935, Cl. 504-243.000.

Yamashita, Kazuyoshi; Saito, Kenji; and Seko, Shinzo, 5,412,106, Cl. 549-70.000.

Sumitomo Electric Industries, Ltd.: See—  
Inada, Hiroshi, 5,411,919, Cl. 437-209.000.

Kuhara, Yoshiki; Koseki, Hideaki; Michikoshi, Hisato; and Tonai, Ichiro, 5,412,229, Cl. 257-183.000.

Sumitomo Electric Lightwave Corp.: See—  
Robblee, John J.; Bohannon, William D., Jr.; and Ewing, Kevin C., 5,410,901, Cl. 72-176.000.

Sumitomo, Hidehiko: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masuhiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.

Sumitomo Metal Mining Co., Ltd.: See—  
Yukinobu, Masaya; Kawata, Munekazu; and Tsukui, Yasuo, 5,411,792, Cl. 428-212.000.

Sumitomo Precision Products Co., Ltd.: See—  
Takahashi, Norio; and Tsujita, Mitsuhiko, 5,411,323, Cl. 303-20.000.

Sumitomo Rubber Industries, Ltd.: See—  
Kurashima, Takao; and Iwanaga, Takeshi, 5,411,255, Cl. 273-78.000.

Sakon, Yutaka, 5,410,868, Cl. 57-213.000.

Sumitomo Seika Chemicals Co.: See—  
Yamashita, Kazuyoshi; Saito, Kenji; and Seko, Shinzo, 5,412,106, Cl. 549-70.000.

Sumitomo Wiring Systems, Ltd.: See—  
Ochi, Hiroyuki, 5,411,419, Cl. 439-787.000.

Ogawa, Shinji; and Matsumoto, Masayoshi, 5,411,410, Cl. 439-336.000.

Ogawa, Shinji; and Matsumoto, Masayoshi, 5,411,411, Cl. 439-336.000.

Ogawa, Shinji; and Matsumoto, Masayoshi, 5,411,412, Cl. 439-336.000.

Summit Technology, Inc.: See—  
Klopotek, Peter J., 5,411,501, Cl. 606-4.000.

Sumrail, Theodore S.; Graham, William H.; Reector, Carl M.; and Reed, Joey M., to Thiokol Corporation. Aluminized eutectic bonded insensitive high explosive. 5,411,615, Cl. 149-47.000.

Sun-Maid Growers of California: See—  
Conley, Bruce G., 5,411,561, Cl. 47-58.000.

Sunaga, Naoki: See—  
Kojima, Tetsuji; Miyashita, Hiromi; Hagiwara, Shigemi; and Sunaga, Naoki, 5,412,490, Cl. 358-473.000.

Sundararajan, Srikanth: See—  
Srikanth, Usha; and Sundararajan, Srikanth, 5,412,758, Cl. 395-75.000.

Sundqvist, Kristian; and Blomqvist, Gunnar, to OY KWH Pipe AB. Method for manufacturing a joint pipe. 5,411,619, Cl. 156-187.000.

Supino, Charles G.: See—  
Kroll, Mark W.; Supino, Charles G.; Adams, Theodore P.; and Brumwell, Dennis A., 5,411,526, Cl. 607-5.000.

Suppelsa, Anthony J.; Darveaux, Robert F.; Goodwin, Thomas A.; Abdala, Julio; and Liebman, Henry F., to Motorola, Inc. Method for attaching a shield. 5,411,199, Cl. 228-179.100.

Surka, Stefan, to United Parcel Service of America, Inc. Method and apparatus for decoding bar code images using multi-order feature vectors. 5,412,196, Cl. 235-462.000.

Sutcliffe, Larrie G.: See—  
Arnold, Hamilton W.; Devasirvathan, Daniel M.; Sollenberger, Nelson R.; Sutcliffe, Larrie G.; and Varma, Vijay K., 5,412,658, Cl. 370-69.100.

Sutton, Jeff R.; and Grau, Juan G., Jr., to Proxim Incorporated. Digital communications equipment using differential quaternary frequency shift keying. 5,412,687, Cl. 375-202.000.

Suwa, Koichi: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa,

Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Suzuka, Shinya, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera having a variable photographing aperture and retractable optical system. 5,412,443, Cl. 354-94.000.

Suzuki, Akira: See—  
Hotta, Harumichi; Suzuki, Akira; and Tozuka, Akira, 5,410,941, Cl. 84-601.000.

Suzuki, Eiko: See—  
Sekiya, Takuro; Kimura, Takashi; Horike, Masanori; Watanabe, Yoshio; Motomura, Shuji; Suzuki, Eiko; Yamaguchi, Takayuki; and Kadonaga, Masami, 5,412,413, Cl. 347-46.000.

Suzuki, Hajime; Kataoka, Kousaku; and Oonishi, Katsuji, to Sanyo Electric Co., Ltd. Dish washing machine. 5,411,042, Cl. 134-57.000.

Suzuki, Haruo: See—  
Omori, Toshimichi; Suzuki, Haruo; Sampei, Tetsuya; Kanero, Takahiro; Nakagawa, Masayoshi; and Kurihara, Masayoshi, 5,411,605, Cl. 148-113.000.

Suzuki, Hiroyuki; and Furukawa, Osamu, to Nikon Corporation. Projection exposure method and apparatus with focus detection. 5,412,214, Cl. 250-548.000.

Suzuki, Isao, to MKS Japan, Inc. Mass flow sensor. 5,410,912, Cl. 73-204.150.

Suzuki, Junichiro, to NGK Spark Plug Co., Ltd. Silicon nitride base sintered body. 5,411,923, Cl. 501-97.000.

Suzuki, Katsuhiko: See—  
Kawabe, Satomi; Suzuki, Katsuhiko; Nakayama, Tomoyuki; and Hoshino, Hiroyuki, 5,411,850, Cl. 430-567.000.

Suzuki, Katsunori, to Mitsubishi Denki Kabushiki Kaisha. Serial data transfer device. 5,412,610, Cl. 365-219.000.

Suzuki, Kazuhiro: See—  
Inokuti, Yukio; Suzuki, Kazuhiro; and Hina, Eiji, 5,411,604, Cl. 148-112.000.

Suzuki, Kazuyoshi: See—  
Ota, Shuichi; Uetake, Akihiro; Sawada, Takashi; and Suzuki, Kazuyoshi, 5,412,525, Cl. 360-132.000.

Suzuki, Kenji, to Fuji Photo Film Co., Ltd. Photographic printing apparatus and method. 5,412,451, Cl. 355-68.000.

Suzuki, Masahiro: See—  
Ejima, Satoshi; and Suzuki, Masahiro, 5,412,424, Cl. 348-252.000.

Suzuki Motor Corporation: See—  
Narita, Masaki, 5,411,007, Cl. 123-690.000.

Suzuki, Satoshi: See—  
Ikeda, Takashi; and Suzuki, Satoshi, 5,412,156, Cl. 84-635.000.

Mizuno, Yoshiyuki; Ii, Hidehiro; Suzuki, Satoshi; and Tonooka, Yukihisa, 5,412,271, Cl. 310-71.000.

Suzuki, Takashi: See—  
Matsuda, Haruo; Nishinaka, Shigeyuki; and Suzuki, Takashi, 5,411,881, Cl. 435-240.270.

Suzuki, Tatsundo: See—  
Hamamoto, Nobuo; Onishi, Tadashi; Suzuki, Tatsundo; Nagata, Minoru; Mizuishi, Kenichi; and Tyojamaro, Yosuke, 5,412,719, Cl. 380-9.000.

Svenska Rotor Maskiner AB: See—  
Lundin, Stig; and Saletti, Hakan, 5,411,387, Cl. 418-201.200.

Soderlund, Frits, 5,411,388, Cl. 418-203.000.

Swanson, David K.; Ideker, Raymond E.; and Walcott, Greg., to Cardiac Pacemakers, Inc.; and Duke University. Dual capacitor biphasic defibrillator waveform generator employing selective connection of capacitors for each phase. 5,411,525, Cl. 607-5.000.

Swars, Helmut, to Emitec Gesellschaft fuer Emissionstechnologie mbH. Electrically heatable honeycomb body, in particular catalyst carrier body, with internal support structures. 5,411,711, Cl. 422-177.000.

Swartz, Jerome; and Sanders, Robert, to Symbol Technologies, Inc. Mobile point-of-sale supermarket checkout system. 5,412,193, Cl. 235-383.000.

Sweeney, Charles T. Electrolytic cell and electrodes therefor. 5,411,655, Cl. 204-256.000.

Sweetheart Cup Company Inc.: See—  
Shah, Basit H., 5,411,683, Cl. 264-50.000.

Swidler, Ronald, to Lommtech International Management Corporation. Electrophotographic toner and developer compositions and color reproduction processes using same. 5,411,833, Cl. 430-109.000.

Swift, Graham: See—  
Holy, Norman L.; Bortnick, Newman M.; Swift, Graham; and Hughes, Kathleen A., 5,412,026, Cl. 525-54.310.

Swinburne Limited: See—  
Mainwaring, David E.; and Guy, David W., 5,411,560, Cl. 44-592.000.

Swirhun, Stanley E.; and O'Neill, Thomas J., Jr., to Photonics Research Incorporated. Linear polarization of semiconductor laser. 5,412,680, Cl. 372-45.000.

Symbol Technologies, Inc.: See—  
Dvorkis, Paul, 5,412,198, Cl. 235-472.000.

Swartz, Jerome; and Sanders, Robert, 5,412,193, Cl. 235-383.000.

Symtron Systems, Inc.: See—  
Rogers, William; Ernst, James J.; Williamson, Steven; and Musto, Dominick J., 5,411,397, Cl. 434-226.000.

Syntex (U.S.A.) Inc.: See—  
Clark, Robin D.; Fisher, Lawrence E.; Flippin, Lee A.; Martin, Michael G.; and Stabler, Stephen R., 5,412,102, Cl. 548-253.000.

Systemix, Inc.: See—  
Mayo, Susan K.; Namikawa, Reiko; Kaneshima, Hideto; and McCune, Joseph M., 5,411,749, Cl. 424-578.000.



Szabo, Kurt P.: See—  
Gruodis, Algirdas J.; Patel, Piyushkumar C.; and Szabo, Kurt P., 5,412,665, Cl. 371-27.000.

Ta Yen Paper Box Container Co., Ltd.: See—  
Kuo, Shin C., 5,411,786, Cl. 428-184.000.

Tabb, David L., to Du Pont de Nemours, E. I., and Company: Curable elastomeric blends. 5,412,034, Cl. 525-194.000.

Tabuchi, Masayuki: See—  
Fukunaga, Satoru; Hisatomi, Junichirou; Nakamura, Kazuhiro; Ohi, Ken'ichi; Tanaka, Hideki; and Tabuchi, Masayuki, 5,412,314, Cl. 324-158.100.

Tachibana, Kiyomi; Sakuta, Koji; and Isobe, Kenichi, to Kose Corporation; and Shin-Etsu Chemical Co., Ltd.: Silicone polymer, paste-like silicone composition, and w/o-type cosmetic composition comprising the same. 5,412,004, Cl. 524-27.000.

Tachibana, Kozo: See—  
Shinkai, Seiji; Matsuda, Tsutomu; Arimura, Takashi; Kawabata, Hirosuke; and Tachibana, Kozo, 5,412,114, Cl. 549-354.000.

Tackett, James E., to Marathon Oil Company: Method for measuring physical properties of hydrocarbons. 5,412,581, Cl. 364-498.000.

Tada, Hirohiko; and Kurokawa: Akihiro, to Mitsubishi Precision Co., Ltd.: Optical gyro with expanded detectable range of input rotation angular velocity and optical waveguide-type phase modulator used in the same. 5,412,471, Cl. 356-350.000.

Taga, Yutaka: See—  
Ando, Masahiko; Noda, Koji; Yamamoto, Yoshihisa; Hayabuchi, Masahiro; Tsukamoto, Kazumasa; Hojo, Yasuo; Taga, Yutaka; Oba, Hidehiro; and Kubo, Seitoku, 5,411,451, Cl. 477-144.000.

Tagata, Shuji; and Sai, Fumio, to Kao Corporation: Detergent composition having a sulfosuccinic amide. 5,411,674, Cl. 252-117.000.

Tagawa, Masahiro: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Tahara, Katsumi, to Sony Corporation: Encoding method and decoding method of color signal component of picture signal having plurality resolutions. 5,412,428, Cl. 348-396.000.

Tahara, Yoshifumi: See—  
Hori, Masaru; Okano, Haruo; Aoyama, Michishige; Ito, Masao; Hattori, Kei; Higuchi, Fumihiko; and Tahara, Yoshifumi, 5,411,631, Cl. 216-72.000.

Taiwan Semiconductor Manufacturing Company: See—  
Yoo, Chue-San; Tsaur, Jyh-Min; Chen, Chong-Shi, and Tseng, Pin-Nan, 5,411,907, Cl. 437-44.000.

Taiyo Yuden Co., Ltd.: See—  
Kazama, Satoshi; and Imaizumi, Tatsuya, 5,412,359, Cl. 333-206.000.

Takagi, Yoichi; and Fujiwara, Kazunori, to Hitachi, Ltd.: Method and device for pattern form recognition and automatic pattern match cutting device. 5,412,578, Cl. 364-474.340.

Takahara, Kazuko; Ishii, Kazuhiko; and Sato, Hideyuki, to Hitachi, Ltd.: Process monitoring system and a window displaying method therefor. 5,412,400, Cl. 345-119.000.

Takahashi, Hiroshi; and Sakaue, Shinsuke, to Nissan Motor Co., Ltd.: Gear shift control apparatus. 5,411,449, Cl. 477-120.000.

Takahashi, Kazuhide: See—  
Ogawa, Atsushi; Minakawa, Kuninori; and Takahashi, Kazuhide, 5,411,614, Cl. 148-670.000.

Takahashi, Norio; and Tsujita, Mitsuhiro, to Sumitomo Precision Products Co., Ltd.: Automatic brake control apparatus and a brake pressure control valve. 5,411,323, Cl. 303-20.000.

Takahashi, Shoji: See—  
Miyamoto, Kouichi; and Takahashi, Shoji, 5,410,933, Cl. 83-783.000.

Takahashi, Yoichi: See—  
Shimada, Yuji; Takahashi, Yoichi; and Noda, Koji, 5,410,877, Cl. 60-302.000.

Takakura, Eiichi: See—  
Nagayoshi, Atsushi; Higuchi, Koichi; Yamaguchi, Kazutoshi; Takakura, Eiichi; Saito, Masataka; and I. Fusanori, 5,412,733, Cl. 381-74.000.

Takamoto, Kenji: See—  
Todokoro, Hideo; Takamoto, Kenji; Otake, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiko; Ninomiya, Ken; and Kure, Tokuo, 5,412,210, Cl. 250-310.000.

Takano, Isamu, to NEC Corporation: High frequency amplifier. 5,412,339, Cl. 330-54.000.

Takano, Manabu: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Takano, Minoru: See—  
Takemura, Susumu; Takano, Minoru; Kizawa, Satoru; and Saito, Kazuo, 5,411,935, Cl. 504-243.000.

Takaoka, Masahiko: See—  
Yahagi, Hideo; Takaoka, Masahiko; Hoshikawa, Shingo; Miyoshi, Takeshi; and Okada, Keiji, 5,411,274, Cl. 277-203.000.

Takara, Yoshifumi: See—  
Hirano, Yoshihisa; Takara, Yoshifumi; and Ogasawara, Masahiro, 5,411,624, Cl. 156-345.000.

Takasago International Corporation: See—  
Takaya, Hidemasa; Ohta, Tetsuo; Kumobayashi, Hidenori; Okeda, Yoshiki; and Gonda, Yoshiharu, 5,412,109, Cl. 549-263.000.

Takasaki, Naruto; and Tanaka, Yutaka, to Hitachi Software Engineering Co., Ltd.: Method for the detection of line width of line image in image processor. 5,412,742, Cl. 382-316.000.

Takaya, Hidemasa; Ohta, Tetsuo; Kumobayashi, Hidenori; Okeda, Yoshiki; and Gonda, Yoshiharu, to Takasago International Corporation: Process for preparing optically active 4-methyl-2-oxetanone. 5,412,109, Cl. 549-263.000.

Take, Masao: See—  
Okazaki, Akira; Matsuda, Shinichi; Lee, Takanobu; Matsushita, Ikuo; and Take, Masao, 5,412,266, Cl. 310-40.0MM.

Takeda Chemical Industries, Ltd.: See—  
Akiyama, Koichi; Miyashita, Hiromu; Aoki, Sanji; Hatta, Ken; Ino, Takashi; and Mishima, Yasuhiro, 5,412,003, Cl. 523-513.000.

Takeda, Fumiteru; and Fumihiko, Ojima, to Yamaha Corporation: Tone color control apparatus for musical tone signal producer. 5,412,154, Cl. 84-622.000.

Takeda, Kinji; and Kori, Yukiko, to Kabushiki Kaisha Takeda: Rimless spectacles with adjustable temples and lenses. 5,412,440, Cl. 351-110.000.

Takeda, Nobutoshi: See—  
Matsuoka, Yoshihiro; Takeda, Nobutoshi; and Mizuhashi, Tohru, 5,412,747, Cl. 385-85.000.

Takeda, Toshihiko: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Takeda, Yoshiyuki: See—  
Matsuo, Takeshi; Takeda, Yoshiyuki; Yoshida, Takeshi; Kakuta, Masayuki; Kida, Yasuhiko; and Harada, Hiroyuki, 5,412,462, Cl. 355-308.000.

Takei, Seiji; and Hara, Takehiko, to Nippon Thompson Co., Ltd.: Rolling guide unit. 5,411,334, Cl. 384-45.000.

Takemura, Hiromichi; and Murakami, Yasuo, to NSK Ltd.: Rolling bearing. 5,411,336, Cl. 384-492.000.

Takemura, Susumu; Takano, Minoru; Kizawa, Satoru; and Saito, Kazuo, to Sumitomo Chemical Co., Ltd.: Dihydrobenzofuran derivatives, their production and use. 5,411,935, Cl. 504-243.000.

Taketa, Kaoru: See—  
Ikeda, Norihiko; and Taketa, Kaoru, 5,411,911, Cl. 437-52.000.

Takeuchi, Akihiko: See—  
Ono, Kazuaki; Tanigawa, Koichi; Takeuchi, Akihiko; Motoyama, Hajime; and Miyamoto, Toshio, 5,412,455, Cl. 355-219.000.

Takeuchi, Makoto: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Taki, Osamu: Soil solidification apparatus with a shear blade of adjustable length and rotation speed for creating a ribbed soil-cement pile. 5,411,353, Cl. 405-241.000.

Talalay, Paul: See—  
Cho, Cheon-Gyu; Posner, Gary H.; Talalay, Paul; and Zhang, Yuesheng, 5,411,986, Cl. 514-514.000.

Tam, Karman; Moe, Erik; and Kupferman, Hanan, to Mitsumi Electric Co., Ltd.: Disk drive power control circuit and method. 5,412,809, Cl. 395-750.000.

Tam, Man C., to Xerox Corporation: Heat development process of migration imaging members. 5,411,825, Cl. 430-41.000.

Tamai, Satoshi; Abe, Takao; and Nagase, Yunosuke, to Lederle (Japan), Ltd.: Process for preparing (1R,5S,6S)-2-[(6,7-dihydro-5H-pyrazolo [1,2-A][1,2,4]triazolium-6-yl)thio-6-[(R)-1-hydroxyethyl]-1-methyl-carbapenem-3-carboxylate and starting materials thereof. 5,412,103, Cl. 548-365.100.

Tamaki, Sayuri: See—  
Taniguchi, Takao; Iizuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shinichi; and Yamashita, Tadakazu, 5,411,558, Cl. 44-301.000.

Tamao, Kohei: See—  
Ito, Yoshihiko; Tamao, Kohei; Yamaguchi, Shigehiro; and Nakagawa, Yoshiki, 5,412,105, Cl. 549-4.000.

Tamarkin, Dov: See—  
Eini, Meir; and Tamarkin, Dov, 5,411,992, Cl. 514-731.000.

Tamura, Hiroshi; Mishima, Naoshi; and Kawasaki, Yoshiaki, to Ricoh Company, Ltd.: Electrophotographic photoconductor. 5,411,827, Cl. 430-58.000.

Tamura, Toshiharu, to Japan Bonkote Company Limited: Iron-tip temperature detector of electric soldering iron. 5,412,178, Cl. 219-241.000.

Tamura, Toshinari: See—  
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 5,412,096, Cl. 546-16.000.

Tan, Kuang L.: See—  
Kang, En-Tang; Ting, Yen P.; Neoh, Koon G.; and Tan, Kuang L., 5,411,573, Cl. 75-721.000.

Tanaka, Hideki: See—  
Fukunaga, Satoru; Hisatomi, Junichirou; Nakamura, Kazuhiro; Ohi, Ken'ichi; Tanaka, Hideki; and Tabuchi, Masayuki, 5,412,314, Cl. 324-158.100.

Tanaka, Hidemasa, to Fujitsu Limited: Facsimile machine capable of transmitting voice messages. 5,412,710, Cl. 379-67.000.

Tanaka, Hiromi: See—  
Yoshida, Makoto; Shimizu, Kazuyuki; Morita, Eiichi; Fujimori, Masato; and Tanaka, Hiromi, 5,411,589, Cl. 118-688.000.

Tanaka, Katsunori: See—  
Fukue, Ichiro; Mandai, Shigemi; Tanaka, Katsunori; Kawabata, Hitoshi; Sato, Nobuo; Nishida, Hiroyuki; and Gora, Tetsuo, 5,410,884, Cl. 60-747.000.

Tanaka, Keishin; Hikichi, Toichiro; and Kumagai, Chiaki, to Honda Giken Kogyo Kabushiki Kaisha: Two wheeled vehicle braking system using a target slippage ratio for control. 5,411,325, Cl. 303-100.000.

Tanaka, Kenichi: See—  
Yamauchi, Yoshimitsu; Tanaka, Kenichi; Sakiyama, Keizo; and Ayukawa, Akitsu, 5,411,904, Cl. 437-43.000.

Tanaka, Masakazu; Mori, Hiroshi; and Mabuchi, Mamoru, to Nippondenso Co., Ltd.: Exhaust-gas purification device for an internal combustion engine or the like. 5,410,875, Cl. 60-288.000.

Tanaka, Naoki: See—  
Okawa, Yasuo; Ito, Akiyoshi; Hayasaka, Hiroshi; Saeki, Toshio; Tanaka, Naoki; and Sugawara, Kiyobumi, 5,410,847, Cl. 52-272.000.

Tanaka, Norihiko; Okui, Kazuyuki; Doi, Yasuhiro; Sato, Hirotaka; and Yorozu, Hidenori, to Kao Corporation: Bath additive composition comprising aluminum salt and carbonate or bicarbonate which yields a bath water of pH 8 to 9. 5,411,731, Cl. 424-78.020.

Tanaka, Ryoichi: See—  
Miyama, Hiroshi; Ohki, Tetsuhiko; Kaji, Hitoshi; Shimizu, Ryo-suke; Tanaka, Ryoichi; Matsuo, Mamoru; Kawamoto, Masao; and Kikukawa, Hiroyuki, 5,410,988, Cl. 122-250.00R.

Tanaka, Tatsuo: Specifically configured sheet members or articles for use in improving sound or image quality. 5,412,541, Cl. 361-818.000.

Tanaka, Tutomu: See—  
Yamamoto, Tokihiko; Yamaoka, Tomoyuki; Yoshida, Yoshiaki; Shin, Kazuo; Aoshima, Hiromitsu; and Tanaka, Tutomu, 5,411,993, Cl. 514-766.000.

Tanaka, Yukio; Yamada, Kenichi; and Ogura, Taketsugu, to Murata Manufacturing Co., Ltd.: Screen printing apparatus. 5,410,957, Cl. 101-127.000.

Tanaka, Yuko, to Kabushiki Kaisha Toshiba: Three-dimensional image display apparatus using numerical projection. 5,412,764, Cl. 395-124.000.

Tanaka, Yutaka: See—  
Takasaki, Naruto; and Tanaka, Yutaka, 5,412,742, Cl. 382-316.000.

Tanemoto, Kei: See—  
Kanai, Takao; Tanemoto, Kei; Yamazaki, Shuichi; and Nagashima, Takeo, 5,411,808, Cl. 428-472.000.

Tang, Peng C.: See—  
Rao, Narasinga; Tang, Peng C.; and Musser, John H., 5,412,123, Cl. 552-209.000.

Tang, Reginald T.-H.; Mares, Frank; Boyle, William J., Jr.; Chiu, Tin-Ho; and Patel, Kundanbhai M., to United States Surgical Corporation: Medical devices fabricated from homopolymers and copolymers having recurring carbonate units. 5,412,068, Cl. 528-370.000.

Tani, Hiroji: See—  
Nakamura, Kazutaka; Tani, Hiroji; Yoneda, Yasunobu; and Sakabe, Yukio, 5,412,357, Cl. 333-181.000.

Tanigawa, Koichi: See—  
Ono, Kazuaki; Tanigawa, Koichi; Takeuchi, Akihiko; Motoyama, Hajime; and Miyamoto, Toshio, 5,412,455, Cl. 355-219.000.

Taniguchi, Harutaka: See—  
Kawashima, Tomoyuki; Kato, Hisato; Shibata, Kazuyoshi; and Taniguchi, Harutaka, 5,411,759, Cl. 427-58.000.

Taniguchi, Junko; Yamaguchi, Noriyuki; Kurashita, Takuji; Ishizuka, Mitsuru; and Yao, Masaharu, to Mitsubishi Denki Kabushiki Kaisha: Luminance and chrominance signals separating filter adaptive to movement of image. 5,412,434, Cl. 348-669.000.

Taniguchi, Takao; Iizuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shinichi; and Yamashita, Tadakazu, to Kao Corporation; and Nippon Oil Company, Limited: Heavy oil emulsion fuel and process for production thereof. 5,411,558, Cl. 44-301.000.

Tanikoshi, Sadao, to Kabushiki Kaisha Toshiba: Shield structure for use in microwave circuit device. 5,412,340, Cl. 330-68.000.

Tanuma, Chiaki; Saito, Mitsunaga; and Osugi, Yukihiko, to Kabushiki Kaisha Toshiba; and Tokyo Electric Co., Ltd.: Developing apparatus. 5,412,456, Cl. 355-245.000.

Tanzer, Richard W.; Abuto, Frank P.; Kellenberger, Stanley R.; Laux, Daniel R.; Nortman, Brian K.; Pomplun, William S.; Rippl, Carl G.; Robinson, Mark L.; Sallee, Lorry F.; Yarbrough, Sandra M.; and Zenker, David L., to Kimberly-Clark Corporation: Absorbent article which includes superabsorbent material located in discrete pockets having an improved containment structure. 5,411,497, Cl. 604-368.000.

Taphorn, Joseph B.: See—  
Adsett, Willie, 5,410,960, Cl. 101-363.000.

Tarcsay, Lajos: See—  
Odink, Karel G.; Tarcsay, Lajos; Bruggen, Josef; Wiesendanger, Walter; Cerletti, Nico; Sorg, Clemens; DeWolf-Peters, Christiane; and Delabie, Jan, 5,411,882, Cl. 435-240.200.

Tashiro, Yoshihisa, to Isuzu Motors Limited: Apparatus for diminishing nitrogen oxides. 5,410,873, Cl. 60-276.000.

Tastemaker: See—  
Cohen, A. M.; Lenselink, W.; and van Ek, C., 5,412,121, Cl. 549-477.000.

Tate, John: See—  
Nagasawa, Mitsuru; Tate, John; and Trojan, R. Joseph, 5,411,194, Cl. 224-254.000.

Taylor, Byron D.: Soil sampler. 5,411,087, Cl. 166-264.000.

Taylor, James W.: See—  
Murray, Rex E.; Eaton, Robert F.; Upshaw, Thomas A.; Taylor, James W.; Bassett, David R.; and Lincoln, David M., 5,412,038, Cl. 525-303.000.

Taylor, William L.: Pasta-based food product. 5,411,752, Cl. 426-94.000.

TEAC Corporation: See—  
Sakaguchi, Takahiro; Abe, Yohji; and Sugahara, Hiroshi, 5,412,273, Cl. 310-268.000.

Techlam: See—  
Senes, Rene; and Thuet, Sylvain, 5,410,969, Cl. 105-215.100.

Technical Research Associates, Inc.: See—  
Weeks, Joseph K., Jr., 5,410,796, Cl. 29-419.100.

Tedeschi, Jeffrey B.: See—  
Goldstein, Gary W.; and Tedeschi, Jeffrey B., 5,411,518, Cl. 606-202.000.

Teener, Michael D.: See—  
Van Brunt, Roger; Hillman, Daniel L.; Nilson, Christopher; Opre-scu, Florin; and Teener, Michael D., 5,412,698, Cl. 375-373.000.

Tehrani, Saied: See—  
Goronkin, Herbert; Shen, Jun; and Tehrani, Saied, 5,412,224, Cl. 257-15.000.

Tektronix, Inc.: See—  
Meadows, R. David; Price, David H.; and Hubert, Joseph H., 5,412,579, Cl. 364-487.000.

Ravel, Mihir K.; Jones, Michael D.; and Pepper, Steven H., 5,412,330, Cl. 324-753.000.

Telecom Etablissement autonome de droit public and la Poste-Eta-blissement autonome de droit public: See—  
Nevoux, Rola; and Hiole, Philippe, 5,412,726, Cl. 380-24.000.

Telefonaktiebolaget LM Ericsson: See—  
Naslund, Jonas; Johansson, Thomas; and Dahlstrom, Johan, 5,412,725, Cl. 380-23.000.

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Millet, Jean-Marie; and Makuc, Daniel, 5,410,828, Cl. 40-316.000.

Telequip Corporation: See—  
Jones, Michael F., 5,412,730, Cl. 380-46.000.

Temple, James M.; Bergh, James A.; and Stanley, Robert P., to Case Logic, Inc.: Container for compact disks and the like. 5,411,134, Cl. 206-45.130.

Tench, D. Morgan, to Rockwell International Corporation: Hydrogen assisted reduced oxide soldering system. 5,411,645, Cl. 204-140.000.

Tennican, Patrick O.; Phipps, L. Myles; and Michaelsen, Russell A., to Hyprotek: Catheter access system and method. 5,411,485, Cl. 604-191.000.

Tennican, Patrick O.; Phipps, L. Myles; and Michaelsen, Russell A., to Hyprotek, Inc.: Initialization and access system for multi-lumen central venous catheters. 5,411,490, Cl. 604-236.000.

Terada, Yukio, to King Printing Co., Ltd.: Textile printing process. 5,411,557, Cl. 8-444.000.

Teradaira, Mitsuaki, to Seiko Epson Corporation: Architecture and method for supporting enable/disable of printer panel switching by a host computer. 5,412,761, Cl. 395-111.000.

Terashima, Kazutaka: See—  
Sasaki, Hitoshi; Tokizaki, Eiji; and Terashima, Kazutaka, 5,410,914, Cl. 73-437.000.

Terrazas, Luis: Neck relaxer. 5,411,471, Cl. 602-18.000.

Terry, John P.: See—  
Hollis, C. George; Terry, John P.; and Jaquess, Percy A., 5,411,666, Cl. 210-632.000.

Terumo Kabushiki Kaisha: See—  
Fujii, Tadashi; and Ishida, Shinji, 5,411,535, Cl. 607-32.000.

Teske, Richard E.: See—  
Laskaris, Michael A.; and Teske, Richard E., 5,411,100, Cl. 169-14.000.

Teta, Jeffrey M.: Outdoor cooking device. 5,411,011, Cl. 126-50.000.

Teuten, Craig S.: Adjustable frame bow making device. 5,411,188, Cl. 223-46.000.

Teutsch, Jean-Georges: See—  
Gaillard-Kelly, Martine; Goubet, Francois; Philibert, Daniel; and Teutsch, Jean-Georges, 5,411,981, Cl. 514-386.000.

Texaco Inc.: See—  
Marrelli, John D.; Durrett, Michael G.; Helms, David A.; Pepin, Lisa L.; and Hatton, Gregory J., 5,412,326, Cl. 324-640.000.

Texas Aluminum Industries, Inc.: See—  
Christopher, Michael E., 5,410,849, Cl. 52-309.200.

Texas Instrument Incorporated: See—  
Santini, Giovanni; Naso, Giovanni; D'Arrigo, Sebastiano; and Smayling, Michael C., 5,411,908, Cl. 437-52.000.

Texas Instruments Incorporated: See—  
Boysel, R. Mark, 5,411,426, Cl. 445-25.000.

Clapp, John S., III, 5,412,531, Cl. 361-190.000.

Gale, Richard O., 5,412,186, Cl. 219-679.000.

Hornbeck, Larry J., 5,411,769, Cl. 427-534.000.

Magel, Gregory A.; and Stoltz, Richard A., 5,412,593, Cl. 365-96.000.

Matthews, Mark; and Weidman, Michael R., 5,411,152, Cl. 209-668.000.

Schreck, John F.; Kaya, Cetin; and McElroy, David J., 5,412,603, Cl. 365-189.010.

Texter, John; and Willis, Roland G., to Eastman Kodak Company: Low volume processing for establishing boundary conditions to control developer diffusion in color photographic elements. 5,411,840, Cl. 430-380.000.



- Thangavelu, Kandasamy; and Pullala, Venkataramana S., to Otis Elevator Company. Arrival time determination for passengers boarding an elevator car. 5,411,118, Cl. 187-392.000.
- Thayer, Bruce E., to Xerox Corporation. Friction load insensitive mounting for blade. 5,412,461, Cl. 355-299.000.
- Thebault, Jacques; Seron, Alain; and Beguin, Francois, to Societe European De Propulsion. Method of obtaining a sialon-based ceramic material by reducing an aluminosilicate material, and use thereof in forming a ceramic coating on a refractory substrate. 5,411,762, Cl. 427-226.000.
- Theofan, Georgia: See—  
Grinna, Lynn; Theofan, Georgia; and Parsons, Thomas F., 5,411,941, Cl. 514-12.000.
- Therma-Wave, Inc.: See—  
Rosencwaig, Allan; Danville; and Willenborg, David L., 5,412,473, Cl. 356-351.000.
- Thermo King Corporation: See—  
Sjoholm, Lars I.; Erickson, Lee J.; and Freund, Peter W., 5,410,889, Cl. 62-160.000.
- Theurer, Rudolf: See—  
Nowak, Gerhard; Winter, Alfred; Theurer, Rudolf; Morbitzer, Hans-Peter; Kruschik, Klaus; and Wieser, Peter, 5,411,283, Cl. 280-618.000.
- Thiebaut, Jean-Marie: See—  
Roussy, Georges; Marchand, Christophe; Thiebaut, Jean-Marie; Souiri, Mina; Kienemann, Alain; Petit, Corinne; and Maire, Gilbert, 5,411,649, Cl. 204-157.430.
- Thieroff-Ekerdt, Ruth: See—  
Neef, Gunter; Steinmeyer, Andreas; Kirsch, Gerald; Schwarz, Katka; Haberey, Martin; Thieroff-Ekerdt, Ruth; and Rach, Petra, 5,411,949, Cl. 514-167.000.
- Thiokol Corporation: See—  
Sumrail, Theodore S.; Graham, William H.; Rector, Carl M., and Reed, Joey M., 5,411,615, Cl. 149-47.000.
- Thomas & Betts Corporation: See—  
Okuyama, Hideki; Yamamoto, Masahiro; and Sonobe, Toshimitsu, 5,411,399, Cl. 439-67.000.
- Thomas G. Faria Corporation: See—  
Blackburn, David A., 5,410,913, Cl. 73-313.000.
- Thomas, Gareth D.: See—  
Parnell, Aaron T.; and Thomas, Gareth D., 5,411,383, Cl. 418-48.000.
- Thomas, Glenn A.; James, Simon M.; and Rowe, Christopher J., to British Telecommunications public limited company. Apparatus and method for monitoring losses in a branched optical fibre network. 5,412,464, Cl. 356-73.100.
- Thomas, John E.; Boche, Daniel K.; Decker, James D.; and Copeland, James L., to Ecobal Inc. Solid detergent dispenser for floor scrubber machine. 5,411,716, Cl. 422-264.000.
- Thomas, Keith. Electronic fluid sensing actuating target apparatus. 5,411,269, Cl. 273-349.000.
- Thomas, Mark S.: See—  
Arstein, David M.; Geller, William L.; Gles, Thomas E.; and Thomas, Mark S., 5,412,498, Cl. 359-189.000.
- Thomas, Michael E., to National Semiconductor Corporation. Method of making electrostatic switches for integrated circuits. 5,410,799, Cl. 29-622.000.
- Thomas, Robert J.; and Chang, Hsueh-Rong, to General Electric Company. Using a magnetic field to locate an amalgam in an electrodeless fluorescent lamp. 5,412,289, Cl. 315-248.000.
- Thomas, Ronald E., to Osram Sylvania Inc. Lamp socket. 5,411,407, Cl. 439-271.000.
- Thomas, Simon W. H.; and Pruehsner, William R., to Corometrics Medical Systems, Inc. Fetal pulse oximetry sensor. 5,411,024, Cl. 128-634.000.
- Thomas, Stephen P. Ear piercing device and method. 5,411,516, Cl. 606-188.000.
- Thomascik, Terrance A. Skijor belt. 5,411,461, Cl. 482-124.000.
- Thomasson, Samuel L. Apparatus and method for reducing acoustic feedback. 5,412,734, Cl. 351-83.000.
- Thompson, Cecil E., Jr.: See—  
Thompson, Myron P.; and Thompson, Cecil E., Jr., 5,411,009, Cl. 124-89.000.
- Thompson, David R.: See—  
Nicolas, Patrick S., Jr.; Bikson, Benjamin; Giglia, Salvatore; and Thompson, David R., 5,411,662, Cl. 210-321.800.
- Thompson, Mitchell D.: See—  
Josephson, Stanley M.; Kopesec, Michael F.; Royal, P. Darrell; Stephens, Thomas S.; and Thompson, Mitchell D., 5,412,190, Cl. 235-379.000.
- Thompson, Myron P.; and Thompson, Cecil E., Jr. Compound bow anti vibration and noise device. 5,411,009, Cl. 124-89.000.
- Thompson, Robert W., Jr.: See—  
Bauman, Douglas A.; Lowenfeld, Simon; Schultz, Brian A.; and Thompson, Robert W., Jr., 5,412,756, Cl. 395-50.000.
- Thomson Consumer Electronics, Inc.: See—  
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- Helfrich, Kenneth J., 5,412,290, Cl. 315-371.000.
- Thomson-CSF: See—  
Delage, Sylvain; Blanck, Herve; and Cassette, Simone, 5,411,632, Cl. 156-652.100.
- Wolk, Ivan; and Boulzaguet, Guy, 5,412,310, Cl. 323-355.000.
- Thomson, Linda L.: See—  
Bogart, Frank J.; Butterfield, Bruce D.; Chavez, David L., Jr.; Dittmer, Henry C.; Fix, Frederick R.; Hardouin, Larry J.; Schmidt, Nancy K.; and Thomson, Linda L., 5,412,714, Cl. 379-221.000.
- Thor, Eric J.; McIntosh, Kevin D.; Jones, Bruce R.; and Dando, Jeremy D., to Avecor Cardiovascular Inc. Combined cardiomy and venous blood reservoir. 5,411,705, Cl. 422-45.000.
- Thorpe, John A.: See—  
Fleming, Christopher A.; Grot, Walther G.; and Thorpe, John A., 5,411,575, Cl. 75-743.000.
- Thorstensen, Eric B.: See—  
Beaudry, Edward R.; Thorstensen, Eric B.; and Duprez, Wayne R., 5,410,991, Cl. 123-41.100.
- Thuet, Sylvain: See—  
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- Tibbling, Lars; and Maus, Roy. Keratometer device having photographically produced bore pattern. 5,412,441, Cl. 351-200.000.
- Tiefel, Thomas H.: See—  
Jin, Sungho; McCormack, Mark T.; and Tiefel, Thomas H., 5,411,814, Cl. 428-692.000.
- Tieszen, Katherine A.: See—  
Peavey, David L.; Tieszen, Katherine A.; Pagnini, Kristina; Schader, Fred E.; Stephens, Timothy D.; Cianos, Nicholas; and Conkle, John R., 5,412,390, Cl. 342-417.000.
- Tillotson, Ltd.: See—  
McCarthy, Gerard; and Bowles, Roger, 5,411,680, Cl. 261-35.000.
- Timken Company, The: See—  
Driver, Richard C., 5,411,335, Cl. 384-448.000.
- Timken, Hye Kyung C.: See—  
Chawla, Birbal; Mazzone, Dominik N.; Sarli, Michael S.; Shih, Stuart S.; and Timken, Hye Kyung C., 5,411,658, Cl. 208-89.000.
- Timm, Heinrich: See—  
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- Ting, Yen P.: See—  
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- Tinti, Maria O.: See—  
Giannesi, Fabio; Bolognesi, Maria L.; Tinti, Maria O.; and De Angelis, Francesco, 5,412,113, Cl. 549-328.000.
- Tippmann, Eugene R. Subatmospheric pressure cook-and-hold steaming method. 5,411,753, Cl. 426-510.000.
- TNS Mills, Inc.: See—  
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- To, Derrick, to Masco Corporation of Indiana. Guide ring for a door knob assembly. 5,411,303, Cl. 292-357.000.
- Toa Medical Electronics Co., Ltd.: See—  
Ogino, Shinichi, 5,412,466, Cl. 356-246.000.
- Tobita, Issei: See—  
Otaka, Tadashi; Okura, Akimitsu; Iwamoto, Hiroshi; Todokoro, Hideo; Komoda, Tsutomu; and Tobita, Issei, 5,412,209, Cl. 250-310.000.
- Tochacek, Miroslav: See—  
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- Toda Kogyo Corp.: See—  
Honmyo, Torayuki, 5,411,801, Cl. 428-402.000.
- Toda, Masaaki; Ohuchida, Shuichi; and Ohno, Hiroyuki, to ONO Pharmaceutical Co., Ltd. Heterocyclic compounds. 5,411,974, Cl. 514-365.000.
- Todokoro, Hideo; Takamoto, Kenji; Otaka, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiko; Ninomiya, Ken; and Kure, Tokuo, to Hitachi, Ltd. Scanning electron microscope and method for production of semiconductor device by using the same. 5,412,210, Cl. 250-310.000.
- Todokoro, Hideo: See—  
Otaka, Tadashi; Okura, Akimitsu; Iwamoto, Hiroshi; Todokoro, Hideo; Komoda, Tsutomu; and Tobita, Issei, 5,412,209, Cl. 250-310.000.
- Togawa, Masatoshi: See—  
Kato, Hidetoshi; Mayumi, Nobuo; and Togawa, Masatoshi, 5,412,323, Cl. 324-429.000.
- Tohoku Chemical Industries, Co., Ltd.: See—  
Yukinobu, Masaya; Kawata, Munekazu; and Tsukui, Yasuo, 5,411,792, Cl. 428-212.000.
- Tokai Kogyo Kabushiki Kaisha: See—  
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- Tokizaki, Eiji: See—  
Sasaki, Hitoshi; Tokizaki, Eiji; and Terashima, Kazutaka, 5,410,914, Cl. 73-437.000.
- Tokumaru, Takeji; and Chiba, Mamoru, to Kabushiki Kaisha Toshiba. Input buffer with level detector circuit. 5,412,259, Cl. 326-21.000.
- Tokyo Electric Co., Ltd.: See—  
Tanuma, Chiaki; Saito, Mitsunaga; and Osugi, Yukihiro, 5,412,456, Cl. 355-245.000.
- Tokyo Electron Limited: See—  
Hirano, Yoshihisa; Takara, Yoshifumi; and Ogasawara, Masahiro, 5,411,624, Cl. 156-345.000.
- Hori, Masaru; Okano, Haruo; Aoyama, Michishige; Ito, Masao; Hattori, Kei; Higuchi, Fumihiko; and Tahara, Yoshifumi, 5,411,631, Cl. 216-72.000.
- Tokyo Electron Yamanashi Limited: See—  
Iino, Shinji; Kubota, Tamio; and Yokota, Keiichi, 5,412,329, Cl. 324-754.000.
- Tokyo Institute of Technology: See—  
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- Tomic, Mladimir: See—  
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- Tomita, Toshihiko: See—  
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- Tonai, Ichiro: See—  
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- Tonooka, Yukihisa: See—  
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- Toppa Moore Co., Ltd.: See—  
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- Toqan, Majed A.: See—  
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- Toriyabe, Keiji: See—  
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- Torrington Company, The: See—  
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- Toshiba Corporation: See—  
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- Toshiba Tungaloy Co., Ltd.: See—  
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- Tosoh Corporation: See—  
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- Totetsu Koun Co., Ltd.: See—  
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- Toth, William D.: See—  
Belec, Eric A.; and Toth, William D., 5,411,250, Cl. 271-185.000.
- Totty, Ronald E., to Harris Corporation. Multiplexing of digitally encoded NTSC and HDTV signals over single microwave communication link from television studio to tower transmitter facility for simultaneous broadcast (simulcast) to customer sites by transmitter facility. 5,412,426, Cl. 348-385.000.
- Tousignant, Lew A., to Minnesota Mining and Manufacturing Company. Flexible thermal transfer apparatus for cooling electronic components. 5,411,077, Cl. 165-104.330.
- Tovey, H. Jonathan; and Scirica, Paul A., to United States Surgical Corporation. Surgical apparatus having hinged jaw structure. 5,411,519, Cl. 606-207.000.
- Tower, William A.: See—  
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- Towle, L. Christopher: See—  
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- Townsend, Wesley P.: See—  
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- Toyama, Kouichi, to Fuji Electric Co., Ltd. Cylindrical container inner surface tester. 5,412,203, Cl. 250-223.00B.
- Toyoko Boreki Kabushiki Kaisha: See—  
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- Yamada, Toshiro; and Nonomura, Chisato, 5,411,695, Cl. 264-211.130.
- Toyoda Gosei Co., Ltd.: See—  
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- Toyota Jidosha Kabushiki Kaisha: See—  
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- Furutani, Masayuki; and Nii, Yoshihide, 5,412,251, Cl. 290-16.000.
- Yahagi, Hideo; Takaoka, Masahiko; Hoshikawa, Shingo; Miyoshi, Takeshi; and Okada, Keiji, 5,411,274, Cl. 277-203.000.
- Yano, Tatsuo; Watanabe, Masayuki; Ota, Kouji; and Matsumoto, Tadayuki, 5,412,759, Cl. 395-83.000.
- Tozuka, Akira: See—  
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- Tozuka, Kenji: See—  
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- Tozuka, Yukitaka, to Toshiba Corporation. Video telephone device with automatic video camera angle adjustment. 5,412,417, Cl. 348-14.000.
- Tracy, David H.: See—  
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- Trainham, James A., III; Law, Clarence G., Jr.; Newman, John S.; Keating, Kenneth B.; and Eames, Douglas J., to Du Pont de Nemours, E. I., and Company. Electrochemical conversion of anhydrous hydrogen halide to halogen gas using a cation-transporting membrane. 5,411,641, Cl. 204-59.00R.
- Traini, Carlo M.; and Maciel, Antonio J. A., to De Nora Permelec do Brasil S.A.; Salgema Industrias Quimicas S.A.; and Maciel, Antonio Jose Acioli. Chlor-alkali electrolysis process carried out in cells provided with porous diaphragms. 5,411,642, Cl. 204-98.000.
- Tramont, Yvette A.: See—  
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- Transitions Optical, Inc.: See—  
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- Travis, Harry; and Grice, Gordon J., to Custom Industrial Products. Self-locking strut nut system. 5,411,356, Cl. 411-85.000.
- Treat, David W.; Bour, David P.; and Paoli, Thomas L., to Xerox Corporation. Multi-beam, orthogonally-polarized emitting monolithic quantum well lasers. 5,412,678, Cl. 372-45.000.
- Treat, Michael R.: See—  
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- Tredici, Gianfranco D.: See—  
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- Treil, Nicolas: See—  
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- Trek Medical Corporation: See—  
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- Tri/Mark Corporation: See—  
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- Tridon Limited: See—  
Anjos, Theodore R.; Reese, Michael H.; Crockett, Watkins, IV; Holz, Gene C.; and Segato, Frank, 5,410,781, Cl. 24-274.00R.
- Trieb, Karl-Heinz: See—  
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- Trimble Navigation Limited: See—  
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- Trojan, R. Joseph: See—  
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 Uramoto, Hiroshi, to Ricoh Company, Ltd. Self-oscillating DC-DC converter with zero voltage switching. 5,412,555, Cl. 363-18.000.  
 Urano, Satoshi: See—  
 Furukawa, Junji; Okamoto, Hiroshi; Onouchi, Yoshio; Andoh, Takashi; and Urano, Satoshi, 5,412,079, Cl. 534-732.000.  
 Urata, Kazumoto; Oguni, Kensaku; Ishibane, Kyuhei; and Katsumata, Naoto, to Hitachi, Ltd. Apparatus for detecting composition of refrigerant and method therefor. 5,410,887, Cl. 62-129.000.  
 Uriya, Susumu; and Nakamura, Atunori, to NEC Corporation. Electronic circuit readily capable of controlling extent of a radio communication zone. 5,412,696, Cl. 375-354.000.



- Ushio, Masaru: See—  
Maruyama, Kazuhisa; Ushio, Masaru; Sato, Junji; Sakata, Satoshi; Kudo, Tomoo; Matsudaira, Tadashi; Watanabe, Hiroyuki; and Maekawa, Yoshikazu, 5,412,295, Cl. 318-434.000.
- Ushio, Yukihide: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.
- Usuda, Shinji: See—  
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 5,412,096, Cl. 546-16.000.
- Usui, Ryuji: See—  
Okada, Kenichi; and Usui, Ryuji, 5,412,472, Cl. 356-350.000.
- Usuki, Masahiro; and Ueno, Susumu, to Shin-Etsu Chemical Co., Ltd. Polymer scale preventive agent, polymerization vessel effective in preventing polymer scale deposition, and process of producing polymer using said vessel, 5,411,675, Cl. 252-181.000.
- Utley, Wayne S., to Vitex Packaging, Inc. Process for making windowed form, fill and seal bags, 5,410,857, Cl. 53-410.000.
- Vaccari, Franco, to Dolomite S.p.A. Ski boot with toe piece and overlapping flap, 5,410,822, Cl. 36-117.000.
- Valence Technology, Inc.: See—  
Chaloner-Gill, Benjamin, 5,411,820, Cl. 429-192.000.
- Koksang, Rene, 5,411,764, Cl. 427-383.700.
- Valiant Machine & Tool, Inc.: See—  
Noestheden, Andrew, 5,411,130, Cl. 198-457.000.
- Vamvakas, Spiro: See—  
Scott, Curtis E.; Arsenia, Vito J.; Vamvakas, Spiro; and Oberle, Joseph C., 5,412,280, Cl. 313-573.000.
- VanBibber, Charles E. Tool used for removing spindle bearings, 5,410,793, Cl. 29-263.000.
- Van Broeck, Didier: See—  
Edmonds-Alt, Xavier; Martinez, Serge; Proietto, Vincenzo; and Van Broeck, Didier, 5,411,971, Cl. 514-318.000.
- Van Brunt, Roger; and Oprescu, Florin, to Apple Computer, Inc. Delay line separator for data bus, 5,412,697, Cl. 375-360.000.
- Van Brunt, Roger; Hillman, Daniel L.; Nilson, Christopher; Oprescu, Florin; and Teener, Michael D., to Apple Computer, Inc. Adaptive data separator, 5,412,698, Cl. 375-373.000.
- Vance, Gene: See—  
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- van der Gen, Arne: See—  
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- van der Griendt, Adrianus J.: See—  
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- Van Der Kop, Joannes A. E.: See—  
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- Van Domelen, John: See—  
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- van Ek, C.: See—  
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- Van Erp, Joost: See—  
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- van Ligt, Raoul F.; and Asmus, Mark G., to van Ligt, Raoul F. Light polarizing spectacle lens, 5,412,505, Cl. 359-483.000.
- van Mensvoort, Adrianus J., to U.S. Philips Corporation. Color display tube having an internal magnetic shield, 5,412,276, Cl. 313-402.000.
- VanSaun, Philip A.: See—  
Glazman, Jerry S.; Davis, Mark K., and VanSaun, Philip A., 5,412,701, Cl. 376-419.000.
- Van Seyoc, Thomas W.: See—  
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- Vargas, Anthony; Asplund, Pamela C.; and Corcoran, Cathleen, to Elizabeth Arden Company, Division of Conopco, Inc. Non-irritating  $\alpha$ -hydroxy carboxylic acid compositions, 5,411,734, Cl. 424-401.000.
- Vargas, J. Ramon: See—  
Harder, John W.; Burns, Paul A.; Vargas, J. Ramon; Bowne, Arlyce T.; Knight, Philip D.; Begley, William J.; and Ling, Hans G., 5,411,839, Cl. 430-379.000.
- Vargo, William R., to Hardy Manufacturing, Inc. System for joining support members, 5,411,154, Cl. 211-189.000.
- Varma, Vijay K.: See—  
Arnold, Hamilton W.; Devasirvathan, Daniel M.; Sollenberger, Nelson R.; Sutliff, Larrie G.; and Varma, Vijay K., 5,412,658, Cl. 370-69.100.
- Varsik, David A., to United Technologies Corporation. Vibration damping shroud for a turbomachine vane, 5,411,370, Cl. 415-209.400.
- Vasudev, Prahalad K.; and Low, Kah K., to Sematech, Inc. Phase shifting mask structure with absorbing/attenuating sidewalls for improved imaging, 5,411,824, Cl. 430-5.000.
- Vauclin, Philippe, to Landis & Gyr Business Support AG. Device for detecting attempts at fraud on an apparatus for reading and writing on a chip card, 5,412,318, Cl. 324-708.000.
- VDO Adolf Schindling AG: See—  
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- Veal, John: See—  
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- Vemishetti, Purushotham: See—  
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- Ventritex, Inc.: See—  
Mar, Craig E.; Bush, M. Elizabeth, and Pless, Benjamin D., 5,411,544, Cl. 607-122.000.
- Venturini, Jean-Jacques: See—  
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- Venus, Frank, Jr.: See—  
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- Veregin, Richard P. N.: See—  
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- Verheijen, Joannes: See—  
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- Veris, Inc.: See—  
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- Vermeer, Robert; Harichian, Bijan; and Au, Van, to Lever Brothers Company, Division of Conopco, Inc. Thickened foam stable compositions comprising alkyl(alkyl glycosid)uronamides, 5,412,118, Cl. 549-417.000.
- Verstrat, Daniel W.: See—  
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- Vestar, Inc.: See—  
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- Moore, Larry J.; and Adler-Moore, Jill, 5,411,743, Cl. 424-450.000.
- Vetter, W. Moray. Firearm bipod, 5,410,835, Cl. 42-94.000.
- Vetterlein, David A.: See—  
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- Vevert, Jean: See—  
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- Vial, Fernand; and Sagawa, Masato, to Ugimag SA. Method of protecting magnetic powders and densified permanent magnets of the Fe Nd B type from oxidation and atmospheric corrosion, 5,411,603, Cl. 148-101.000.
- Vickerman, David C.: See—  
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- Victory, James. Orientable keybox with keypanels vertically and horizontally extendable, 5,411,139, Cl. 206-493.000.
- Vienamo, Teppo T.; Saari, Pauli J.; Holmlund, Timo E.; and Jaarvinen, Jyrki H. V., to Kemira Oy. Face shield, 5,410,757, Cl. 2-9.000.
- Viera, Fernando M., to Cordis Corporation. Atherectomy guidewire, 5,411,033, Cl. 128-772.000.
- Viertel, Lothar; and Welter, Patrick, to Gebr. Happich GmbH. Outer support bracket for vehicle sun visor, 5,411,310, Cl. 296-97.900.
- Vilas, John W. Drill jig for animal prosthesis insertion, 5,411,504, Cl. 606-87.000.
- Vild, Michael J.; and Common, Daniel G. Heated glass sheet positioning on roll conveyor, 5,411,128, Cl. 198-345.100.
- Villa, Nuccio: See—  
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- Vimak Corporation: See—  
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- Vincelette, Scott; Ferguson, Paul F., Jr.; and Adams, Robert W., to Analog Devices, Inc. Error reduction in switched capacitor digital-to-analog converter systems by balanced sampling, 5,412,387, Cl. 341-150.000.
- Vincent, Kenneth: See—  
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- Vinegar, Harold J.; De Rouffignac, Eric P.; Bielamowicz, Lawrence J.; Baxley, Phillip T.; and Wellington, Scott L., to Shell Oil Company. Heat injection process, 5,411,089, Cl. 166-272.000.
- Viola, Gian T.: See—  
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- Virginia Tech Intellectual Properties, Inc.: See—  
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- Viscio, Donald P.; Gentile, Robert A.; and Kraus, Peter E., to Emhart Inc. Screw thread locking insert, 5,411,357, Cl. 411-110.000.
- Viswanathan, Tandur L.: See—  
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- Vitale, Americus C.: See—  
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- Vitex Packaging, Inc.: See—  
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- VLSI Technology, Inc.: See—  
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- Brugge, Hunter B., 5,412,250, Cl. 257-750.000.
- Johnson, Eric A.; Loh, Tsong; and Wang, Chung S., 5,411,906, Cl. 437-44.000.
- Martin, William C., 5,412,313, Cl. 324-158.100.
- Vogel, Peter, to U.S. Philips Corporation. Device for controlling the quantizer of a hybrid coder, 5,412,431, Cl. 348-405.000.
- Vogel, Walter B.: See—  
Campbell, Ira J.; Schartner, Cletus L.; Daugherty, David A.; Vogel, Walter B.; and Coyle, Lawrence J., 5,411,306, Cl. 294-81.400.
- Vogelstein, Bert; and Kinzler, Kenneth W., to Johns Hopkins University. The Amplification of human MDM2 gene in human tumors, 5,411,860, Cl. 435-6.000.
- Volpe, Kevin, to Executone Information Systems, Inc. Apparatus and method for connecting telephone switching devices, 5,412,715, Cl. 377-326.000.
- von Bergen, Ernst-Peter: See—  
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- Von Buren, Stefan, to Husky Injection Molding Systems Ltd. Heated nozzle assembly including a heater clamp arrangement, 5,411,392, Cl. 425-549.000.
- Von Eysmond, Jorg: See—  
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- Voss, Hans: See—  
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- Vu, Ngo Q.: See—  
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- W. L. Gore & Associates, Inc.: See—  
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- W. R. Grace & Co.-Conn.: See—  
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- Locke, James C.; Walter, James F.; and Larew, Hiram G., III, 5,411,736, Cl. 424-410.000.
- Seech, Alan G.; Cairns, James E.; and Marvan, Igor J., 5,411,664, Cl. 210-602.000.
- Wachtel, Helmut: See—  
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- Wachter, Erwin: See—  
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- Wacker-Chemie GmbH: See—  
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- Waclawik, Ronald E.; and Boyd, Scott D., to United States of America. Navy. Flow-through elastomeric launch system for submarines, 5,410,978, Cl. 114-238.000.
- Wada, Toshio: See—  
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- Waggoner, Robert: See—  
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- Wagland, Alison M.: See—  
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- Wagner, Melvin P.: See—  
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- Wagner, Paul: See—  
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- Wagner, Robert K., to Environmental Technologies. Interconnecting apparatus and method for air handling systems, 5,411,299, Cl. 285-189.000.
- Wahr, Thomas: See—  
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- Wajda, Robert G. Wallet security device, 5,412,373, Cl. 340-571.000.
- Wakimoto, Kingo, to Mitsubishi Denki Kabushiki Kaisha. Display device having a built-in memory, 5,412,777, Cl. 395-166.000.
- Wakunaga Seiyaku Kabushiki Kaisha: See—  
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- Walbro Corporation: See—  
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- Walcott, Greg: See—  
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- Walczak, Thomas J., to Motorola. Power control apparatus and method for a radio frequency amplifier, 5,412,341, Cl. 330-138.000.
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- Walker, Craig I., to Warman International Ltd. Impeller annular seal, 5,411,367, Cl. 415-170.100.
- Walker, Michael L., to Halliburton Company. Method and composition for protecting metal surfaces from oxidative environments, 5,411,670, Cl. 507-117.000.
- Wallace, David E.; and Schulte, Jeffrey P., to American Cryogas Industries, Inc. Method and apparatus for supplementing mechanical refrigeration by the controlled introduction of a cryogen, 5,410,886, Cl. 62-63.000.
- Wallace, Marcus T., to Fibercore Recycle Systems, Inc. Device for recycling a tube such as a core, 5,410,929, Cl. 83-160.000.
- Wallace, Millard. Foldable table, 5,411,314, Cl. 297-158.400.
- Wallrafen, Werner, to VDO Adolf Schindling AG. Switch device suitable for use in automotive vehicles, 5,412,255, Cl. 307-116.000.
- Walsh, Thomas J.: See—  
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- Walter, James F.: See—  
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- Walters, Glenn J.; and McCormick, John A., to Advanced Deposition Technologies, Inc. Fused microwave conductive structure, 5,412,187, Cl. 219-728.000.
- Wan, Tak M., to Arrow Link Industries Limited. Tent, 5,411,046, Cl. 135-126.000.
- Wanderstok, Georges: See—  
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- Wang, Albert C.: See—  
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- Wang, Carl B., to Du Pont de Nemours, E. I., and Company. Diffusion patterning process and screen therefor, 5,411,628, Cl. 216-62.000.
- Wang, Chung S.: See—  
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- Wang, Hong-Shang. Suspension type foot massager, 5,411,469, Cl. 601-92.000.
- Wang, Hui-Po; Lee, On; and Fan, Chin-Tsai, to Industrial Technology Research Institute. Derivatives and preparation of 2,2-dimethyl-5-substituted phenoxy-pentanoic acids, 5,412,112, Cl. 549-328.000.
- Wang, Jui-Shang: See—  
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- Wang, Ming Ta: See—  
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- Wang, Weiguo: See—  
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- Waraksa, Thomas J.; Michaels, Paul A.; Slaughter, Sherri A.; Poirier, James A.; and Rea, Irvin B., to Lectron Products, Inc. Rolling code for a keyless entry system, 5,412,379, Cl. 340-825.720.
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- Ward, Paul C.: See—  
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- Wardavoir, Francois, to Hobbycar. Amphibious motor vehicle chassis and vehicle including such a chassis, 5,410,980, Cl. 114-270.000.
- Warfield, Timothy J., to Motorola, Inc. Method for roughening surface of halocarbon film, 5,411,629, Cl. 216-34.000.
- Warman International Ltd.: See—  
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- Warner, John C.: See—  
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- Watanabe, Hiroyuki: See—  
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- Watanabe, Masayuki: See—  
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- Watanabe, Noriyoshi; Morishige, Kiyoshi; and Inoue, Hajime, to Mitsubishi Gas Chemical Company, Inc. Polyamide resin composition, 5,412,013, Cl. 524-413.000.
- Watanabe, Osamu; Yamada, Motoyuki; Yagihashi, Fujio; Yamamoto, Akira; and Isono, Yoshinobu, to Shin-Etsu Chemical Co., Ltd. Polymer having a narrow dispersion of molecular weight and a manufacturing process thereof, 5,412,050, Cl. 526-313.000.
- Watanabe, Yoshio: See—  
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- Waterman, Glenn N., to Diacor, Inc. Bilateral head and arms immobilization support for medical purposes and methods, 5,410,769, Cl. 5-632.000.



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Itoh, Michio; and Yamada, Hiromichi, 5,412,408, Cl. 347-132.000.

Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Yamada, Hiroshi: See—  
Ogawa, Kichiro; Yamada, Hiroshi; Nouno, Youzou; and Kagami, Yasuo, 5,411,790, Cl. 428-209.000.

Yamada, Kazuro: See—  
Serizawa, Yoji; Noguchi, Akio; Ushio, Yukihide; Matsuo, Shimpei; Yamada, Kazuro; Uchiyama, Seiji; Takeuchi, Makoto; Suwa, Koichi; Hiroshima, Koichi; Tsukida, Shinichi; Takano, Manabu; Goto, Masahiro; Inoue, Takahiro; Yamada, Hiromichi; Kato, Junichi; and Ojima, Masaki, 5,412,480, Cl. 358-296.000.

Yamada, Kenichi: See—  
Tanaka, Yukio; Yamada, Kenichi; and Ogura, Taketsugu, 5,410,957, Cl. 101-127.000.

Yamada, Kenji; and Nakagawa, Tatsuo, to NEC Corporation. Multi-processing system for assembly/disassembly of asynchronous transfer mode cells. 5,412,655, Cl. 370-60.100.

Yamada, Kunitaka: See—  
Yano, Akihiro; Naito, Yutaka; Yamada, Kunitaka; and Ohtsuru, Masaaki, 5,412,046, Cl. 526-171.000.

Yamada, Motoyuki: See—  
Watanabe, Osamu; Yamada, Motoyuki; Yagihashi, Fujio; Yamamoto, Akira; and Isono, Yoshinobu, 5,412,050, Cl. 526-313.000.

Yamada, Noboru: See—  
Ohno, Eiji; Nishiuchi, Kenichi; Nagata, Kenichi; Yamada, Noboru; and Akahira, Nobuo, 5,412,626, Cl. 369-13.000.

Yamada, Noriko: See—  
Sakurai, Yasuhisa; Okano, Teruo; Kataoka, Kazunori; Yamada, Noriko; Inoue, Shohei; and Yokoyama, Masayuki, 5,412,072, Cl. 530-322.000.

Yamada, Satoru: See—  
Todokoro, Hideo; Takamoto, Kenji; Otaka, Tadashi; Mizuno, Fumio; Yamada, Satoru; Kuroda, Katsuhiko; Ninomiya, Ken; and Kure, Tokuo, 5,412,210, Cl. 250-310.000.

Yamada, Shigeru; Tsuji, Masataka; and Mitsui, Kenji, to Kabushiki Kaisha Photron. High speed imaging apparatus. 5,412,422, Cl. 348-218.000.

Yamada, Toshiro; and Nonomura, Chisato, to Toyo Boseki Kabushiki Kaisha. Thermoplastic resin film and a method for producing the same. 5,411,695, Cl. 264-211.130.

Yamagata, Hideo: See—  
Udaka, Shigezo; Sakaguchi, Kenji; Yamagata, Hideo; and Dekker, Koen, 5,411,886, Cl. 435-252.300.

Yamagishi, Kiichi, to Yoshida Kogyo K.K. Narrow fabric loom operating mechanism. 5,411,064, Cl. 139-449.000.

Yamaguchi, Kazutoshi: See—  
Nagayoshi, Atsushi; Higuchi, Koichi; Yamaguchi, Kazutoshi; Takakura, Eiichi; Saito, Masataka; and I. Fusanori, 5,412,733, Cl. 381-74.000.

Yamaguchi, Kouichi: See—  
Fukuda, Kenichi; Yamaguchi, Kouichi; Sato, Shinichi; Kishita, Hirofumi; Arai, Masatoshi; and Fujiki, Hironao, 5,412,135, Cl. 556-448.000.

Yamaguchi, Manabu; and Kanno, Masaaki, to National Tank Company. Method for electrostatic liquid/liquid contactor. 5,411,651, Cl. 204-186.000.

Yamaguchi, Masayoshi: See—  
Yamamoto, Akihiko; Zenitani, Yurimasa; and Yamaguchi, Masayoshi, 5,412,020, Cl. 524-505.000.

Yamaguchi, Noriyuki: See—  
Taniguchi, Junko; Yamaguchi, Noriyuki; Kurashita, Takuji; Ishizuka, Mitsuru; and Yao, Masaharu, 5,412,434, Cl. 348-669.000.

Yamaguchi, Shigehiro: See—  
Ito, Yoshihiko; Tamao, Kohei; Yamaguchi, Shigehiro; and Nakagawa, Yoshiki, 5,412,105, Cl. 549-4.000.

Yamaguchi, Takao: See—  
Hamada, Hiroki; Honda, Shoji; Shono, Masayuki; and Yamaguchi, Takao, 5,411,915, Cl. 437-129.000.

Yamaguchi, Takayuki: See—  
Sekiya, Takuro; Kimura, Takashi; Horike, Masanori; Watanabe, Yoshio; Motomura, Shuji; Suzuki, Eiko; Yamaguchi, Takayuki; and Kadonaga, Masami, 5,412,413, Cl. 347-46.000.

Yamaguchi, Takeshi, to Minolta Camera Kabushiki Kaisha. Paper feeding device. 5,411,248, Cl. 271-171.000.

Yamaha Corporation: See—  
Hotta, Harumichi; Suzuki, Akira; and Tozuka, Akira, 5,410,941, Cl. 84-601.000.

Ikedo, Takashi; and Suzuki, Satoshi, 5,412,156, Cl. 84-635.000.

Kageyama, Yasuo; Fujii, Shigeki; and Ohtani, Yasushi, 5,412,152, Cl. 84-607.000.

Kurosaki, Makoto; and Gotoh, Mitsumasa, 5,410,938, Cl. 84-411.000.

Okamoto, Tomio; and Fujii, Junji, 5,410,937, Cl. 84-403.000.

Takeda, Fumiteru; and Fumihiko, Ojima, 5,412,154, Cl. 84-622.000.

Yamazaki, Shohei; Honda, Kazuhiko; and Narusawa, Sadayuki, 5,412,628, Cl. 369-32.000.

Yamaha Hatsudoki Kabushiki Kaisha: See—  
Masuda, Tatsuyuki; Maebashi, Kousei; Nakamura, Michihisa; and Suhara, Hidenori, 5,410,993, Cl. 123-65.0PE.

Yamakawa, Koji: See—  
Yasumoto, Takaaki; Iwase, Nobuo; Koiwa, Kaoru; Yamakawa, Koji; and Iyogi, Kiyoshi, 5,412,160, Cl. 174-258.000.

Yamakawa, Tsutomu: See—  
Shuto, Keisei; and Yamakawa, Tsutomu, 5,412,215, Cl. 250-363.090.

Yamamoto, Akihiko; Zenitani, Yurimasa; and Yamaguchi, Masayoshi, to Mitsui Petrochemical Industries, Ltd. Propylene polymer compositions. 5,412,020, Cl. 524-505.000.

Yamamoto, Akira: See—  
Watanabe, Osamu; Yamada, Motoyuki; Yagihashi, Fujio; Yamamoto, Akira; and Isono, Yoshinobu, 5,412,050, Cl. 526-313.000.

Yamamoto, Keisuke: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Shinjo, Katsuhiko; Miyazaki, Toshihiko; Kuroda, Ryo; Yamamoto, Keisuke; and Kawase, Toshimitsu, 5,412,641, Cl. 369-126.000.

Yamamoto, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Capacitive acceleration detector. 5,410,915, Cl. 73-517.00R.

Yamamoto, Masahiro: See—  
Okuyama, Hideki; Yamamoto, Masahiro; and Sonobe, Toshimitsu, 5,411,399, Cl. 439-67.000.

Yamamoto, Masanobu: See—  
Naka, Yuji; and Yamamoto, Masanobu, 5,411,272, Cl. 273-434.000.

Naka, Yuji; and Yamamoto, Masanobu, 5,411,272, Cl. 273-437.000.

Yamamoto, Masaya, to Yazaki Corporation. Connector. 5,411,413, Cl. 439-470.000.

Yamamoto, Mayuko: See—  
Nishimura, Ryuji; Yamamoto, Mayuko; and Imaide, Takuya, 5,412,487, Cl. 358-452.000.

Yamamoto, Tokihiko; Yamaoka, Tomoyuki; Yoshida, Yoshiaki; Shin, Kazuo; Aonuma, Hiromitsu; and Tanaka, Tutomu, to Nihon Tengen-yaku Kenkyusho Co. Ltd.; and Meiji Milk Prod. Co., Ltd. Anti-inflammatory, stable aqueous preparation comprising azulene sodium sulfonate and polyhydric alcohol. 5,411,993, Cl. 514-766.000.

Yamamoto, Tomie: See—  
Abe, Masahiro; Mase, Yasukazu; and Yamamoto, Tomie, 5,411,916, Cl. 437-189.000.

Yamamoto, Yoshihisa: See—  
Ando, Masahiko; Noda, Koji; Yamamoto, Yoshihisa; Hayabuchi, Masahiro; Tsukamoto, Kazumasa; Hojo, Yasuo; Taga, Yutaka; Oba, Hidehiro; and Kubo, Seitoku, 5,411,451, Cl. 477-144.000.

Yamanaka, Mikio: See—  
Araki, Jun; Nakatuka, Jun; Murata, Wataru; Sumitomo, Hidehiko; Kasuya, Masayuki; Ota, Hitoshi; Kato, Yuichi; Fukaya, Masahiro; Ohmura, Keiichi; Yamanaka, Mikio; and Fudanoki, Fumio, 5,411,610, Cl. 148-542.000.

Yamanouchi Pharmaceutical Co., Ltd.: See—  
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatoshi; and Tamura, Toshinari, 5,412,096, Cl. 546-16.000.

Yamaoka, Tomoyuki: See—  
Yamamoto, Tokihiko; Yamaoka, Tomoyuki; Yoshida, Yoshiaki; Shin, Kazuo; Aonuma, Hiromitsu; and Tanaka, Tutomu, 5,411,993, Cl. 514-766.000.

Yamasa Corporation: See—  
Sakata, Shinji; Miyashita, Takanori; and Kondo, Kazuhiko, 5,412,089, Cl. 536-28.500.

Yamashita, Juli; and Fukui, Yukio, to Agency Of Industrial Science And Technology. Cad free-form reshaping method. 5,412,770, Cl. 395-142.000.

Yamashita, Kazuyoshi; Saito, Kenji; and Seko, Shinzo, to Sumitomo Chemical Co., Ltd.; and Sumitomo Seika Chemicals Co. Process for production of 2-thiophene aldehydes. 5,412,106, Cl. 549-70.000.

Yamashita, Khotaro: See—  
Maeda, Miyuki; Yamashita, Khotaro; and Maeda, Akira, 5,412,775, Cl. 395-158.000.

Yamashita, Nobuyuki; Imanishi, Ryo; and Uemura, Katsuhiko, to Kubota Corporation. Shift control system for a vehicle transmission having a backward/forward drive changeover device and a stepless change speed device. 5,410,923, Cl. 74-474.000.

Yamashita, Tadakazu: See—  
Taniguchi, Takao; Iizuka, Masanori; Isobe, Kazuo; Tamaki, Sayuri; Satake, Shinichi; and Yamashita, Tadakazu, 5,411,558, Cl. 44-301.000.

Yamashita, Tsuyoshi, to Kyowa Machinery Co., Ltd. Track apparatus for egg breaking mechanisms. 5,410,953, Cl. 99-500.000.

Yamasita, Yukio: See—  
Yoda, Eiji; Sato, Haruyoshi; Yamasita, Yukio; Yuasa, Hitoshi; and Otsuki, Yutaka, 5,411,836, Cl. 430-190.000.

Yamauchi, Toshiaki: See—  
Horie, Kenzo; and Yamauchi, Toshiaki, 5,411,342, Cl. 400-613.000.

Yamauchi, Yoshiaki: See—  
Ichikawa, Atsushi; Yamauchi, Yoshiaki; and Saito, Akira, 5,412,633, Cl. 369-44.140.

Yamauchi, Yoshimitsu; Tanaka, Kenichi; Sakiyama, Keizo; and Ayukawa, Akitsu, to Sharp Kabushiki Kaisha. Process for fabricating nonvolatile random access memory having a tunnel oxide film. 5,411,904, Cl. 437-43.000.

Yamazaki, Kazutoshi: See—  
Nakata, Naotaro; and Yamazaki, Kazutoshi, 5,412,509, Cl. 359-811.000.

Yamazaki, Nobuto; and Kyomasu, Ryuichi, to Kabushiki Kaisha Shin-kawa. Bonding apparatus. 5,411,195, Cl. 228-1.100.

Yamazaki, Shohei; Honda, Kazubiko; and Narusawa, Sadayuki, to Yamaha Corporation. Apparatus for intermittently recording and reproducing a signal on a disc type recording medium. 5,412,628, Cl. 369-32.000.

Yamazaki, Shuichi: See—  
Kanai, Takao; Tanemoto, Kei; Yamazaki, Shuichi; and Nagashima, Takeo, 5,411,808, Cl. 428-472.000.

Yamazaki, Yoshihiro: See—  
Iizuka, Takashi; Arai, Yasunori; and Yamazaki, Yoshihiro, 5,412,510, Cl. 359-820.000.

Yamrom, Boris; and Martin, Kenneth M., to General Electric Company. Method for vector field visualization using time varying texture maps. 5,412,765, Cl. 395-130.000.

Yanagisawa, Masayoshi: See—  
Hirata, Tadashi; and Yanagisawa, Masayoshi, 5,410,904, Cl. 72-446.000.

Yanagisawa, Yoshihiro: See—  
Miyazaki, Toshihiko; Matsuda, Hiroshi; Kawade, Hisaaki; Eguchi, Ken; Kawada, Haruki; Kawagishi, Hideyuki; Yanagisawa, Yoshihiro; Yamamoto, Keisuke; Kawase, Toshimitsu; Oguchi, Takahiro; Takeda, Toshihiko; and Tagawa, Masahiro, 5,412,597, Cl. 365-174.000.

Yang, Darchun B., to Loctite Corporation. Free radically curable formulations employing dithiolate catalysts. 5,411,995, Cl. 522-27.000.

Yang, Jie, to University of Virginia Patent Foundation. Cryogenic atomic force microscope. 5,410,910, Cl. 73-105.000.

Yang, Tai-Her. Machine tool adjustable head. 5,410,790, Cl. 29-40.000.

Yang, Tai-Her. Motor control circuit having series or compound excitation during starting and shunt excitation during normal running. 5,412,298, Cl. 318-529.000.

Yano, Akihiro; Naito, Yutaka; Yamada, Kunitaka; and Ohtsuru, Masaaki, to Tosoh Corporation. Polyethylene and method of production thereof. 5,412,046, Cl. 526-171.000.

Yano, Shinsuke: See—  
Hirai, Takami; and Yano, Shinsuke, 5,412,358, Cl. 333-204.000.

Yano, Tatsuo; Watanabe, Masayuki; Ota, Kouji; and Matsumoto, Tadayuki, to Kawasaki Jukogyo Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Robot control method and apparatus. 5,412,759, Cl. 395-83.000.

Yansura, Daniel G.: See—  
Adams, Robin M.; Power, Scott D.; Powers, David B.; Wells, James A.; and Yansura, Daniel G., 5,411,873, Cl. 435-69.100.

Yao, Masaharu: See—  
Taniguchi, Junko; Yamaguchi, Noriyuki; Kurashita, Takuji; Ishizuka, Mitsuru; and Yao, Masaharu, 5,412,434, Cl. 348-669.000.

Yarbrough, Sandra M.: See—  
Tanzer, Richard W.; Abuto, Frank P.; Kellenberger, Stanley R.; Laux, Daniel R.; Nortman, Brian K.; Pomplun, William S.; Rippl, Carl G.; Robinson, Mark L.; Sallee, Lorry F.; Yarbrough, Sandra M.; and Zenker, David L., 5,411,497, Cl. 604-368.000.

Yashiki, Hiroshi: See—  
Nagase, Norikazu; Moriguchi, Yoshihiro; Inomata, Youichi; Yashiki, Hiroshi; Ohura, Masaki; and Kato, Yoshiki, 5,411,630, Cl. 216-22.000.

Yashiki, Yuichi, to Fuji Xerox Co., Ltd. Image-holding member and production method thereof, method for forming image-forming master using the image-holding member and the forming apparatus, and image-forming method using them. 5,411,826, Cl. 430-41.000.



Yasuhiro, Kuramoto; Shuichiro, Noda; Maruyama, Shinobu; Hatono, Shunso; Mochizuki, Haruyo; and Yazaki, Akira, to Wakunaga Seiyaku Kabushiki Kaisha; and Fujisawa Pharmaceutical Co., Ltd. Quinolone derivative or salt thereof and antibacterial containing the same. 5,412,098, Cl. 546-156.000.

Yasumoto, Takaaki; Iwase, Nobuo; Koiwa, Kaoru; Yamakawa, Koji; and Iyogi, Kiyoshi, to Kabushiki Kaisha Toshiba. Circuit board. 5,412,160, Cl. 174-258.000.

Yatani, Hiroshi: See—  
Miyashita, Yukio; Yatani, Hiroshi; and Ito, Tatsuya, 5,411,000, Cl. 123-425.000.

Yates, Lawrence J.: See—  
Golden, Jo-Ann; Squatrito, Angelo; Brown, Thomas J.; Yates, Lawrence J.; and Elfman, Kenneth, 5,410,971, Cl. 108-6.000.

Yatsuka, Takeshi: See—  
Hirakouchi, Hiroshi; Nakamura, Masanori; Yatsuka, Takeshi; and Kadowaki, Nobuo, 5,411,810, Cl. 428-480.000.

Yayla, Gokce: See—  
Krishnamoorthy, Ashok V.; Marchand, Philippe J.; Yayla, Gokce; and Esener, Sadik C., 5,412,592, Cl. 365-49.000.

Yazaki, Akira: See—  
Yasuhiro, Kuramoto; Shuichiro, Noda; Maruyama, Shinobu; Hatono, Shunso; Mochizuki, Haruyo; and Yazaki, Akira, 5,412,098, Cl. 546-156.000.

Yazaki Corporation: See—  
Kondo, Hiroki, 5,411,406, Cl. 439-263.000.

Yamamoto, Masaya, 5,411,413, Cl. 439-470.000.

Yearwood, M. Deon. Electric fence wire insulation. 5,412,158, Cl. 174-163.00F.

Yeda Research and Development Co., Ltd.: See—  
Cahen, David; Gartsman, Konstantin; and Lyubomirsky, Igor, 5,412,242, Cl. 257-442.000.

Yee, Vincent M. Multi-function lighting device. 5,412,548, Cl. 362-202.000.

Yeh, Tsung-Shou; Lin, Jane-Chyi; and Hwang, Shiang-Po, to Industrial Technology Research Institute. Strengthening of multilayer ceramic/glass articles. 5,411,563, Cl. 65-17.300.

Yeo, Jong K.; Chang, Suk K.; Koo, Eun H.; and Lee, Min H., to Lucky, Ltd. Thermoplastic resin composition. 5,412,028, Cl. 525-65.000.

Yeo, Richard G.: See—  
Ellwood, Derek C.; Evans, Charles G. T.; Dunn, Geoffrey M.; McInnes, Neil; Yeo, Richard G.; and Smith, Keith J., 5,411,874, Cl. 435-84.000.

Yero, Emilio, to SGS-Thomson Microelectronics S.A. Device for generating a voltage for programming a programmable permanent memory, especially of EPROM type, method and memory relating thereto. 5,412,602, Cl. 365-189.010.

Yeung, B. W. Anissa: See—  
Sacripante, Guernio G.; Yeung, B. W. Anissa; McAneney, T. Brian; and Kittelberger, J. Stephen, 5,411,829, Cl. 430-106.000.

Yi, Gil-Goo; Kwon, Jun-Tae; and Yoon, Duk-Kyoon, to SKC Limited. Videotape cassette case. 5,411,219, Cl. 242-347.000.

YKK Corporation: See—  
Dudek, Chet; and Ishikawa, Kiichiro, 5,410,975, Cl. 112-113.000.

Yocom, Thomas M., to ABB Power T & D Company, Inc. Real-time timer interval adjustment. 5,412,624, Cl. 368-156.000.

Yoda, Eiji; Sato, Haruyoshi; Yamasita, Yukio; Yuasa, Hitoshi; and Otsuki, Yutaka, to Nippon Oil Co., Ltd. Positive type photoresist composition comprising a polymer having carbon-carbon double bonds with a maleic half ester and a maleimide attached to the backbone. 5,411,836, Cl. 430-190.000.

Yoerger, William E., to Eastman Kodak Company. Method of modifying the charging propensity of carrier particles for electrostatic graphic developers and modified carrier particles. 5,411,832, Cl. 430-108.000.

Yokoe, Masaaki; Yokoyama, Hiroshi; and Kashita, Yoshinori, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Doll's hair. 5,411,800, Cl. 428-362.000.

Yokohama Rubber Company, The: See—  
Ueotani, Toshihiro; and Sugiyama, Yuichi, 5,411,567, Cl. 71-9.000.

Yokohama Rubber Co., Ltd.: See—  
Kogure, Tomohiko, 5,411,068, Cl. 152-209.00R.

Yokota, Junichi; Okada, Hiroshi; and Yoshioka, Hiroshi, to Sony Corporation. Recording/reproducing apparatus. 5,412,513, Cl. 360-32.000.

Yokota, Keiichi: See—  
Iino, Shinji; Kubota, Tamio; and Yokota, Keiichi, 5,412,329, Cl. 324-754.000.

Yokoyama, Hiroshi: See—  
Yokoe, Masaaki; Yokoyama, Hiroshi; and Kashita, Yoshinori, 5,411,800, Cl. 428-362.000.

Yokoyama, Masayuki: See—  
Sakurai, Yasuhisa; Okano, Teruo; Kataoka, Kazunori; Yamada, Noriko; Inoue, Shohci; and Yokoyama, Masayuki, 5,412,072, Cl. 530-322.000.

Yomtov, Barry M., to InControl, Inc. Implantable cardiac patient monitor. 5,411,031, Cl. 128-706.000.

Yoneda, Yasunobu: See—  
Nakamura, Kazutaka; Tani, Hiroji; Yoneda, Yasunobu; and Sakabe, Yukio, 5,412,357, Cl. 333-181.000.

Yoo, Chue-San; Tsaur, Jyh-Min; Chen, Chong-Shi; and Tseng, Pin-Nan, to Taiwan Semiconductor Manufacturing Company. Capping free metal silicide integrated process. 5,411,907, Cl. 437-44.000.

Yoon, Duk-Kyoon: See—  
Yi, Gil-Goo; Kwon, Jun-Tae; and Yoon, Duk-Kyoon, 5,411,219, Cl. 242-347.000.

York, Billie M.: See—  
Nixon, Jon C.; and York, Billie M., 5,411,940, Cl. 514-12.000.

Yorozu, Hidenori: See—  
Tanaka, Norihiro; Okui, Kazuyuki; Doi, Yasuhiro; Sato, Hirotsuka; and Yoroze, Hidenori, 5,411,731, Cl. 424-78.020.

Yoshida, Hiroaki: See—  
Kido, Eiichi; Yui, Yuh; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326.000.

Yoshida Kogyo K.K.: See—  
Oda, Kiyoshi, 5,411,445, Cl. 474-154.000.

Yamagishi, Kiichi, 5,411,064, Cl. 139-449.000.

Yoshida, Makoto; Shimizu, Kazuyuki; Morita, Eiichi; Fujimori, Masato; and Tanaka, Hiromi, to Konica Corporation. Coating apparatus with coating die. 5,411,589, Cl. 118-688.000.

Yoshida, Naoyuki: See—  
Miyazawa, Kazutoshi; and Yoshida, Naoyuki, 5,411,877, Cl. 435-125.000.

Yoshida, Tadashi: See—  
Bannai, Yuuichi; Yoshida, Tadashi; Hirabayashi, Yasuji; and Oosawa, Hidefumi, 5,412,486, Cl. 358-444.000.

Yoshida, Takeshi: See—  
Matsuo, Takeshi; Takeda, Yoshiyuki; Yoshida, Takeshi; Kakuta, Masayuki; Kida, Yasuhiko; and Harada, Hiroyuki, 5,412,462, Cl. 355-308.000.

Yoshida, Tsunezo; Kuriyama, Yasuhide; and Kanbayashi, Shigehisa, to Ishihara Sangyo Kaisha Ltd. Herbicidal oil-based suspension comprising nicosulfuron and urea as a stabilizing agent. 5,411,932, Cl. 504-132.000.

Yoshida, Yoshiaki: See—  
Yamamoto, Tokihiko; Yamaoka, Tomoyuki; Yoshida, Yoshiaki; Shin, Kazuo; Aonuma, Hiromitsu; and Tanaka, Tutomu, 5,411,993, Cl. 514-766.000.

Yoshikawa, Hidetaka, to Kabushiki Kaisha Toshiba. Variable rate coder/decoder system. 5,412,484, Cl. 358-433.000.

Yoshimatsu, Morio, to Sony Corporation. Residual capacity indicating device. 5,412,307, Cl. 320-44.000.

Yoshimura, Takumi; Tonyabe, Keiji; Masuda, Katsumi; and Hanai, Ryo, to Kumiai Chemical Industry Co., Ltd.; and Ihara Chemical Industry Co., Ltd. Alkanolic acid amide derivative or its salt, process for producing the same and herbicidal composition. 5,411,934, Cl. 504-239.000.

Yoshioka, Hiroshi: See—  
Yokota, Junichi; Okada, Hiroshi; and Yoshioka, Hiroshi, 5,412,513, Cl. 360-32.000.

Yoshioka, Katsuki: See—  
Soma, Takao; Kawasaki, Shinji; Ito, Shigenori; and Yoshioka, Katsuki, 5,411,767, Cl. 429-453.000.

Yoshioka, Toshifumi: See—  
Ishiwata, Kazuya; Enomoto, Takashi; and Yoshioka, Toshifumi, 5,412,494, Cl. 359-67.000.

Yoshioka, Yasuhiro: See—  
Seto, Nobuo; Yoshioka, Yasuhiro; and Morigaki, Masakazu, 5,411,846, Cl. 430-546.000.

Yoshitomi Pharmaceutical Industries, Ltd.: See—  
Sakata, Shinji; Miyashita, Takanori; and Kondo, Kazuhiko, 5,412,089, Cl. 536-28.500.

Tsuji, Katsuji; and Hirashima, Hidenori, 5,411,990, Cl. 514-640.000.

Yoshiura, Syoichiro: See—  
Kido, Eiichi; Yui, Yuh; Anzai, Shunju; Yoshiura, Syoichiro; Imagawa, Shinji; Yoshida, Hiroaki; Kawasaki, Yoshikazu; Kawabata, Itaru; Fukunaga, Keizo; Mori, Toyokazu; and Tsuji, Masaru, 5,412,213, Cl. 250-326.000.

You, Hyun S., to Samsung Electronics Co., Ltd. Refrigerator having a cool air leak-prevention device. 5,411,328, Cl. 312-405.000.

Young, Cameron L.; Eng, Dan Y.; Causey, Fred E.; Malone, Philip G.; and Brabston, William N., to United States of America, Army. Separated electrode system in electrolytically setting or hardening reactive cement pastes. 5,411,653, Cl. 204-228.000.

Young, Charles L.: See—  
Goldman, Ira B.; Rosen, Louis A.; Marshall, Edward J.; Fredrickson, James E.; and Young, Charles L., 5,412,324, Cl. 324-551.000.

Young, Donald C., to Union Oil Company of California. Glyphosate-sulfuric acid adduct herbicides and use. 5,411,944, Cl. 504-206.000.

Young, Donald R., Jr.: See—  
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Young, Ian; Wong, Keng L.; and Greason, Jeffrey K., to Intel Corporation. PLL clock generator integrated with microprocessor. 5,412,349, Cl. 331-34.000.

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Younkin, Chester R.; and Wigler, Stephen R., to Westinghouse Electric Corporation. Distributed processing telecommunication switch with standardized switch units. 5,412,645, Cl. 370-58.300.

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Zebold, David F.; and Mathes, A. Wayne, Jr., to Moto Mirror Inc. Remotely controlled mirror assembly and control system therefor. 5,412,512, Cl. 359-878.000.

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Zouzoulas, John, deceased (by Zouzoulas, Helen, executrix), to Mars Incorporated. Currency validator and cassette transport alignment apparatus. 5,411,249, Cl. 271-181.000.

Zumbiel, Michael W. Tennis ball cap. 5,410,760, Cl. 2-195.100.

Zuzich, Anne H.; and Blytas, George C., to Shell Oil Company. Polycondensation of phenolic hydroxyl-containing compounds and polyhydric alcohols and thermal condensation to form polyethercyclic polyols. 5,412,115, Cl. 549-378.000.

Zwiener, Christian; Sonntag, Michael; Margotte, Dieter; Pedain; Blum, Harald; and Schneider, Volker, to Bayer Aktiengesellschaft. Surface coatings and a process for their production. 5,412,056, Cl. 528-73.000.

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3i Research Exploitation Limited: See—  
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432583 B.C. Ltd.: See—  
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Batey, John G.; Burrets, Park W.; Grewe, William F.; Whitestone, Bruce G.; and Yerger, Mark D., to Federal Express Corporation. Noise reduction kit for jet turbine engines. B1 5,127,602, 5-2-95, Cl. 244-1.00N.

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Chen, Ping. Multi-functional physical exerciser. 357,952, 5-2-95, Cl. D21-191.000.

Cheng, Hsiang-Ta; and Lee, Shih-Ping, to Darjung Industries, Co., Ltd. Combined multipurpose portable light and recharger therefor. 357,990, 5-2-95, Cl. D26-38.000.

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Kimbrough, Mark, to Dell USA, L.P. Desktop computer. 357,905, 5-2-95, Cl. D14-100.000.



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Losi, Raymond, II, to Variflex, Inc. Safety helmet. 358,004, 5-2-95, Cl. D29-102.000.

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Matsuda, Takumi, to Seikosha Co., Ltd. Clock movement. 357,885, 5-2-95, Cl. D10-129.000.

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- Stroud, David J.: See—  
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- Tsushi, Masao, to Cateye Co., Ltd. Speedometer sensor for a bicycle. 357,878, 5-2-95, Cl. D10-98.000.
- Turmala, Jeanette L. Card stand. 357,939, 5-2-95, Cl. D19-90.000.
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- Ueda, Takashi, to Cateye Co., Ltd. Speedometer for a bicycle. 357,879, 5-2-95, Cl. D10-98.000.
- Ueda, Takashi, to Cateye Co., Ltd. Speedometer for bicycle. 357,880, 5-2-95, Cl. D10-98.000.
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- Wadolowski, Donat. Lottery poker game. 357,945, 5-2-95, Cl. D21-37.000.
- Wagenheim, Lester. Animal figure. 357,950, 5-2-95, Cl. D21-154.000.
- Walsh, David C. Implement head for supporting sandpaper. 357,850, 5-2-95, Cl. D8-90.000.
- Wang, Wen-Mu. Faucet. 357,975, 5-2-95, Cl. D23-238.000.
- Warehime, Cynthia M. K.; Johnson, Craig L.; and Duncan, James A., to StairMaster Sports/Medical Products, Inc. Exercise cycle. 357,953, 5-2-95, Cl. D21-194.000.
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- Wegrzyn, Joseph S.; Ruskowski, Charles; and Crescenzi, Donald C., to General Signal Corporation. Fixed lens emergency lighting unit. 357,997, 5-2-95, Cl. D26-85.000.
- Weigl, Adolf. Adjustable lock box. 358,014, 5-2-95, Cl. D99-28.000.
- Weiss, John C. Flashlight mouthpiece. 357,999, 5-2-95, Cl. D26-138.000.
- Weiss, Stephan. Dispenser. 357,857, 5-2-95, Cl. D9-300.000.
- Westinghouse Electric Corporation: See—  
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- Williams, Thomas F. Multipurpose tool for golfers. 357,964, 5-2-95, Cl. D21-234.000.
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- Wiseman, John A.: See—  
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- World Trend, Inc.: See—  
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- Yeh, John. Coffee table. 357,831, 5-2-95, Cl. D6-487.000.
- Yeh, John. End table. 357,832, 5-2-95, Cl. D6-488.000.
- Young, Stanfield K., to Casablanca Fan Company. Combined ceiling fan and light. 357,978, 5-2-95, Cl. D23-377.000.
- Yuen, Se Kit, to John Manufacturing Limited. Adjustable desk lamp. 357,993, 5-2-95, Cl. D26-65.000.

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- Buckley, Rosalie K., Successor Trustee: See—  
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- Canada, Her Majesty the Queen in Right of, as represented by the Minister of Agriculture: See—  
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- Collicutt, Lynn M., to Canada, Her Majesty the Queen in Right of, as represented by the Minister of Agriculture. Shrub rose plant named Winnipeg Parks. 9,122, 5-2-95, Cl. 1.000.
- Gibeault, Victor A.; Leonard, Matthew K.; Youngner, Victor B., deceased; and Janowitz, Violet E., heir, to University of California, The Regents of the. Zoysiagrass plant named 'De Anza'. 9,127, 5-2-95, Cl. 90.000.
- Glicenstein, Leon, to Yoder Brothers, Inc. Chrysanthemum plant named Warm Megan. 9,126, 5-2-95, Cl. 82.300.
- Goffreda, Joseph C.; and Voordeckers, Anna M., to Rutgers University. Apple tree NJ109. 9,123, 5-2-95, Cl. 35.100.
- Janowitz, Violet E., heir: See—  
Gibeault, Victor A.; Leonard, Matthew K.; Youngner, Victor B., deceased; and Janowitz, Violet E., heir, 9,127, Cl. 90.000.
- Johnson, Philip A. Rosemary plant named 'Renzels'. 9,124, 5-2-95, Cl. 54.100.
- Kohl, Paul A., deceased; and by Buckley, Rosalie K., Successor Trustee. Azalea hybrid plant 'Paul A. Kohl'. 9,125, 5-2-95, Cl. 56.000.
- Leonard, Matthew K.: See—  
Gibeault, Victor A.; Leonard, Matthew K.; Youngner, Victor B., deceased; and Janowitz, Violet E., heir, 9,127, Cl. 90.000.
- Rutgers University: See—  
Goffreda, Joseph C.; and Voordeckers, Anna M., 9,123, Cl. 35.100.
- University of California, The Regents of the: See—  
Gibeault, Victor A.; Leonard, Matthew K.; Youngner, Victor B., deceased; and Janowitz, Violet E., heir, 9,127, Cl. 90.000.
- Voordeckers, Anna M.: See—  
Goffreda, Joseph C.; and Voordeckers, Anna M., 9,123, Cl. 35.100.
- Yoder Brothers, Inc.: See—  
Glicenstein, Leon, 9,126, Cl. 82.300.
- Youngner, Victor B., deceased: See—  
Gibeault, Victor A.; Leonard, Matthew K.; Youngner, Victor B., deceased; and Janowitz, Violet E., heir, 9,127, Cl. 90.000.

LIST OF  
STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE  
2ND DAY OF MAY, 1995

- Bennett, David R.: See—  
New, Nancy A.; LaVon, Gary D.; and Bennett, David R., H1440, Cl. 604-386.000.
- Cherne, Richard D.; Clark, Jack E., II; Dejong, Glenn A.; Lichtel, Richard L.; Morris, Wesley H.; and Speece, William H. SOI CMOS device having body extension for providing sidewall channel stop and bodytie. H1435, 5-2-95, Cl. 257-347.000.
- Clark, Jack E., II: See—  
Cherne, Richard D.; Clark, Jack E., II; Dejong, Glenn A.; Lichtel, Richard L.; Morris, Wesley H.; and Speece, William H., H1435, Cl. 257-347.000.
- Cytron, Sheldon, to United States of America, Army. Method and apparatus for conformal embedded ceramic armor. H1434, 5-2-95, Cl. 89-36.020.
- Dejong, Glenn A.: See—  
Cherne, Richard D.; Clark, Jack E., II; Dejong, Glenn A.; Lichtel, Richard L.; Morris, Wesley H.; and Speece, William H., H1435, Cl. 257-347.000.
- Dow Chemical Company, The: See—  
Hairston, Thomas J., H1439, Cl. 525-523.000.
- Estes, Elvin G.; Hahne, Jon; Hayes, Richard J.; and Hussion, Robert, to United States of America, Army. Gun liner repair apparatus. H1433, 5-2-95, Cl. 451-57.000.
- Gergen, William P.; and Lutz, Robert G., to Shell Oil Company. Modified block copolymers functionalized in the monoalkenyl aromatic or vinylarene block. H1438, 5-2-95, Cl. 525-314.000.
- Hahne, Jon: See—  
Estes, Elvin G.; Hahne, Jon; Hayes, Richard J.; and Hussion, Robert, H1433, Cl. 451-57.000.
- Hairston, Thomas J., to Dow Chemical Company, The. Method to increase the level of  $\alpha$ -glycol in liquid epoxy resin. H1439, 5-2-95, Cl. 525-523.000.
- Hayes, Richard J.: See—  
Estes, Elvin G.; Hahne, Jon; Hayes, Richard J.; and Hussion, Robert, H1433, Cl. 451-57.000.
- Hussion, Robert: See—  
Estes, Elvin G.; Hahne, Jon; Hayes, Richard J.; and Hussion, Robert, H1433, Cl. 451-57.000.
- Kersey, Alan D.; and Villarruel, Carl A. Interferometric fiber optic sensor configuration with pump-induced phase carrier. H1436, 5-2-95, Cl. 356-345.000.
- LaVon, Gary D.: See—  
New, Nancy A.; LaVon, Gary D.; and Bennett, David R., H1440, Cl. 604-386.000.
- Lichtel, Richard L.: See—  
Cherne, Richard D.; Clark, Jack E., II; Dejong, Glenn A.; Lichtel, Richard L.; Morris, Wesley H.; and Speece, William H., H1435, Cl. 257-347.000.
- Lutz, Robert G.: See—  
Gergen, William P.; and Lutz, Robert G., H1438, Cl. 525-314.000.
- Morris, Wesley H.: See—  
Cherne, Richard D.; Clark, Jack E., II; Dejong, Glenn A.; Lichtel, Richard L.; Morris, Wesley H.; and Speece, William H., H1435, Cl. 257-347.000.
- New, Nancy A.; LaVon, Gary D.; and Bennett, David R. Fitted belt for absorbent garment. H1440, 5-2-95, Cl. 604-386.000.
- Shell Oil Company: See—  
Gergen, William P.; and Lutz, Robert G., H1438, Cl. 525-314.000.
- Speece, William H.: See—  
Cherne, Richard D.; Clark, Jack E., II; Dejong, Glenn A.; Lichtel, Richard L.; Morris, Wesley H.; and Speece, William H., H1435, Cl. 257-347.000.
- Spelthann, Heinz H. Grafted copolymers. H1437, 5-2-95, Cl. 525-190.000.
- United States of America  
Army: See—  
Cytron, Sheldon, H1434, Cl. 89-36.020.
- Estes, Elvin G.; Hahne, Jon; Hayes, Richard J.; and Hussion, Robert, H1433, Cl. 451-57.000.
- Villarruel, Carl A.: See—  
Kersey, Alan D.; and Villarruel, Carl A., H1436, Cl. 356-345.000.



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# CLASSIFICATION OF PATENTS

ISSUED MAY 2, 1995

NOTE.—First number, class; second number, subclass; third number, patent number

NOTE.—First number, class, second number, subclass, third number, item.											
CLASS 2	100	5,410,821	584	5,410,881	458	5,410,939	343	5,410,982	5,411,598		
2	5,410,755	117	5,410,822	602	5,410,882	473	5,410,940	CLASS 117	57 D	5,411,042	
9	5,410,756	127	5,410,823	646	5,410,883	601	5,410,941	202	5,410,983	5,411,043	
51	5,410,757	CLASS 37		747	5,410,884	607	5,412,152	206	5,410,984	CLASS 135	
108	5,410,758	242	5,410,824	CLASS 62		619	5,412,153	CLASS 118	66	5,411,044	
195.1	5,410,759	254	5,410,825	25	5,410,885	622	5,412,154	666	5,411,588	83	5,411,045
	5,410,760	457	5,410,826	63	5,410,886	627	5,412,155	688	5,411,589	126	5,411,046
338	5,410,761	CLASS 40		129	5,410,887	635	5,412,156	715	5,411,590	127	5,411,047
436	5,410,762	1.5	5,410,827	136	5,410,888	CLASS 89		718	5,411,591	CLASS 136	
	5,410,763	316	5,410,828	160	5,410,889	27.14	5,410,942	719	5,411,592	203	5,411,599
CLASS 4		414	5,410,829	228.4	5,410,890	CLASS 91			5,411,593	225	5,411,600
250	5,410,766	518	5,410,830	286	5,410,891	459	5,410,943	CLASS 119		256	5,411,601
540	5,410,764	CLASS 42		17.3	5,411,563	520	5,410,944	37	5,410,985	CLASS 137	
CLASS 5		25	5,410,831	68	5,411,564	CLASS 92		52.2	5,410,986	15	Re.34,923
93.1	5,410,765	70.11	5,410,832	386	5,411,565	48	5,410,945	166	5,410,987		5,411,048
601	5,410,767	73	5,410,833	402	5,411,566	80	5,410,947	CLASS 122		71	5,411,049
609	5,410,768	75.02	5,410,834	CLASS 68		CLASS 95		250 R	5,410,988	101	5,411,050
632	5,410,769	94	5,410,835	189	5,410,892	47	B1 5,051,114	367.1	5,410,989	225	5,411,051
CLASS 8		CLASS 43		CLASS 70		57	5,411,576	CLASS 123		505.28	5,411,052
437	5,411,556	57.1	5,410,836	14	5,410,893	96	5,411,577	3	5,410,990	512.1	5,411,054
444	5,411,557	66	5,410,837	39	5,410,894	101	5,411,578	41.1	5,410,991	513.5	5,411,055
CLASS 15		CLASS 44		202	5,410,895	277	5,411,579	41.49	5,410,992	527.4	5,411,056
97.3	5,410,770	301	5,411,558	226	5,410,896	CLASS 96		65 PE	5,410,993	550	5,411,057
220.1	5,410,771	347	5,411,559	276	5,410,897	5	5,411,580	90.12	5,410,994	572	5,411,058
228	5,410,772	592	5,411,560	370	5,410,898	8	5,411,581	90.22	5,410,995	599	5,411,059
230.11	5,410,773	CLASS 47		436	5,410,900	CLASS 99		190.2	5,410,996	CLASS 138	
250.3	5,410,774	40.5	5,410,838	CLASS 71		335	5,410,948	193.3	5,410,997	98	5,411,060
338	5,410,775	58	5,410,839	9	5,411,567	348	5,410,949	204	5,410,998	CLASS 139	
398	5,410,776	58	5,410,840	22	5,411,568	421 HV	5,410,950	425	5,411,000	91	5,411,061
CLASS 16		CLASS 49		24	5,411,569	443 C	5,410,951	450.6	5,411,001	383 AA	5,411,062
58	5,410,777	67	5,410,841	176	5,410,901	500	5,410,952	497	5,411,002	549	5,411,063
115	5,410,778	334	5,410,842	334	5,410,902	537	5,410,953	502	5,411,003	449	5,411,064
370	5,410,779	399	5,410,903	399	5,410,903	543	5,410,955	520	5,411,004	CLASS 141	
CLASS 24		446	5,410,904	446	5,410,904	CLASS 092		557	5,411,005	1	5,411,065
168	5,410,780	CLASS 51		CLASS 73		65	5,410,946	634	5,411,006	CLASS 144	
274 R	5,410,781	295	B1 4,773,920	11.03	5,410,905	90	5,410,956	690	5,411,007	348	5,411,066
505	5,410,782	CLASS 52		11.04	5,410,906	CLASS 100		CLASS 124		23	5,411,602
516	5,410,783	63	5,410,844	23.31	5,410,907	90	5,410,956	23.1	5,411,008	101	5,411,603
589	5,410,784	167.2	5,410,845	31.05	5,410,908	CLASS 101		89	5,411,009	112	5,411,604
635	5,410,785	204.5	5,410,846	105	5,410,910	127	5,410,957	15	5,411,010	113	5,411,605
CLASS 28		272	5,410,847	128	5,410,911	170	5,410,958	50	5,411,011	240	5,411,606
191	5,410,786	284	5,410,848	198	5,410,909	230	5,410,959	59.5	5,411,012	272	5,411,607
246	5,410,787	309.17	5,410,850	204.15	5,410,912	363	5,410,960	307 R	5,411,013	302	5,411,608
290	5,410,788	309.2	5,410,849	313	5,410,913	375	5,410,961	390	5,411,014	325	5,411,609
CLASS 29		381	5,410,851	437	5,410,914	376	5,410,963	684	5,411,015	542	5,411,610
25.35	5,410,789	408	5,410,852	517 R	5,410,915	378	5,410,964	CLASS 127		557	5,411,611
40	5,410,790	712	5,410,854	706	5,410,916	389.1	5,410,965	37	5,411,594	567	5,411,612
235	5,410,791	717.1	B1 5,042,220	800	5,410,917	CLASS 102		4	5,411,020	606	5,411,613
252	5,410,792	747	5,410,855	864	5,410,918	202	5,410,966	6	5,411,016	670	5,411,614
263	5,410,793	773	5,410,853	864.63	5,410,919	439	5,410,967	201.25	5,411,017	CLASS 149	
281.5	5,410,794	CLASS 53		866.5	5,410,920	CLASS 105		201.28	5,411,018	47	5,411,615
402.15	5,410,795	397	5,410,856	89.14	5,410,921	206.1	5,410,968	203.25	5,411,019	CLASS 152	
419.1	5,410,796	410	5,410,857	89.15	5,410,922	215.1	5,410,969	206.28	5,411,021	209 B	5,411,067
435	5,410,797	477	5,410,858	473 P	5,410,931	355	5,410,970	632	5,411,022	209 R	5,411,068
527.2	5,410,798	537	5,410,859	474	5,410,932	CLASS 106		633	5,411,023	210	5,411,069
622	5,410,799	569	5,410,860	CLASS 75		1.05	5,411,582	634	5,411,024	527	5,411,071
727	5,410,800	586	5,410,861	10.15	5,411,570	14.05	5,411,583	642	5,411,025	CLASS 156	
740	5,410,801	590	5,410,862	232	5,411,571	35	5,411,584	660.03	5,411,026	73.1	5,411,616
748	5,410,802	39.1	5,410,863	500	5,411,572	287.1	5,411,585	661.08	5,411,027	154	5,411,617
753	5,410,803	CLASS 54		721	5,411,573	415	5,411,586	696	5,411,028	164	5,411,618
827	5,410,804	CLASS 56		743	5,411,574	486	5,411,587	706	5,411,029	187	5,411,619
830	5,410,805	2	5,410,864	CLASS 81		CLASS 108		736	5,411,032	230	5,411,620
840	5,410,806	7	Re.34,921	57.33	5,410,924	6	5,410,971	772	5,411,033	242	5,411,621
843	5,410,807	15.9	5,410,865	136	5,410,925	50	5,410,972	844	5,411,034	265	5,411,622
890.036	5,410,808	17.4	5,410,866	139	5,410,926	246	5,410,973	845	5,411,035	290	5,411,623
898.067	5,410,809	320.2	5,410,867	155	5,410,928	CLASS 110		849	5,411,036	345	5,411,624
CLASS 30		CLASS 57		160	5,410,929	CLASS 112		882	5,411,037	359	5,411,625
41	5,410,810	213	5,410,868	335	5,410,930	83	5,410,974	898	5,411,038	396	5,411,626
43.9	5,410,811	39.02	5,410,869	698.31	5,410,932	113	5,410,975	CLASS 131		466	5,411,627
77	5,410,812	39.33	5,410,870	783	5,410,933	121.12	5,410,976	330	5,411,039	652.1	5,411,632
276	B1 4,349,962	267	5,410,871	820	5,410,934	CLASS 114		211	5,411,040	CLASS 160	
287	5,410,813	274	5,410,872	851	5,410,935	91	5,410,977	322	5,411,041	84.11	5,411,072
368	5,410,814	276	5,410,873	CLASS 84		238	5,410,978	CLASS 134		135	5,411,073
234	5,410,815	288	5,410,875	298	5,410,936	243	5,410,979	2	5,411,595	52	5,411,633
527	5,410,816	122	5,410,819	403	5,410,937	270	Re.34,922	26	5,411,596	65	5,411,634
559	5,410,817	CLASS 34		411 R	5,410,938	294	5,410,980	CLASS 135		109	5,411,635
833	5,410,818	CLASS 36					5,410,981				
		25 R	5,410,820								

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135	5,411,637	CLASS 200	182	5,411,160	97	5,411,229	CLASS 266	158.4	5,411,314
175	5,411,639	1 B	269	5,411,159	205.8	5,411,230	5,411,240	440.24	5,411,315
CLASS 164	5 R	5,412,164	293	5,411,161	206.5	5,411,231	5,411,242	452.15	5,411,316
4.1	5,411,074	5 R	320	5,411,162	231.3	5,411,232		452.3	5,411,317
485	5,411,075	43.14	326	5,411,163	305	5,411,233	CLASS 267	452.45	5,411,318
		61.41	334	5,411,164	345.1	5,411,234	140.14	483	5,411,319
CLASS 165		339	404	5,411,165	371	5,411,235	CLASS 269		
80.2	5,411,076	536	460	5,411,167	500	5,411,236	42	5,411,244	5,411,320
104.33	5,411,077		CLASS 221		534	5,411,237	CLASS 270		
113	5,411,078	174	22	5,411,168	664	5,411,238	20.1	5,411,245	5,411,321
151	5,411,079	CLASS 202	73	5,411,169			CLASS 271		5,411,322
162	5,411,080	CLASS 204	167				117	5,411,246	5,411,323
CLASS 166		59 R	CLASS 222				119	5,411,247	5,411,324
120	5,411,081	98	201.9	5,412,200	201.9	5,412,200	171	5,411,248	5,411,325
181	5,411,082	115	208.1	5,412,201	208.1	5,412,201	181	5,411,249	5,411,326
187	5,411,083	130	214 A	5,412,202	214 A	5,412,202	185	5,411,250	
230	5,411,084	140	223 B	5,412,203	223 B	5,412,203	195	5,411,251	CLASS 307
242	5,411,085	147	231.12	5,412,204	231.12	5,412,204	240	5,411,252	5,412,253
245	5,411,086	153.1	234	5,412,205	234	5,412,205			5,412,254
264	5,411,087	153.19	253	5,412,206	253	5,412,206			5,412,255
265	5,411,088	157.43	288	5,412,207	288	5,412,207	CLASS 273		
272	5,411,089	164	310	5,412,208	310	5,412,208	32 H	5,411,253	
278	5,411,090	182.4		5,412,209		5,412,209	73 J	5,411,254	
280	5,411,091	186	201.9	5,412,210	201.9	5,412,210	78	5,411,255	
293	5,411,092	224 R	325	5,412,211	325	5,412,211	85 A	5,411,256	
300	5,411,093	228	326	5,412,212	326	5,412,212	85 CP	5,411,257	
303	5,411,094	242	363.09	5,412,213	363.09	5,412,213	86 B	5,411,258	
317	5,411,095	256	364	5,412,214	364	5,412,214	93 C	5,411,259	
321	5,411,096	299 R	390.05	5,412,215	390.05	5,412,215	139	5,411,260	
324	5,411,097		396 R	5,412,216	396 R	5,412,216	156	5,411,261	
369	5,411,098	CLASS 206	442.17	5,412,217	442.17	5,412,217	157 R	5,411,262	
387	5,411,099	45.13	461.1	5,412,218	461.1	5,412,218	164 I	5,411,263	
CLASS 169		45.15	548	5,412,219	548	5,412,219	167 H	5,411,264	
14	5,411,100	63.5	563	5,412,220	563	5,412,220	169	5,411,265	
CLASS 172		423	573	5,412,221	573	5,412,221	181 A	5,411,266	
378	5,411,101	459.1	588	5,412,222	588	5,412,222	187 R	5,411,267	
781	5,411,102	493					201	5,411,268	
CLASS 174		504	CLASS 224				292	5,411,269	
52.4	5,412,157	553	58	5,411,190	58	5,411,190	349	5,411,270	
163 F	5,412,158		129.06	5,411,191	129.06	5,411,191	434	5,411,271	
250	5,412,159		149.1	5,411,192	149.1	5,411,192		5,411,272	
258	5,412,160		252	5,411,193	252	5,411,193	CLASS 252		
CLASS 175		89	254	5,411,194	254	5,411,194	437	5,411,273	
20	5,411,103	CLASS 208	321	5,411,196	321	5,411,196		5,411,274	
65	5,411,104	CLASS 209					CLASS 277		
69	5,411,105	166	CLASS 228				203	5,411,275	
78	5,411,106	172.5	56.5	5,411,195	56.5	5,411,195		5,411,276	
296	5,411,107	235	56.9	5,411,197	56.9	5,411,197	CLASS 279		
CLASS 181		583	125	5,411,198	125	5,411,198	62	5,411,277	
150	5,412,162	668	179.1	5,411,199	179.1	5,411,199		5,411,278	
CLASS 182			219	5,411,200	219	5,411,200	CLASS 280		
17	5,411,111	CLASS 210	71	5,411,201	71	5,411,201	11.2	5,411,279	
84	5,411,112	130	87.05	5,411,202	87.05	5,411,202	11.22	5,411,280	
179	5,411,113	151	104	5,411,203	104	5,411,203		5,411,281	
CLASS 184		222	114	5,411,204	114	5,411,204	47.38	5,411,282	
1.5	5,411,114	264	244	5,411,205	244	5,411,205	281.1	5,411,283	
6.12	5,411,115	321.8					433	5,411,284	
CLASS 187		300.38	CLASS 232				606	5,411,285	
360	5,411,117	602	133	5,411,206	133	5,411,206	618	5,411,286	
382	5,412,163	610	183	5,411,207	183	5,411,207	656	5,411,287	
392	5,411,118	632	191	5,411,208	191	5,411,208	701	5,411,288	
CLASS 188		638	192	5,411,209	192	5,411,209	717	5,411,289	
79.51	5,411,119	704	194	5,411,210	194	5,411,210	728.3	5,411,290	
112 R	5,411,120	744	197	5,411,211	197	5,411,211	735	5,411,291	
CLASS 191			256	5,411,212	256	5,411,212	737	5,411,292	
33 PM	5,411,121	CLASS 211	272	5,411,213	272	5,411,213	806	5,411,293	
CLASS 192		30	282	5,411,214	282	5,411,214		5,411,294	
66	5,411,122	50	306	5,411,215	306	5,411,215	CLASS 281		
85 AA	5,411,123	59.2	321	5,411,216	321	5,411,216	628	5,411,295	
103 R	5,411,124	188	343	5,411,217	343	5,411,217	640	5,411,296	
CLASS 193		189	457	5,411,218	457	5,411,218	685	5,411,297	
35 R	Re.34,924		462	5,411,219	462	5,411,219	729	5,411,298	
CLASS 194			472	5,411,220	472	5,411,220		5,411,299	
202	5,411,125	CLASS 215	487	5,411,221	487	5,411,221	CLASS 283		
317	5,411,126	11.1					67	5,411,294	
CLASS 198		231	CLASS 239				81	5,411,295	
333	5,411,127	330	632	5,411,222	632	5,411,222	86	5,411,296	
343.1	5,411,128		632	5,411,223	632	5,411,223		5,411,297	
442	5,411,129	CLASS 216	632	5,411,224	632	5,411,224	CLASS 285		
457	5,411,130	22	632	5,411,225	632	5,411,225	20	5,411,298	
572	5,411,131	34	632	5,411,226	632	5,411,226	44	5,411,299	
790	5,411,132	62	632	5,411,227	632	5,411,227	267	5,411,300	
845	5,411,133	72	632	5,411,228	632	5,411,228	316	5,411,301	
		89.2	632	5,411,229	632	5,411,229	355	5,411,302	
			632	5,411,230	632	5,411,230		5,411,303	
			632	5,411,231	632	5,411,231	CLASS 294		
			632	5,411,232	632	5,411,232	207.13	5,411,304	
			632	5,411,233	632	5,411,233	241	5,411,305	
			632	5,411,234	632	5,411,234	303	5,411,306	
			632	5,411,235	632	5,411,235	309	5,411,307	
			632	5,411,236	632	5,411,236	318	5,411,308	
			632	5,411,237	632	5,411,237	429	5,411,309	
			632	5,411,238	632	5,411,238	551	5,411,310	
			632	5,411,239	632	5,411,239	613	5,411,311	
			632	5,411,240	632	5,411,240	640	5,411,312	
			632	5,411,241	632	5,411,241	686	5,411,313	
			632	5,411,242	632	5,411,242	708	5,411,314	
			632	5,411,243	632	5,411,243	752	5,411,315	
			632	5,411,244	632	5,411,244	753	5,411,316	
			632	5,411,245	632	5,411,245	754	5,411,317	
			632	5,411,246	632	5,411,246		5,411,318	
			632	5,411,247	632	5,411,247		5,411,319	
			632	5,411,248	632	5,411,248		5,411,320	
			632	5,411,249	632	5,411,249		5,411,321	
			632	5,411,250	632	5,411,250		5,411,322	
			632	5,411,251	632	5,411,251		5,411,323	
			632	5,411,252	632	5,411,252		5,411,324	
			632	5,411,253	632	5,411,253		5,411,325	
			632	5,411,254	632	5,411,254		5,411,326	
			632	5,411,255	632	5,411,255		5,411,327	
			632	5,411,256	632	5,411,256		5,411,328	
			632	5,411,257	632	5,411,257		5,411,329	
			632	5,411,258	632	5,411,258		5,411,330	
			632	5,411,259	632	5,411,259		5,411,331	
			632	5,411,260	632	5,411,260		5,411,332	
			632	5,411,261	632	5,411,261		5,411,333	
			632	5,411,262	632	5,411,262		5,411,334	
			632	5,411,263	632	5,411,263		5,411,335	
			632	5,411,264	632	5,411,264		5,411,336	
			632	5,411,265	632	5,411,265		5,411,337	
			632	5,411,266	632	5,411,266		5,411,338	
			632	5,411,267	632	5,411,267		5,411,339	
			632	5,411,268	632	5,411,268		5,411,340	
			632	5,411,269	632	5,411,269		5,411,341	
			632	5,411,270	632	5,411,270		5,411,342	
			632	5,411,271	632	5,411,271		5,411,343	
			632	5,411,272	632	5,411,272		5,411,344	
			632	5,411,273	632	5,411,273		5,411,345	
			632	5,411,274	632	5,411,274		5,411,346	



246	5,411,373	534	5,411,769	409	5,411,398	CLASS 446	23	5,411,945	523	5,412,044		
CLASS 417	556	5,411,770	CLASS 435	71	5,411,427	30	5,411,946	CLASS 526	133	5,412,045		
53	5,411,374	586	5,411,772	4	5,411,858	43	5,411,947	33	5,412,128	560	5,412,142	
295	5,411,375	1	5,411,773	5	5,411,857	90	5,411,948	35	5,412,129	56	5,412,143	
312	5,411,376	4	5,411,774	6	5,411,859	242	5,411,949	56	5,412,130	98	5,412,149	
333	5,411,377	17	5,411,775	43	5,411,860	167	5,411,950	145	5,412,131	133	5,412,150	
360	5,411,378	34	5,411,776	1	5,411,861	183	5,411,951	312	5,412,132	153	5,412,151	
390	5,411,379	34.9	5,411,777	214	5,411,862	211	5,411,952	313	5,412,133	167	5,412,152	
454	5,411,380	35.7	5,411,778	216	5,411,863	47	5,411,953	317.1	5,412,134	179	5,412,153	
472	5,411,381	36.91	5,411,779	224.2	5,411,864	92	5,411,954	300	5,412,135	191	5,412,154	
500	5,411,382	38	5,411,780	227.5	5,411,865	451	5,411,955	CLASS 527	25	5,412,155	198	5,412,156
CLASS 418	57	5,411,781	7.93	5,411,866	CLASS 451	166	5,411,956	CLASS 528	9	5,412,052	218	5,412,157
48	5,411,383	11	5,411,782	5,411,867	CLASS 452	198	5,411,957	15	5,412,053	236	5,412,158	
55.1	5,411,384	14	5,411,783	5,411,868	CLASS 453	259	5,411,958	73	5,412,054	247	5,412,159	
96	5,411,385	18	5,411,784	5,411,869	CLASS 454	269	5,411,959	96	5,412,055	263	5,412,160	
149	5,411,386	23	5,411,785	5,411,870	CLASS 455	279	5,411,960	129	5,412,056	290	5,412,161	
201.2	5,411,387	30	5,411,786	5,411,871	CLASS 456	288	5,411,961	183	5,412,057	329	5,412,162	
203	5,411,388	69.1	5,411,787	5,411,872	CLASS 457	291	5,411,962	196	5,412,058	333	5,412,163	
CLASS 419	184	5,411,788	84	5,411,873	CLASS 458	304	5,411,963	272	5,412,059	4	5,412,164	
29	5,411,789	91.2	5,411,789	5,411,874	CLASS 459	311	5,411,964	298	5,412,060	184	5,412,165	
CLASS 420	200	5,411,790	125	5,411,875	CLASS 460	318	5,411,965	353	5,412,061			
48	5,411,791	210	5,411,791	5,411,876	CLASS 461	330	5,411,966	361	5,412,062			
79	5,411,792	215	5,411,792	5,411,877	CLASS 462	347	5,411,967	370	5,412,063			
561	5,411,793	216	5,411,793	5,411,878	CLASS 463	365	5,411,968	374	5,412,064			
CLASS 422	229	5,411,794	240.2	5,411,879	CLASS 464	386	5,411,969	392	5,412,065			
29	5,411,795	231	5,411,795	5,411,880	CLASS 465	397	5,411,970	477	5,412,066			
45	5,411,796	236	5,411,796	5,411,881	CLASS 466	44	5,411,971	481	5,412,067			
46	5,411,797	341	5,411,797	5,411,882	CLASS 467	34	5,411,972	488	5,412,068			
68.1	5,411,798	343	5,411,798	5,411,883	CLASS 468	145	5,411,973	494	5,412,069			
81	5,411,799	362	5,411,799	5,411,884	CLASS 469	148	5,411,974	501	5,412,070			
91	5,411,800	402	5,411,800	5,411,885	CLASS 470	154	5,411,975	509	5,412,071			
137	5,411,801	403	5,411,801	5,411,886	CLASS 471	372	5,411,976	520	5,412,072			
177	5,411,802	404	5,411,802	5,411,887	CLASS 472	373	5,411,977	520	5,412,073			
186	5,411,803	404	5,411,803	5,411,888	CLASS 473	374	5,411,978	535	5,412,074			
186.15	5,411,804	411.1	5,411,804	5,411,889	CLASS 474	384	5,411,979	546	5,412,075			
232	5,411,805	63	5,411,805	5,411,890	CLASS 475	386	5,411,980	549	5,412,076			
243	5,411,806	94	5,411,806	5,411,891	CLASS 476	397	5,411,981	566	5,412,077			
264	5,411,807	165	5,411,807	5,411,892	CLASS 477	521	5,411,982	629	5,412,078			
275	5,411,808	174	5,411,808	5,411,893	CLASS 478	529	5,411,983	634	5,412,079			
CLASS 423	542.2	5,411,809	5,411,809	5,411,894	CLASS 479	560	5,411,984	686	5,412,080			
69	5,411,810	5,411,810	5,411,810	5,411,895	CLASS 480	616	5,411,985	698	5,412,081			
210	5,411,811	5,411,811	5,411,811	5,411,896	CLASS 481	640	5,411,986	732	5,412,082			
220	5,411,812	5,411,812	5,411,812	5,411,897	CLASS 482	665	5,411,987	732	5,412,083			
253	5,411,813	5,411,813	5,411,813	5,411,898	CLASS 483	731	5,411,988	732	5,412,084			
306	5,411,814	5,411,814	5,411,814	5,411,899	CLASS 484	766	5,411,989	732	5,412,085			
328.2	5,411,815	5,411,815	5,411,815	5,411,900	CLASS 485	38	5,411,990	732	5,412,086			
387	5,411,816	5,411,816	5,411,816	5,411,901	CLASS 486	53	5,411,991	732	5,412,087			
484	5,411,817	5,411,817	5,411,817	5,411,902	CLASS 487	54	5,411,992	732	5,412,088			
658.5	5,411,818	5,411,818	5,411,818	5,411,903	CLASS 488	59	5,411,993	732	5,412,089			
CLASS 424	185	5,411,819	5,411,819	5,411,904	CLASS 489	79	5,411,994	732	5,412,090			
59	5,411,820	5,411,820	5,411,820	5,411,905	CLASS 490	96	5,411,995	732	5,412,091			
70.12	5,411,821	5,411,821	5,411,821	5,411,906	CLASS 491	101	5,411,996	732	5,412,092			
78.02	5,411,822	5,411,822	5,411,822	5,411,907	CLASS 492	104	5,411,997	732	5,412,093			
192.1	5,411,823	5,411,823	5,411,823	5,411,908	CLASS 493	112	5,411,998	732	5,412,094			
195.1	5,411,824	5,411,824	5,411,824	5,411,909	CLASS 494	124	5,411,999	732	5,412,095			
322	5,411,825	5,411,825	5,411,825	5,411,910	CLASS 495	145	5,412,000	732	5,412,096			
401	5,411,826	5,411,826	5,411,826	5,411,911	CLASS 496	176	5,412,001	732	5,412,097			
B1 4,997,657	5,411,827	5,411,827	5,411,827	5,411,912	CLASS 497	344	5,412,002	732	5,412,098			
408	5,411,828	5,411,828	5,411,828	5,411,913	CLASS 498	436	5,412,003	732	5,412,099			
410	5,411,829	5,411,829	5,411,829	5,411,914	CLASS 499	437	5,412,004	732	5,412,100			
411	5,411,830	5,411,830	5,411,830	5,411,915	CLASS 500	466	5,412,005	732	5,412,101			
445	5,411,831	5,411,831	5,411,831	5,411,916	CLASS 501	513	5,412,006	732	5,412,102			
448	5,411,832	5,411,832	5,411,832	5,411,917	CLASS 502	513	5,412,007	732	5,412,103			
450	5,411,833	5,411,833	5,411,833	5,411,918	CLASS 503	513	5,412,008	732	5,412,104			
59	5,411,834	5,411,834	5,411,834	5,411,919	CLASS 504	513	5,412,009	732	5,412,105			
70.12	5,411,835	5,411,835	5,411,835	5,411,920	CLASS 505	513	5,412,010	732	5,412,106			
78.02	5,411,836	5,411,836	5,411,836	5,411,921	CLASS 506	513	5,412,011	732	5,412,107			
192.1	5,411,837	5,411,837	5,411,837	5,411,922	CLASS 507	513	5,412,012	732	5,412,108			
195.1	5,411,838	5,411,838	5,411,838	5,411,923	CLASS 508	513	5,412,013	732	5,412,109			
322	5,411,839	5,411,839	5,411,839	5,411,924	CLASS 509	513	5,412,014	732	5,412,110			
401	5,411,840	5,411,840	5,411,840	5,411,925	CLASS 510	513	5,412,015	732	5,412,111			
B1 4,997,657	5,411,841	5,411,841	5,411,841	5,411,926	CLASS 511	513	5,412,016	732	5,412,112			
408	5,411,842	5,411,842	5,411,842	5,411,927	CLASS 512	513	5,412,017	732	5,412,113			
410	5,411,843	5,411,843	5,411,843	5,411,928	CLASS 513	513	5,412,018	732	5,412,114			
411	5,411,844	5,411,844	5,411,844	5,411,929	CLASS 514	513	5,412,019	732	5,412,115			
445	5,411,845	5,411,845	5,411,845	5,411,930	CLASS 515	513	5,412,020	732	5,412,116			
448	5,411,846	5,411,846	5,411,846	5,411,931	CLASS 516	513	5,412,021	732	5,412,117			
450	5,411,847	5,411,847	5,411,847	5,411,932	CLASS 517	513	5,412,022	732	5,412,118			
59	5,411,848	5,411,848	5,411,848	5,411,933	CLASS 518	513	5,412,023	732	5,412,119			
70.12	5,411,849	5,411,849	5,411,849	5,411,934	CLASS 519	513	5,412,024	732	5,412,120			
78.02	5,411,850	5,411,850	5,411,850	5,411,935	CLASS 520	513	5,412,025	732	5,412,121			
192.1	5,411,851	5,411,851	5,411,851	5,411,936	CLASS 521	513	5,412,026	732	5,412,122			
195.1	5,411,852	5,411,852	5,411,852	5,411,937	CLASS 522	513	5,412,027	732	5,412,123			
322	5,411,853	5,411,853	5,411,853	5,411,938	CLASS 523	513	5,412,028	732	5,412,124			
401	5,411,854	5,411,854	5,411,854	5,411,939	CLASS 524	513	5,412,029	732	5,412,125			
B1 4,997,657	5,411,855	5,411,855	5,411,855	5,411,940	CLASS 525	513	5,412,030	732	5,412,126			
408	5,411,856	5,411,856	5,411,856	5,411,941	CLASS 526	513	5,412,031	732	5,412,127			
410	5,411,857	5,411,857	5,411,857	5,411,942	CLASS 527	513	5,412,032	732	5,412,128			
411	5,411,858	5,411,858	5,411,858	5,411,943	CLASS 528	513	5,412,033	732	5,412,129			
445	5,411,859	5,411,859	5,411,859	5,411,944	CLASS 529	513	5,412,034	732	5,412,130			
448	5,411,860	5,411,860	5,411,860	5,411,945	CLASS 530	513	5,412,035	732	5,412,131			
450	5,411,861	5,411,861	5,411,861	5,411,946	CLASS 531	513	5,412,036	732	5,412,132			
59	5,411,862	5,411,862	5,411,862	5,411,947	CLASS 532	513	5,412,037	732	5,412,133			
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## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

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Alabama .....	1	Kentucky .....	21	Oregon .....	41
Alaska .....	2	Louisiana .....	22	Pennsylvania .....	42
American Samoa .....	3	Maine .....	23	Puerto Rico .....	43
Arizona .....	4	Maryland .....	24	Rhode Island .....	44
Arkansas .....	5	Massachusetts .....	25	South Carolina .....	45
California .....	6	Michigan .....	26	South Dakota .....	46
Canal Zone .....	7	Minnesota .....	27	Tennessee .....	47
Colorado .....	8	Mississippi .....	28	Texas .....	48
Connecticut .....	9	Missouri .....	29	Utah .....	49
Delaware .....	10	Montana .....	30	Vermont .....	50
District of Columbia .....	11	Nebraska .....	31	Virginia .....	51
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Kansas .....	20	Oklahoma .....	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

### PATENTS

01 :	5,411,186	5,411,050	5,411,738	5,412,304	5,412,727	5,411,177
	5,411,579	5,411,051	5,411,740	5,412,309	5,412,729	5,411,250
	5,411,615	5,411,070	5,411,743	5,412,325	5,412,731	5,411,252
	5,412,639	5,411,094	5,411,748	5,412,344	5,412,755	5,411,344
02 :	5,411,098	5,411,133	5,411,760	5,412,352	5,412,771	5,411,350
	5,411,201	5,411,164	5,411,764	5,412,353	5,412,773	5,411,352
	5,411,461	5,411,191	5,411,772	5,412,354	5,412,774	5,411,357
04 :	5,411,136	5,411,192	5,411,778	5,412,355	5,412,775	5,411,370
	5,411,142	5,411,194	5,411,780	5,412,356	5,412,779	5,411,479
	5,411,165	5,411,207	5,411,813	5,412,363	5,412,782	5,411,481
	5,411,339	5,411,227	5,411,820	5,412,369	5,412,783	5,411,519
	5,411,364	5,411,263	5,411,833	5,412,370	5,412,793	5,411,521
	5,411,368	5,411,267	5,411,837	5,412,378	5,412,800	5,411,613
	5,411,400	5,411,268	5,411,864	5,412,384	5,412,801	5,411,617
	5,411,503	5,411,270	5,411,867	5,412,390	5,412,806	5,411,637
	5,411,511	5,411,272	5,411,873	5,412,394	5,412,809	5,411,657
	5,411,590	5,411,282	5,411,876	5,412,416	5,412,773	5,411,698
	5,411,629	5,411,295	5,411,883	5,412,419	5,412,833	5,411,727
	5,411,903	5,411,298	5,411,888	5,412,433	5,412,861	5,411,734
	5,412,192	5,411,318	5,411,895	5,412,473	5,412,864	5,411,969
	5,412,224	5,411,343	5,411,901	5,412,476	5,412,918	5,411,995
	5,412,382	5,411,348	5,411,906	5,412,479	5,412,920	5,412,082
	5,412,388	5,411,353	5,411,913	5,412,498	5,412,955	5,412,130
	5,412,389	5,411,377	5,411,917	5,412,500	5,412,962	5,412,196
	5,412,668	5,411,402	5,411,918	5,412,501	5,412,966	5,412,197
	5,412,734	5,411,418	5,411,941	5,412,521	5,411,134	5,412,324
06 :	Re. 34,925	5,411,425	5,411,944	5,412,522	5,411,145	5,412,328
	5,410,755	5,411,455	5,411,947	5,412,526	5,411,1730	5,412,374
	5,410,762	5,411,466	5,412,035	5,412,527	5,412,116	5,412,468
	5,410,765	5,411,472	5,412,043	5,412,538	5,412,194	5,412,701
	5,410,774	5,411,473	5,412,053	5,412,539	5,412,207	5,412,706
	5,410,775	5,411,476	5,412,087	5,412,548	5,412,257	5,412,715
	5,410,794	5,411,483	5,412,102	5,412,564	5,412,372	5,412,751
	5,410,797	5,411,486	5,412,123	5,412,567	5,412,420	5,411,478
	5,410,799	5,411,500	5,412,126	5,412,574	5,412,516	5,411,641
	5,410,805	5,411,509	5,412,129	5,412,580	5,412,575	5,411,710
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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning PCT member countries, see the notice appearing in the *Official Gazette* at 1168 O.G. 100, on Nov. 29, 1994.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52, on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2, on July 7, 1987, and at 1091 O.G. 2, on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed, effective Oct. 1, 1994, due to a change in the exchange rate of the U.S. dollar with regard to the German mark, and was announced in the *Official Gazette* at 1165 O.G. 81, on Aug. 23, 1994.

International fees were changed, effective on January 1, 1995, due to a change in the exchange rate of the U. S. dollar with regard to the Swiss franc, and were announced in the *Official Gazette* at 1168 O.G. 99, on Nov. 29, 1994.

Certain domestic PCT fees and charges for International Search and Preliminary Examination were changed, effective Oct. 1, 1994, and were announced in the *Official Gazette* at 1165 O.G. 132, on Aug. 30, 1994.

The schedule of PCT fees (in U.S. dollars), effective Jan. 1, 1995, is as follows:

International Application (PCT Chapter I) fees:

Transmittal fee.....	210.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed.....	640.00
—Corresponding prior U.S. national application filed.....	420.00
—Supplemental search fee, per additional invention (payable only upon invitation) .....	180.00
European Patent Office as ISA.....	1537.00

International fees

Basic fee .....	604.00
Basic Supplemental fee (for each page over 30).....	12.00
Designation fee per country or region	
—For the first 10 national or regional offices designated .....	147.00
—For each designation in excess of 10 offices.....	No Charge

Precautionary designation fee and confirmation fee for each precautionary designation confirmed (PCT Rule 15.5)	
—Designation fee.....	147.00
—Confirmation fee.....	73.50

International Application (PCT Chapter II) fees associated with filing a Demand for Preliminary Examination:

Handling fee .....	185.00
Preliminary examination fee	

USPTO as International Preliminary Examining Authority (IPEA)

—USPTO was ISA in PCT Chapter I.....	460.00
—Additional examination fee, per additional invention (payable only upon invitation).....	140.00
—USPTO was not ISA in PCT Chapter I....	690.00
—Additional examination fee, per additional invention (payable only upon invitation) .....	240.00

U.S. National Stage Fees	Small Entity	Regular
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Basic National fee

USPTO was IPEA

—All claims presented satisfied provisions of PCT Article 33(2) to (4).....	46.00	92.00
—All claims presented did not satisfy provisions of PCT Article 33(2) to (4) .....	330.00	660.00
USPTO was ISA but not IPEA.....	365.00	730.00

USPTO was neither ISA nor IPEA

—Filed without a search report from the European Patent Office or the Japanese Patent Office.....	490.00	980.00
—Filed with a search report from the European Patent Office or the Japanese Patent Office.....	425.00	850.00

Other National fees

—For each independent claim in excess of 3.....	38.00	76.00
—For each claim in excess of 20 ..	11.00	22.00
—For each application containing a multiple dependent claim.....	120.00	240.00
—Surcharge for filing oath or declaration after the time limit applicable under PCT Article 22 or 39(1) .....	65.00	130.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1).....	130.00	130.00

Dec. 12, 1994

BRUCE A. LEHMAN  
Assistant Secretary of Commerce and  
Commissioner of Patents and Trademarks

Patent Cooperation Treaty Update

The International Bureau of the World Intellectual Property Organization has informed the U.S. Patent and Trademark Office that, due to a change in the exchange rate of the U.S. dollar with regard to the German mark, the dollar amount of the international search fee charged by the European Patent Office for international applications filed in the United States Receiving Office will be \$1722.00, effective June 20, 1995.

Apr. 14, 1995

BRUCE A. LEHMAN  
Assistant Secretary of Commerce and  
Commissioner of Patents and Trademarks

## Status of Appeal Cases

**The Date of Examiner's Answer of Oldest  
Ex Parte Appeals Awaiting Assignment to Panel for  
a Decision Without a Hearing as of  
March 31, 1995**

Chemical Discipline -	November 27, 1992
Mechanical Discipline -	September 8, 1994
Electrical Discipline -	February 3, 1994

**The Date of Examiner's Answer of Oldest  
Ex Parte Appeals Awaiting the Setting of Hearing  
Date as of March 31, 1995**

Chemical Discipline -	March 30, 1993
Mechanical Discipline -	August 11, 1994
Electrical Discipline -	February 24, 1994

**Board of Patent Appeals and Interferences  
Decisions Rendered in Ex Parte Appeals  
During the Month of March, 1995**

Affirmed.....	131
Affirmed-in-Part.....	32
Reversed.....	97
<b>Total Decided.....</b>	<b>260</b>

## Notice of Maintenance Fees Payable

Title 37 Code of Federal Regulations (CFR), Section 1.362(d) provides that maintenance fees may be paid without surcharge for the six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(h), as amended effective Dec. 16, 1991. If the maintenance fee is not paid in the patent requiring such payment the patent will expire on the 4th, 8th, or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 05, 1992 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 5,109,546 through 5,111,535  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 03, 1988 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,741,050 through 4,742,577  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 01, 1984 for which maintenance fees due at 11 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,445,231 through 4,446,570  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

For patents based on applications filed on or after Dec. 12, 1980, but before Aug. 27, 1982, patent owners must establish small entity status according to 37 CFR 1.27 if they have not done so and if they wish to pay the small entity amount.

The current amounts of the maintenance fees due at 3 years and six months, 7 years and six months, and 11 years and six months are set forth in 37 CFR 1.20(e)-(g), as amended Oct. 1, 1994, which are reproduced below:

## 37 CFR § 1.20 Post-issuance fees

(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§ 1.9(f)) .....	\$480.00
By other than a small entity .....	\$960.00

(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§ 1.9(f)) .....	\$965.00
By other than a small entity .....	\$1,930.00

(g) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 12 years; the fee is due by eleven years and six months after the original grant:

By a small entity (§ 1.9(f)) .....	\$1,450.00
By other than a small entity .....	\$2,900.00

The amount of the surcharge for paying the maintenance fee during the grace period or after expiration of the patent are set forth in 37 CFR 1.20(h), and (i) which are reproduced below:

(h) Surcharge for paying a maintenance fee during the 6 month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980:

By a small entity (§ 1.9(f)) .....	\$65.00
By other than a small entity .....	\$130.00

(i) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been:

(1) unavoidable .....	\$640.00
(2) unintentional .....	\$1,500.00

**Notice of Expiration of Patents  
Due to Failure to Pay Maintenance Fee**

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

**PATENTS WHICH EXPIRED March 1, 1995  
DUE TO FAILURE TO PAY MAINTENANCE FEES**

Patent Number	Serial Number	Issue Date
Re. 32,752	07/092,453	09/20/88
(4,644,987)	(06/807,158)	(02/24/87)
Re. 33,131	07/162,401	12/19/89
(4,645,264)	(06/690,460)	(02/24/87)
4,375,113	06/264,474	03/01/83
4,375,124	06/320,238	03/01/83

Patent Number	Serial Number	Issue Date	4,375,545	06/275,577	03/01/83
4,375,163	06/223,445	03/01/83	4,375,546	06/321,354	03/01/83
4,375,164	06/256,447	03/01/83	4,375,548	06/331,854	03/01/83
4,375,166	06/245,822	03/01/83	4,375,549	06/355,636	03/01/83
4,375,170	06/248,612	03/01/83	4,375,550	06/296,880	03/01/83
4,375,172	06/259,637	03/01/83	4,375,551	06/303,644	03/01/83
4,375,174	06/295,550	03/01/83	4,375,553	06/306,580	03/01/83
4,375,181	06/226,550	03/01/83	4,375,554	06/318,598	03/01/83
4,375,185	06/267,209	03/01/83	4,375,557	06/385,991	03/01/83
4,375,188	06/271,237	03/01/83	4,375,561	06/318,117	03/01/83
4,375,198	06/226,152	03/01/83	4,375,563	06/363,706	03/01/83
4,375,202	06/260,747	03/01/83	4,375,578	06/232,344	03/01/83
4,375,210	06/221,462	03/01/83	4,375,585	06/387,900	03/01/63
4,375,231	06/239,333	03/01/83	4,375,591	06/293,383	03/01/83
4,375,235	06/305,241	03/01/83	4,375,607	06/246,502	03/01/83
4,375,238	06/222,345	03/01/83	4,375,609	06/242,809	03/01/83
4,375,243	06/249,081	03/01/83	4,375,612	06/270,740	03/01/83
4,375,270	06/226,383	03/01/83	4,375,614	06/251,306	03/01/83
4,375,273	06/263,067	03/01/83	4,375,623	06/237,309	03/01/83
4,375,279	06/278,504	03/01/83	4,375,624	06/276,140	03/01/83
4,375,284	06/269,994	03/01/83	4,375,625	06/265,882	03/01/83
4,375,292	06/371,152	03/01/83	4,375,627	06/277,589	03/01/83
4,375,296	06/288,726	03/01/83	4,375,630	06/250,096	03/01/83
4,375,297	06/217,018	03/01/83	4,375,641	06/227,081	03/01/83
4,375,304	06/221,688	03/01/83	4,375,642	06/284,696	03/01/83
4,375,307	06/248,747	03/01/83	4,375,648	06/268,973	03/01/83
4,375,308	06/263,849	03/01/83	4,375,649	06/268,974	03/01/83
4,375,309	06/220,079	03/01/83	4,375,650	06/258,856	03/01/83
4,375,323	06/295,981	03/01/83	4,375,652	06/313,882	03/01/83
4,375,324	06/305,961	03/01/83	4,375,653	06/252,757	03/01/83
4,375,325	06/252,444	03/01/83	4,375,661	06/296,101	03/01/83
4,375,354	06/267,702	03/01/83	4,375,670	06/279,240	03/01/83
4,375,365	06/344,947	03/01/83	4,375,679	06/239,092	03/01/83
4,375,373	06/326,255	03/01/83	4,375,693	06/257,011	03/01/83
4,375,376	06/329,020	03/01/83	4,375,694	06/257,012	03/01/83
4,375,383	06/255,336	03/01/83	4,644,588	06/871,467	02/24/87
4,375,384	06/355,402	03/01/83	4,644,589	06/698,441	02/24/87
4,375,391	06/234,176	03/01/83	4,644,590	06/830,047	02/24/87
4,375,393	06/266,786	03/01/83	4,644,593	06/785,895	02/24/87
4,375,394	06/356,992	03/01/83	4,644,594	06/726,430	02/24/87
4,375,396	06/322,316	03/01/83	4,644,595	06/792,679	02/24/87
4,375,398	06/381,287	03/01/83	4,644,599	06/650,215	02/24/87
4,375,403	06/340,436	03/01/83	4,644,607	06/821,598	02/24/87
4,375,407	06/275,905	03/01/83	4,644,609	06/697,733	02/24/87
4,375,411	06/254,739	03/01/83	4,644,611	06/799,487	02/24/87
4,375,421	06/312,439	03/01/83	4,644,622	06/720,139	02/24/87
4,375,422	06/320,390	03/01/83	4,644,625	06/848,872	02/24/87
4,375,427	06/241,953	03/01/83	4,644,628	06/822,638	02/24/87
4,375,435	06/270,072	03/01/83	4,644,630	06/668,548	02/24/87
4,375,436	06/324,873	03/01/83	4,644,632	06/839,339	02/24/87
4,375,437	06/274,703	03/01/83	4,644,633	06/768,664	02/24/87
4,375,441	06/217,886	03/01/83	4,644,634	06/635,628	02/24/87
4,375,450	06/254,558	03/01/83	4,644,638	06/653,359	02/24/87
4,375,451	06/257,302	03/01/83	4,644,639	06/684,892	02/24/87
4,375,452	06/311,579	03/01/83	4,644,640	06/842,097	02/24/87
4,375,453	06/334,719	03/01/83	4,644,642	06/772,196	02/24/87
4,375,457	06/307,128	03/01/83	4,644,644	06/808,177	02/24/87
4,375,460	06/304,133	03/01/83	4,644,645	06/814,156	02/24/87
4,375,465	06/275,472	03/01/83	4,644,651	06/798,840	02/24/87
4,375,467	06/305,913	03/01/83	4,644,655	06/781,699	02/24/87
4,375,468	06/366,594	03/01/83	4,644,656	06/618,574	02/24/87
4,375,471	06/235,801	03/01/83	4,644,657	06/777,002	02/24/87
4,375,475	06/233,521	03/01/83	4,644,658	06/680,397	02/24/87
4,375,476	06/301,846	03/01/83	4,644,660	06/735,735	02/24/87
4,375,485	06/295,011	03/01/83	4,644,672	06/756,249	02/24/87
4,375,487	06/249,652	03/01/83	4,644,674	06/668,274	02/24/87
4,375,489	06/250,979	03/01/83	4,644,676	06/752,804	02/24/87
4,375,496	06/260,228	03/01/83	4,644,680	06/838,140	02/24/87
4,375,504	06/260,241	03/01/83	4,644,683	06/754,170	02/24/87
4,375,506	06/316,701	03/01/83	4,644,684	06/739,758	02/24/87
4,375,507	06/383,883	03/01/83	4,644,685	06/220,270	02/24/87
4,375,509	06/318,705	03/01/83	4,644,691	06/743,564	02/24/87
4,375,512	06/270,009	03/01/83	4,644,692	06/735,624	02/24/87
4,375,524	06/278,129	03/01/83	4,644,693	06/767,603	02/24/87
4,375,526	06/323,329	03/01/83	4,644,697	06/652,887	02/24/87
4,375,532	06/306,972	03/01/83	4,644,699	06/616,013	02/24/87
4,375,539	06/313,017	03/01/83	4,644,700	06/734,906	02/24/87
4,375,540	06/297,817	03/01/83	4,644,703	06/839,243	02/24/87
			4,644,704	06/798,907	02/24/87



Patent Number	Serial Number	Issue Date	4,644,947	06/762,294	02/24/87
4,644,705	06/860,737	02/24/87	4,644,950	06/711,162	02/24/87
4,644,706	06/822,328	02/24/87	4,644,952	06/702,500	02/24/87
4,644,708	06/821,446	02/24/87	4,644,961	06/705,601	02/24/87
4,644,713	06/824,279	02/24/87	4,644,962	06/659,834	02/24/87
4,644,716	06/743,448	02/24/87	4,644,964	06/743,065	02/24/87
4,644,718	06/812,190	02/24/87	4,644,965	06/788,889	02/24/87
4,644,720	06/667,094	02/24/87	4,644,968	06/527,603	02/24/87
4,644,722	06/787,092	02/24/87	4,644,970	06/786,533	02/24/87
4,644,723	06/836,482	02/24/87	4,644,978	06/783,567	02/24/87
4,644,724	06/719,846	02/24/87	4,644,982	06/778,879	02/24/87
4,644,725	06/710,241	02/24/87	4,644,984	06/780,754	02/24/87
4,644,727	06/825,852	02/24/87	4,645,000	06/853,902	02/24/87
4,644,732	06/763,622	02/24/87	4,645,001	06/735,559	02/24/87
4,644,734	06/699,790	02/24/87	4,645,002	06/670,263	02/24/87
4,644,740	06/705,648	02/24/87	4,645,003	06/812,693	02/24/87
4,644,748	06/728,822	02/24/87	4,645,004	06/603,583	02/24/87
4,644,749	06/476,943	02/24/87	4,645,005	06/723,765	02/24/87
4,644,750	06/829,148	02/24/87	4,645,006	06/679,288	02/24/87
4,644,751	06/711,900	02/24/87	4,645,011	06/722,070	02/24/87
4,644,761	06/699,731	02/24/87	4,645,013	06/775,142	02/24/87
4,644,762	06/761,541	02/24/87	4,645,016	06/730,420	02/24/87
4,644,767	06/751,489	02/24/87	4,645,019	06/785,102	02/24/87
4,644,771	06/745,491	02/24/87	4,645,021	06/819,043	02/24/87
4,644,775	06/745,304	02/24/87	4,645,022	06/740,916	02/24/87
4,644,777	06/773,874	02/24/87	4,645,023	06/704,427	02/24/87
4,644,778	06/785,174	02/24/87	4,645,024	06/776,624	02/24/87
4,644,779	06/742,636	02/24/87	4,645,030	06/593,728	02/24/87
4,644,781	06/679,343	02/24/87	4,645,034	06/748,798	02/24/87
4,644,785	06/773,272	02/24/87	4,645,039	06/746,719	02/24/87
4,644,794	06/751,695	02/24/87	4,645,040	06/577,984	02/24/87
4,644,796	06/808,351	02/24/87	4,645,047	06/780,400	02/24/87
4,644,797	06/753,854	02/24/87	4,645,055	06/848,803	02/24/87
4,644,802	06/718,314	02/24/87	4,645,058	06/830,244	02/24/87
4,644,803	06/797,599	02/24/87	4,645,067	06/828,260	02/24/87
4,644,808	06/807,081	02/24/87	4,645,068	06/744,256	02/24/87
4,644,810	06/691,862	02/24/87	4,645,070	06/668,897	02/24/87
4,644,811	06/746,617	02/24/87	4,645,072	06/670,392	02/24/87
4,644,818	06/665,969	02/24/87	4,645,076	06/772,332	02/24/87
4,644,821	06/675,363	02/24/87	4,645,077	06/769,121	02/24/87
4,644,823	06/480,817	02/24/87	4,645,079	06/659,202	02/24/87
4,644,824	06/713,801	02/24/87	4,645,080	06/626,577	02/24/87
4,644,825	06/678,014	02/24/87	4,645,081	06/792,304	02/24/87
4,644,827	06/592,155	02/24/87	4,645,086	06/781,253	02/24/87
4,644,830	06/667,844	02/24/87	4,645,097	06/753,229	02/24/87
4,644,833	06/789,106	02/24/87	4,645,106	06/724,262	02/24/87
4,644,840	06/612,201	02/24/87	4,645,109	06/737,482	02/24/87
4,644,842	06/814,507	02/24/87	4,645,115	06/726,973	02/24/87
4,644,843	06/774,516	02/24/87	4,645,117	06/617,610	02/24/87
4,644,847	06/626,411	02/24/87	4,645,118	06/770,618	02/24/87
4,644,850	06/814,757	02/24/87	4,645,119	06/627,892	02/24/87
4,644,851	06/760,682	02/24/87	4,645,127	06/646,562	02/24/87
4,644,859	06/726,821	02/24/87	4,645,130	06/764,156	02/24/87
4,644,860	06/712,662	02/24/87	4,645,151	06/735,961	02/24/87
4,644,861	06/814,485	02/24/87	4,645,155	06/841,209	02/24/87
4,644,867	06/714,283	02/24/87	4,645,157	06/812,389	02/24/87
4,644,870	06/663,724	02/24/87	4,645,163	06/737,714	02/24/87
4,644,872	06/623,015	02/24/87	4,645,169	06/647,120	02/24/87
4,644,874	06/765,777	02/24/87	4,645,175	06/551,956	02/24/87
4,644,878	06/795,294	02/24/87	4,645,181	06/782,021	02/24/87
4,644,881	06/870,160	02/24/87	4,645,184	06/734,925	02/24/87
4,644,884	06/633,978	02/24/87	4,645,189	06/730,770	02/24/87
4,644,887	06/861,224	02/24/87	4,645,198	06/762,372	02/24/87
4,644,894	06/698,338	02/24/87	4,645,204	06/698,680	02/24/87
4,644,904	06/705,195	02/24/87	4,645,208	06/779,926	02/24/87
4,644,906	06/732,369	02/24/87	4,645,210	06/682,985	02/24/87
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4,644,908	06/670,793	02/24/87	4,645,216	06/830,375	02/24/87
4,644,919	06/810,752	02/24/87	4,645,220	06/695,445	02/24/87
4,644,923	06/716,638	02/24/87	4,645,221	06/879,548	02/24/87
4,644,926	06/712,850	02/24/87	4,645,222	06/731,110	02/24/87
4,644,929	06/716,816	02/24/87	4,645,224	06/713,981	02/24/87
4,644,937	06/606,219	02/24/87	4,645,226	06/645,318	02/24/87
4,644,938	06/693,672	02/24/87	4,645,228	06/782,090	02/24/87
4,644,941	06/734,328	02/24/87	4,645,232	06/817,486	02/24/87
4,644,944	06/645,858	02/24/87	4,645,236	06/804,909	02/24/87
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4,644,946	06/776,120	02/24/87	4,645,244	06/580,224	02/24/87
			4,645,248	06/875,865	02/24/87

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4,645,258	06/782,902	02/24/87	4,645,553	06/739,927	02/24/87
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4,645,288	06/677,912	02/24/87	4,645,615	06/833,701	02/24/87
4,645,289	06/752,424	02/24/87	4,645,616	06/793,469	02/24/87
4,645,294	06/680,446	02/24/87	4,645,621	06/682,299	02/24/87
4,645,298	06/518,145	02/24/87	4,645,625	06/675,052	02/24/87
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4,645,474	06/808,820	02/24/87	4,645,774	06/803,792	02/24/87
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4,645,486	06/619,492	02/24/87	4,645,784	06/511,626	02/24/87
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4,645,522	06/747,303	02/24/87	4,645,819	06/727,135	02/24/87
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4,645,529	06/796,135	02/24/87	4,645,827	06/591,096	02/24/87
4,645,531	06/696,201	02/24/87	4,645,831	06/679,818	02/24/87

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4,645,833	06/420,684	02/24/87	4,646,149	06/697,560	02/24/87
4,645,837	06/668,298	02/24/87	4,646,151	06/697,601	02/24/87
4,645,838	06/624,530	02/24/87	4,646,152	06/697,600	02/24/87
4,645,844	06/515,410	02/24/87	4,646,156	06/799,164	02/24/87
4,645,845	06/588,365	02/24/87	4,646,157	06/491,483	02/24/87
4,645,852	06/776,244	02/24/87	4,646,158	06/783,564	02/24/87
4,645,854	06/725,891	02/24/87	4,646,159	06/593,751	02/24/87
4,645,883	06/608,628	02/24/87	4,646,170	06/757,448	02/24/87
4,645,884	06/574,805	02/24/87	4,646,173	06/744,106	02/24/87
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4,645,919	06/698,228	02/24/87	4,646,202	06/861,747	02/24/87
4,645,925	06/584,829	02/24/87	4,646,209	06/720,603	02/24/87
4,645,932	06/712,799	02/24/87	4,646,214	06/817,499	02/24/87
4,645,933	06/522,309	02/24/87	4,646,217	06/775,863	02/24/87
4,645,935	06/672,427	02/24/87	4,646,218	06/726,261	02/24/87
4,645,941	06/765,444	02/24/87	4,646,219	06/794,962	02/24/87
4,645,949	06/596,564	02/24/87	4,646,224	06/558,043	02/24/87
4,645,955	06/656,091	02/24/87	4,646,226	06/794,256	02/24/87
4,645,956	06/649,461	02/24/87	4,646,228	06/621,915	02/24/87
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4,645,988	06/808,303	02/24/87	4,646,247	06/705,427	02/24/87
4,645,991	06/698,080	02/24/87	4,646,254	06/892,453	02/24/87
4,645,993	06/710,269	02/24/87	4,646,255	06/490,655	02/24/87
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4,646,017	06/761,230	02/24/87	4,646,299	06/611,445	02/24/87
4,646,018	06/761,231	02/24/87	4,646,302	06/489,948	02/24/87
4,646,019	06/761,232	02/24/87	4,646,304	06/732,775	02/24/87
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4,646,021	06/761,441	02/24/87	4,646,313	4,995,345	02/24/87
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4,646,029	06/751,136	02/24/87	4,646,318	4,995,353	02/24/87
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4,646,037	06/736,844	02/24/87	4,646,324	4,995,373	02/24/87
4,646,039	06/667,822	02/24/87	4,646,330	4,995,374	02/24/87
4,646,040	06/750,885	02/24/87	4,646,332	4,995,380	02/24/87
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4,646,047	06/781,072	02/24/87	4,646,339	4,995,402	02/24/87
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4,646,069	06/747,714	02/24/87	4,995,121	4,995,440	02/26/91
4,646,072	06/731,150	02/24/87	4,995,128	4,995,442	02/26/91
4,646,075	06/548,312	02/24/87	4,995,132	4,995,444	02/26/91
4,646,080	06/611,221	02/24/87	4,995,136	4,995,450	02/26/91
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4,646,086	06/688,100	02/24/87	4,995,143	4,995,465	02/26/91
4,646,093	06/643,340	02/24/87	4,995,147	4,995,474	02/26/91
4,646,094	06/520,276	02/24/87	4,995,152	4,995,476	02/26/91
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4,646,101	06/811,063	02/24/87	4,995,167	4,995,486	02/26/91
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4,646,147	06/673,740	02/24/87	4,995,197	4,995,518	02/26/91
4,646,148	06/671,489	02/24/87	4,995,201	4,995,520	02/26/91
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				07/322,496	02/26/91

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4,995,236	07/420,154	02/26/91	4,995,538	07/279,631	02/26/91
4,995,244	07/446,504	02/26/91	4,995,540	07/334,817	02/26/91
4,995,250	07/406,684	02/26/91	4,995,542	07/506,339	02/26/91
4,995,252	07/319,363	02/26/91	4,995,556	07/148,004	02/26/91
4,995,267	07/299,832	02/26/91	4,995,558	07/311,309	02/26/91
4,995,268	07/402,073	02/26/91	4,995,573	07/453,288	02/26/91
4,995,270	07/507,667	02/26/91	4,995,575	07/365,994	02/26/91
4,995,271	07/478,231	02/26/91	4,995,576	07/015,690	02/26/91
4,995,272	07/357,757	02/26/91	4,995,578	07/514,717	02/26/91
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4,995,280	07/514,279	02/26/91	4,995,604	07/301,651	02/26/91
4,995,282	07/381,800	02/26/91	4,995,606	07/421,781	02/26/91
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4,995,321	07/365,439	02/26/91	4,995,643	07/407,439	02/26/91
4,995,322	06/938,078	02/26/91	4,995,649	07/496,160	02/26/91
4,995,327	07/475,388	02/26/91	4,995,651	07/444,820	02/26/91
4,995,328	07/525,765	02/26/91	4,995,655	07/519,812	02/26/91
4,995,329	07/397,243	02/26/91	4,995,657	07/299,435	02/26/91
4,995,330	07/425,037	02/26/91	4,995,661	07/419,506	02/26/91
4,995,332	07/362,683	02/26/91	4,995,662	07/376,773	02/26/91
4,995,336	07/514,205	02/26/91	4,995,664	07/378,642	02/26/91
4,995,337	07/488,882	02/26/91	4,995,680	07/346,526	02/26/91
4,995,342	07/499,088	02/26/91	4,995,699	07/118,709	02/26/91
4,995,344	07/440,520	02/26/91	4,995,709	07/376,413	02/26/91
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4,995,346	07/372,322	02/26/91	4,995,713	07/353,631	02/26/91
4,995,353	07/508,072	02/26/91	4,995,719	07/416,770	02/26/91
4,995,371	07/471,620	02/26/91	4,995,724	07/393,805	02/26/91
4,995,373	07/498,965	02/26/91	4,995,730	07/288,235	02/26/91
4,995,374	07/484,126	02/26/91	4,995,732	07/535,975	02/26/91
4,995,380	07/433,052	02/26/91	4,995,736	07/528,032	02/26/91
4,995,386	07/358,566	02/26/91	4,995,737	07/521,609	02/26/91
4,995,402	07/256,678	02/26/91	4,995,746	07/317,378	02/26/91
4,995,414	07/534,052	02/26/91	4,995,747	07/230,472	02/26/91
4,995,416	07/399,462	02/26/91	4,995,749	07/402,480	02/26/91
4,995,425	07/522,091	02/26/91	4,995,752	07/447,953	02/26/91
4,995,439	07/469,390	02/26/91	4,995,762	07/522,319	02/26/91
4,995,440	07/479,354	02/26/91	4,995,764	07/339,596	02/26/91
4,995,442	07/489,119	02/26/91	4,995,765	07/207,041	02/26/91
4,995,444	07/535,986	02/26/91	4,995,767	07/502,833	02/26/91
4,995,450	07/395,581	02/26/91	4,995,770	07/456,706	02/26/91
4,995,459	07/207,492	02/26/91	4,995,771	07/470,822	0



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Patent Number	Serial Number	Issue Date	4,996,259	07/397,879	02/26/91
4,995,871	07/303,228	02/26/91	4,996,270	07/267,714	02/26/91
4,995,872	07/416,983	02/26/91	4,996,284	07/342,170	02/26/91
4,995,873	07/364,764	02/26/91	4,996,286	06/702,307	02/26/91
4,995,875	07/199,475	02/26/91	4,996,294	07/429,673	02/26/91
4,995,880	07/412,487	02/26/91	4,996,304	07/488,373	02/26/91
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4,995,897	07/345,671	02/26/91	4,996,313	07/438,622	02/26/91
4,995,900	07/278,302	02/26/91	4,996,314	07/246,071	02/26/91
4,995,901	07/461,581	02/26/91	4,996,315	07/465,682	02/26/91
4,995,902	07/378,119	02/26/91	4,996,318	07/438,480	02/26/91
4,995,910	07/390,173	02/26/91	4,996,319	07/473,493	02/26/91
4,995,914	07/222,012	02/26/91	4,996,321	07/484,963	02/26/91
4,995,919	07/339,039	02/26/91	4,996,333	07/557,601	02/26/91
4,995,922	07/295,559	02/26/91	4,996,348	07/221,405	02/26/91
4,995,926	07/383,232	02/26/91	4,996,352	07/373,741	02/26/91
4,995,928	07/267,303	02/26/91	4,996,354	07/401,941	02/26/91
4,995,931	07/452,409	02/26/91	4,996,355	07/338,162	02/26/91
4,995,938	07/387,922	02/26/91	4,996,361	07/079,625	02/26/91
4,995,939	07/301,889	02/26/91	4,996,364	07/336,157	02/26/91
4,995,943	07/228,142	02/26/91	4,996,368	07/471,867	02/26/91
4,995,946	07/419,557	02/26/91	4,996,369	07/498,057	02/26/91
4,995,952	07/044,068	02/26/91	4,996,373	07/419,062	02/26/91
4,995,962	07/459,154	02/26/91	4,996,379	07/357,291	02/26/91
4,995,965	07/427,154	02/26/91	4,996,382	07/279,753	02/26/91
4,995,971	07/390,022	02/26/91	4,996,383	07/503,599	02/26/91
4,995,974	07/334,043	02/26/91	4,996,391	07/388,818	02/26/91
4,995,975	07/540,858	02/26/91	4,996,393	07/503,537	02/26/91
4,995,978	07/406,823	02/26/91	4,996,395	07/375,407	02/26/91
4,995,979	07/399,167	02/26/91	4,996,403	07/474,906	02/26/91
4,995,986	07/566,647	02/26/91	4,996,406	07/497,176	02/26/91
4,995,991	07/326,311	02/26/91	4,996,409	07/398,829	02/26/91
4,995,994	07/339,547	02/26/91	4,996,410	07/485,912	02/26/91
4,995,999	07/527,688	02/26/91	4,996,414	07/413,744	02/26/91
4,996,001	07/300,476	02/26/91	4,996,416	07/340,420	02/26/91
4,996,006	07/313,241	02/26/91	4,996,426	07/407,160	02/26/91
4,996,008	07/467,959	02/26/91	4,996,427	07/456,498	02/26/91
4,996,021	07/529,406	02/26/91	4,996,429	07/429,563	02/26/91
4,996,029	07/314,069	02/26/91	4,996,432	07/102,489	02/26/91
4,996,033	07/434,485	02/26/91	4,996,436	07/487,899	02/26/91
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4,996,044	07/378,506	02/26/91	4,996,467	07/454,993	02/26/91
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4,996,055	07/341,443	02/26/91	4,996,481	07/390,176	02/26/91
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4,996,086	07/488,930	02/26/91	4,996,489	07/331,332	02/26/91
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4,996,095	07/214,681	02/26/91	4,996,493	07/396,074	02/26/91
4,996,110	06/897,951	02/26/91	4,996,500	07/426,637	02/26/91
4,996,112	07/334,691	02/26/91	4,996,503	07/541,825	02/26/91
4,996,117	07/412,583	02/26/91	4,996,504	07/407,736	02/26/91
4,996,123	07/326,414	02/26/91	4,996,516	07/435,595	02/26/91
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4,996,147	07/225,385	02/26/91	4,996,536	07/424,235	02/26/91
4,996,158	07/287,043	02/26/91	4,996,540	07/301,242	02/26/91
4,996,159	07/471,024	02/26/91	4,996,541	07/510,577	02/26/91
4,996,160	07/060,136	02/26/91	4,996,543	07/461,345	02/26/91
4,996,174	07/027,270	02/26/91	4,996,544	07/463,520	02/26/91
4,996,191	07/284,662	02/26/91	4,996,547	07/401,390	02/26/91
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4,996,198	07/217,488	02/26/91	4,996,559	07/426,739	02/26/91
4,996,199	07/199,801	02/26/91	4,996,578	07/288,182	02/26/91
4,996,200	07/423,700	02/26/91	4,996,601	07/372,818	02/26/91
4,996,203	07/362,915	02/26/91	4,996,608	07/265,788	02/26/91
4,996,208	07/367,820	02/26/91	4,996,615	07/239,161	02/26/91
4,996,214	07/545,258	02/26/91	4,996,616	07/340,335	02/26/91
4,996,218	07/230,358	02/26/91	4,996,618	07/300,577	02/26/91
4,996,223	07/295,037	02/26/91	4,996,620	07/434,670	02/26/91
4,996,227	07/316,591	02/26/91	4,996,625	07/400,500	02/26/91
4,996,231	07/391,769	02/26/91	4,996,632	07/255,062	02/26/91
4,996,241	07/414,824	02/26/91	4,996,635	07/420,909	02/26/91
4,996,249	07/344,132	02/26/91	4,996,637	07/453,510	02/26/91
4,996,257	07/340,509	02/26/91	4,996,640	07/111,692	02/26/91
			4,996,649	07/230,482	02/26/91

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4,996,679	07/379,647	02/26/91
4,996,693	07/376,096	02/26/91
4,996,694	07/352,646	02/26/91
4,996,695	07/503,129	02/26/91
4,996,696	07/317,665	02/26/91
4,996,714	07/527,390	02/26/91

#### Reissue Applications Filed

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.12(b)).

**4,757,833**, Re. S.N. 08/375,260, Jan. 19, 1995, Cl. 262, METHOD FOR IMPROVING PRODUCTION OF VISCOUS CRUDE OIL, Dennis E. Danley, Owner of Record: *OPFG, Houston, Tex.*, Attorney or Agent: Ronald Abramson, Ex. Gp.: 2203

**4,992,809**, Re. S.N. 08/386,348, Feb. 10, 1995, Cl. 354/149.11, ZOOM FINDER SYSTEM, Katsuhiko Nozaki, et. al., Owner of Record: *Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Alan J. Kasper, Ex. Gp.: 2101

**5,080,400**, Re. S.N. 08/181,325, Jan. 14, 1993, Cl. 285/23, DOUBLE LOBE TUBULAR CONNECTOR CLAMP, Frank C. Adamek, et. al., Owner of Record: *Vetco Gray Inc., Houston, Tex.*, Attorney or Agent: James E. Bradley, Ex. Gp.: 3501

**5,138,344**, Re. S.N. 08/288,262, Aug. 11, 1994, Cl. 346/140R, INK JET APPARATUS AND INK JET CARTRIDGE THEREFOR, Toshihiko Ujita, Owner of Record: *Canon Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Richard P. Bauer, Ex. Gp.: 2108

**5,154,028**, Re. S.N. 08/322,835, Oct. 13, 1994, Cl. 52/208, FLUSH MOUNTED VEHICLE GLAZING, David A. Hill, et. al., Owner of Record: *Excel Industries, Inc., Elkhart, Ind.*, Attorney or Agent: Robert K. Roth, Ex. Gp.: 3504

**5,160,866**, Re. S.N. 08/328,499, Oct. 25, 1994, Cl. 310/90, SPINDLE MOTOR, Noriaki Hishida, et. al., Owner of Record: *Nippon Densan Corporation, Kyoto, Japan*, Attorney or Agent: Joseph S. Kentoffio, Ex. Gp.: 2102

**5,164,992**, Re. S.N. 08/340,615, Nov. 16, 1994, Cl. 382/002, FACE RECOGNITION SYSTEM, Matthew Turk, et. al., Owner of Record: *Massachusetts Institute of Technology, Cambridge, Mass.*, Attorney or Agent: Eric L. Prah, Ex. Gp.: 2606

**5,165,998**, Re. S.N. 08/404,469, Mar. 14, 1995, Cl. 428/407, PREPOLYMERS OF OLEFINS CONTAINING A CHROMIUM OXIDE AND A GRANULAR REFRACTORY OXIDE SUPPORT, Jean-Claude A. Bailly, Owner of Record: *BP Chemicals Limited, London, England*, Attorney or Agent: Harold Haidt, Ex. Gp.: 1505

**5,166,189**, Re. S.N. 08/347,031, Nov. 23, 1994, Cl. 514/2, ENTERAL DIET FOR PATIENTS WITH PULMONARY DISEASE, Susan L. Trimbo, et. al., Owner of Record: *Clintec Nutrition Co., Deerfield, Ill.*, Attorney or Agent: Robert M. Barrett, Ex. Gp.: 1806

**5,172,454**, Re. S.N. 08/361,828, Dec. 22, 1994, Cl. 24/68SK, SECURING-DEVICE, PARTICULARLY FOR FOOTWEAR, Dino Martignago, Owner of Record: *Officine Everest S.P.A., Crocetta Del Montello, Italy*, Attorney or Agent: Douglas W. Robinson, Ex. Gp.: 3507

**5,181,621**, Re. S.N. 08/377,590, Jan. 25, 1995, Cl. 211/181, TUB SHOWER HEADER-BAR ACCESSORY-RACK W/ UNIVERSAL-BRACKET, Jay Plaehn, Owner of Record: *Inventor*, Attorney or Agent: None, Ex. Gp.: 3505

**5,193,347**, Re. S.N. 08/405,208, Mar. 16, 1995, Cl. 62/3.7, HELMET-MOUNTED AIR SYSTEM FOR PERSONAL COMFORT, Yair J. Apisdorf, Owner of Record: *Inventor*, Attorney or Agent: Wayne D. Porter, Jr., Ex. Gp.: 3404

**5,195,829**, Re. S.N. 08/407,977, Mar. 22, 1995, Cl. 383/100, FLAT BOTTOMED STAND-UP MICROWAVE CORN POPPING BAG, Jeffrey T. Watkins, Owner of Record: *Golden Valley Microwave Foods, Inc., Edina, Minn.*, Attorney or Agent: Joseph M. Kastelic, Ex. Gp.: 2401

**5,215,308**, Re. S.N. 08/405,189, Mar. 16, 1995, Cl. 273/218, SOLID GOLF BALL, Hidenori Hiraoka, et. al., Owner of Record: *Sumitomo Rubber Industries, LTD, Kobe-Shi, Japan*, Attorney or Agent: Joe M. Muncy, Ex. Gp.: 1512

**5,249,361**, Re. S.N. 08/405,941, Mar. 17, 1995, Cl. 30/77, GUARD FOR RAZOR BLADE ASSEMBLY, Domenic Apprille V.N. Jr., Owner of Record: *Gillette Co., Boston, Mass.*, Attorney or Agent: Aubrey C. Brine, Ex. Gp.: 3204

**5,278,327**, Re. S.N. 08/360,444, Dec. 21, 1995, Cl. 554/150, FATTY OIL EX HELIANTHUS ANNUUS FOR THE PRODUCTION OF DIPERAZELAIC, Horst Eierdanz, et. al., Owner of Record: *Henkel Kommanditgesellschaft Auf Aktien, Duesseldorf, Germany*, Attorney or Agent: Frank E. Robbins, Ex. Gp.: 1204

**5,379,516**, Re. S.N. 08/404,847, Mar. 15, 1995, Cl. 29/888, SCROLL COMPRESSOR PUMP CARTRIDGE ASSEMBLY, Joseph P. Vaccaro, et. al., Owner of Record: *Carrier Corp./Stephen Revis*, Attorney or Agent: David J. Zobkiw, Ex. Gp.: 3206

#### Requests for Reexaminations Filed

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,368,405**, Reexam. No. 90/003,759, Mar. 22, 1995, Cl. 315/016, ELECTRON GUN FOR A CATHODE RAY TUBE, Shigeo Takenaka, et. al., Owner of Record: *Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan*, Attorney or Agent: Banner Birch McKie & Beckett, Washington, D.C., Ex. Gp.: 2202, Requester: Owner

**4,834,841**, Reexam. No. 90/003,763, Mar. 21, 1995, Cl. 203/019, METHOD FOR TREATING BACKING OVEN STACK GASES, Kenneth W. Peck, Owner of Record: *Inventor*, Attorney or Agent: Vinson & Elkins, Houston, Tex., Ex. Gp.: 1308, Requester: Conserve Resources, Inc., c/o Oliver D. Olson, Olson & Olson, Portland, Ore.

**4,880,005**, Reexam. No. 90/003,758, Mar. 16, 1995, Cl. 408/052, PACEMAKER FOR DETECTING AND TERMINATING A TACHYCARDIA, Benjamin D. Pless, et. al., Owner of Record: *Intermedics, Inc., Angleton, Tex.*, Attorney or Agent: John R. Merklings, Ex. Gp.: 3501, Requester: Ventritex, Inc., c/o Steven M. Mitchell, Sunnyvale, Calif.

**4,940,916**, Reexam. No. 90/003,764, Mar. 22, 1995, Cl. 313/306, ELECTRON SOURCE WITH MICROPOINT EMISSIVE CATHODES AND DISPLAY MEANS BY CATHODOLUMINESCENCE EXCITED BY FIELD EMISSION USING SAID SOURCE, Michel Borel, et. al., Owner of Record: *Com-*

Reg. Number	Serial Number	Reg. Date	985,551	72/441,306	06/04/1974
985,328	72/455,099	06/04/1974	985,553	72/448,471	06/04/1974
985,329	72/455,100	06/04/1974	985,554	72/449,195	06/04/1974
985,334	72/429,165	06/04/1974	985,555	72/451,138	06/04/1974
985,335	72/429,555	06/04/1974	985,556	72/453,141	06/04/1974
985,344	72/449,183	06/04/1974	985,561	72/461,203	06/04/1974
985,345	72/460,322	06/04/1974	985,563	72/453,920	06/04/1974
985,346	72/463,559	06/04/1974	985,568	72/457,028	06/04/1974
985,348	72/410,393	06/04/1974	985,572	72/461,104	06/04/1974
985,350	72/428,145	06/04/1974	985,573	72/461,105	06/04/1974
985,351	72/435,181	06/04/1974	985,579	72/438,074	06/04/1974
985,358	72/348,063	06/04/1974	985,580	72/439,791	06/04/1974
985,360	72/380,774	06/04/1974	985,604	72/458,920	06/04/1974
985,361	72/392,345	06/04/1974	985,606	72/460,405	06/04/1974
985,362	72/396,956	06/04/1974	985,607	72/460,491	06/04/1974
985,365	72/411,772	06/04/1974	985,609	72/465,458	06/04/1974
985,368	72/439,397	06/04/1974	985,610	72/465,996	06/04/1974
985,372	72/445,064	06/04/1974	985,611	72/390,252	06/04/1974
985,373	72/445,513	06/04/1974	985,614	72/392,572	06/04/1974
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985,382	72/452,361	06/04/1974	985,617	72/434,849	06/04/1974
985,383	72/458,875	06/04/1974	985,618	72/438,496	06/04/1974
985,385	72/386,430	06/04/1974	985,620	72/456,807	06/04/1974
985,389	72/444,353	06/04/1974	985,623	72/466,242	06/04/1974
985,400	72/454,361	06/04/1974	985,624	72/466,243	06/04/1974
985,401	72/454,374	06/04/1974	985,625	72/466,244	06/04/1974
985,403	72/454,908	06/04/1974	985,629	72/461,279	06/04/1974
985,406	72/456,650	06/04/1974	985,630	72/461,280	06/04/1974
985,407	72/456,789	06/04/1974	985,631	72/461,589	06/04/1974
985,408	72/461,314	06/04/1974	985,633	72/312,337	06/04/1974
985,409	72/462,322	06/04/1974	985,636	72/424,601	06/04/1974
985,414	72/462,691	06/04/1974	985,637	72/428,633	06/04/1974
985,418	72/463,483	06/04/1974	985,641	72/433,895	06/04/1974
985,420	72/410,895	06/04/1974	985,643	72/440,249	06/04/1974
985,430	72/434,299	06/04/1974	985,648	72/315,527	06/04/1974
985,433	72/442,943	06/04/1974	985,649	72/315,528	06/04/1974
985,434	72/443,181	06/04/1974	985,652	72/421,155	06/04/1974
985,438	72/451,712	06/04/1974	985,653	72/424,804	06/04/1974
985,440	72/453,704	06/04/1974	985,654	72/431,115	06/04/1974
985,445	72/403,615	06/04/1974	985,655	72/432,309	06/04/1974
985,447	72/409,439	06/04/1974	985,657	72/433,274	06/04/1974
985,449	72/422,031	06/04/1974	985,669	72/454,166	06/04/1974
985,452	72/431,773	06/04/1974	985,671	72/424,607	06/04/1974
985,453	72/432,861	06/04/1974	985,675	72/437,787	06/04/1974
985,454	72/433,482	06/04/1974	985,676	72/440,495	06/04/1974
985,459	72/440,725	06/04/1974	985,677	72/445,968	06/04/1974
985,460	72/442,795	06/04/1974	985,682	72/366,062	06/04/1974
985,461	72/446,509	06/04/1974	985,684	72/426,826	06/04/1974
985,466	72/451,873	06/04/1974	985,686	72/434,660	06/04/1974
985,467	72/451,874	06/04/1974	985,688	72/445,573	06/04/1974
985,471	72/461,573	06/04/1974	985,690	72/454,535	06/04/1974
985,473	72/443,886	06/04/1974			
985,474	72/448,620	06/04/1974			
985,478	72/442,913	06/04/1974			
985,483	72/462,635	06/04/1974			
985,484	72/427,705	06/04/1974			
985,485	72/448,754	06/04/1974	D. 340,083	BOARD GAME	
985,488	72/451,234	06/04/1974	Contact:	Evelyn M. Sommer	
985,489	72/423,272	06/04/1974		360 Lexington Avenue	
985,494	72/460,312	06/04/1974		New York, N.Y. 10017	
985,496	72/463,994	06/04/1974		(voice): (212) 682-1974	
985,499	72/465,113	06/04/1974			
985,501	72/465,402	06/04/1974	Re. 34,221	ADJUSTABLE DENTOALVEOLAR	
985,504	72/438,413	06/04/1974		IMPLANT SYSTEM	
985,511	72/405,338	06/04/1974	Contact:	Eugene Chovanes	
985,512	72/437,214	06/04/1974		101 Bala Avenue	
985,514	72/440,558	06/04/1974		Bala-Cynwyd, Pa. 19004	
985,516	72/446,864	06/04/1974		(voice): (610) 667-4392	
985,519	72/450,676	06/04/1974			
985,522	72/453,061	06/04/1974	4,553,193	SCANNING LIGHT SYSTEM	
985,524	72/455,043	06/04/1974	Contact:	Richard P. Ferrara	
985,531	72/443,984	06/04/1974		45 Rockefeller Plaza	
985,532	72/450,889	06/04/1974		New York, N.Y. 10111	
985,538	72/456,446	06/04/1974		(voice): (212) 757-2200	
985,540	72/458,028	06/04/1974		(fax): (212) 586-1461	
985,543	72/458,947	06/04/1974			
985,544	72/460,349	06/04/1974	4,755,912	METHOD OF PHOTOGRAPHY	
985,549	72/431,795	06/04/1974	Contact:	Richard P. Ferrara	



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45 Rockefeller Plaza  
New York, N.Y. 10111  
(voice): (212) 757-2200  
(fax): (212) 586-1461

Las Vegas, Nev. 89101-5522  
(voice): (702) 383-2939

5,035,103 SELF SEALING VACUUM VENT  
AND DOME PROCESS  
Contact: Walter Akkala  
638 Sycamore Sq.  
Lady Lake, Fla. 32159  
(voice): (904) 753-0004

5,036,745 DEFAULTLESS MUSICAL KEY-  
BOARDS FOR WOODWIND  
STYLED ELECTRONIC MUSICAL  
INSTRUMENTS  
Contact: Daniel A. Sullivan  
150 Chaney Ct.  
New Kensington, Pa. 15068  
(voice): (412) 335-8121

5,105,736 COMPACTION APPARATUS FOR  
METALIC DRUMS WITH HINGED  
SPINDLE SAFETY SWITCH  
Contact: Drew Morris  
PO Box 10111  
Greeneville, S.C. 29603  
(voice): (803) 292-6376

5,158,013 CAN FLATTENING APPARATUS  
Contact: Drew Morris  
PO Box 10111  
Greeneville, S.C. 29603  
(voice): (803) 292-6376

5,255,572 VARIABLE STROKE MECHANISM  
Contact: Kenneth Pickens  
1055 N. 115th St.  
Omaha, Nebr. 68154  
(voice): (402) 493-3200

5,325,771 OIL FILTER CRUSHING APPA-  
RATUS AND METHOD  
Contact: Drew W. Morris  
Treasurer, Drew-It Corp.  
PO Box 10111  
Greeneville, S.C. 29603  
(voice): (803) 292-6376

5,333,419 WATER DIVERTER FOR SLOPED  
ROOF FLASHINGS  
Contact: Andrew J. Hickner  
1271 N HWY 288-13  
Richwood, Tex. 77531  
(voice): (409) 265-5840

5,370,583 THRILL RIDE APPARATUS  
Contact: Robert A. Spray  
7114 East 71st St.  
Indianapolis, Ind. 46256  
(voice): (317) 841-0113  
(fax): (317) 849-6245

5,383,105 LAMP FOR SURGICAL ILLUMINA-  
TION WITH AUTOMATIC ADJUST-  
MENT OF CONCENTRATION OF  
LIGHT RAYS ON THE OPERATING  
FIELD  
Contact: Neil F. Greenblum  
Sandler, Greenblum & Bernstein  
2920 South Glebe Rd.  
Arlington, Va. 22206  
(voice): (703) 739-0333

5,386,757 UNIVERSAL MUSICAL SCALE,  
SCALE PATTERN, AND CHORD  
INDICATOR  
Contact: Daniel Derrick  
330 South 10th St.

In re Baird

In view of the public hearing held on the standard of nonob-  
viousness under 35 U.S.C. § 103 and written comments received  
pursuant to the hearing, the Commissioner of Patents and  
Trademarks has reconsidered the Office's March 22, 1994  
Notice, entitled "In re Baird," published in the *Official Gazette*  
on April 19, 1994 (1161 O.G. 314). The notice is hereby with-  
drawn.

The determination of the patentability of claims to a species  
within a prior art genus is highly fact dependent. Thus, patent  
examiners are instructed to analyze such claims on a case-by-  
case basis. See, for example, *In re Baird*, 16 F.3d 380, 29  
USPQ2d 1550 (Fed. Cir. 1994); *In re Bell*, 991 F.2d 781, 26  
USPQ2d 1529 (Fed. Cir. 1993); *In re Jones*, 958 F.2d 347, 21,  
USPQ2d 1941 (Fed. Cir. 1992); *Merck & Co. v. Biocraft Labs.*,  
874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493  
U.S. 975 (1989); *In re Susi*, 440 F.2d 442, 169 USPQ 423  
(CCPA 1971); *In re Lemin*, 332 F.2d 839, 141 USPQ 814  
(CCPA 1964); *In re Rosicky*, 276 F.2d 656, 125 USPQ 341  
(CCPA 1960).

Comprehensive guidelines will follow relating to what evi-  
dence is necessary to establish and to rebut a *prima facie* case  
of obviousness in a case involving a genus-species relationship.

April 17, 1995

BRUCE A. LEHMAN  
Assistant Secretary of Commerce  
and Commissioner of Patents  
and Trademarks

Certificate of Correction  
For Week of May 9, 1995

Re. 34,860	5,176,333	5,249,937	5,306,758
D. 343,783	5,178,204	5,250,493	5,307,330
D. 346,618	5,184,267	5,250,926	5,308,903
D. 352,518	5,186,195	5,252,170	5,310,172
D. 354,764	5,187,194	5,252,444	5,311,303
D. 355,086	5,189,403	5,253,215	5,314,980
D. 355,173	5,190,773	5,254,283	5,315,095
D. 356,118	5,191,704	5,254,563	5,316,938
4,463,375	5,193,029	5,254,599	5,318,977
4,499,493	5,195,005	5,255,690	5,321,466
4,549,307	5,195,766	5,255,875	5,322,184
4,756,798	5,196,463	5,256,700	5,322,667
4,769,377	5,198,173	5,258,056	5,322,889
4,788,309	5,200,085	5,258,179	5,323,562
4,843,363	5,201,353	5,259,455	5,324,531
4,886,842	5,201,497	5,264,891	5,325,823
4,895,495	5,203,259	5,265,088	5,328,368
4,974,435	5,203,765	5,266,769	5,328,710
4,982,984	5,209,710	5,268,806	5,331,073
5,004,038	5,211,267	5,270,041	5,331,514
5,043,743	5,213,105	5,274,819	5,332,204
5,048,480	5,217,023	5,277,583	5,333,626
5,056,962	5,217,964	5,279,426	5,333,711
5,077,943	5,220,843	5,281,419	5,333,917
5,078,132	5,228,930	5,281,750	5,334,765
5,092,429	5,229,856	5,283,290	5,334,854
5,093,711	5,232,824	5,284,477	5,334,862
5,112,282	5,236,283	5,286,460	5,335,054
5,113,900	5,236,952	5,287,241	5,337,738
5,138,114	5,237,060	5,291,234	5,338,081
5,143,557	5,238,797	5,292,446	5,338,597
5,144,427	5,238,944	5,293,498	5,339,995
5,146,487	5,240,796	5,294,693	5,340,431
5,149,777	5,241,076	5,296,470	5,340,646
5,162,161	5,244,098	5,298,361	5,340,710
5,164,860	5,247,224	5,300,863	5,341,314
5,171,473	5,247,227	5,303,241	5,341,749
5,173,389	5,247,874	5,306,707	5,342,276

5,342,843	5,353,041	5,360,699	5,368,205	5,374,983	5,382,016	5,385,688	5,391,560
5,342,966	5,353,141	5,360,700	5,368,313	5,374,990	5,382,119	5,385,797	5,391,855
5,344,290	5,353,909	5,360,929	5,368,789	5,375,376	5,382,169	5,385,854	5,392,082
5,344,448	5,354,321	5,361,087	5,368,925	5,375,695	5,382,274	5,386,258	5,392,135
5,344,522	5,354,397	5,361,143	5,369,113	5,376,661	5,382,478	5,386,264	5,392,326
5,344,930	5,354,751	5,361,153	5,369,433	5,376,831	5,382,737	5,386,269	5,392,528
5,344,959	5,355,233	5,361,259	5,369,439	5,376,902	5,382,834	5,386,310	5,392,731
5,345,956	5,355,279	5,361,310	5,369,440	5,376,956	5,383,012	5,386,379	5,393,165
5,346,404	5,355,937	5,361,482	5,369,861	5,377,009	5,383,242	5,386,544	5,393,174
5,347,121	5,355,991	5,362,366	5,370,230	5,377,248	5,383,457	5,386,575	5,393,276
5,347,192	5,356,075	5,362,587	5,370,949	5,377,256	5,384,103	5,386,983	5,393,694
5,347,561	5,356,082	5,362,604	5,371,007	5,377,431	5,384,137	5,387,540	5,393,715
5,347,939	5,356,143	5,363,182	5,371,388	5,377,686	5,384,625	5,387,668	5,393,808
5,348,975	5,356,510	5,363,822	5,371,405	5,377,922	5,384,626	5,387,704	5,393,883
5,349,026	5,356,888	5,363,849	5,371,450	5,378,467	5,384,643	5,388,918	5,393,902
5,349,408	5,356,894	5,364,042	5,371,739	5,378,607	5,384,644	5,389,044	5,393,937
5,349,450	5,357,479	5,364,453	5,371,843	5,378,791	5,384,680	5,389,214	5,394,293
5,349,475	5,358,004	5,365,063	5,372,366	5,379,092	5,384,876	5,390,399	5,394,575
5,350,299	5,358,538	5,365,229	5,372,486	5,379,108	5,384,882	5,390,400	5,394,791
5,350,671	5,358,702	5,365,262	5,372,698	5,379,650	5,384,889	5,390,420	5,395,075
5,351,272	5,359,202	5,365,380	5,372,935	5,380,289	5,384,963	5,390,574	5,395,091
5,351,810	5,359,695	5,365,442	5,373,185	5,380,578	5,385,297	5,390,934	5,395,265
5,352,417	5,360,023	5,365,639	5,373,463	5,380,591	5,385,340	5,390,948	5,395,442
5,352,757	5,360,239	5,365,938	5,374,004	5,380,866	5,385,551	5,391,123	5,396,575
5,352,856	5,360,638	5,366,600	5,374,675	5,381,532	5,385,610	5,391,187	5,396,897

Summary of Final Decisions  
Issued by the  
Trademark Trial and Appeal Board  
March 6-10, 1995

Date Issued	Type of Case <sup>(1)</sup>	Proceeding or App'n No.	Party/Parties	Issue	TTAB Decision	Opposer's/ Petitioner's Mark and Goods/Services	Applicant's/ Respondent's Mark and Goods/Services	Mark and Goods Cited by Examining Attorney	Recommended for Publication
3-6	CANC	17,589	SuperFlow Corp. v. Exxon Corp.	2(d)	Petition to Cancel Denied	"SUPERFLOW" [automotive testing and measuring apparatus, namely, engine dynamometers which collect engine data and process information electronically onto computer chips, and flowbenches which measure air flow through internal combustion engines]	"SUPERFLOW" [motor oil]		No
3-7	OPP	88,177	Prince Sports Group, Inc. v. Prince & Princess Ltd.	2(d)	Opposition Sustained	"PRINCE" [sports racquets, footwear, etc.; clothing, including children's t-shirts, shorts, skirts, etc.]	"PRINCE & PRINCESS" [children's clothing]		No
3-8	EX EX EX	74/335,088 74/335,101 75/335,106	John L. Scott, Inc.	2(d)	Refusal Reversed		"SCOTTLINE" [in stylized lettering], and "SCOTTLINE" (and design) [all three marks for recorded real estate sales information via computer controlled telephone equipment]	"SCOTT" (and design) [real estate brokerage services]	No

(1) EX = EX PARTE APPEAL; OPP = OPPOSITION; C = CANCELLATION; CU = CONCURRENT USE; (R) = REQ. FOR RECONSIDERATION

Date Issued	Type of Case <sup>(1)</sup>	Proceeding or App'n No.	Party/Parties	Issue	TTAB Decision	Opposer's/ Petitioner's Mark and Goods/Services	Applicant's/ Respondent's Mark and Goods/Services	Mark and Goods Cited by Examining Attorney	Recommended for Publication
3-8	EX	74/345,076	Loran Futures, Inc.	2(c)(4) [surname]; Section 6(c) disclaimer requirement	Refusal Reversed as to 2(c)(4); Refusal Affirmed as to disclaimer requirement (with leave to submit disclaimer)		"LORAN FUTURES, INC." [commodity investment advisory services]		No

(1) EX = EX PARTE APPEAL; OPP = OPPOSITION; C = CANCELLATION; CU = CONCURRENT USE; (R) = REQ. FOR RECONSIDERATION



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Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box DAC	Petitions decided by the Office of Petitions including petitions to revive and petitions to accept late payment of issue fees or maintenance fees.
Box DD	Disclosure Documents or material related to the Disclosure Document Program.
Box FWC	Requests for File Wrapper Continuation Applications (under 37 CFR 1.62).
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Box Reexam	Correspondence pertaining to the reconstruction of lost patent files.
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	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications <i>prior</i> to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").

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Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislative and International Affairs.
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Box 10	Orders for certified copies of PTO documents.
Box 11	Electronic Ordering Service (EOS).
Box 13	Mail for the Employee and Labor Relations Division.
Box 14	Mail directed to the APS Contracts Office.
Box 16	Deposit Account Replenishment Checks.
Box 17	Invoices directed to the Office of Finance.
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Pennsylvania	Philadelphia: The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Puerto Rico	Mayaguez General Library, University of Puerto Rico	Not Yet Operational
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Clemson University Libraries	(803) 656-3024
South Dakota	Rapid City: Devereaux Library, South Dakota School of Mines and Technology	(605) 394-6822
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8877
	Nashville: Stevenson Science Library, Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 495-4500
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-3826
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 828-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
West Virginia	Morgantown: Evansdale Library, West Virginia University	(304) 293-2510
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	Madison	(608) 262-6845
	Milwaukee Public Library	(414) 286-3051
Wyoming	Casper: Natrona County Public Library	(307) 237-4935



PATENT EXAMINING CORPS

BRUCE A. LEHMAN, Commissioner  
LAWRENCE J. GOFFNEY Jr., Assistant Commissioner for Patents  
EDWARD R. KAZENSKE, Deputy Assistant Commissioner for Patents  
STEPHEN G. KUNIN, Deputy Assistant Commissioner for Patent Policy  
J.O. THOMAS, JR., Deputy Assistant Commissioner for Patent Process Services

PATENT EXAMINING GROUPS	Phone number Area Code 703	New Case Date*
CHEMICAL EXAMINING GROUPS		
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 1100— JOHN E. KITTLE, Director .....	308-0661	02/17/94
ORGANIC CHEMISTRY, GROUP 1200—RICHARD V. FISHER, Director .....	308-1235	04/22/94
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 1300—BARRY S. RICHMAN, Director .....	308-0651	06/28/94
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY STOCK MATERIALS AND COMPOSITIONS, GROUP 1500—THEODORE MORRIS, Director .....	308-2351	05/12/94
BIOTECHNOLOGY, GROUP 1800—JOHN J. DOLL, Director .....	308-0196	11/16/93
ELECTRICAL EXAMINING GROUPS		
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 2100—STEWART LEVY, Director .....	308-1782	06/21/94
SPECIAL LAWS AND ADMINISTRATION, GROUP 2200—ROBERT E. GARRETT, Director .....	308-0511	09/11/93
COMPUTER SYSTEMS AND COMPUTER APPLICATION, GROUP 2300— BOBBY R. GRAY, Director .....	305-9600	03/10/94
PACKAGES, CLEANING, TEXTILES AND GEOMETRICAL INSTRUMENTS GROUP 2400—GERALD GOLDBERG, Director .....	308-0771	02/01/94
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 2500— JANICE A. HOWELL, Director .....	308-0956	12/07/93
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 2600—NICHOLAS P. GODICI, Director .....	305-4700	09/21/93
DESIGN, GROUP 2900—JOHN E. KITTLE, Director .....	308-0661	06/15/93
MECHANICAL EXAMINING GROUPS		
HANDLING AND TRANSPORTATION MEDIA, GROUP 3100—F.R. SCHMIDT, Director .....	308-1113	01/31/94
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 3200—CARLTON R. CROYLE, Director .....	308-1148	01/11/94
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 3300—J.J. LOVE, Director .....	308-0858	04/14/94
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 3400—DONALD G. KELLY, Director .....	308-0861	01/27/94
GENERAL CONSTRUCTION, PETROLEUM AND MINING ENGINEERING, GROUP 3500—A.L. SMITH, Director .....	308-1021	02/14/94

\*A communication from the examiner should have been received in most applications filed prior to this date.

**Expiration of Patents:** The patents within the range of numbers indicated below expire during April 1995 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents.....	Numbers 4,081,864 to 4,086,663 inclusive
Plant Patents .....	4,232 to 4,244

TRADEMARK OPERATION

Bruce Lehman, Commissioner  
Philip G. Hampton II, Assistant Commissioner  
Robert M. Anderson, Deputy Assistant Commissioner  
David E. Bucher, Director, Trademark Examining Operation  
Condition of Trademark Applications as of March 1, 1995

Law Office	Oldest Date	
	New*	Amendment Filed
Law Office 3—Kathryn A. Erskine, Managing Attorney, (703) 308-9103 Scientific Equipment, Furniture, Houseware and Glass—Int. Classes 9, 20, 21 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/04/94	12/30/94
Law Office 4—Sharon Marsh, Managing Attorney, (703) 308-9104 Scientific Equipment, Furniture, Houseware and Glass—Int. Classes 9, 20, 21, Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	08/30/94	12/16/94
Law Office 5—Mary Sparrow, Managing Attorney, (703) 308-9105 Cosmetics, Cleaning Preparations, Paper Products and Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/03/94	12/08/94
Law Office 6—Myra Kurzbard, Managing Attorney, (703) 308-9106 Scientific Equipment, Furniture, Houseware and Glass—Int. Classes 9, 20, 21, Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	09/28/94	11/30/94
Law Office 7—David Shallant, Managing Attorney, (703) 308-9107 Lubricants, Fuels, Industrial Equipment & Materials—Int. Classes 4, 6, 11, 14, 19 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	09/01/94	12/13/94
Law Office 8—Thomas Lamone, Managing Attorney, (703) 308-9108 Cosmetics, Cleaning Preparations, Paper Products & Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/13/94	12/16/94
Law Office 9—Sidney Moskowitz, Managing Attorney, (703) 308-9109 Lubricants, Industrial Equipment, Materials & Musical Instruments—Int. Classes 4, 6, 7, 8, 12, 13, 15, 16, 17, 18, 19, Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	09/09/94	12/09/94
Law Office 10—Jean Logan, Managing Attorney, (703) 308-9110 Cordage, Fibers, Yarns, Threads, Fabrics, Clothing & Floor Coverings— Int. Classes 22, 23, 24, 25, 26, 27 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	09/12/94	10/24/94
Law Office 11—Thomas Howell, Managing Attorney, (703) 308-9111 Paints, Pharmaceuticals & Medical Apparatus—Int. Classes 2, 5, 10 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/02/94	10/24/94
Law Office 12—Deborah Cohn, Managing Attorney, (703) 308-9112 Cosmetics, Cleaning Preparations, Paper Products & Toys—Int. Classes 3, 16, 28 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/17/94	01/15/95
Law Office 13—Craig Morris, Managing Attorney, (703) 308-9113 Chemicals, Food, Beverages, Wines & Spirits—Int. Classes 1, 29, 30, 31, 32, 33 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	07/05/94	10/21/94
Law Office 14—Ron Williams, Managing Attorney, (703) 308-9114 Chemicals, Food, Beverages, Wines & Spirits—Int. Classes 1, 29, 30, 31, 32, 33 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/04/94	01/03/95
Law Office 15—Paul Fahrenkopf, Managing Attorney, (703) 308-9115 Rubber, Leather Goods & Clothing—17, 18, 25 Services—Int. Classes 35, 36, 37, 38, 39, 40, 41, 42 .....	10/06/94	11/16/94
**Collective Marks—Class 200 **Certification Marks—Classes A & B Office of Trademark Services—Jodi Rush, Director (703) 308-9000 Post Registration Section—Jacqueline Cole, Managing Attorney, (703) 308-9500 Affidavits Under Sections 8 & 15 (All Classes) .....	08/02/94	—0—
Renewals (All Classes) .....	10/13/94	—0—
Section 12(C) Publications (All Classes) .....	—0—	—0—

1. \*\* Assigned to each law office
2. Applicants with inquiries concerning the status of their applications and a touch tone phone should call (703) 308-8747 from 6:30 a.m. to Midnight Est, Monday thru Friday. This automated voice system will provide the current status of your application. Applicants are urged not to file unnecessary inquiries concerning the status of their applications. See Section 411 of the *Trademark Manual of Examining Procedure*.
3. \* These dates identify the oldest unassigned new case in each law office. All cases with earlier dates have either been examined and made the subject of an action or are currently being worked on by the assigned examiner.

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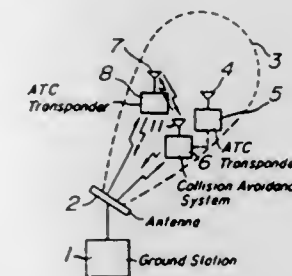
UMI

## REEXAMINATIONS

MAY 9, 1995

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 Re. 32,368 (2559th)  
**COLLISION AVOIDANCE SYSTEM FOR AIRCRAFT**  
Chuhel Funatsu, Yokahama, and Toshikiyo Hirata, Samukawa,  
both of Japan, assignors to Toyo Tsushinki K.K., Samukawa,  
Japan  
Reexamination Request No. 90/003,634, Nov. 10, 1994.  
Reexamination Certificate for Reissue Patent Re. 32,368, issued  
Mar. 10, 1987, Ser. No. 620,798, Jun. 14, 1984.  
Claims priority, application Japan, Aug. 15, 1975, 50/99674  
Int. Cl.<sup>6</sup> G01S 13/93, 13/76  
U.S. Cl. 342—32



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 12-22 is confirmed.

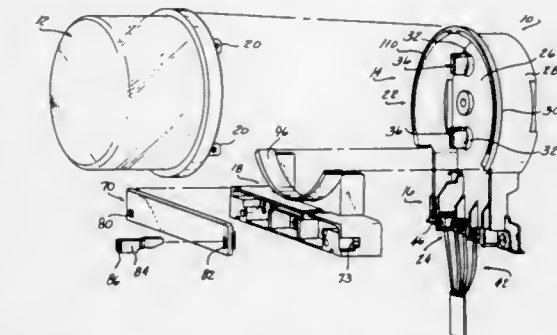
Claims 1-11 were previously cancelled.

12. A collision avoidance system for aircraft which are each equipped with an ATC transponder comprising:  
an interrogation station located on a first aircraft and having a secondary surveillance radar function, said interrogation station emitting an interrogation signal which is to be responded to by an ATC transponder of a second aircraft;  
a detection means located on said first aircraft for detecting the existence of said second aircraft in proximity to said first aircraft;  
an output control means operatively connected to said detection means for altering at least one of an output power and a transmission period of said interrogation signal emitted by said interrogation station when said detection means detects information concerning said second aircraft which exceeds a predetermined value.

B1 Re. 34,531 (2560th)  
**WATTHOUR METER SOCKET ADAPTER**  
John Bell, Livonia, and William Keopfgen, Farmington Hills, both of Mich., assignors to Ekstrom Industries, Inc., Farmington Hills, Mich.  
Reexamination Request No. 90/003,542, Aug. 19, 1994.  
Reexamination Certificate for Reissue Patent Re. 34,531, issued Feb. 1, 1994, Ser. No. 963,060, Oct. 19, 1992.  
Int. Cl.<sup>6</sup> H01R 9/09  
U.S. Cl. 439—135

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 2 and 4-8 is confirmed.



Claims 1, 3 & 9 were previously cancelled.

B1 4,225,647 (2561st)  
**ARTICLES HAVING THIN, CONTINUOUS, IMPERVIOUS COATINGS**  
Richard A. Parent, 69 Waterford Way, Fairport, N.Y. 14450  
Reexamination Request No. 90/003,300, Jan. 10, 1994.  
Reexamination Certificate for Patent No. 4,225,647, issued Sep. 30, 1980, Ser. No. 857,028, Dec. 2, 1977.  
Int. Cl.<sup>6</sup> B32B 15/08, 27/28, 27/12  
U.S. Cl. 428—336

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 4, 5, and 6 is confirmed.

Claims 1-3 are cancelled.

New claim 7 is added and determined to be patentable.

B1 4,457,973 (2562nd)  
**CONDUCTIVE COMPOSITE FILAMENTS AND METHODS FOR PRODUCING SAID COMPOSITE FILAMENTS**  
Masao Matsui, Takatsuki; Hiroshi Naito, and Kazuo Okamoto, both of Osaka, all of Japan, assignors to Kanebo Synthetic Fibers Ltd., Osaka and Kanebo Ltd., Tokyo, both of Japan  
Reexamination Request No. 90/002,312, Feb. 22, 1991.  
Reexamination Certificate for Patent No. 4,457,973, issued Jul. 3, 1984, Ser. No. 469,367, Feb. 24, 1983.  
Division of Ser. No. 268,026, May 28, 1991, Pat. No. 4,420,534.  
Claims priority, application Japan, Jun. 6, 1980, 55-76901, Japan, Jun. 14, 1980, 55-80753, Japan, Jun. 19, 1980, 55,83650  
Int. Cl.<sup>6</sup> D02G 3/00  
U.S. Cl. 428—372



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:



Claims 10 and 12 are cancelled.

Claims 1, 5, 11, 17, 19 and 21 are determined to be patentable as amended.

Claims 2-4, 6-9, 13-16, 18, 20 and 22, dependent on an amended claim, are determined to be patentable.

1. A conductive composite filament having a whiteness of from 70-90%, said conductive composite filament comprising a conductive component composed of electrically conductive metal oxide particles having a specific resistance of not more than  $10^2 \text{ ohm.cm}$  and at least one polymer selected from the group consisting of thermoplastic polymers and solvent-soluble polymers, bonded to an electrically non-conductive component composed of a fiber-forming polymer, said electrically conductive metal oxide particles comprising 30-85% by weight of the total weight of said conductive component and comprising a core made of titanium [oxide] dioxide, the surface of said core being coated with an electrically conductive tin oxide.

B2 4,564,313 (2563rd)

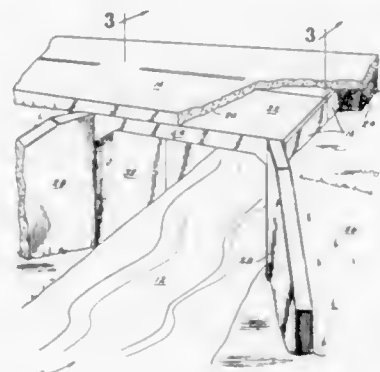
# RECTILINEAR CULVERT STRUCTURE

Robert L. Niswander, and Tomy W. Cornwell, both of Findlay, Ohio, assignors to Hyway Concrete Products Co., Findlay, Ohio

Reexamination Request No. 90/003,571, Sep. 15, 1994.  
Reexamination Certificate for Patent No. 4,564,313, issued Jan. 14, 1986, Ser. No. 537,337, Sep. 29, 1983.

Reexamination Certificate B1 4,564,313, issued Mar. 7, 1989.  
Int. Cl.<sup>6</sup> E01F 5/00

U.S. Cl. 405-125



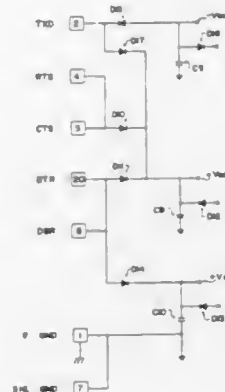
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The Patentability of claims 1-3, 5-17, 20, 21, and 24-29 is confirmed.

Claims 4, 18, 19, 22, & 23 were previously cancelled.

1. A bottomless concrete culvert assembly comprising, in combination, at least one unitary, rectilinear culvert structure and a pair of footers, said culvert structure having only one substantially planar span and a pair of parallel sidewalls integrally and rigidly formed with and extending substantially perpendicularly from said planar span, one each of said footers disposed in supporting relationship with a respective one of said sidewalls.

B1 4,677,646 (2564th)  
DATASET POWERED BY CONTROL AND DATA SIGNALS FROM DATA TERMINAL  
David E. Dodds, and Ludo Bertsch, both of Saskatoon, Canada, assignors to Saskatchewan Economic Development Corporation, Regina, Canada  
Reexamination Request Nos. 90/002,744, Jun. 3, 1992 and 90/002,989, Mar. 10, 1993.  
Reexamination Certificate for Patent No. 4,677,646, issued Jun. 30, 1987, Ser. No. 761,390, Aug. 1, 1985.  
Continuation of Ser. No. 467,014, Feb. 16, 1983, Pat. No. 4,534,039  
Claims priority, application United Kingdom, Feb. 26, 1982, 8205660  
Int. Cl.<sup>6</sup> H04B 3/00; H04L 25/00; H04M 11/00  
U.S. Cl. 375-36



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 6-11 is confirmed.

Claims 1-5 are cancelled.

6. Dataset apparatus comprising first terminal means including a plurality of separate terminal connectors for attachment to data terminal apparatus for receiving therefrom and supplying thereto at respective ones of said separate terminal connectors electrical data signals and electrical control signals, second terminal means for connection to transmission lines, means for modifying and controlling electrical data signals emitted from said terminal apparatus prior to transmission on said transmission lines as transmitted data signals and electrical data signals received from said transmission lines prior to transmission to said terminal apparatus as received data signals, and power supply means for said modifying means, said power supply means being connected to a plurality of said terminal connectors for receiving said control and data signals from said terminal apparatus for extracting voltage solely from said control and data signals whereby to provide power for generating said transmitted data signals for said transmission lines and for generating said received signals for said data terminal.

B1 4,763,440 (2565th)  
SYSTEM AND METHOD FOR PROTECTING PLANTS FROM FREEZE DAMAGE  
Gregory S. James, 116 W. New York Ave., DeLand, Fla. 32720  
Reexamination Request No. 90/003,448, May 31, 1994.  
Reexamination Certificate for Patent No. 4,763,440, issued Aug. 16, 1988, Ser. No. 509,919, Jul. 1, 1983.  
Int. Cl.<sup>6</sup> A01G 13/02, 13/06  
U.S. Cl. 47-2

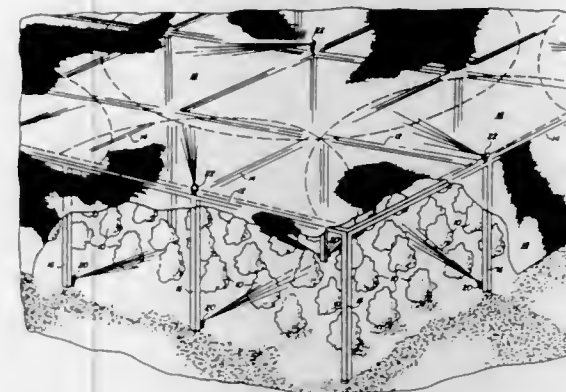
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1, 2, 6, 7, 8, and 9 are determined to be patentable as amended.

Claims 3-5, dependent on an amended claim, are determined to be patentable.

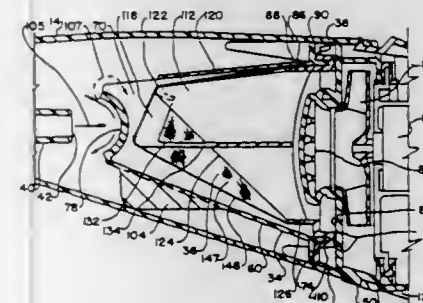
New claim 10 is added and determined to be patentable.

1. A method for protecting a ground plot of foliage plants from freezing, said method comprising the steps of:  
(a) providing ground-level sprinklers throughout said plot;



(b) covering said plot and said ground-level sprinklers with a covering of the type having openings therein;  
(c) providing elevated sprinklers above said covering;  
(d) sprinkling said plot with water through said ground-level sprinklers; and  
(e) sprinkling said covering with water through said elevated sprinklers as the ambient temperature drops to about 32° F., whereby the water from said elevated sprinklers freezes in the openings of said covering and holds heat released during operation of said ground-level sprinklers under said covering.

B1 4,831,685 (2566th)  
WET AND DRY VACUUM CLEANER  
Nick M. Bosyj, North Canton; John A. Leonatti, Uniontown; Vincent L. Weber, Canton, and Gregory P. Wagner, Akron, all of Ohio, assignors to The Hoover Company, North Canton, Ohio  
Reexamination Request No. 90/003,502, Jul. 21, 1994.  
Reexamination Certificate for Patent No. 4,831,685, issued May 23, 1989, Ser. No. 126,021, Nov. 27, 1987.  
Int. Cl.<sup>6</sup> A47L 5/24, 9/12, 9/18  
U.S. Cl. 15-344

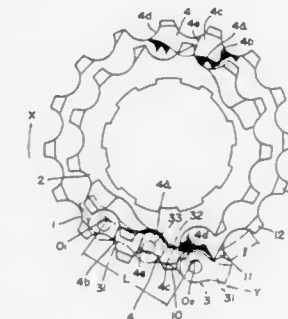


AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-17 is confirmed.

1. A hand held vacuum cleaner comprising:  
a housing including a fan inlet;  
a collection container separably attached to said housing and including tubular means therein having an inlet and an outlet for conveying liquid and dirt laden air from a surface being cleaned to the interior of said collection container;  
a motor/fan unit located in said housing and in air flow communication with said collection container via the fan inlet, said motor/fan unit producing a flow of dirt and liquid laden air into said collection container via said tubular means;  
a liquid separator located within said collection container and elongated in a direction from said tubular means to said housing and interposed therebetween to inhibit liquid flow to said housing and thus provide for liquid storage within the interior of said collection container, said liquid separator having inlet and outlet apertures for providing air communication between the fan inlet and said tubular means; and  
a baffle within said collection container elongated transversely of said separator and having a generally semicylindrically shaped concave surface positioned opposite the outlet of said tubular means for redirecting liquid and dirt laden air emanating from the outlet of said tubular means.

B1 4,889,521 (2567th)  
MULTISTAGE SPROCKET ASSEMBLY FOR A BICYCLE  
Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Sakai, Japan  
Reexamination Request No. 90/003,615, Oct. 26, 1994.  
Reexamination Certificate for Patent No. 4,889,521, issued Dec. 26, 1989, Ser. No. 261,323, Oct. 24, 1988.  
Claims priority, application Japan, Oct. 21, 1987, 62-161539; Jun. 4, 1988, 63-74583  
Int. Cl.<sup>6</sup> F16H 63/00  
U.S. Cl. 474-164



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-6 is confirmed.

New claims 7-35 are added and determined to be patentable.

1. A multistage sprocket assembly for a bicycle, said sprocket assembly comprising:  
at least one large diameter sprocket having at its outer periphery a plurality of teeth; and at least one smaller diameter sprocket having at its outer periphery a plurality of teeth smaller in number than said plurality of teeth of said larger diameter sprocket, a pair of adjacent teeth of said larger diameter sprocket having a first center point therebetween and a pair of adjacent teeth of said smaller diameter sprocket having a second center point therebetween, said first center point and said second center point being positioned on a tangent line extending along a traveling path between said smaller diameter sprocket and said





MAY 9, 1995

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 34,929

## PLASTIC BAG FOR VACUUM SEALING

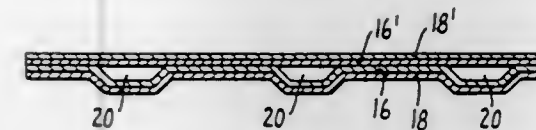
Hanns J. Kristen, San Anselmo, Calif., assignor to Tilia, Inc., San Francisco, Calif.

Original No. 4,756,422, dated Jul. 12, 1988, Ser. No. 36,323, Apr. 9, 1987. Continuation-in-part of Ser. No. 9,110, Jan. 28, 1987, abandoned, which is a continuation of Ser. No. 778,875, Sep. 23, 1985, abandoned. Application for reissue Jan. 22, 1993, Ser. No. 7,850

Int. Cl.<sup>6</sup> B65D 81/20

U.S. Cl. 206—524.8

16 Claims



1. A tubular receptacle adapted to be formed into an evacuated and sealed bag comprising

first and second superimposed plastic panels, each having a uniform thickness and defining inner and outer surfaces thereon, joined together at opposite lateral sides thereof to define a chamber adapted to have a product disposed therein,

each of said first and second panels comprising an uniform inner layer, defining one of said inner surfaces thereon, composed of a heat sealable material, and an uniform outer layer composed of a gas impermeable material, and a plurality of raised protuberances having said uniform thickness and formed in a generally regular and waffle-like pattern on the inner surface of at least one of said first and second panels to project outwardly therefrom towards the inner surface of the other panel to define a plurality of intercommunicating channels entirely around and between said protuberances.

5. The receptacle of claim 1 wherein [distal] distal ends of said protuberances and bottom surfaces defining said channels and which face the inner surface of said other panel each define at least generally flat and exposed surface areas thereon that are coplanar relative to each other.

Re. 34,930

## CHILD RESISTANT REMINDER CLOSURE

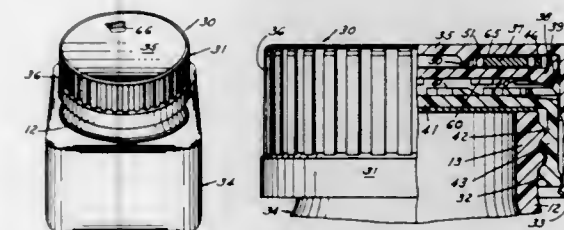
Maximilian Kusz, Waterville, Ohio, assignor to Owens Illinois Closure Inc., Toledo, Ohio

Original No. 5,184,739, dated Feb. 9, 1993, Ser. No. 878,647, May 5, 1992. Application for reissue Jun. 28, 1993, Ser. No. 83,818

Int. Cl.<sup>6</sup> B65D 55/02

U.S. Cl. 215—220

9 Claims



1. A child resistant reminder closure comprising an outer closure member having a base wall and a peripheral skirt,

an inner closure member having a base wall and a peripheral skirt,

interengaging means between the outer closure member and inner closure member to retain the inner closure member against axially outward movement relative to the outer closure member,

said outer closure member and said inner closure member having limited axial movement [to one another] relative to each other,

an assembly of a day disk and an indexing disk being rotatably mounted on said outer closure member,

said day disk being provided adjacent the inner surface of the base wall of the outer closure member,

said indexing disk being provided adjacent said day disk,

said day disk having an opening and a first set of flexible radial ratcheting means extending radially inwardly into the opening from said day disk and a second set of flexible radial ratcheting means extending radially from the day disk in the same circumferential direction as the first set,

said outer closure member having a first set of lugs adapted to engage said first set of flexible radial ratcheting means such that there is permissible rotational movement of the day disk relative to the outer closure in one circumferential direction,

[said outer closure member having another set of lugs adapted to engage said second set of flexible ratcheting means,]

said indexing disk having [means thereon] a second set of lugs on the top surface engageable by said [first] second set of flexible ratcheting means on said day disk such that there is permissible rotational movement of the day disk relative to the indexing disk in the opposite circumferential direction from that of permissible rotational movement of the day disk relative to the outer closure member,

a [first] set of [axially] rotationally interengageable means between said outer closure member and said indexing disk which are engaged when the outer closure member is rotated through a predetermined angle in either direction,

a [second] set of axially interengageable child resistant means between said indexing disk and said inner closure member,

said day disk having circumferentially spaced indicia thereon,

said base wall of said outer closure member having an opening adapted to be selectively aligned with said indicia,

interengaging means on the inner closure member adapted to engage means on a container by relative rotation of said inner closure member and a container,

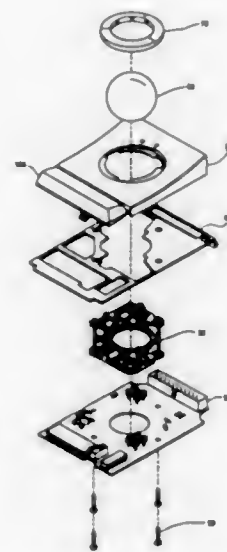
such that when the outer closure member is moved axially [to engage] toward the inner closure member [and the outer closure member is rotated, the axially interengageable child resistant means between said indexing disk and said inner closure member become engaged and the closure can be removed or applied from [a] the container by rotation of the outer closure member and such that said day disk can be rotated relative to said outer closure member during either said application or said removal of said disk to bring different indicia into view through said opening.

Re. 34,931  
**CURSOR POSITIONING DEVICE OPERABLE OVER VARIOUS DEGREES OF ELEVATION**  
 Douglas J. Duchon, Chanhassen, Minn., assignor to Logitech S.A., Apples, Switzerland  
 Original No. 5,008,528, dated Apr. 16, 1991, Ser. No. 380,092, Jul. 14, 1989. Application for reissue Apr. 16, 1993, Ser. No. 49,456

Int. Cl.<sup>6</sup> G01V 9/04

U.S. Cl. 250—221

22 Claims



13. A cursor control device for entering commands into a computer, comprising:  
 a housing;  
 a rotatable ball within said housing;  
 a first ball retainer in contact with said ball at a point on a first side of a centerline of said ball, said first ball retainer including a plurality of encoding means contacting said ball for generating an electrical signal corresponding to rotational movement of said ball; and  
 a second ball retainer positioned for contact with said ball at a point on a second side of said centerline of said ball and holding said ball in contact with said encoding means regardless of the elevational orientation of said housing.

Re. 34,932  
**CONTINUOUS INK JET PRINTING DEVICE**  
 Colin Gray, Hemmingford Grey, England, assignor to Elmjett Limited, United Kingdom  
 Original No. 5,115,251, dated May 19, 1992, Ser. No. 568,775, Aug. 17, 1990. Application for reissue Apr. 2, 1993, Ser. No. 41,569  
 Claims priority, application United Kingdom, Mar. 16, 1988, 8806218

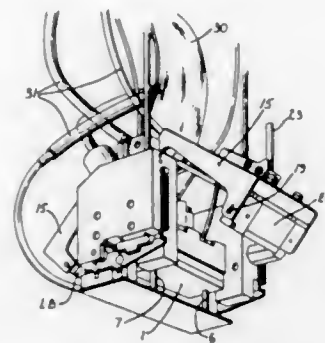
Int. Cl.<sup>6</sup> G01D 15/18

U.S. Cl. 347—74

11 Claims

1. A continuous ink jet printing device comprising a nozzle plate (1) with a plurality of nozzles (4) from which, in use, jets of ink drops are ejected, and an electrode assembly (LB) with a drop-charging electrode (9), the electrode assembly being located relatively to the nozzle plate in directions perpendicular to the direction of the ink jets by virtue of one of the elec-

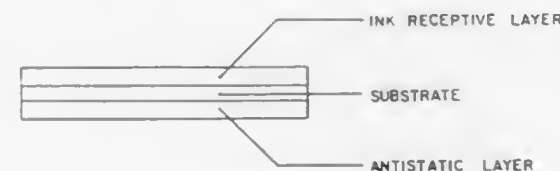
trode assembly and nozzle plate being rigid with a rigid rail (6, 7), and by virtue of a groove (10) rigid with the other of the



electrode assembly and nozzle plate engaging directly the rail, said groove having opposing edge surfaces engaged by the rail.

Re. 34,933  
**PRINTING FILM**  
 Morgan E. Gager, Warwick; David Atherton, North Kingstown, both of R.I., and Surendra K. Gadodia, Diamond Bar, Calif., assignors to Arkwright, Incorporated, Fiskeville, R.I.  
 Original No. 5,215,814, dated Jun. 1, 1993, Ser. No. 680,200, Apr. 5, 1991. Application for reissue Oct. 12, 1993, Ser. No. 135,304  
 Claims priority, application European Pat. Off., Apr. 1, 1992, 92200921; Japan, Apr. 3, 1992, 4-127897  
 Int. Cl.<sup>6</sup> B32B 9/00  
 U.S. Cl. 428—246

48 Claims



1. A fast drying printing film composite comprising a transparent, translucent or opaque film substrate having an ink receptive essentially transparent polymeric layer on at least one side of said substrate, said ink receptive layer containing one or more polymers or copolymers with the exception of butadiene and styrene resins, at least one of said polymers or copolymers being soluble or swellable in an aliphatic hydrocarbon solvent, said ink receptive layer having a solvent absorptivity of Isopar G of from 14% to 45% by weight with respect to the weight of the ink receptive layer, a Sheffield surface roughness value of less than 140 [cc of air/minute] Sheffield Units and an offset dry time of less than about two hours.

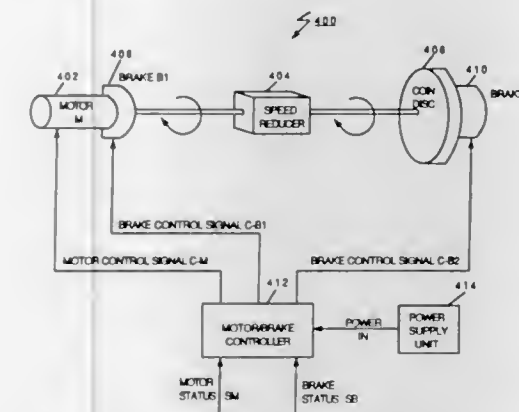
Re. 34,934  
**COIN SORTER WITH COUNTER AND BRAKE MECHANISM**  
 Donald E. Raterman, 1345 Carol Ln., Deerfield, Ill. 60015; Richard A. Mazur, 1508 Culpepper Dr., Naperville, Ill. 60540, and Richard D. Prindahl, 1125 Worthington Dr., Hoffman Estates, Ill. 60194  
 Original No. 5,055,086, dated Oct. 8, 1991, Ser. No. 475,127, Feb. 5, 1990. Continuation-in-part of Ser. No. 113,869, Oct. 27, 1987, Pat. No. 4,921,463. Application for reissue Oct. 6, 1993, Ser. No. 132,715  
 Int. Cl.<sup>6</sup> G07D 3/16

U.S. Cl. 453—10

28 Claims

26. A braking system for quickly and accurately stopping the rotation of a coin disc in a coin sorting and counting system com-

prising on electric motor rotatably driving a coin disc through a mechanical coupling means, said system comprising:  
 a first rotation arrestor coupled to said motor for stopping said coin disc from being rotated by said motor;  
 a second rotation arrestor coupled to said coin disc for stopping the rotation thereof; and



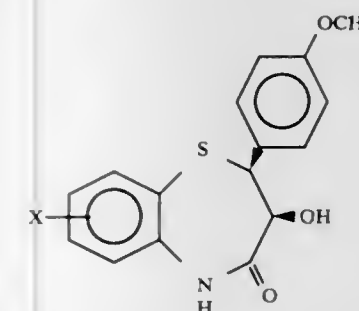
control means for operating said first rotation arrestor and said second rotation arrestor in synchronism so as to stop the rotation of said coin disc without exerting shock loads on said mechanical coupling means.

Re. 34,935  
**METHOD FOR PREPARING (+)-(2S,3S)-3-HYDROXY-2-(4-METHOXYPHENYL)-2,3-DIHYDRO-5H-1,5-BENZOTHAZEPINE-4-ONE AND CHLORINATED DERIVATIVES THEREOF**  
 Guy Rossey, Voisins-Le-Bretonneux; Isaac Chekroun, Epinay; Antonio Ugolini, Le Pecq; Alexander Wick, St. Nom La Breteche; Bernard Gerin; Andre Bourbon, both of Mantes La Jolie, and Jean-Baptiste Graux, Mantes La Ville, all of France, assignors to Synthelabo, Robinson, France  
 Original No. 5,102,998, dated Apr. 7, 1992, Ser. No. 426,285, Oct. 24, 1989. Continuation-in-part of Ser. No. 408,042, Sep. 14, 1989, Pat. No. 5,013,835. Application for reissue Apr. 29, 1993, Ser. No. 53,855  
 Claims priority, application France, Jan. 11, 1989, 89 00246  
 Int. Cl.<sup>6</sup> C07D 267/02

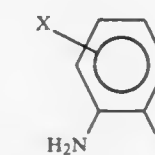
U.S. Cl. 540—491

6 Claims

1. A method for preparing a compound of the general formula (I)

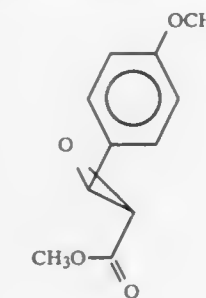


wherein X is hydrogen or chlorine, said method consisting essentially of:  
 reacting a compound of the general formula (II)



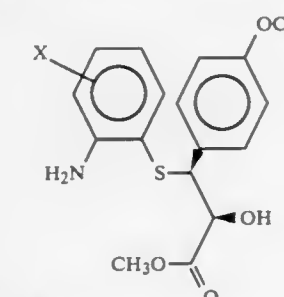
(II)

with a compound of formula (III) in optically pure levorotatory form



(III)

to obtain an intermediate compound of general formula (IV)



(IV)

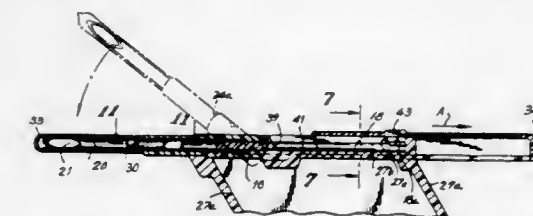
[; and then,]  
 and then, without isolating said intermediate, cyclizing the intermediate compound wherein said cyclization is effected in the presence of acid, and wherein said reacting and cyclizing steps are performed in the presence of [a solvent selected from the group consisting of chlorinated organic solvent that have boiling points greater than 70° C] chlorobenzene.

**ANIMAL MARKER IMPLANTING SYSTEM**  
 Neil E. Campbell, Hasbrouck Heights, and Chinsoo Park, Rutherford, both of N.J., assignors to Bio Medic Data Systems, Inc., Maywood, N.J.  
 Original No. 4,787,384, dated Nov. 29, 1988, Ser. No. 919,152, Oct. 6, 1986. Application for reissue Jul. 22, 1993, Ser. No. 96,075

U.S. Cl. 606—117

Int. Cl.<sup>6</sup> A01K 11/00

16 Claims



11. A needle assembly for use in an implanting apparatus including a hollow tube having an exit opening and an entrance opening, a marker positioned in said tube proximate to said [entrance] exit opening wherein said marker includes a coating thereon for defining an interference fit of said marker in said tube and a drive pin means disposed in said tube between said marker and said entrance opening for positioning said tube, said marker being a glass capsule and said coating being of a non-glass material.



## PLANT PATENTS

GRANTED MAY 9, 1995

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

9,128

## NECTARINE TREE, 'SURE FIRE'

Steven P. Reimer, 22506 Dinuba Ave., Dinuba, Calif. 93618

Filed Dec. 13, 1993, Ser. No. 165,986

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—41.1

1 Claim

1. A new and distinct variety of nectarine tree to be denominated varietally as "Sure Fire", substantially as illustrated and described, and which is characterized principally as to novelty by its production of fruit which are somewhat similar in their overall appearance to the fruit produced by the Mayfire nectarine tree [unpatented] from which it was derived as a chance mutation, but which is distinguished therefrom, and characterized principally as to novelty by producing fruit which are ripe for commercial harvesting and shipment approximately 10 days later than the fruit produced by the Mayfire nectarine tree at the same geographical location.

9,129

## 'P. F. 1' PEACH TREE

Paul J. Friday, P.O. Box 850, Coloma, Mich. 49038

Filed Jun. 24, 1994, Ser. No. 266,721

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—43.1

1 Claim

1. A new and distinct variety of peach tree substantially as illustrated and described as medium-large size, medium upright in growth and a regular and productive bearer of medium large size, yellow flesh semi-cling fruit, good flavor and eating quality; and being further characterized by a non-showy blossom about  $\frac{1}{2}$  inch in diameter when in full bloom, said fruit as maturity is of substantially oval spheroidal shape with firm flesh and red skin color covering 90% of the fruit, said maturity occurring about 21 days before maturity of the Redhaven.

9,130

## STRAWBERRY PLANT CALLED 'BALBOA'

Thomas M. Sjulín, Aromas; Amado Q. Amorao, Camarillo, and

Joseph I. Espejo, Jr., Watsonville, all of Calif., assignors to

Driscoll Strawberry Associates, Inc., Watsonville, Calif.

Filed Aug. 3, 1994, Ser. No. 285,388

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—48

1 Claim

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

9,131

## AZALEA PLANT NAMED CHAMPAGNE

Frank C. Moser, Alva, Fla., assignor to Yoder Brothers, Inc.,

Barberton, Ohio

Filed Apr. 6, 1994, Ser. No. 223,723

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—56

1 Claim

1. A new and distinct cultivar of azalea named Champagne, as illustrated and described.

9,132

## AZALEA PLANT NAMED YB 871 REMEMBRANCE

Frank C. Moser, Alva, Fla., assignor to Yoder Brothers, Inc.,

Barberton, Ohio

Filed Apr. 6, 1994, Ser. No. 223,996

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—57

1 Claim

1. A new and distinct cultivar of azalea named YB 871 Remembrance, as described and illustrated.

9,133

## LILIUM 'MEMPHIS'

Johan A. Mak, 5595 Halls Ferry Rd., Independence, Oreg.

97351

Filed Sep. 28, 1994, Ser. No. 314,071

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—87.4

1 Claim

1. A new and distinctive variety of Oriental hybrid lily plant substantially as herein shown and described, characterized by its high resistance to disease; its tolerance of virus; its vigorous growth and rapid natural propagation; the excellence of its flower form, size, and substance; its versatility both as a garden plant and as a cut-flower producer from pre-cooled bulbs forced under glass out of season; and in particular by its unique upright to semi-upright flowers with deep pink coloration shading into a wide white center bordering a short, narrow yellow ray along the midrib, accented with noticeable magenta rose papillae on the basal half of each tepal, a combination unique among Oriental hybrid lilies suited to forcing and to mass commercial cultivation.

9,134

## GERANIUM PLANT NAMED MERILOU

Adrianus W. M. Enthoven, Wateringen, Netherlands, assignor to

Enthoven Breeding B.V., Wateringen, Netherlands

Filed Feb. 26, 1994, Ser. No. 197,346

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—87.12

1 Claim

1. A new and distinct cultivar of geranium plant named Merilou, as illustrated and described.

9,135

## ZOYSIAGRASS PLANT NAMED 'VICTORIA'

Victor A. Gibeault, Riverside; Matthew K. Leonard, Romoland,

both of Calif., and Victor B. Youngner, deceased, late of

Riverside, Calif. by Violet E. Janowitz, heir, assignors to The

Regents of the University of California, Los Angeles, Calif.

Filed Jan. 13, 1994, Ser. No. 180,899

Int. Cl.<sup>6</sup> A01H 5/00

U.S. Cl. Plt.—90

1 Claim

1. A new and distinct variety of Zoysiagrass named 'Victoria', substantially as described and illustrated, which has a longer growing season and green color retention in winter than the variety 'El Toro', and substantially no purple pigmentation.

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**PATENTS**  
**GRANTED MAY 9, 1995**

**ERRATA**

For CLASS	See PATENT NO.
34-097 .....	5,412,879
451-038 .....	5,412,910
34-104 .....	5,412,928
181-268 .....	5,413,189
209-567 .....	5,413,222
227-175 .....	5,413,272
228-180 .....	5,413,275
294-088 .....	5,413,403
415-169 .....	5,413,462
424-195 .....	5,413,474
425-311 .....	5,413,487
606-004 .....	5,413,555
604-892 .....	5,413,572
71-027 .....	5,413,616
283-081 .....	5,413,025
75-371 .....	5,413,617
216-020 .....	5,413,667
216-002 .....	5,413,668
134-001 .....	5,413,670
216-037 .....	5,413,671
216-087 .....	5,413,672
156-657 .....	5,413,678
216-099 .....	5,413,679
208-207 .....	5,413,704
514-185 .....	5,413,786
427-217 .....	5,413,844
423-447 .....	5,413,866
435-189 .....	5,413,960
502-333 .....	5,413,984
502-355 .....	5,413,985
524-558 .....	5,414,060
568-333 .....	5,414,075
564-051 .....	5,414,118
200-001 .....	5,414,231



## ERRATA-CONTINUED

For CLASS	See PATENT NO.
326-062 .....	5,414,305
327-143 .....	5,414,307
327-293 .....	5,414,308
327-110 .....	5,414,309
327-062 .....	5,414,310
327-094 .....	5,414,311
326-083 .....	5,414,312
327-351 .....	5,414,313
327-427 .....	5,414,314
345-175 .....	5,414,413
348-123 .....	5,414,521
360-130 .....	5,414,585
362-026 .....	5,414,595
365-185 .....	5,414,693

## PATENTS

GRANTED MAY 9, 1995

## GENERAL AND MECHANICAL

5,412,810

## HELMET FOR RIDING VEHICLE

Fujio Taniuchi, Tokyo, Japan, assignor to Shoei Kako Kabushiki Kaisha, Tokyo, Japan

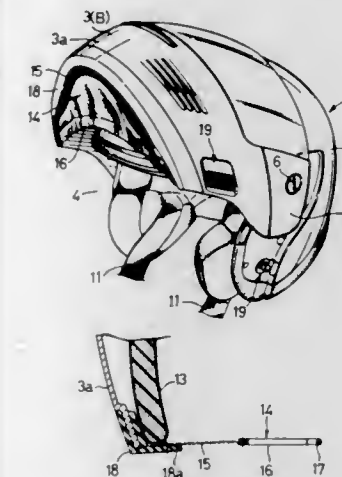
Filed Jan. 6, 1994, Ser. No. 177,936

Claims priority, application Japan, Jul. 28, 1993, 5-041021 U

Int. Cl.<sup>6</sup> A42B 1/08

U.S. Cl. 2-424

4 Claims



1. A helmet for riding a vehicle, having a cap body and a chin covering portion provided in said cap body for covering a chin of a user, said cap body comprising:

a main cap body having a large window opened at a lower front end of the main cap body; and  
an auxiliary cap body forming said chin covering portion and carried on left and right sidewalls of said main cap body for turning movement between a lowered position, in which a lower half of said large window is covered with said chin covering portion to define an upper half of said large window into a small window, and a lifted position, in which said large window is entirely opened, wherein said chin covering portion is provided at a lower edge thereof with an expandable and contractible chin cover for covering a lower face of the chin of the user, and a portion of said chin cover is made of a mesh material of a property permitting an inhalation and exhalation there-through by breathing of the user, and said chin covering portion also including resilient urging means, operatively connected to said chin cover, for resiliently urging at least a rear edge portion of said chin cover into a contracted state.

5,412,811

## HEADGEAR HAVING A HOLDING DEVICE FOR HOLDING AN INSTRUMENT

Peter Hildenbrand, Beimerstetten; Walter Matuschek, Aalen, and Heinz Gottlob, Königsbrunn, all of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Germany

Filed Oct. 2, 1992, Ser. No. 955,976

Claims priority, application Germany, Oct. 4, 1991, 91 12 375 U; Oct. 4, 1991, 91 12 376 U; Oct. 4, 1991, 91 12 377 U

Int. Cl.<sup>6</sup> A42B 3/04

U.S. Cl. 2-10

25 Claims

1. A headgear to be worn on the head and adapted for holding a measuring unit, illuminating unit or viewing unit, the headgear comprising:

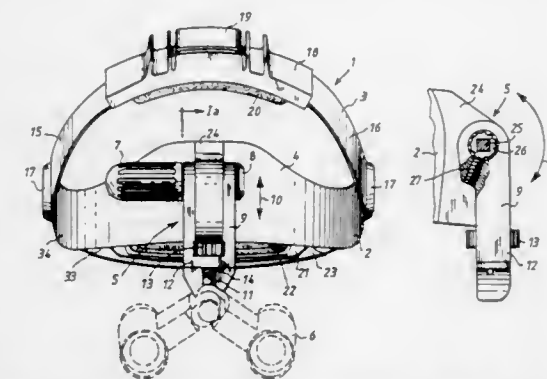
a frontal band extending around the circumference of the head of the wearer and having a front end portion;  
a headband extending over the head of the wearer and hav-

ing respective headband ends connected to said frontal band;

a holding device including: a base body mounted on said front end portion; a bracket having holding means for holding the unit; and, clamping means for connecting said bracket to said base body;

said base body having a slot formed therein so as to extend in a substantially vertical direction;

said clamping means including: pivot pin means defining a pivot axis and being mounted in said bracket and extending through said slot; and, manually actuatable tightening means for coacting with said pivot pin means to release said bracket and permit movement of said bracket in elevation along said slot in a first line of movement relative to said base and to fix said bracket at any desired location in elevation along said slot;



said bracket being pivotally mounted on said pivot pin means so as to pivot about said pivot axis and be movable through an angular range and along a predetermined second line of movement relative to said base body while said bracket is at any location along said first line; and, detent means for latching said bracket only in a plurality of angular positions about said pivot axis within said angular range; and, said detent means including detents on said pivot pin means for fixing said positions one next to the other at predetermined intervals within said angular range; and, a resiliently-biased pressure piece mounted in said bracket for engaging any one of said detents for latching and fixing said bracket at the angular position corresponding to said one detent.

5,412,812

## DETACHABLE EYESHIELD ATTACHMENT FOR VISOR CAPS OR THE LIKE

Bayani V. Gatchalian, 1609 Dawnbreak Ct., St. Charles, Mo. 63303-5011

Filed Nov. 23, 1993, Ser. No. 156,317

Int. Cl.<sup>6</sup> A42B 1/06

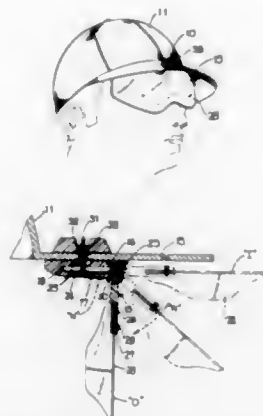
U.S. Cl. 2-10

4 Claims

1. A detachable eyeshield attachment in combination with a visor cap, comprising:

a clip-type mounting base consisting of a pair of flexible upper and lower clipping arms normally separated by a space gap therebetween, said arms having at the respective inward front end portions thereof transversely oriented complementing grooves which are cooperating with each other in a manner that they define an adjustable, split-sided knuckle, wherein said mounting base is removably attached to the underside portion of a cap visor by a bolt-and-nut combination in which the head of the bolt is fixedly secured at

the lower arm and upwardly piercing slidably through respective holes provided at the upper arm and visor so that the exposed end of said bolt engages with a wing nut at the top side of said visor whereby actuating said wing nut to abut or move away from the top side surface of the visor effects, respectively, a tightening or loosening of the gripping or locking hold of said arms over said holder,



a pivotable eyeshield holder with an eyeshield fixedly secured thereto, said holder having an integrally formed pin-like rear end portion being removably and hingedly held in said arms through the grooves thereof such that said holder is capable of rotating at its pivot for at least about a ninety degree angular displacement from its operative position and outwardly to its inoperative position.

5,412,813

## SKIER'S DRAG CHUTE

Loring F. Hosley, P.O. Box 444, Allenhurst, N.J. 07711  
Filed Nov. 10, 1993, Ser. No. 149,800  
Int. Cl.<sup>6</sup> A41D 3/08

U.S. Cl. 2—69

4 Claims



1. A deployable chute apparatus for use on skiers, said apparatus comprising: a chute of flexible material and having top and bottom edges, two side edges, two upper corners and two lower corners, said top edge of curved construction so as to form a concavely curved edge running between said two upper corners, a wrist attachment means attached to each said upper corners of said chute, leg attachment means in connection with said chute near said lower corners of said chute, a belt having two portions, each attached to said chute near one of said side edges of said chute.

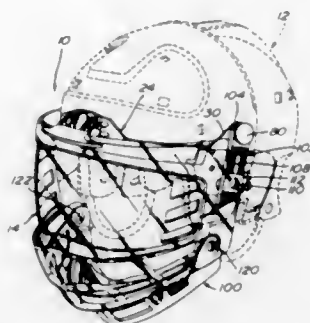
5,412,814

## PROTECTIVE SPORTS HEADGEAR

Martin P. Pernicka, St-Francois; Paul Isabelle, and Hubert Gagnon, both of St-Augustin de Desmaures, all of Canada, assignors to Leader Industries, Inc., Boucherville, Canada  
Filed Apr. 25, 1994, Ser. No. 231,816  
Int. Cl.<sup>6</sup> A42B 1/08

U.S. Cl. 2—424

11 Claims



1. A protective sports headgear comprising:  
a helmet defining a forehead area and top, rear and sides to cover a wearer's head;  
an intermediate adapter fixed to said forehead area, said adapter defining a front portion and opposite side portions;  
a visor shield hingedly connected to said adapter at said opposite side portions;  
lock engaging means on said visor shield centrally thereof and along the upper edge thereof; and  
lock means mounted at said front portion of said adapter and cooperating with said lock engaging means on said visor shield; said lock means being manually releasable so that, by disengaging said lock engaging means from said lock means, said visor shield may be pivotally lifted to extend over said forehead area and said top of said helmet.

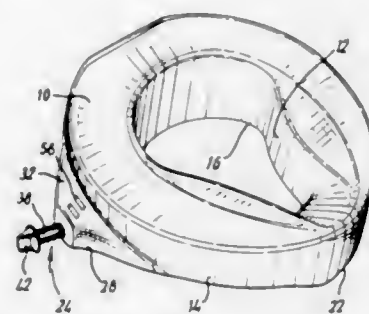
5,412,815

## TOILET SEATS

William E. Ellis, Allestree, England, assignor to Gordon Ellis and Company, Derby, England  
Filed May 31, 1994, Ser. No. 250,915  
Int. Cl.<sup>6</sup> A47K 13/02, 13/26

U.S. Cl. 4—239

5 Claims



1. A raised toilet seat adapted to be supported on a toilet bowl, comprising:  
(a) a toilet seat surface, wherein the seat surface includes downwardly depending inner and outer flanges extending, respectively, from an inner and outer periphery of the surface to define a downwardly opening channel below the seat surface, the outer flange is intended in use to be generally on a level with a level defined by top of the toilet bowl and is provided at its front with a first downwardly directed extension intended, in use, to project below the level of the top of the toilet bowl, said inner

flange and said first extension cooperating to provide a first clamping means adapted to engage the toilet bowl to hold the seat against displacement;  
(b) toilet bowl engaging means formed in said channel for supporting the toilet seat on a toilet bowl;  
(c) said seat being formed in a single piece from injection or rotational molded plastic material; and  
(d) second and third extensions downwardly depending from the outer flange are provided on opposite sides of the seat in a rearward region of the seat to define a second clamping means, each of said second and third extensions including a threaded passage for accommodating a threaded member adapted to clamp the seat to the toilet bowl.

5,412,816

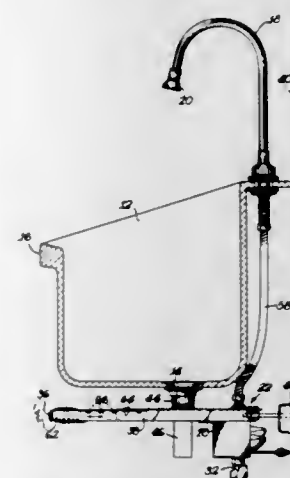
## SURGICAL SCRUB SINK

Graham H. Paterson, Wilmington, and Barry Bedwell, Bear, both of Del., assignors to Speakman Company, Wilmington, Del.

Filed Jan. 7, 1994, Ser. No. 178,509  
Int. Cl.<sup>6</sup> E03C 1/05

U.S. Cl. 4—623

2 Claims



1. A surgical scrub sink comprising a tub mounted to a support wall and above a floor wherein said tub includes a drain hole and a drain tube connected to said drain hole, a faucet mounted over and disposed toward said tub, an electronically operated on/off mechanism including a solenoid controlled electronic mixing valve for controlling the flow of water from said faucet into said tub, a narrow beam, short focus sensor mounted on a support arm below the tub attached to the tub drain tube wherein said support arm is of elongated shape including a main bracket, an extender bracket slidably mounted to said main bracket and lockable in position for varying the effective length of said arm, and said sensor being mounted to said extender bracket, and wherein said support arm also contains adjustment screws disposed against said wall, said sensor being mounted at an elevation of from about six inches to about thirty inches above said floor and directing a beam toward the front of the tub, said sensor having a focal length of about 2-6 inches for detecting the presence and absence of a user in the immediate vicinity of said tub, and said sensor being operatively connected to said on/off mechanism for turning on said faucet when the presence of a user is detected and for turning off said faucet when the absence of a user is detected.

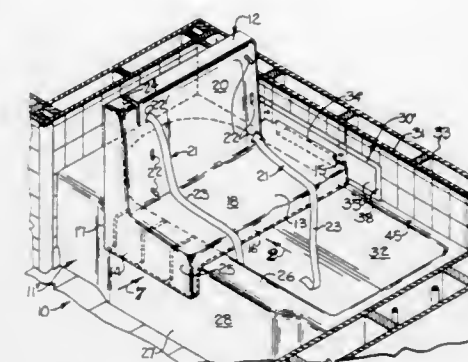
5,412,817

## BATHING FIXTURE

Lee A. Smith, 3901 Foxcroft Rd., Charlotte, N.C. 28211, assignor to Kendrick S. Gaertner; Susannah S. Knight; Sarah Jane S. Plevka and Lee A. Smith, all of Charlotte, N.C.  
Filed Oct. 29, 1993, Ser. No. 145,751  
Int. Cl.<sup>6</sup> A47K 3/12

U.S. Cl. 4—578.1

9 Claims



1. A bathing fixture comprising  
a bathtub including a relatively low front wall which defines a horizontal upper edge, an opposite back wall which is spaced from said front wall, and a receptacle in said back wall having at least one opening therein which opens toward said front wall and which is disposed at an elevation which substantially corresponds to that of said upper edge, and  
a seat assembly comprising,  
(a) a horizontal support portion which includes opposite first and second side edges, opposite front and rear edges, an upper surface, and a bottom surface,  
(b) a housing mounted to said bottom surface of said seat assembly,  
(c) elongate plunger means including pad means mounted to one end thereof,  
(d) means mounting said plunger means to said housing so that said plunger means extends in a lateral direction which extends between said side edges with said pad means positioned adjacent said first side edge of said support portion, and so as to permit selective movement of said plunger means in the lateral direction, and  
(e) stabilizing bar means at said second side edge and extending in the lateral direction,  
said seat assembly being mounted to said bathtub with said first side edge of said support portion resting upon said upper edge of said front wall of said bathtub, with said pad means of said plunger means laterally engaging said front wall of said bathtub, and with said stabilizing bar means extending into said opening of said receptacle in said back wall of said bathtub, and wherein said opening and said stabilizing bar means are closely interfitting and have approximately the same size and cooperate with each other to prevent the seat assembly from tilting and shifting so as to prevent possible injury to a bather.

5,412,818

## WASHING-UP SINK WITH A WASHPLATE

Kai-Jung Chen, No. 22, Lane 281, Southeast Street, Hsinchu City, Taiwan, Prov. of China

Filed Jul. 19, 1994, Ser. No. 277,192  
Int. Cl.<sup>6</sup> E03C 1/01

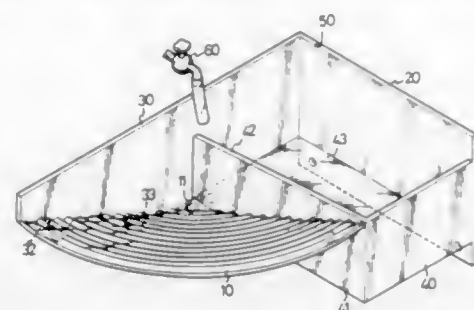
U.S. Cl. 4—642

4 Claims

1. A washing-up sink comprising:  
first, second, third, and fourth side plates which are arranged in a substantially rectangular structure, said rectangular structure having a first bottom plate mounted to a lower edge thereof thereby defining a first compartment, said first side plate having an extension, said extension of said



first side plate and said fourth side plate having a second bottom plate mounted therebetween at lower edges thereof, said second bottom plate having a length less than that of said extension and a width less than that of said



fourth side plate, said second bottom plate having an inclined washplate projecting from an outer edge thereof and extending upwardly and outwardly between said extension of said first side plate and said fourth side plate thereby defining a second compartment.

5,412,819

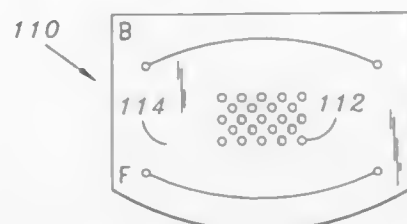
## DISPOSABLE SAMPLE COLLECTION DEVICE

Richard S. Matusiewicz, San Jose, and Josefina T. Baker, Cupertino, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Division of Ser. No. 88,491, Jul. 6, 1993, Pat. No. 5,337,426, which is a continuation of Ser. No. 919,637, Jul. 24, 1992, abandoned, which is a continuation of Ser. No. 616,491, Nov. 21, 1990, abandoned. This application Jul. 8, 1994, Ser. No. 273,543 Int. Cl.<sup>6</sup> A47K 11/00

U.S. Cl. 4-661

8 Claims



1. A fecal specimen collection device for use on a conventional toilet seat which is pivotally attached in a toilet bowl, the seat having an upper and lower surface bounded by opposite user support sides each having an outer peripheral edge and having an opening extending through said surfaces for passage of waste matter, the device including a sheet of flexible non-rigid material having first and second opposite edges and third and fourth opposite edges, the sheet including not more than a single lengthwise portion running from the first edge to the second edge, the lengthwise portion including a plurality of openings, and straps on either side of the lengthwise portion defined by slits in the sheet, the slits separating the lengthwise portion from the straps and being generally parallel to and proximate the third and fourth opposite edges of the sheet, the slits having a length such that the outer peripheral edges of the seat can pass through said slits thus positioning one strap across the upper surface of the seat near the pivotal attachment and the other strap across the upper surface at a front of the seat with the single lengthwise portion of the sheet disposed with at least a portion thereof below the lower surface and extending across said opening so as to retain fecal matter deposited thereon by a user while said plurality of openings serve to allow passage of liquids therethrough, the sheet being of such a thickness and consistency such that the straps may be easily torn subsequent to deposition of said fecal matter whereby the device can be lowered into the toilet bowl for disposal.

5,412,820  
INVALID HOIST WITH Laterally ADJUSTABLE BASE

Derek Richards, Longhope, England, assignor to Arjo Limited, Gloucester, England

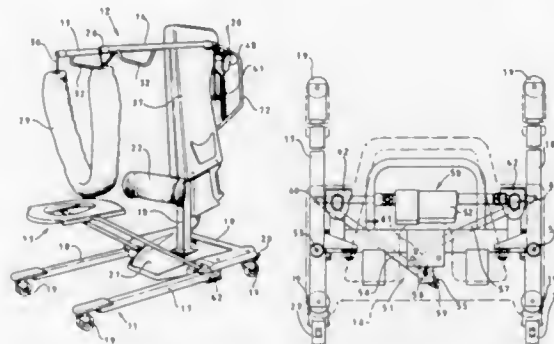
Division of Ser. No. 71,385, Jun. 2, 1993, Pat. No. 5,369,821.

This application Jun. 2, 1994, Ser. No. 253,069  
Claims priority, application United Kingdom, Jun. 6, 1992, 9212055

Int. Cl.<sup>6</sup> A61G 7/14

U.S. Cl. 5-86.1

2 Claims



1. An invalid hoist comprising a chassis having a main support member on which a mast is supported and two side members extending forwardly of the main support member, the side members being swivellable by power operated means between a first position in which they extend from the main support member in parallel or substantially parallel spaced relationship and a second position in which they diverge as they extend forwardly from the main support member, the power operated means comprising an electrically powered actuator and a linkage arrangement which ensures that the side members are swivelled in opposite angular directions at equal angular rates of displacement by the actuator, said linkage arrangement comprising a first link connected to the main support member for pivotal movement about a first axis parallel to and equidistantly spaced from the swivel axes of the two side members and second and third links connected at first ends to the first link for pivotal movement relative thereto about second and third axes disposed on opposite sides of, and equidistantly spaced from the first axis and connected at second ends to the two side members, respectively, for pivotal movement relative thereto about fourth and fifth axes spaced equidistantly from the first axis and also spaced equidistantly from the swivel axes of respective side members.

5,412,821  
PRESSURE RELIEF SUPPORT SYSTEM FOR A MATTRESS

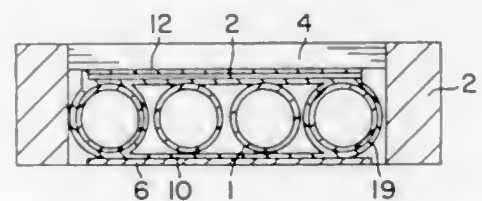
John W. Wilkinson, Bennington, Vt., assignor to Span-America Medical Systems, Inc., Greenville, S.C.

Division of Ser. No. 601,314, Oct. 22, 1990, Pat. No. 5,070,560. This application Nov. 18, 1991, Ser. No. 793,576

Int. Cl.<sup>6</sup> A47C 29/00

U.S. Cl. 5-455

20 Claims



1. A pressure relief support system for a mattress, comprising: a substantially rectangular casing, said casing including an

inner area removably supporting a plurality of respective sealable fluid filled elongate cylinders therein in a predetermined substantially parallel arrangement along the length of a longitudinal first direction of said casing so as to substantially define the shape and size of said mattress; a plurality of substantially mutually parallel sleeves formed on a selected first side of said casing, said sleeves being situated over the length of said elongate cylinders and extending in a lateral direction substantially perpendicular to said first direction of said casing, and said sleeves being formed for removably receiving respective independent slats therein for providing independent lateral slat user support for reducing longitudinal shear forces on such user;

a plurality of individual relatively firm slats respectively and removably received in said plurality of sleeves such that selected of said slats may be easily alternately inserted into and removed from respective of said sleeves without disturbing the remainder of said slats and without disturbing said predetermined arrangement of said cylinders;

selective closure means for selectively exposing said casing inner area such that selected of said elongated cylinders with selected amounts of fluid therein may be easily alternately inserted into and removed from said casing inner area without disturbing said arrangement of the remainder of said cylinders in relation to said casing and without disturbing said slats received in their respective sleeves; and

support means within said casing inner area for forming predetermined compartments for the insertion of at least selected of said elongate cylinders therein so as to form said predetermined arrangement thereof.

5,412,822

## ADJUSTABLE MULTI-COMPARTMENT PNEUMATIC SUPPORT APPARATUS

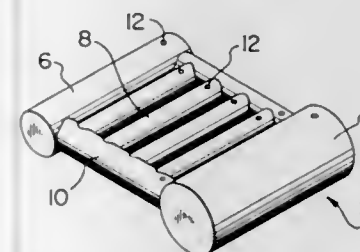
Bryan J. Kelly, 5566 - 6th Avenue, Delta, British Columbia, Canada V4M 1M1

Filed Oct. 15, 1993, Ser. No. 136,137

Int. Cl.<sup>6</sup> A47C 27/08

U.S. Cl. 5-455

17 Claims



1. An adjustable multi-compartment inflatable or hydraulically fillable support form comprising:

- (a) at least one first hollow chamber which can be individually inflated or fluid filled through a specific resealable valve;
- (b) at least one second hollow chamber which can be individually inflated or fluid filled through a specific resealable valve; and
- (c) at least one third hollow chamber which can be individually inflated or fluid filled through a specific resealable valve; wherein the first chamber and the second chamber are spaced from one another in parallel configuration, and there is a plurality of parallel third chambers which are positioned between the first chamber and the second chamber, and including a pair of fourth chambers which are positioned on either end of the parallel third chambers, extending laterally between the first chamber and the second chamber.

5,412,823

## PATIENT'S EXAMINATION TABLE FOR CARRYING OUT MEDICAL EXAMINATIONS

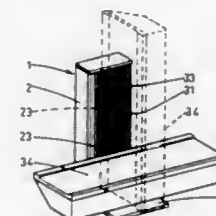
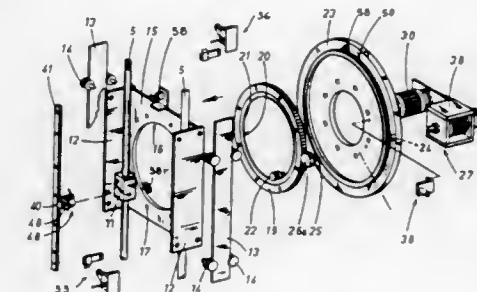
Stefano Sitta, Sasso Marconi, Italy, assignor to C.A.T. di Corsini Giuseppe & C. S.P.A., Bologna, Italy

Filed Feb. 22, 1994, Ser. No. 201,164

Claims priority, application Italy, Feb. 26, 1993, BO93A0070  
Int. Cl.<sup>6</sup> A61G 13/00

U.S. Cl. 5-601

9 Claims



1. An apparatus for rotating and translating an examination table comprising:

- support means for supporting the table;
- first movement means coupled to the support means for rotating the table, at least 90 degrees in either direction, about a horizontal axis transverse to a longitudinal dimension of the table, the horizontal axis located at a substantially medial portion of the table; and
- second movement means coupled to the support means for vertically translating the support means and the table in the up and down directions.

5,412,824

## EXPANDABLE SUPPORT MATTRESS, PARTICULARLY TO SUPPORT WOMEN DURING PREGNANCY

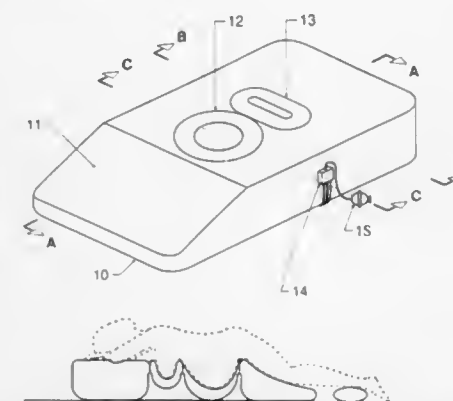
Mark D. Emerson, Matt H. Emerson, and David D. Emerson, all of San Jose, Calif., assignors to Maternal Concepts, Ltd., San Jose, Calif.

Filed Aug. 12, 1993, Ser. No. 105,123

Int. Cl.<sup>6</sup> A47C 27/10; A61G 7/00

U.S. Cl. 5-632

7 Claims



1. An adjustable mattress, adapted to support a substantial portion, including the breasts, abdomen, hips, thighs and knees

of the body of a pregnant female user in a prone position, comprising a generally horizontal upper mattress portion with a first cavity adapted to accommodate the enlarged abdomen of the user and a second, adjustable in size, cavity adapted to accommodate the breasts of the user, and a lower mattress portion adapted to support the thighs and knees of the user, the lower mattress portion having a supporting surface sloping downwardly from the upper mattress portion adjacent the hip supporting area towards the knee supporting area of the lower mattress portion, the downwardly sloped lower mattress portion adapted to support the thighs in a downwardly inclined orientation and to facilitate the getting on or off the mattress by the user.

5,412,825

# TOP COVER LOCKING SYSTEM OF A BOILING CLOTHES WASHING MACHINE

Kyung H. Moon, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

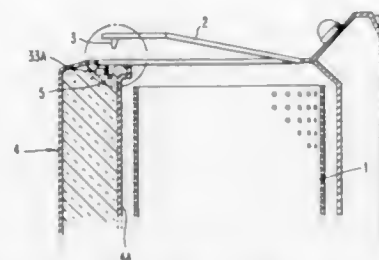
Filed Oct. 20, 1992, Ser. No. 963,633

Claims priority, application Rep. of Korea, Oct. 21, 1991, 91-18529

Int. Cl.<sup>6</sup> D06F 37/42

U.S. Cl. 8—159

4 Claims



3. A method for controlling a boiling clothes washing machine having a heater for boiling water, including the steps of: determining whether a boiling wash mode or a dehydrating mode is to be performed; determining whether a cover is locked during the boiling wash mode or the dehydrating mode; stopping the operation of the boiling wash mode and the dehydrating mode, if the cover is not locked; and locking the cover to perform the boiling wash mode or the dehydrating mode.

5,412,826

# SUCTION CLEANER FOR SUBMERGED SURFACES

Dennis A. Raubenheimer, 46 Kloff Road, Bedfordview, Johannesburg, Transvaal, South Africa

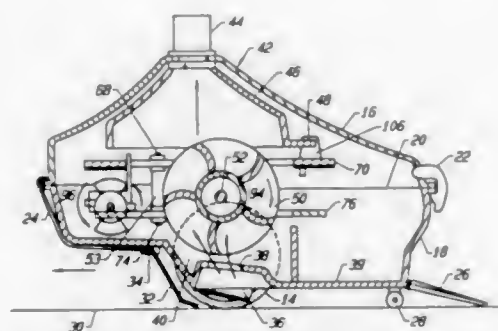
Filed Mar. 21, 1994, Ser. No. 215,370

Claims priority, application South Africa, Apr. 1, 1993, 93/2356; Jul. 9, 1993, 93/4953

Int. Cl.<sup>6</sup> E04H 3/20

U.S. Cl. 15—1.7

26 Claims



1. An underwater pool cleaner comprising:

a housing;  
means located within said housing for cleaning the surface of a swimming pool;  
wheel means;  
means for upwardly biasing said wheel means;  
means for rotatably mounting said wheel means to said housing, said mounting means further allowing said wheel means to be translated downwardly against the biasing means; and  
drive means affixed to said housing and coupled to said wheel means, said drive means intermittently imparting a force to said wheel means in a manner to cause said wheel means to rotate and be translated downwardly against said biasing means.

5,412,827

# TOOTHBRUSH

Ingo Müller, Klagenfurt; Norbert Schneider, Ebental, Austria, and Erich Krammer, Klagenfurt, all of, assignors to U.S. Philips Corporation, New York, N.Y.

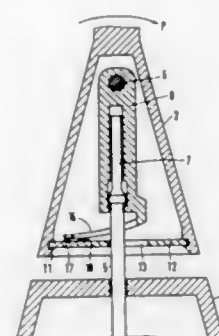
Filed Jul. 27, 1994, Ser. No. 280,915

Claims priority, application Belgium, Jul. 30, 1993, 09300795

Int. Cl.<sup>6</sup> A61C 17/34; A46B 13/02, 7/06

U.S. Cl. 15—22.1

7 Claims



1. A toothbrush having two housing sections (1, 2) which are pivotable relative to one another, of which a first housing section (1) serves as a handle and accommodates a drive unit (4) for driving a drive shaft (5), and of which a second housing section (2) carries a brush-head (3), which is drivable by the drive shaft, which second housing section (2) is pivotable relative to the drive shaft (5) about a pivot (6), characterized in that the toothbrush comprises a spring device having at least one spring (14) which acts between the second housing section (2) and the drive shaft (5), the second housing section (2) being pivotable relative to the first housing section (1) about the pivot (6) against a pressure exerted by the spring (14) during use of the toothbrush, which spring snaps when a given pressure threshold is exceeded and which pivot is disposed in the second housing section and also forms at least a part of a mechanical coupling between the drive shaft and the second housing section.

5,412,828

# FREE FORM HAIR CARE BRUSH

Albert J. Kuhlmeier, 6119 N. Artesian, Chicago, Ill. 60659, and George Spector, 233 Broadway Rm 702, New York, N.Y. 10279

Filed Aug. 20, 1993, Ser. No. 109,244

Int. Cl.<sup>6</sup> A46B 7/10

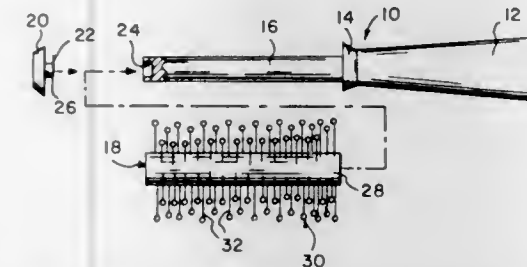
U.S. Cl. 15—27

1 Claim

1. A free form hair care brush which comprises:  
a) a handle;  
b) a collar formed on one side of said handle;  
c) a shaft extending from said collar;  
d) a bristle attachment rotatively positioned onto said shaft;  
e) a retainer cap;  
f) means for mounting said retainer cap onto a distal end of

said shaft opposite from said collar, to keep said bristle attachment on said shaft, so that a rotating action of said bristle attachment will glide through hair rather than pull the hair, thereby making hair styling easier and reduce hair damage; wherein said mounting means includes:

- g) said shaft having a socket formed in its distal end;
- h) a shank extending from an inner side of said retainer cap, which fits snugly onto said socket in said shaft, wherein said bristle attachment includes:
- i) a sleeve sized to rotatively fit onto said shaft;
- j) a plurality of bristles extending radially from said sleeve to engage with the hair; wherein



- k) said socket in said shaft having internal threads;
- l) said shank on said retainer cap having external threads so that said shank can be screwed into said socket;
- m) said retainer cap having an annular groove in its inner side and being of a size as the diameter of said sleeve;
- n) a ball bearing race to fit into said annular groove adjacent an end of said sleeve; and
- o) a finger grip formed on an outer side of said retainer cap, so that said retainer is tightened and loosened to change the rotation action of said bristle attachment, when said ball bearing race moves towards and away from the end of said sleeve.

5,412,829

# TILE GROUT SCRUBBER

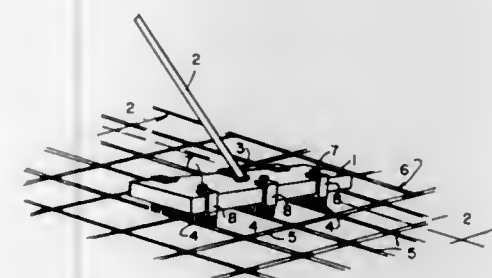
Esther L. Hefner, 5982 Set-N-Sun Pl., Jupiter, Fla. 33458

Filed Jun. 27, 1994, Ser. No. 265,924

Int. Cl.<sup>6</sup> A47L 11/282, 11/24; A46B 7/00, 9/10

U.S. Cl. 15—52.1

17 Claims



1. A grout scrubber for scrubbing a plurality of parallel grout lines between floor tiles simultaneously, the scrubber comprising:

- a plurality of individual scrubbing elements, each element having a rigid housing means and extending downwardly therefrom a long, narrow, resilient scrubbing member having a front face wider than the width of said grout lines and opposed sides substantially longer than said front face;
- a base means having a front face substantially wider than the distance between adjacent parallel grout lines;
- a handle attached to said base means and extending upwardly therefrom; and
- mounting means for adjustably mounting said housing means on said base means with said scrubbing members extending downwardly and said sides maintained parallel to one

another and spaced apart to correspond to said distance between adjacent grout lines.

5,412,830

# DUAL TEXTURED IMPLEMENT FOR PERSONAL CLEANSING AND METHOD OF CONSTRUCTION

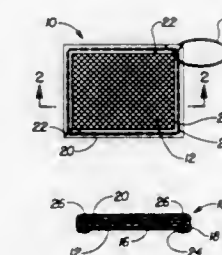
Richard M. Girardot; Eric J. Grosogeat, and Richard G. Bausch, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 31, 1994, Ser. No. 221,430

Int. Cl.<sup>6</sup> A47L 13/10

U.S. Cl. 15—118

20 Claims



1. A personal cleansing implement comprising:

- a) a hydrophobic batt, said batt being a stack of layers of hydrophobic, expanded, heat set, diamond mesh scrim, said batt having a top surface, a bottom surface and a perimeter;
- b) a softer layer of hydrophobic material connected to said batt, said softer layer having at least one aperture therein and an outer edge, said softer layer positioned on said top surface of said batt with said outer edge of said softer layer aligned with and adjacent to said perimeter of said batt, said softer layer connected to said batt at said outer edge by a connecting means to form a dual textured cleansing implement with high open area.

5,412,831

# TOOTHBRUSH WITH REPLACEABLE BRUSH HEAD

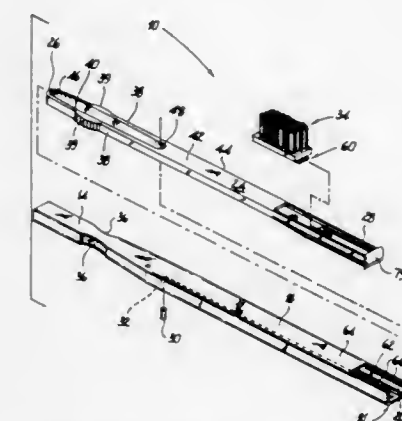
Michael Mongelluzzo, Bayside, N.Y., assignor to Mongelluzzo & Butta, Ltd., Manhasset, N.Y.

Filed Feb. 17, 1994, Ser. No. 197,739

Int. Cl.<sup>6</sup> A46B 9/01

U.S. Cl. 15—167.1

7 Claims



1. A toothbrush comprising:

- (a) a tubular casing including first and second ends and an axial bore having an internal surface and defining a longitudinal axis;
- (b) a support member having first and second ends and extending longitudinally into said tubular casing for movement along said longitudinal axis therein between a closed position and an open position;



- (c) means supported by said tubular casing for limiting the relative longitudinal movement of said support member within said tubular casing to movement between said closed and open positions; and
- (d) a brush head including a base having upper and lower surfaces, said upper surface having bristles extending therefrom, said lower surface having a connecting member extending therefrom, said brush head being removably supported by said second end of said support member, said brush head being adapted for connection and disconnection from said second end of said support member when said support member is in said open position.
- (e) said second end of said tubular casing comprises an opening at a top surface thereof defined by said internal surface and a pair of ribs extending within said opening from said internal surface, said ribs extending into said axial bore from said second end of the tubular casing along a direction parallel to said longitudinal axis, each of said ribs defining a shoulder partially supporting said brush head when said support member is in said closed position.

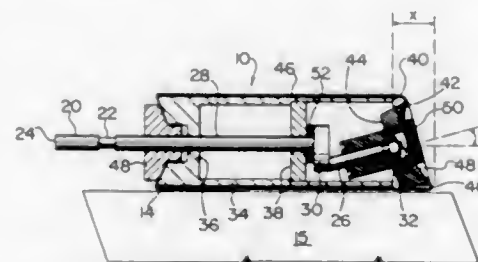
5,412,832

## EDGING PAINT ROLLER

Neil Irven, R.R. #4, Chrysler Ontario, Canada K0A 1R0  
Filed Apr. 6, 1994, Ser. No. 223,729  
Int. Cl.<sup>6</sup> B05C 17/02

U.S. Cl. 15—230.11

11 Claims



1. A paint roller comprising:  
an axle including a first straight portion, a second portion angled relative to the first straight portion, and an offset link connecting said first and second portions;  
a cylindrical roller body rotatably mounted on the first straight portion of the axle having an open end and extending over a major portion of the length of the axle, and having a substantially linear painting contact surface;  
a frusto-conical roller body having a narrower end and a wider end, rotatably mounted on the second portion of the axle, having a substantially linear painting contact surface, and having its narrower end partially contained within the open end of the cylindrical roller body; and  
a tubular covering constructed and adapted to carry paint, which is elastic in at least a direction substantially parallel to the first straight portion of the axle encasing both the cylindrical roller body and the frusto-conical roller body; wherein the linear painting contact surface of the frusto-conical roller body provides an extension to the linear painting contact surface of the cylindrical roller body.

5,412,833

## WINDSHIELD WIPER ARM ADJUSTMENT CONNECTOR

William L. Hayden, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 6, 1994, Ser. No. 318,933

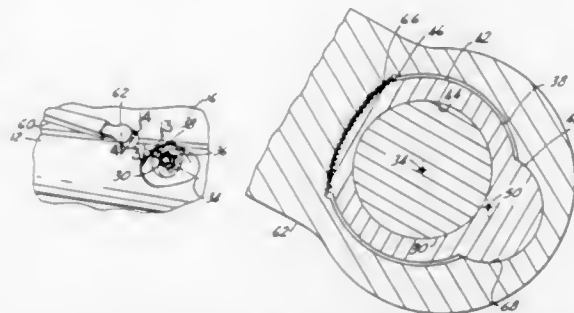
Int. Cl.<sup>6</sup> B60S 1/34

U.S. Cl. 15—250.34

12 Claims

1. A windshield wiper adjustment connector assembly for use on a vehicle comprising:  
a pivot shaft rotatably mounted to the vehicle and having a pivot axis of rotation;  
an adjustment connector, mounted on and fixed to the pivot

shaft at a predetermined orientation said adjustment connector including a main portion generally concentric with the pivot shaft, and a secondary portion protruding laterally from the main portion, said secondary portion being of arcuate form with a substantially constant radius about an adjustment axis which is spaced from and substantially parallel to the pivot axis, with the main portion also including a plurality of spaced teeth running substantially parallel to the pivot axis opposite the secondary portion; and



a wiper arm head, with the wiper arm head having a main recess for receiving the main portion of the adjustment connector and a secondary arcuate recess of substantially constant radius having substantially the same radius as the secondary portion for receiving the secondary portion, with the main recess also including a plurality of serrations aligned and spaced to mate with the teeth and having at least one more serration than teeth to allow various connection orientations between the head and the adjustment connector about said adjustment axis.

5,412,834

## WINDSHIELD WIPER BLADE WITH COMPOSITE SUPPORTING BRACKET FRAME

Hermann Burkard, Iffezheim; Wolfgang Leutsch, Buehlertal; Wilfried Merkel, Kappelrodeck, and Martin Schaeck, Buehl, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

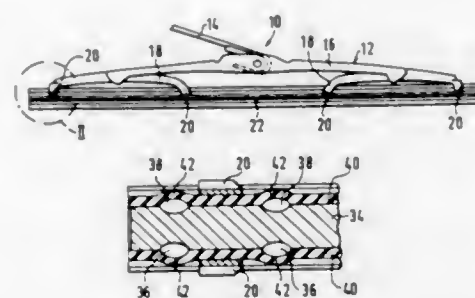
Filed May 24, 1994, Ser. No. 248,444

Claims priority, application Germany, Jun. 22, 1993, 43 20 637.9

Int. Cl.<sup>6</sup> B60S 1/38

U.S. Cl. 15—250.42

5 Claims



1. A windshield wiper blade, comprising a composite supporting bracket frame pivotally connected with a wiper arm and including a plurality of frame components, at least one of said components being provided with holding claws; and elongated wiper strip composed of an elastic material and guided in said holding claws, said wiper strip having a strip back which is engaged by said holding claws and has end portions extending outwardly beyond said claws, said strip back also having a longitudinal opening, said wiper strip having a longitudinal wiper lip adapted to abut against a windshield to be wiped and

an elastic reinforcing rail received in said longitudinal opening of said strip back and having a length substantially corresponding to a length of said wiper strip, said longitudinal opening of said strip back being formed as a throughgoing passage which is open only at each end of said strip back and has a cross-section corresponding to a cross-section of said reinforcing rail, said reinforcing rail having at least one longitudinal side provided with two expansions which are longitudinally spaced from one another and extending laterally outwardly from said side so as to form securing means for securing said wiper strip on said supporting bracket frame and holding said reinforcing rail in said strip back, said expansions being longitudinally spaced from one another by a distance which is greater than a width of one of said holding claws in a longitudinal direction of said wiper strip, so that in a finally mounted condition said holding claws of said wiper strip engage between said expansions.

5,412,835

## LOCKING HINGED DUST PAN

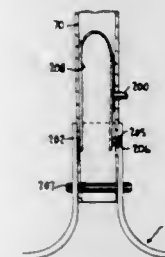
Peter S. Vosbikian, Moorestown, N.J.; Haig Vartanian, Cheltenham, and Brian A. Gorman, Albrightsville, both of Pa., assignors to Quickie Manufacturing Corporation, Cinnaminson, N.J.

Continuation-in-part of Ser. No. 21,201, Feb. 23, 1993, Pat. No. 5,367,737. This application Nov. 10, 1993, Ser. No. 150,607

Int. Cl.<sup>6</sup> A47L 13/52

U.S. Cl. 15—257.7

8 Claims



1. A dust pan assembly, comprising:  
a base member generally defining a pan with an open front, the base member having a bottom, an open front scoop portion and three walls extending upwardly around the bottom, one of said three walls being a rear wall remote from the open front scoop portion, the other two of said three walls terminating at said open front scoop portion;  
a pair of spaced opposed surfaces defining a handle receiving collar having a handle receiving region at said rear wall, and having at least two locking receptacles defining locking positions disposed on one of said spaced opposed surfaces;  
an elongated handle having a hollow bottom received by said collar within the handle receiving region of said collar;  
pivot means for pivotally coupling said handle to said base member, said pivot means defining a pivot axis;  
an essentially V-shaped spring disposed in said bottom of said handle having two legs compressed towards one another by walls of the handle, the legs defining an open end and a closed end, the spring bearing at least two projections being urged laterally outwardly from the handle by the spring along one of said legs, the projections being spaced longitudinally of the handle, wherein one of the projections, nearer the pivot axis, protrudes from a first opening in said handle to define a locking pin movable outwardly of the handle to engage a respective one of the locking receptacles, and another of the projections more remote from the pivot axis and at a point outside of said handle receiving region, defines a locking means actuator coupled to said locking pin, whereby depression of the locking means actuator causes retraction of the locking pin from a respective one of said locking receptacles enabling pivoting of said handle between the locking

positions and wherein said handle is selectively lockable in at least two locking positions, by rotation of said handle around the pivot axis to align said locking pin with a respective one of said locking receptacles.

5,412,836

## CLOTH CUTTER BED SLAT CLEANER WITH VACUUM REMOVAL FEATURE

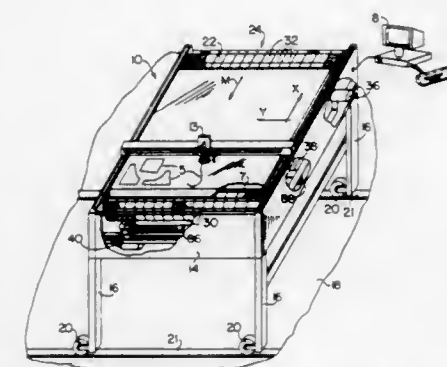
Richard Kuehta, Tolland, Conn., assignor to Gerber Garment Technology, Inc., Tolland, Conn.

Filed Oct. 6, 1993, Ser. No. 132,388

Int. Cl.<sup>6</sup> B08B 5/04

U.S. Cl. 15—308

12 Claims



1. In a cutting machine of the type having a bristle bed formed from an endless conveyor member trained over rotatable end units located at opposite ends of a frame and having a given width taken transversely to the advancement direction of the conveyor and a given length taken along the advancement direction of the conveyor, a bristle bed cleaning apparatus comprising:

a carriage supported on said frame adjacent the conveyor for movement in a direction extending generally parallel to the given width dimension of the conveyor between one location and another location;  
positioning means secured to the frame to define a cleaning station on the frame relative to the conveyor member and being drivably connected to the carriage for controllably driving the carriage between said one and said another locations;  
cleaning means mounted to said carriage for movement therewith between said one and the another locations for engaging with the bristle bed of the conveyor so as to clean a discrete area of the bristle bed as defined generally by a discrete portion of the length of the conveyor member and the distance travelled by the carriage between said one and the other locations; and  
means carried by the carriage and connected with the cleaning means for moving the cleaning means into and out of engagement with one portion of the length of the conveyor at a time.

5,412,837

## VACUUM CLEANER

Peter Wörwag, Romanshorn, Switzerland, assignor to Firma Fedag, Romanshorn, Switzerland

Filed Feb. 26, 1993, Ser. No. 23,847

Claims priority, application Germany, Feb. 28, 1992, 42 06 187.3

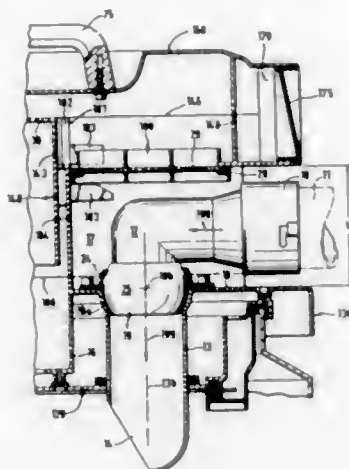
Int. Cl.<sup>6</sup> A47L 5/36

U.S. Cl. 15—353

17 Claims

1. A vacuum cleaner comprising:  
a receptacle;  
a cover, for closing said receptacle, having a radially open passage;  
a drive motor connected to said cover;

a suction fan, producing a suction air stream that is guided via said suction socket into said receptacle and removed from said receptacle, connected to said cover; an angular suction socket positioned within said passage, said angular suction socket having a first leg for receiving a suction hose, said first leg extending radially with respect to a longitudinal central axis of said vacuum cleaner, and a second leg extending substantially vertically into



said receptacle at a distance from said longitudinal central axis, said second leg connected to said passage at an end of said passage proximal to said longitudinal central axis so as to be vertically and horizontally tiltable; and wherein said motor has a vertical axis and said suction fan has a vertical axis coinciding with said vertical axis of said motor, with said vertical axis of said motor and said vertical axis of said suction fan spaced at a distance to said longitudinal central axis of said vacuum cleaner.

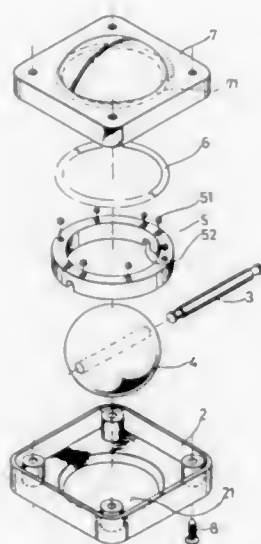
#### 5,412,838 CASTER FOR BAGGAGE

I-Min Yang, No. 358, Sec. 1, Chang Hsi Road, Tainan, Taiwan, Prov. of China

Filed Dec. 1, 1993, Ser. No. 159,530  
Int. Cl.<sup>6</sup> B60B 33/08

U.S. Cl. 16—26

1 Claim



1. A caster for coupling to a bottom surface of baggage, comprising:

- a. an upper fixing plate having a plurality of through bores formed therein for receiving a respective plurality of

fasteners therethrough to couple said upper fixing plate to the bottom surface of baggage, said upper fixing plate having an annular recess formed in a lower surface thereof;

- b. a lower fixing plate having a centrally disposed opening formed therethrough and a plurality of through bores formed therein and located in corresponding relationship to said through bores of said upper fixing plate, whereby the fasteners which secure said upper fixing plate to the bottom surface of baggage also respectively pass through said plurality of lower fixing plate through bores for coupling said lower fixing plate to said upper fixing plate;
- c. a bearing rotatively secured between said upper and lower fixing plates, said bearing including (1) an annular body member having opposing upper and lower surfaces, said lower surface of said annular body member having a pair of diametrically opposed notches formed therein, (2) a plurality of small balls disposed in a plurality of respective recess openings formed in said annular body upper surface, and (3) a ring-shaped member having an arcuate cross-sectional contour overlying said plurality of small balls and disposed within said annular recess of said upper fixing plate;
- d. a longitudinally extended shaft member, said shaft member having a pair of opposing ends respectively disposed in said pair of notches of said bearing body member; and
- e. a ball member having a predetermined diameter, said ball member having at least a portion thereof extending through said central opening of said lower fixing plate and having a rotative axis defined by a through bore formed longitudinally therein for passage of said shaft member therethrough, said shaft member providing a pivotal coupling of said ball member to said bearing, said bearing providing for transverse rotative displacement of said rotative axis.

#### 5,412,839

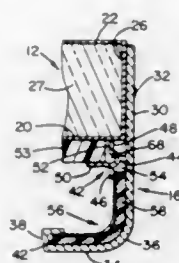
#### SOFT TOUCH APPLIANCE HANDLE ASSEMBLY

Perry C. McCollom, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Jan. 7, 1994, Ser. No. 178,798  
Int. Cl.<sup>6</sup> A47B 95/02

U.S. Cl. 16—111 R

15 Claims



10. An appliance including:

- a cabinet and a door mounted to provide access to the interior of said cabinet; said door including a front panel and a rear panel joined by elongated side panels;
- an elongated extruded handle including a base portion attached to and extending along one of said door side panels; said handle also including a grasping portion overlapping and spaced forward of said door front panel and joined to said base portion by a smoothly curved portion;
- said grasping portion including a distal edge return bent into a first elongated recess on the door side of said grasping portion;
- said handle also including a web on the door side of said base portion and forming with said base portion a second elongated recess;
- an elongated soft feel liner having lateral edge portions

received in said first and second recesses and extending across said curved and grasping portions of said handle.

#### 5,412,840

#### ADJUSTABLE, FURNITURE HINGE HAVING SUPPORT ARM WITH EXTENSIONS ENGAGING GROOVES IN MOUNTING PLATE

Horst Lautenschläger, Reinheim, and Gerhard W. Lautenschläger, Brensbach, both of Germany, assignors to MEPLA-Werke Lautenschläger GmbH & Co. KG, Germany

PCT No. PCT/EP93/00377, § 371 Date Sep. 28, 1993, § 102(e) Date Oct. 18, 1993, PCT Pub. No. WO93/21413, PCT Pub. Date Oct. 28, 1993

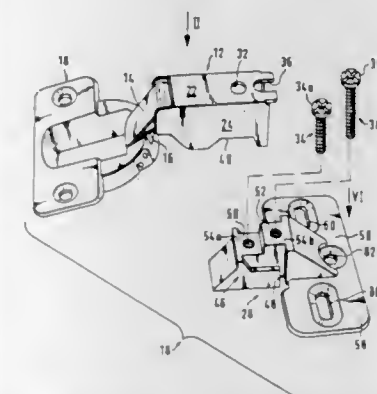
PCT Filed Dec. 21, 1993, Ser. No. 122,529

Claims priority, application Germany, Apr. 8, 1992, 42 11 722.4

Int. Cl.<sup>6</sup> E05D 7/04

U.S. Cl. 16—238

11 Claims



1. Furniture hinge having a door fastening member, which door fastening member is constructed as an insertion cup which is mountable in a recess in the inner surface of a door to be secured to a furniture carcass, the door fastening member being coupled via a joint mechanism to a carcass fastening member which is constructed as a support arm movably securable to a mounting member secured to the furniture carcass, wherein at least a portion of the support arm laterally fittingly engages over the mounting member by way of a web surface of the support arm having a U-shaped cross-section, said web surface comprising a pair of opposing spaced-apart cheeks, the cheeks having narrow, strip-shaped corner extensions which are bent over substantially at right-angles towards one another from limiting edges of the cheeks, which limiting edges face away from the insertion cup, the cheeks extending at right-angles to a carcass fastening surface of the mounting member, whereby the cheeks laterally engage over the mounting member, which corner extensions are each slidable into a conforming groove provided in the mounting member and which grooves are open at an upper end thereof directed away from the carcass, an adjusting screw residing within an associated threaded bore in the mounting member is provided for adjusting the spacing of the support arm from the carcass fastening surface, the web surface of the support arm bearing on a free end of the adjusting screw, a fastening screw passed through an opening in the web surface of the support arm into the mounting member is provided for fixing the support arm, a head of which fastening screw is tightenable against an outer surface of the support arm web surface directed away from the mounting member, wherein the opening through which the fastening screw (38;138) passes is constructed as an elongate hole (36;136) which is open at the end of the web surface which is directed away from the insertion cup and points into an interior of the carcass, and that the length of the grooves (48;148) in the mounting member (20;120), which grooves receive the corner extensions (30;130), and the length of a shaft of the fastening screw (38;138) are so matched to one another that the fastening screw (38;138) may be screwed so far out of

an associated threaded bore (52;152) in the mounting member (20;120), without complete removal of the shaft from the bore, that an adequate clearance for removal of the support arm (12;112) from the mounting member (20;120) is produced between an upper side of the support arm web surface (22;122) and an associated underside of the head (38a;138a) of the fastening screw (38;138).

#### 5,412,841

#### FURNITURE HINGE

Horst Lautenschläger, Reinhard Lautenschläger, both of Reinheim, and Gerhard Lautenschläger, Brensbach, all of Germany, assignors to MEPLA-Werke Lautenschläger GmbH & Co. KG, Germany

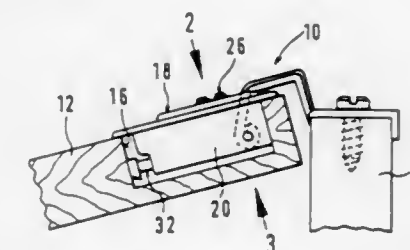
Filed Sep. 22, 1993, Ser. No. 125,479

Claims priority, application Germany, Oct. 17, 1992, 42 35 099.9

Int. Cl.<sup>6</sup> E05D 7/04

U.S. Cl. 16—249

15 Claims



1. A furniture hinge for hanging a door on a cabinet carcass, comprising a carcass-related hinge member and a door-related member coupled therewith across adjacent edges of the carcass and door by a linkage mechanism, the door-related member configured as a hinge cup which can be sunk within a mortise in an inner side of the door, the hinge cup being composed of a cup part lying within the mortise and a fastening flange adjoining an outer margin of the cup part, which fastening flange can be placed on an area of the inner side of the door adjoining the mortise, and in which at least one through-opening in the form of a slot running at right angles to the adjacent edge of the door is provided for a mounting screw which can be driven into the door, the cup part lying within the mortise being made undersize with respect to the mortise such that, when the mounting screw is untightened, the cup part can be displaced in the mortise by a given amount at right angles to the adjacent edge of the door, wherein on the cup part at least one spring is provided thrusting against a wall of the mortise, which at least one spring forces the cup part into a defined initial position within the mortise when the mounting screw is untightened.

#### 5,412,842

#### DETENT HINGE

Allen Riblett, Ardentown, Del., assignor to Southco, Inc., Concordville, Pa.

Continuation of Ser. No. 820,149, Jan. 13, 1992, abandoned. This application Oct. 26, 1993, Ser. No. 143,539

Int. Cl.<sup>6</sup> E05D 11/10

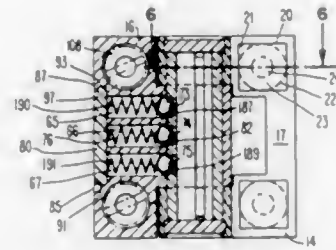
U.S. Cl. 16—334

18 Claims

1. A detent hinge for supporting a vertically or horizontally positioned door to a frame, the detent hinge releasably retaining the door in a predetermined position relative to the frame as the door is rotated to open or to close, the detent hinge comprising a hinge assembly including a first hinge means secured to the frame and a second hinge means secured to the door, each of the first and second hinge means having at least one bore therethrough, a pin assembly disposed within the bores of the first and second hinge means for connecting the hinge assembly for rotatable movement and including at least one aperture formed in an outer surface thereof, at least one



bearing member disposed within the hinge assembly adapted for contacting the outer surface of the pin assembly and at least one biasing means adapted for biasing the bearing member in the direction of the pin assembly for contacting the outer surface for providing a predetermined amount of force thereon, wherein a corresponding amount of torque is required for rotation of the door, whereby upon rotation of the door in a first direction by an operator, the at least one bearing member will be moved against the outer surface of the pin assembly to engage the at least one aperture formed in the outer surface for



retaining the door in a first position, and upon rotation of the door in a second direction by an operator, the at least one bearing member will disengage that at least one aperture for releasing the door, the detent hinge further including a predetermined number of bearing members and biasing means disposed within the hinge assembly, with each bearing member being in contact with the outer surface of the pin assembly, wherein the hinge assembly includes means for varying the predetermined number of bearing members and biasing means disposed within the hinge assembly for adjusting the amount of torque required for rotation of the door.

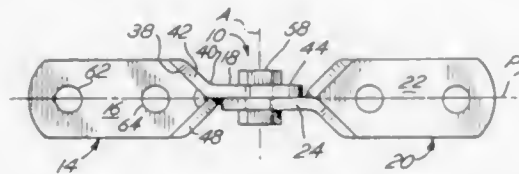
5,412,843

## HINGE CONNECTOR

Viktor Krongauz, Oak Forest; Gregg E. Dohm, Richton Park, and Gulzar A. Qureshi, Tinley Park, all of Ill., assignors to Allied Tube & Conduit Corporation, Harvey, Ill.  
Filed Jul. 8, 1993, Ser. No. 88,752  
Int. Cl.<sup>6</sup> E05D 15/40, 5/02

U.S. Cl. 16—387

17 Claims



1. A structure for supporting pipe or conduit in regions subject to seismic disturbance, comprising a plurality of structural members and a plurality of hinged connectors for joining respective ones of said structural members to one another, each connector comprising:

- first and second metal connectors members each comprising a base portion for attachment to a structural member, and a tab integral with said base portion;
- each said tab comprising an oblique portion adjoining its associated base portion and a longitudinal portion which extends longitudinally beyond its associated base portion, each said longitudinal portion having an opening therein; and
- a pivotal fastener extending through said openings and joining said tabs;
- each of said base portions including an integral bent gusset welded to its associated tab for adding support to its associated tab;
- each of said connector members being capable of being manufactured from a single integral strip of metal.

5,412,844

## SAWLESS LINT CLEANER

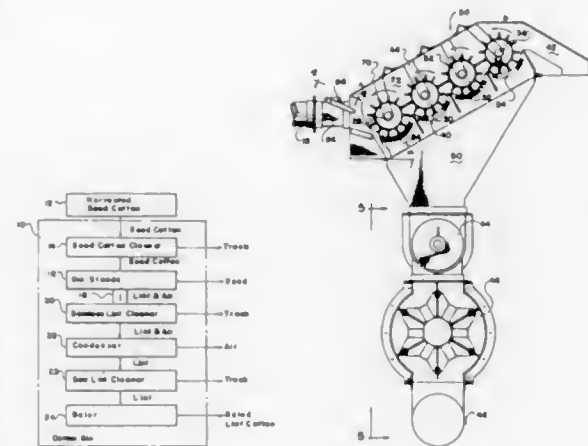
James L. Horn, P.O. Box 53785, Lubbock, Tex. 79453, and A. Shane Johnson, Lubbock, Tex., assignors to James L. Horn, Lubbock, Tex.

Filed May 11, 1993, Ser. No. 60,360

Int. Cl.<sup>6</sup> D01B 1/04

U.S. Cl. 19—40

18 Claims



9. A sawless lint cleaner in a cotton gin having
- a suction means for bringing harvested seed cotton into said gin;
  - a seed cotton cleaner connected to the suction means;
  - gin stands connected to the seed cotton cleaner;
  - a lint duct connected to said gin stands;
  - said lint duct forming a means for conducting lint in an airstream from the gin stand;
  - said sawless lint cleaner comprising in combination with the above:
    - f) an inlet connected to said lint duct;
    - g) a plurality of spiked drums each mounted for rotation about its axis;
    - h) a grating having a cylindrical segment under each of said spiked drums co-axial therewith; and (h') said sawless lint cleaner housed in an airtight housing with a single outlet for lint and air.

5,412,845

## PROCESS AND DEVICE FOR THE JIGGING OF A FLAT CAN

Michael Ueding, Ingolstadt; Michael Strobel, Elchstätt; Albert Kriegler, Rottenegg, and Jürgen Sauer, Ingolstadt, all of Germany, assignors to Rieter Ingolstadt Spinnereimaschinenbau AG, Ingolstadt, Germany

Filed Sep. 29, 1993, Ser. No. 128,609

Int. Cl.<sup>6</sup> D01G 27/00

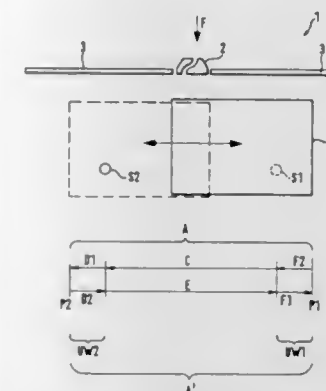
U.S. Cl. 19—159 R

22 Claims

1. A device for imparting a back-and-forth jigging motion to a flat can which is to be filled with a textile fiber sliver from a rotary plate which is stationary relative to said flat can, said device comprising:

- a jigging device, said jigging device further comprising a mechanism for holding a flat can relative said jigging device;
- a driving device operably configured with said jigging device so as to convey said jigging device and flat can in a back-and-forth jigging motion between two reversal points, said driving device further comprising a mechanism configured to impart a modified speed to said jigging device within a predetermined reversal area adjacent each said reversal point; and
- said driving device further comprising a servomotor opera-

bly engaging with a running gear configured with said jigging device, said servomotor having a reversible direc-



tion of rotation for driving said jigging device in said back-and-forth jigging motion.

5,412,846

## DRAW FRAME FLEECE HOPPER INCLUDING A WEAR RESISTANT INSERT

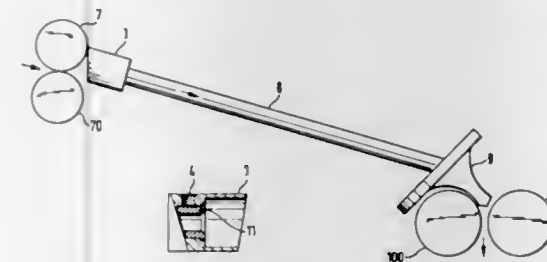
Friedrich Hauner, Ingolstadt, Germany, assignor to Rieter Ingolstadt Spinnereimaschinenbau AG, Ingolstadt, Germany  
Filed Sep. 29, 1993, Ser. No. 128,608

Claims priority, application Germany, Oct. 22, 1992, 42 35 653.9

Int. Cl.<sup>6</sup> D01H 5/72

U.S. Cl. 19—288

9 Claims



1. A fleece hopper for a textile draw frame, said fleece hopper configured to be disposed on a draw frame between a pair of draw-off rollers and a fiber sliver pipe wherein fiber fleece is gathered together in said hopper and directed through said hopper to the fiber sliver pipe, said hopper comprising an outlet through which the gathered fleece is directed, said outlet defining a bore therethrough, said hopper further comprising a pipe-shaped insert element removably fitted into said bore, said insert defining a wear resistant path for the gathered fleece through said hopper outlet, said hopper further comprising a securing mechanism for removably fixing said insert within said bore, said securing mechanism comprising a hole defined through a top surface of said hopper into and substantially perpendicular to said bore with an actuatable engaging member extending through said engaging hole to contact said insert, said insert being removable from said hopper without changing or adjusting said hopper relative to the draw frame.

5,412,847

## LOOSE-BOSS TOP ROLLER

Yasunori Yaguchi, Aichi, Japan, assignor to Nihonbosekiyohin Laboratory Co., Ltd., Aichi, Japan

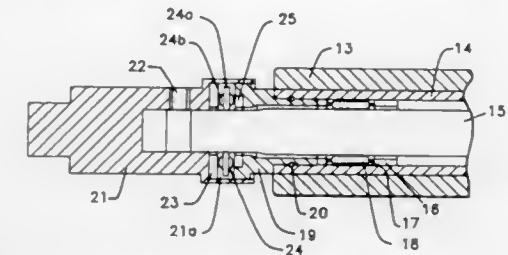
Filed Nov. 4, 1993, Ser. No. 147,500

Claims priority, application Japan, Jun. 30, 1993, 5-186724

Int. Cl.<sup>6</sup> D01H 5/74

U.S. Cl. 19—295

4 Claims



1. A loose-boss top roller comprising:  
a loose-boss having opposite ends;  
a hard rubber material fixed on said loose boss;  
an arbor inserted in the loose-boss;  
needle bearings inserted between the loose-boss and the arbor within opposite ends of the loose-boss;  
a pair of joints each having one end thereof inserted and fixed into a respective end of the loose-boss out of contact with the needle bearings, respectively;  
an end bush fixed on each end of the arbor, each end bush having a hollow recess;  
first thrust washers placed in the hollow recesses of the end bushes;  
second end washers attached to the opposite ends of the joints; and  
thrust ball bearings inserted between the first thrust washers and the second end washers.

5,412,848

## CLIP MECHANISM HAVING OUTWARDLY BIASED LEG MEMBERS

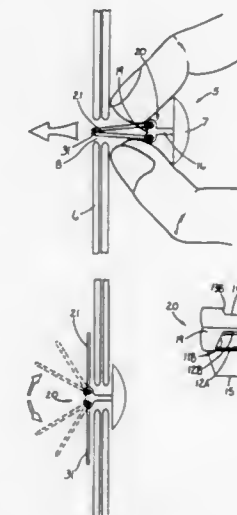
Ronald E. Precourt, Jr., Woonsocket, R.I., assignor to Leach & Garner Company, North Attleboro, Mass.

Filed Jan. 27, 1993, Ser. No. 9,849

Int. Cl.<sup>6</sup> A44B 1/38; F16B 13/04

U.S. Cl. 24—99

11 Claims



1. A clip mechanism comprising:  
a yoke member having a head portion at a head end, a base end and a trunk portion contiguous with said head portion and said base end;

at least two spring members fabricated using material which is resilient but form retaining, each comprising, a crotch portion at a crotch end contiguous with at least a leg portion, said leg portion contiguous with a foot portion having a foot end, and said foot end adapted to be interengageable with said head portion and interengaged therewith;

each said crotch portion, said leg portion and said foot portion having a predetermined cross section;

interengaging means comprising said head portion having at least a set of foot holes for each said spring member, each said set of foot holes adapted to receive therein said foot end of a said spring member and oriented to create an axis for said rotation for said spring member; and

means permitting rotation, upon pinching of each said spring member, comprising said head portion of said yoke member having therein at least two spring member apertures, each said aperture having a periphery defined by a short side a long side and a first and second opposed sides, said short and said long side being parallel each to the other and parallel to said axis of rotation of said spring members said short and said long side being oriented on said head portion and spaced apart by an amount permitting said rotation of each said spring member said short side proximate said head end and said long side proximate said trunk portion of said yoke member, said first and second opposed and non-parallel sides providing bearing surfaces against which ankle portions of said foot portion of said spring member rests thereby creating restoration forces within each of said spring members when each said spring member is rotated from a position wherein said ankle portions rest against said long side, to a position wherein said ankle portions rest against said short side and said spring member is stressed.

5,412,849

## SEPARABLE BOTTOM END STOP ASSEMBLY

Tsutomu Fudaki, Toyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

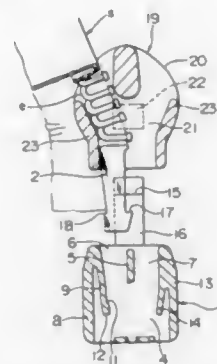
Filed Jul. 21, 1993, Ser. No. 89,518

Claims priority, application Japan, Jul. 31, 1992, 4-205210

Int. Cl.<sup>6</sup> A44B 19/38

U.S. Cl. 24—388

5 Claims



1. A separable assembly for a concealed slide fastener, comprising:

a socket member having a catch plate separating said socket member into two plug member insertion holes, an engaging tongue located within said socket member adjacent a first insertion hole, and an engaging projection extending from said socket member, a slider body having an engaging recess, said engaging projection adapted to engage said recess; and

a first plug member having a locking portion and an engaging portion, said locking portion adapted to engage said catch plate when said first plug member is in a first position in said socket member to prevent removal of said first plug member from said socket member, and said engaging portion adapted to engage said engaging tongue when said first plug member is in a second position in said socket

member when said socket member is moved with the slider body a predetermined distance equal to a distance between said first and second positions when a slider is pulled to slide on the concealed slide fastener in a fastener closing direction.

5,412,850

## JEWELRY CLASP

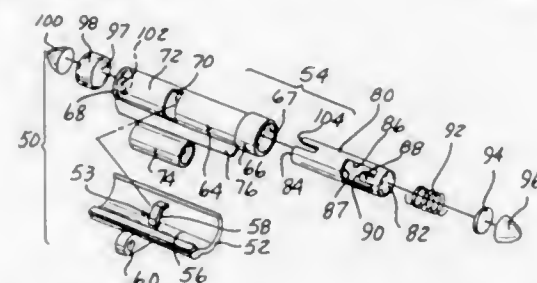
Richard A. Miranda, P.O. Box 71, Lake Worth, Fla. 33460

Filed Jan. 24, 1994, Ser. No. 186,009

Int. Cl.<sup>6</sup> A44B 11/00

U.S. Cl. 24—616

21 Claims



1. A clasp for releasibly interconnecting two movable members, the clasp comprising:

first and second releasibly interconnectible clasp members; projection means mounted on a stem attached to and extending outward from the first clasp member;

the second clasp member including a hollow outer tubular member having a side wall and first and second opposed ends;

an aperture formed in the side wall of the outer tubular member between the first and second ends thereof for slidably receiving the projection means on the first clasp member therethrough;

an inner tubular member slidingly mounted in the outer tubular member and having first and second opposed ends;

a slot formed in the inner tubular member, the slot having a first end portion for receiving the projection means therein and a second end portion for receiving the stem on the first clasp member;

means for forming a closed first end on the outer tubular member;

biasing means, mounted in the outer tubular member and seated between the closed first end of the outer tubular member and the first end of the inner tubular member, for biasing the inner tubular member toward the second end of the outer tubular member such that the second end of the inner tubular member normally extends outward from the second end of the outer tubular member and the lock member receiving means on the inner tubular member extends across the aperture in the side wall of the outer tubular member;

an end cap fixedly secured to the second end of the inner tubular member and disposed exteriorly of the second end of the outer tubular member; and

guide means, mounted on the inner and outer tubular members, for guiding the sliding movement of the inner tubular member within the outer tubular member the guide means including:

guide projection means, mounted on and extending radially across the outer tubular member for engaging the inner tubular member; and

a pair of guide projection receiving means, formed in the inner tubular member, for receiving the guide projection means;

the guide projection means and the guide projection receiving means extending over the full axial length of movement of the inner tubular member within the outer tubular member to prevent rotation of the inner tubular member relative to the outer tubular member; and wherein the guide means coacts with the biasing means to guide the inner tubular member between a first, normal position in

which the second end of the inner tubular member extends outward from the second end of the outer tubular member and the second end portion of the slot in the inner tubular member is aligned with the aperture in the side wall of the outer tubular member to engage the stem on the first clasp member to interconnect the first and second clasp members, and a second position, upon movement of the end cap toward the second end of the outer tubular member, in which the first end portion of the slot in the inner tubular member is aligned with the aperture in the side wall of the outer tubular member to enable the free movement of the projection means on the first clasp member through the aperture in the side wall of the outer tubular member.

5,412,851

## ATTACHMENT FOR A SAFETY PIN

John M. Joseph, Sacramento, Calif., assignor to John M. Pritchard, Fair Oaks, Calif.

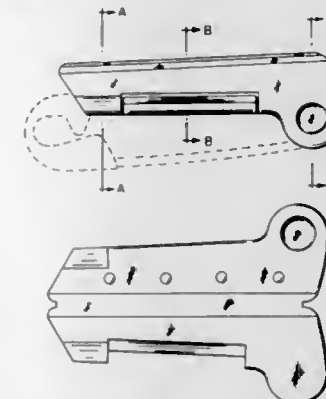
Continuation-in-part of Ser. No. 49,415, Apr. 20, 1993. This

application Jun. 8, 1993, Ser. No. 126,665

Int. Cl.<sup>6</sup> A44B 9/00

U.S. Cl. 24—709

6 Claims



1. A one piece attachment for a lockable safety pin formed of resilient plastic material, said safety pin having first and second wire limbs, a coiled portion connecting adjacent ends of said first and second wire limbs, a cap at the end of the first wire limb, the attachment comprising:

a longitudinally extending main body, said main body having a male half and a female half attached to each other by a centrally located living hinge, the male half and female half having equal longitudinal dimensions, both said male half and said female half having opposing first and second ends, said opposing first ends are foldable about said hinge for securing said coiled portion of said safety pin, and said opposing second ends for securing said cap;

said male half and said female half being capable of releasable locking engagement about said safety pin, said first end of said male half having a transversally extending projection, and said first end of said female half having an aperture capable of locking engagement with said projection for securing said body to said safety pin.

5,412,852

## FASTENING CONVERSION SYSTEM FOR A SHOE

Arthur J. Smaragdus, 111 Lakeside Dr., Rockville Center, N.Y. 11570

Filed Sep. 3, 1993, Ser. No. 115,583

Int. Cl.<sup>6</sup> A43B 11/00

U.S. Cl. 24—713.6

15 Claims

1. A fastening conversion system for a shoe having a throat with a set of spaced apart eyelets on each side of the throat which comprises:

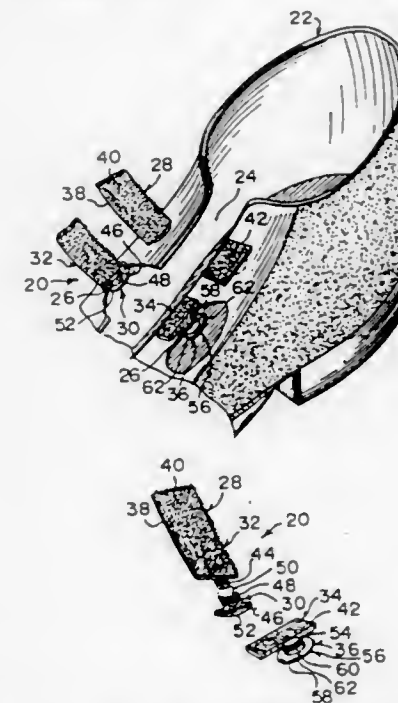
a) a closure member having a plurality of straps;

b) means for securing said closure member to the first set of the spaced apart eyelets;

c) a first portion of a releasing retainer affixed to said closure member;

d) a second portion of said releasing retainer;

e) means for securing said second portion of said releasing retainer to a second set of the spaced apart eyelets, so that when said closure member is placed in a closed position over the throat of the shoe, said first portion of said releasing retainer will engage with said second portion of said releasing retainer, to help keep the shoe on a foot of a person wearing the shoe



f) said first portion of said releasing retainer is a plurality of hooked VELCRO strips, each affixed to underside of each said strap;

g) said second portion of said releasing retainer is a plurality of looped VELCRO pads in which each will engage with one said hooked VELCRO strip;

h) wherein said closure member securing means includes a plurality of externally threaded shanks, each affixed to an end of each said strap; and

i) a plurality of caps, each having a barrel with an internally threaded bore and a flange at the closed end of said barrel, each of said barrel can be inserted into each eyelet of the first set in the shoe, with said flange underneath the eyelet, so that each said shank can be screwed into each said barrel, to be removably attached thereto.

5,412,853

## APPARATUS FOR FINISHING A FABRIC WEB

Frank Catallo, 75 Channel Dr., Port Washington, N.Y. 11050

Continuation of Ser. No. 873,806, Apr. 27, 1992, abandoned.

This application Sep. 21, 1993, Ser. No. 125,130

Int. Cl.<sup>6</sup> D06C 21/00

U.S. Cl. 26—18.6

4 Claims

1. Apparatus having an entry end and an exit end and said apparatus for finishing a fabric web and comprising in combination:

a) a fabric presenting means for said apparatus;

b) means for said apparatus to maintain the fabric web in a flat and smooth state;

c) a fabric treating arrangement for said apparatus;

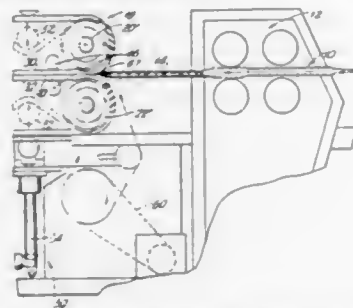
d) said fabric presenting means adapted to deliver said fabric web into said fabric treating arrangement;

e) plural roll means for said fabric treating arrangement;

f) two of said plural roll means disposed in side by side relationship and on a first same side of said fabric treating arrangement;



- g) two other of said plural roll means disposed in side by side relationship and on a second same side of said fabric treating arrangement;
- h) two of said plural roll means being disposed at the entry end of said fabric treating arrangement and in vertical alignment to form a first pair of rolls;
- i) two of said plural roll means disposed at the exit end of said fabric treating arrangement and in vertical alignment to form a second pair of rolls;
- j) plural belts for said fabric treating arrangement and each belt being a pre-determined width;
- k) one of said belts disposed to run around one of said first pair of rolls and one of said second pair of rolls and said rolls being on said first same side;



- l) the other of said belts disposed to run around another of said first pair of rolls and another of said second pair of rolls and both of said rolls being on said second same side;
- m) said first pair of rolls being in vertical alignment and adjustable to cause said belts to abut one another to form a nip therebetween and said nip being located at the vertical center line passing through each of said first pair of rolls;
- n) said belts also being disposed relative to each other to provide a space therebetween for finishing said fabric web;
- o) said belts also being disposed to move around said first pair of rolls in a curved path;
- p) said fabric web being sandwiched in said space between said belts;
- q) said fabric web to move in said fabric treating arrangement and said belts and said sandwiched fabric web to move through said nip whereby said fabric web is shrunk both as it moves through said nip and from said curved path and fabric finishing occurs in said space;
- r) plural guide members having a roll-like shape extending across the width of said belts and said guide members adapted to press said belts against each other and substantially across the width of said belts by having one of said guide members in abutment with one of said belts and said guide members being formed to press against the belt that said guide member abuts to maintain said belt in abutment with the other of said belts and said other guide member also being formed to press against the other of said belts to maintain said other belt in abutment with said fabric web and said guide members being disposed in substantially vertical alignment with each other.
- s) means for said fabric treating apparatus connected to said plural guide members to cause one of said guide members to press against one of said belts and said means also to cause another of said guide members to press against another of said belts, and
- t) said belts being constructed of a fully stretchable material throughout.

5,412,854

#### METHOD OF MAKING A HIGH FREQUENCY FOCUSED TRANSDUCER

Geoff R. Lockwood; Daniel H. Turnbull, both of North York, and F. Stuart Foster, Toronto, all of Canada, assignors to Humphrey Instruments, Inc., San Leandro, Calif. and Sunnybrook Health Science Centre, North York

Filed Jun. 18, 1993, Ser. No. 77,865

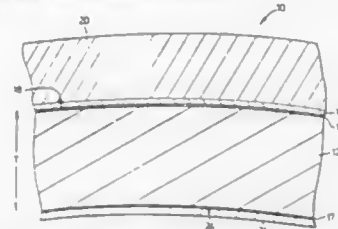
Int. Cl.<sup>6</sup> H01L 41/22

U.S. Cl. 29—25.35

14 Claims

1. A method of fabricating a wafer assembly for a high

frequency focused transducer comprising the following steps: fabricating a piezoelectric or ferroelectric wafer of a thickness of less than about one hundred microns, said thickness chosen to provide resonance at a desired high frequency of greater than 20 MHz;



adhesively bonding a conductive malleable sheet over a back face of said wafer whereby said adhesive stabilises said wafer, said malleable sheet being chosen to have sufficient strength to hold said wafer in a curved state; pressing said wafer with said malleable sheet into a mold in order to form a curve in said wafer and said malleable sheet.

5,412,855

#### CABLE-FEEDING AND CABLE-CHANGING APPARATUS FOR A CABLE PROCESSING MACHINE

Max Koch, Meggen, Switzerland, assignor to Komax Holding AG, Meggen, Switzerland

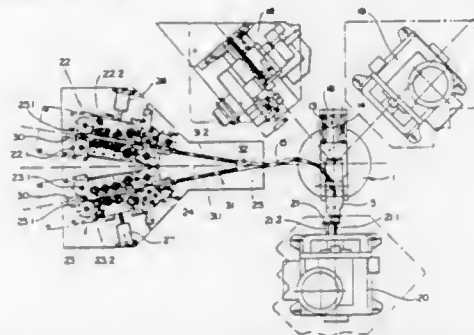
Filed Nov. 16, 1993, Ser. No. 152,208

Claims priority, application Switzerland, Nov. 17, 1992, 03525/92

Int. Cl.<sup>6</sup> H01R 43/00

U.S. Cl. 29—33 M

12 Claims



1. A cable-feeding and cable-changing apparatus for a cable-processing machine for processing a plurality of cables, said apparatus comprising in combination:
- at least one stationary pivotable gripper for firmly holding a first cable during said processing;
  - at least one processing station arranged within the pivotal range of said gripper;
  - at least one cable feeder for transporting and feeding said cable to said gripper;
  - at least one further cable feeder, wherein said cable feeders are arranged to extend at an acute angle to each other in their cable transport direction and symmetrically to a main transport axis; and
  - a cable-stepping device for at least one of said cable feeders.

5,412,856

#### WIRE MARKING, CUTTING AND STRIPPING APPARATUS AND METHOD

Greg Nazerian, Pasadena; Ronald Bailey, Alta Loma, and Jack L. Hoffa, Brea, all of Calif., assignors to Eubanks Engineering Company, Monrovia, Calif.

Continuation of Ser. No. 22,954, Feb. 25, 1993, which is a continuation-in-part of Ser. No. 765,986, Sep. 26, 1991, Pat. No. 5,253,555. This application Apr. 11, 1994, Ser. No. 225,813

The portion of the term of this patent subsequent to Sep. 6, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> H02G 1/12

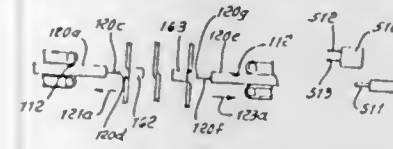
U.S. Cl. 29—33 M

35 Claims

1. In a system for marking elongated wire and for cutting the

wire and stripping insulation therefrom, the combination comprising

- a) first means operable to mark the wire,



- b) second means operable to cut the marked wire and to strip insulation from the wire,
- c) the wire extending between and movable between said first and second means, said first and second means comprising separate stand-alone devices,
- d) and control means operatively connected with said first and second means for controlling operation of said first and second means in time sequence relation to wire movement therebetween, and characterized in that changes in timing of markings by operation of said first means can occur while said second means operates to complete cutting and severing of wire associated with prior markings, thereby to reduce or eliminate wire waste.

5,412,857

#### METHOD OF MAKING A HINGE FOR A NECKLACE

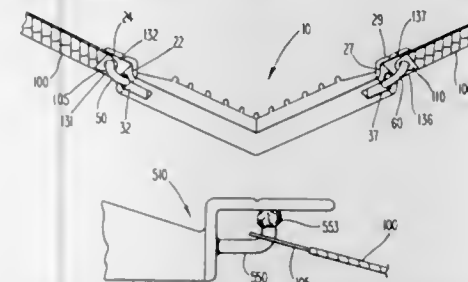
Ofer Azrielant, New York; Alex Gal, Holliswood, and Kenneth Lautman, Long Beach, all of N.Y., assignors to Andin International, Inc., New York, N.Y.

Division of Ser. No. 414,362, Sep. 29, 1989, Pat. No. 5,148,689. This application Sep. 3, 1992, Ser. No. 940,236

Int. Cl.<sup>6</sup> B21F 43/00

U.S. Cl. 29—160.6

6 Claims



1. A method of making a necklace from a chain having an attaching member defining an aperture attached thereto at each end, and a jewelry element having a substantially flat rear surface, and two pins, each attached at one end to two different points on said rear surface, comprising the steps of:

- (a) inserting each of said pins through one of said apertures of said attaching members; and
- (b) bending each of said pins so that an opposite end of each of said pins is in close proximity to said rear surface of said jewelry element;

wherein said jewelry element includes two L-shaped members, each comprising a base and an upright side, each of said upright sides having an interior surface, the bases of which are joined to opposite points of said jewelry element so that the interior surfaces of the upright sides of said L-shaped members are oriented substantially parallel to the plane of said rear surface, each of said pins being attached to one of said upright sides, and in said step of bending said pins are bent so that each pin is in close proximity to the base of the corresponding L-shaped member.

4. A method of making a necklace from a chain having an attaching member defining an aperture attached thereto at each end, and a jewelry element having a rear surface and two pins each attached at one end to and extending from said rear surface to terminate in a free end, comprising the steps of:

- (a) inserting each of said pins through an aperture of one of said attaching members;

- (b) heating said free end of each of said pins so as to create a ball at each of said free ends; and
- (c) allowing each of said balls to cool.

5,412,858

#### METHOD OF ENCASING BUNDLES OF TUBES

Colin Brown, Kookaburra Lodge, 1 Tylers Close, Edith Weston, Oakham, Rutland, Leicestershire, United Kingdom

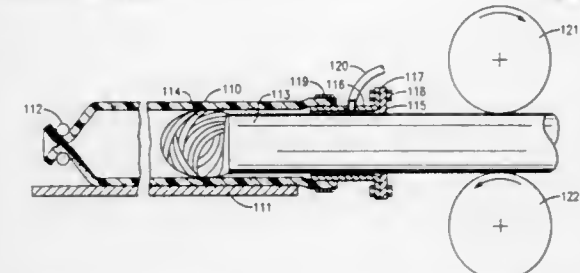
Continuation-in-part of Ser. No. 298,672, Jan. 19, 1989, abandoned, and a continuation-in-part of Ser. No. 578,274, Sep. 6, 1990, abandoned. This application Feb. 8, 1993, Ser. No. 17,499

Claims priority, application United Kingdom, Jan. 19, 1988, 8801109

Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 29—450

7 Claims



1. A method of making a python in which a bundle of tubes is disposed substantially coaxially within a close-fitting elongated sheath having a resiliently expandable inside diameter which comprises

- a) displacing an elongated length of said sheath laterally with respect to its longitudinal axis into an elongated chamber through an elongated opening therein with opposite end portions of the sheath projecting from opposite ends of said elongated chamber,
- b) mechanically expanding the inside diameter of said opposite end portions of the sheath projecting from the opposite ends of the elongated chamber,
- c) pneumatically sealing each of the opposite ends of the elongated chamber around the respective projecting opposite end portions of the sheath,
- d) pneumatically sealing said elongated opening in said chamber through which the sheath entered,
- e) pneumatically evacuating the chamber to expand the inside diameter of all of the sheath not already mechanically expanded at its end portions,
- f) inserting said bundle of tubes longitudinally into the expanded sheath by access through the sheath end portions projecting from the ends of the chamber,
- g) relieving the vacuum within the chamber so that the inside diameter of the sheath therewithin contracts resiliently around said bundle of tubes,
- h) unsealing the opposite end portions of the sheath with respect to the opposite ends of the chamber,
- i) unsealing the opening in said chamber,
- j) mechanically releasing the expanded inside diameter of the opposite end portions of the sheath so that they also contract resiliently around said bundle of tubes, and
- k) displacing the elongated length of sheath with the tube bundle therewithin laterally with respect to its longitudinal axis out of said chamber through said opening.

5,412,859

#### METHOD FOR JOINING A BOOKLET HAVING AN ELASTIC BAND AROUND A NECK OF A CONTAINER

Gerald G. Hubbs, Louisville, Ky.; George R. Burton, Lynchburg, Tenn., and Norman Bittner, Charlestown, Ind., assignors to Brown-Forman Corporation, Louisville, Ky.

Division of Ser. No. 929,442, Aug. 14, 1992, Pat. No. 5,241,743.

This application May 21, 1993, Ser. No. 65,267

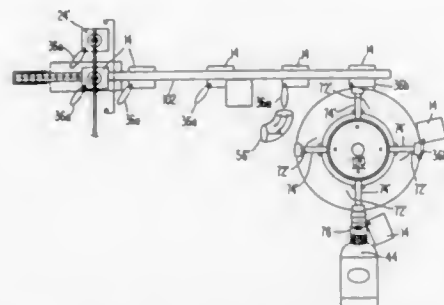
Int. Cl.<sup>6</sup> B23P 21/00; B65B 13/02

U.S. Cl. 29—450

17 Claims

1. A method for positioning a neck booklet having an elastic band around a neck of a container comprising:

placing a plurality of neck booklets on a curved magazine; sequentially removing in series said neck booklets from said curved magazine by a vacuum cup and positioning said neck booklets along a slide plate; providing a plurality of carrier pads disposed to engage said neck booklets between said carrier pads and said slide plate; transporting incrementally said neck booklets along said slide plate via said carrier pads; maintaining with a vacuum nozzle said elastic band in a downwardly projecting closed loop; projecting a needle point into said closed loop of said elastic band as said elastic band moves along said slide plate;



affixing an opening horn to said needle point and disposing said horn, thereby gradually expanding said elastic band into an open loop as said neck booklet moves along said slide plate; receiving said expanded elastic band with a plurality of application fingers, said application fingers having at least three points to define an opening suitable for fitting said elastic band around said neck of said container as said carrier pads incrementally transport said neck booklet; and placing said expanded elastic band around said neck of said container.

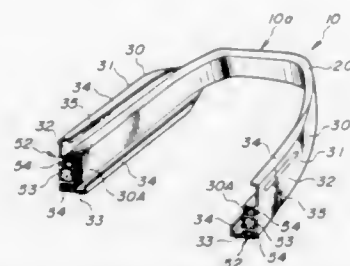
5,412,860

# METHOD OF MAKING A BACK-REST FRAME FOR A SEAT

Fumio Miyauchi, and Shouzi Mizuno, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan  
Division of Ser. No. 797,939, Nov. 26, 1991, abandoned. This application Nov. 5, 1993, Ser. No. 147,436  
Claims priority, application Japan, Nov. 26, 1990, 2-124452 U  
Int. Cl.<sup>6</sup> B23P 17/00

U.S. Cl. 29—527.1

20 Claims



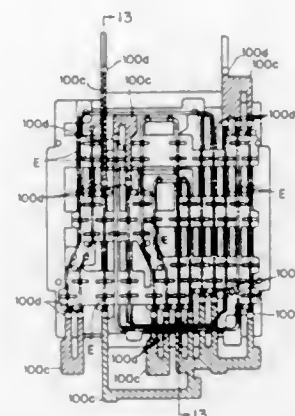
1. A method of making a back-rest frame, comprising the steps of:  
providing a single straight elongate member having a constant cross-sectional shape throughout its length, the cross-sectional shape including a base portion and extended wall portions;  
bending the member into a generally U-shape having an upper section and side sections; and  
removing the extended wall portions from the upper section.

## 5,412,861 APPARATUS FOR LAYING A WIRE IN A JUNCTION BOX

Eiji Fudoo; Takayuki Yamada, and Yuuji Saka, all of Yokkaichi, Japan, assignors to Sumitomo Wiring Systems, Ltd., Japan  
Continuation of Ser. No. 21,356, Feb. 23, 1993, abandoned. This application May 23, 1994, Ser. No. 247,474  
Claims priority, application Japan, Mar. 9, 1992, 4-086457  
Int. Cl.<sup>6</sup> H01R 43/00

U.S. Cl. 29—564.2

9 Claims



1. An apparatus for cutting predetermined portions of a wire set in a pattern on a wiring plate, said apparatus comprising a cutting jig having a plurality of first cutter blades mounted thereon at locations corresponding to said portions, said cutting jig and said wiring plate adapted for movement between a first position, spaced apart from each other, and a second position adjacent each other, whereby movement from said first position to said second position causes said first blades to cut said portions to form severed pieces of said wire, holes in said wiring plate at said portions whereby said several portions are permitted to fall therethrough.

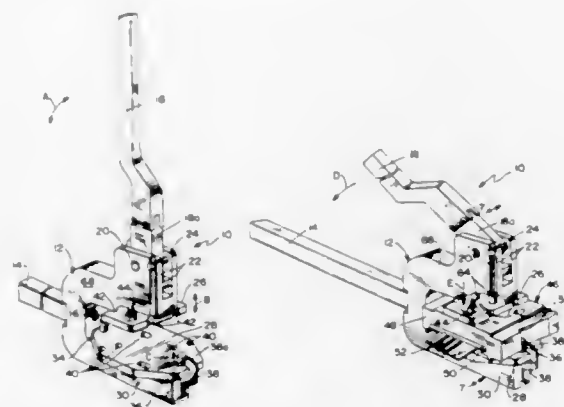
5,412,862

# APPLICATOR TOOL FOR ELECTRICAL CONNECTORS

Joseph D. Comercl, Elmhurst; Robert DeRoss, Naperville, and Frederick J. Gierut, Glenview, all of Ill., assignors to Molex Incorporated, Lisle, Ill.  
Filed Sep. 13, 1993, Ser. No. 120,877  
Int. Cl.<sup>6</sup> H01R 43/042

U.S. Cl. 29—751

8 Claims



1. In an applicator tool for applying an electrical connector, having a housing with a bottom and sides and a plurality of insulation piercing terminals, onto a multi-conductor flat cable, said tool including a frame having a press ram drivable through

a working stroke toward and away from an anvil means in the form of a generally flat platform for supporting the connector, wherein the improvement comprises  
connector positioning means on the anvil means including a fixed member and a yieldable member in spaced relationship to position the connector therebetween, the fixed member engaging one side of the connector and the yieldable member moving in a direction perpendicular to said anvil platform when contacted by the housing bottom to a retracted condition to facilitate positioning the connector between the fixed and yieldable members, said press ram having at least a pair of spaced spring loaded pins for engaging and stabilizing the connector.

5,412,863

# INSTALLATION FOR THE CIRCULATION OF WORKPIECE-CARRYING MOTORIZED PALLETS

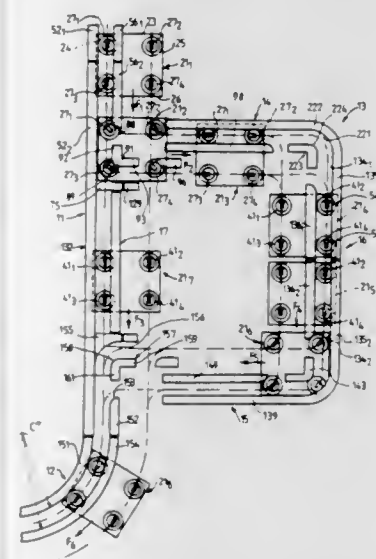
Jacques Prodel, Rue de Cuts - Carlepont, F 60170 Ribecourt, France  
PCT No. PCT/FR92/00398, § 371 Date Jan. 4, 1993, § 102(e)  
Date Jan. 4, 1993, PCT Pub. No. WO92/19419, PCT Pub. Date Nov. 12, 1992

PCT Filed Apr. 30, 1992, Ser. No. 965,251

Claims priority, application France, May 2, 1991, 91 05414  
Int. Cl.<sup>6</sup> B23P 19/04

U.S. Cl. 29—799

22 Claims



1. An installation for circulating workpiece-carrying pallets, said installation comprising:  
support means having a substantially horizontal surface; pallets having a rectangular shape and each comprising a plurality of self-orientable rolling members adapted to roll on said substantially horizontal surface while supporting the pallet;  
interacting means having a common part on said support means and an on-board part on each pallet, the common part and the on-board part adapted to cooperate with each other for driving and guiding the pallets with respect to said support means;  
said on-board part of said interacting means comprising on said pallet:  
sets of horizontal wheels superimposed with respect to each other, each set of horizontal wheel being arranged about a corner of the pallet, substantially above a respective selected one of said self-orientable rolling means; and  
said sets of horizontal wheels comprising driven wheels and freely-rotating guidance wheels;  
said common part of said interacting means comprising a plurality of rail members, said rail members being generally parallel to each other two by two, and arranged in

selected positions on said substantially horizontal surface for defining main track sections, transverse track sections, and interconnections therebetween;  
said horizontal wheels of a pallet being compressibly lodgeable between said parallel rail members substantially in any position in said main track sections, transverse track sections, and interconnections therebetween;  
said common part of said interacting means further comprising actuable rail insert means arranged on said substantially horizontal surface about said interconnections, for controllably cooperating with horizontal wheels of a pallet, for causing such pallet to enter a transverse track.

5,412,864

# METHOD FOR REMOVING OUTER PROTECTIVE LAYER FROM ELECTRICAL CABLE

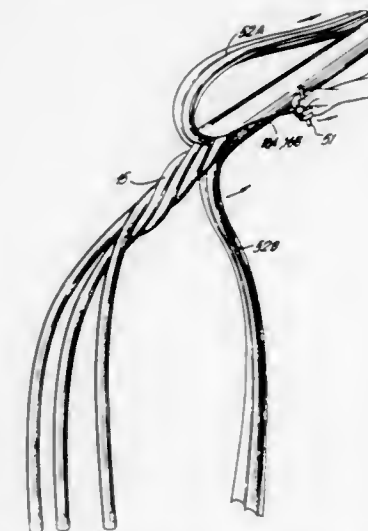
Arthur V. Pack, Monroe, N.Y., and Wesley R. Kegerise, II, Oakland, N.J., assignors to The Okonite Company, Ramsey, N.J.

Continuation-in-part of Ser. No. 801,452, Dec. 2, 1991. This application Oct. 14, 1993, Ser. No. 136,657

Int. Cl.<sup>6</sup> H01R 43/00; B23P 19/00

U.S. Cl. 29—825

3 Claims



1. A method of stripping an electrical power cable, comprising the steps of:

(a) providing an electrical power cable including a plurality of insulated electrical conductors each having a longitudinal extent and being helically intertwined with the other of said electrical conductor so as to form a core conductor assembly having a longitudinal extent and at least a pair of outer interstices adjacent said insulated electrical conductors, at least a pair of strip cords, each said strip cord being disposed along the longitudinal extent of said core conductor assembly and into and out of said outer interstices in a spatially periodic manner, and a water blocking layer disposed about said core conductor assembly and said strip cords so as to prevent passage of water along the interstices about said electrical conductors, and a jacket layer disposed over and adjacent to said water blocking layer; and  
(b) removing a predetermined length of said water blocking layer and said jacket layer by (i) exposing a portion of each strip cord, (ii) gripping each said strip cord with a tool, (iii) manually gripping said tool and pulling said strip cords along the longitudinal extent of said electrical power cable and up to said predetermined length of said cable, thereby cutting simultaneously said jacket layer and water blocking layer and forming at least two strip-like layers of jacket and water blocking material, and (iv)



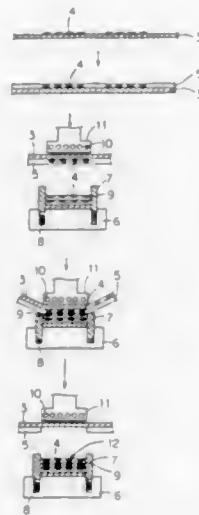
peeling each said strip-like layer of jacket and water blocking material, so as to expose said insulated conductors for spreading.

5,412,865

# METHOD OF MANUFACTURING MULTILAYER ELECTRONIC COMPONENT

Tatsuru Takaoka; Kouichi Yagi, and Yoshiaki Kohno, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

Continuation-in-part of Ser. No. 938,394, Aug. 31, 1992, abandoned. This application Jul. 7, 1993, Ser. No. 88,274 Claims priority, application Japan, Aug. 30, 1991, 3-219842 Int. Cl.<sup>6</sup> H05K 3/36; H01G 7/00; B23P 19/00 U.S. Cl. 29—830 16 Claims



1. A method of manufacturing a layered product having a plurality of sheets for use in a multilayer electronic component, said method comprising the steps of:

- preparing a mother sheet for providing a plurality of sheets of a layered product, said mother sheet being supported on a base;
- applying patterned conductor films to said mother sheet;
- preparing a frame for receiving each of said plurality of sheets so as to align and stack said sheets, said frame defining an inner stacking area having dimensions sized for positioning said sheets therein and an upper rim surface of said frame surrounding said stacking area, a stacking table forming a bottom of said stacking area so as to define a depth of said stacking area, means for adjusting the depth of said stacking area so as to bring a sheet previously stacked therein to a level at least as high as said upper rim surface of said frame;
- moving said mother sheet supported on said base to said frame;
- cutting said mother sheet in dimensions corresponding to said inner dimensions of said frame to obtain respective ones of said plurality of sheets from said mother sheet;
- successively stacking each sheet of said plurality of sheets at said stacking area of said frame by transferring each sheet from said base, each sheet being transferred to said frame so as to contact said sheet previously stacked therein at substantially a level at least as high as said upper rim surface of said frame whereby substantially no air remains between said sheet being transferred and said previously stacked sheet when stacked; and
- pressurizing said stacked sheets in said frame so as to form a layered product.

5,412,866

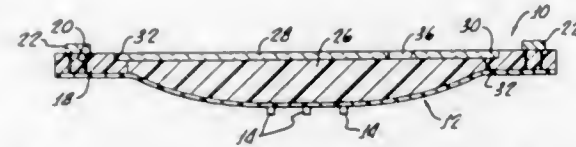
# METHOD OF MAKING A CAST ELASTOMER/MEMBRANE TEST PROBE ASSEMBLY

Blake F. Woith, Orange; John Pasiecznik, Jr., Malibu; William R. Crumly, Anaheim, and Robert K. Betz, Long Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 1, 1993, Ser. No. 88,962 Int. Cl.<sup>6</sup> H01K 3/22

U.S. Cl. 29—848

14 Claims



1. A method of making a device for testing an electrical circuit element having a predetermined pattern of contacts thereon comprising the steps of:  
forming a plurality of membrane contacts in said predetermined pattern on a first side of a flexible membrane,  
deforming the membrane to a predetermined non-planar configuration,  
affixing to the other side of said membrane, while it is in said non-planar configuration, a solid compliant body having said non-planar configuration of said deformed membrane, and  
maintaining said compliant body in contact with said membrane to permanently maintain said predetermined non-planar configuration.

5,412,867

# METHOD OF JOINING FLAT ELECTRODES

Noboru Aikawa, Ibaragi; Koji Matsuo, Katano; Yutaka Nishimura, Kadoma; Hiroshi Iwamoto, Osaka, and Tokuhisa Komatsu, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

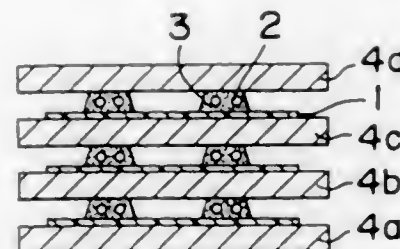
Filed May 25, 1993, Ser. No. 66,224

Claims priority, application Japan, May 25, 1992, 4-132156; Oct. 6, 1992, 4-266942

Int. Cl.<sup>6</sup> H01R 43/00

U.S. Cl. 29—825

1 Claim



1. A method for manufacturing a laminated electrode for controlling electron beams, in which a plurality of flat electrodes are bonded to each other through predetermined intervals, said method comprising the steps of:

- a. positioning on a first flat glass electrode, a support member having a paste pattern thereon, the paste of said paste pattern composed of glass beads, bonded glass powder and a binder of a depolymerizing resin of PVA, polyester or acrylic resin;
- b. positioning on said paste pattern, a second glass electrode positioned so as to overlap said first glass electrode;
- c. repeating steps a. and b. to form an assembly comprising a desired number of overlapping glass electrodes;
- d. heating said assembly of overlapping glass electrodes so as to soften the bonding glass powder therebetween, thereby

laminating and joining said flat electrodes, spaced apart at predetermined intervals by a layer comprising said glass beads.

5,412,868

# PROCESS OF REMOVING POLYMERS IN SEMICONDUCTOR VIAS

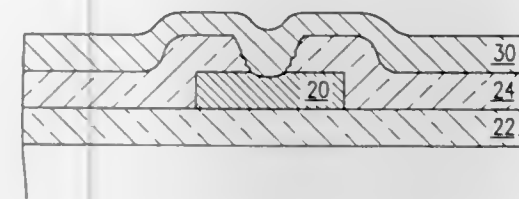
Loi N. Nguyen, and Yih-Shung Lin, both of Carrollton, Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Continuation of Ser. No. 786,039, Oct. 31, 1991, abandoned. This application Feb. 3, 1994, Ser. No. 191,770

Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 29—852

8 Claims



1. A method for forming a via, comprising the steps of:  
forming an oxide layer over a conductive element;  
forming and patterning a resist layer over the oxide layer to define via locations;  
anisotropically etching the oxide layer to open vias in the via locations, wherein contaminate particles containing a polymer, created from the resist and etch chemistry, are formed on the sidewalls of the via; and  
removing the contaminate particles with a chemical which acts as a developer for the resist.

5,412,869

# MAKING A CELL FOR A MOTOR-VEHICLE LATENT-HEAT STORAGE UNIT

Hartmut Boltz, Brey; Richard Christ, Emmelshausen, and Karl-Josef Jakobi, Geisenheim, all of Germany, assignors to Fritz Werner Präzisionsmaschinenbau GmbH, Geisenheim, Germany

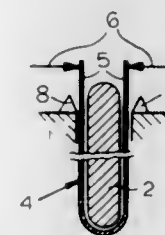
Filed Dec. 7, 1993, Ser. No. 163,081

Claims priority, application Germany, Dec. 8, 1992, 42 41 214.5; Sep. 7, 1993, 43 30 204.1

Int. Cl.<sup>6</sup> B23P 15/26

U.S. Cl. 29—890.032

10 Claims



1. A method of making a cell for a motor-vehicle latent-heat storage unit, the method comprising the steps of sequentially:  
positioning an elongated rectangular sheet-metal blank over a longitudinally extending slot formed in a die;  
pressing an elongated anvil bar forming one of a pair of ultrasonic welding tools down against the blank over the slot to push the bar and the blank into the slot, thereby imparting to it a U-section, and leaving longitudinally extending edge regions projecting out of the slot past the anvil bar;  
folding the edge regions transversely one after the other

inward over the bar, thereby forming the blank into a tube with the edge regions overlapping each other;  
pressing the other of the ultrasonic welding tools against the overlapped edge regions and therethrough against the anvil bar to ultrasonically weld together the overlapped edge regions along a full length of the tube; and  
longitudinally relatively moving the welded tube and the bar to separate the tube from the bar.

5,412,870

# METHOD FOR COATING A ROLL

Pentti S. Lehtonen, Jyväskylä, Finland, assignor to Valmet Paper Machinery, Inc., Helsinki, Finland

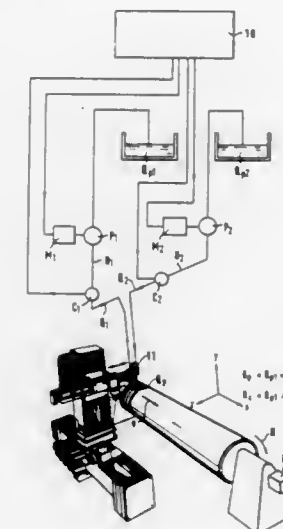
Filed Feb. 14, 1994, Ser. No. 195,758

Claims priority, application Finland, Feb. 11, 1993, 930611

Int. Cl.<sup>6</sup> B23P 15/00

U.S. Cl. 29—895.32

12 Claims



1. A method for coating a roll, comprising the steps of:  
selecting desired surface property values for the roll at least at three axial locations along the length of the roll,  
deriving a mathematical function defining surface property values as a function of axial roll location from at least three points defined by the at least three axial locations and the desired surface property values at the at least three axial locations, and  
coating the roll with a coating agent to provide surface property values at axial locations along the roll in accordance with the mathematical function.

5,412,871

# SAFETY STOCK CARTON KNIFE

Thomas P. Reyburn, 127 E. Maple, Fruitport, Mich. 49415, and Frederick S. Reyburn, 19030 Fruitport Rd., Spring Lake, Mich. 49456

Filed Aug. 17, 1994, Ser. No. 291,450

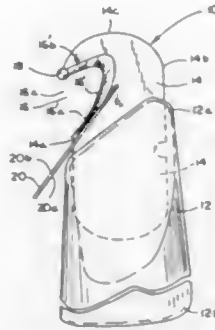
Int. Cl.<sup>6</sup> B67B 7/00

U.S. Cl. 30—2

3 Claims

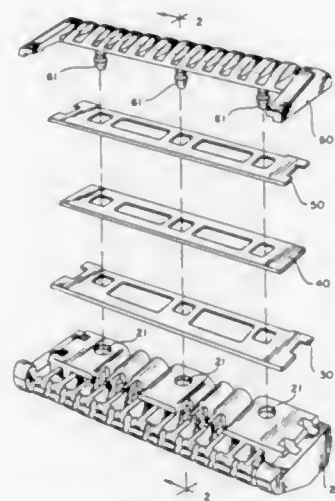
1. A safety stock carton knife comprising an elongated handle having a pair of ends;  
a blade projecting from one of said ends of said handle and having two lateral edges and an outer end;  
said blade having a lateral cutting notch in one of said lateral edges, said cutting notch having a sharp cutting edge and having a laterally oriented mouth including an inner sharp edge closer to said handle and an outer sharp edge farther away from said handle;  
said outer edge converging with said outer end to form an

outer juncture, and said outer juncture having a blunt knob;  
said mouth being smaller in width than about one centimeter; and



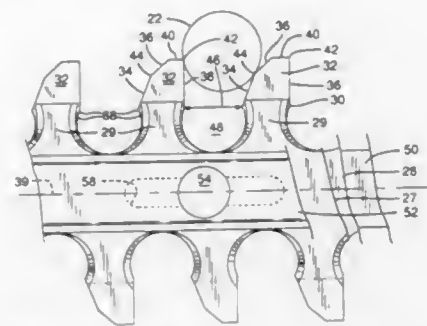
a guard plate on said blade immediately adjacent said inner sharp edge, normal to said blade, with a first surface area toward said handle to protect the fingers of a user, and a second surface area toward said notch to limit depth of cut by said blade.

5,412,872  
**RAZOR HEAD WITH EXPANDABLE SPACER**  
Richard Iderosa, West Haven, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.  
Filed Aug. 4, 1993, Ser. No. 101,884  
Int. Cl.<sup>6</sup> B26B 21/40  
U.S. Cl. 30—50 8 Claims



1. A razor head particularly adapted for wet shaving comprising:  
a blade seat;  
a cap;  
at least one blade located between said blade seat and said cap; and  
a spacer located adjacent said at least one blade;  
wherein said spacer is formed of a material which expands from a first thickness to a second thickness which is at least 2.5% larger than said first thickness during wet shaving.

5,412,873  
**RECIPROCATING HEDGE TRIMMER TOOL HAVING CUTTING TEETH WITH ASYMMETRICAL GUARD PORTIONS**  
Duane M. Gibson, Milwaukie, Oreg., assignor to Blount, Inc., Portland, Oreg.  
Filed Jul. 21, 1993, Ser. No. 95,600  
Int. Cl.<sup>6</sup> B26B 9/02  
U.S. Cl. 30—355 6 Claims

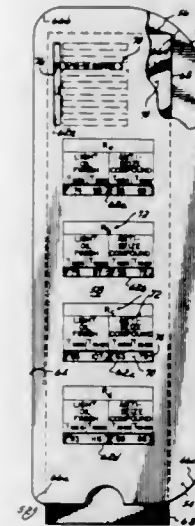


1. A hedge trimmer blade assembly comprising:  
elongated upper and lower blades each having opposed sides, said blades connected together in superimposed relationship for relative lengthwise axial reciprocation, cutting teeth laterally projected from the same side of both of said upper and lower blades whereby the cutting teeth of the upper blade overlies the cutting teeth of the lower blade, the cutting teeth having cutting edges that define cutting chambers and entries into said cutting chambers, and the teeth of one of said blades only having guard portions laterally extended beyond the cutting chamber, adjacent guard portions cooperatively defining a restrictive throat leading to the cutting chamber entry, said guard portions extending from a base at the cutting chamber entry to a tip at its extreme outer end, said guard portion having a non-symmetrical configuration with one side extending substantially perpendicularly relative to the axial length of the assembly and an opposite side tapered from the base to the tip to form a narrow landing at the tip of the guard portion, said throat formed by adjacent guard portions including a straight side and a tapered side of the adjacent guard portions, and said sides cooperatively defining a restriction to prevent oversize stems from entering the cutting chamber.

5,412,874  
**U-BOLT TORQUING METHOD AND TOOL**  
Freddie Madden, Cincinnati, Ohio, assignor to Consolidated Metal Products, Inc., Cincinnati, Ohio  
Filed Feb. 7, 1994, Ser. No. 192,496  
Int. Cl.<sup>6</sup> G01B 3/14  
U.S. Cl. 33—1 SB 7 Claims

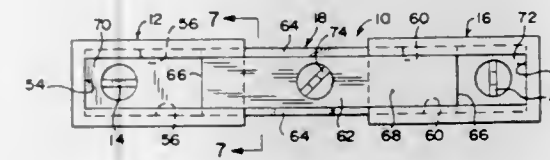
1. A tool used in securing different types of U-bolt assemblies, each U-bolt assembly including a U-bolt having two end-threaded legs and a bend radius for each leg, the tool comprising:  
a slide holder having a pocket cavity formed between a first and second outer surface, at least said first outer surface having at least one window, and a radius for testing the U-bolt bend radius;  
a slide having a third surface slidable within said pocket cavity to varying depths; and  
first indicia including designation data for the different types of U-bolt assemblies and second indicia including a plurality of corresponding optimum torque values for securing the different types of U-bolt assemblies, one of said first and second indicia being located on said first outer surface or said third surface, varying portions of the indicia on

said third surface being visible through said window as the depth of said slide in said pocket cavity is varied, whereby a particular type of U-bolt assembly to be secured is selected by inserting said slide into said pocket cavity a



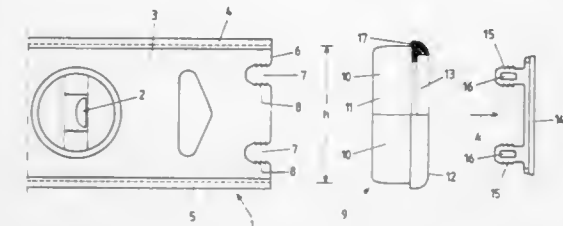
particular depth, the optimum torque value for said particular type of U-bolt assembly being determinable by reading the portions of the indicia on said third surface visible through said window and corresponding indicia located on said first outer surface adjacent to said window.

5,412,875  
**EXPANDABLE LEVEL**  
Kenneth D. Hilderbrandt, P.O. Box 165, Brookhaven, N.Y. 11719  
Filed Nov. 2, 1993, Ser. No. 144,408  
Int. Cl.<sup>6</sup> G01C 9/00  
U.S. Cl. 33—374 2 Claims



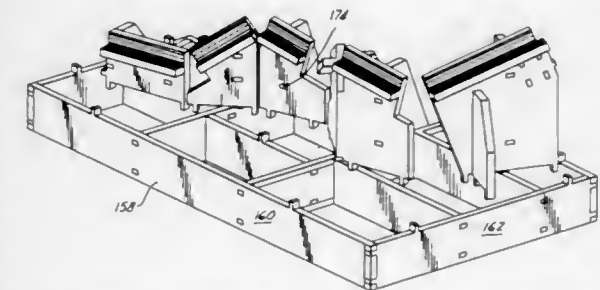
1. An expandable level comprising a main frame; an extension frame; means for adjusting a position of said extension frame with respect to said main frame, so that an effective length of said level can be increased and decreased, including front facing open tracks with opposite inner undercut grooves formed on said main frame and on said extension frame, an elongated arm having a pair of undercut ribs extending along opposite sides, so that each end of said elongated arm can fit into said tracks in said main frame and said extension frame with said undercut ribs sliding in said undercut grooves; first and second leveling vials mounted within a back wall of said track in said main frame and in said extension frame, respectively; and, a third leveling vial mounted within said elongated arm, the elongate arm being fabricated of transparent material so that said first, second and third leveling vials can be seen in all positions of adjustment.

5,412,876  
**PROTECTIVE CAP FOR THE END OF A LEVEL HAVING AN I-SHAPED CROSS-SECTION**  
Dietmar Scheyer, Konstanzer Strasse 34, A-6840 Götzis, Austria  
Filed Apr. 15, 1994, Ser. No. 228,214  
Claims priority, application Austria, May 19, 1993, 983/93  
Int. Cl.<sup>6</sup> G01C 9/24  
U.S. Cl. 33—379 11 Claims



1. A spirit level comprising a spirit level body having an axis, two end faces and an I-shaped cross-section with two flanges and a web extending between the two flanges, the spirit level body having a height and a width, at least one spirit level vial being mounted in the web of the spirit level body, an end cap mounted on each end face of the spirit level body, the end cap comprising a rectangular plate-shaped base member having first and second sides, the base member having a height and a width, wherein the height and the width of the base member are essentially equal to the height and width of the spirit level body, two wing lugs being mounted on the first side of the base member, the two wing lugs defining a gap therebetween, the gap extending at least along a portion of the height of the base member, each end face having at least one recess, each recess having at least one toothed side, each recess having a depth in axial direction of the spirit level body, further comprising at least one projecting lug for fastening the base member to the end face of the spirit level body, the projecting lug extending through the gap between the wing lugs and having a contour corresponding to a contour of the at least one recess, the at least one projecting lug being in positively locking engagement with the at least one recess, the at least one projecting lug having an end portion, the end portion of the projecting lug resting against the second side of the base member, each wing lug having a height extending at a right angle from the base member, and wherein the height of the wing lugs is at least as large as the depth of the at least one recess.

5,412,877  
**FIXTURE GAUGE AND METHOD OF MANUFACTURING SAME**  
Blair T. McKendrick, 29684 Kenloch Dr., Farmington Hills, Mich. 48331  
Continuation-in-part of Ser. No. 858,877, Mar. 27, 1992, Pat. No. 5,208,995. This application May 11, 1993, Ser. No. 62,903  
The portion of the term of this patent subsequent to May 11, 2010, has been disclaimed.  
Int. Cl.<sup>6</sup> G01B 5/20  
U.S. Cl. 33—567 22 Claims



1. A method of manufacturing a gauge for comparing a part with a reference standard, comprising the steps of:



- (A) providing a set of spatial coordinates corresponding to said reference standard;
- (B) producing a programmed set of instructions using said set of spatial coordinates;
- (C) forming a plurality of component members of said gauge using a computer controlled machine operated by said programmed set of instructions;
- (D) providing the component members with interlocking male projections and female openings; and
- (E) assembling said component members into fixed relationships to each other consistent with the set of spatial coordinates.

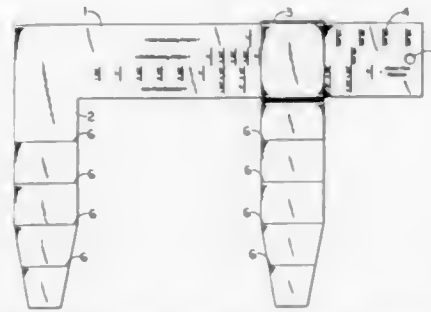
5,412,878

## WHEEL AND HUB GAUGE

Darrell J. Edman, Rte. 1, Box 14A, Boardman, Ore. 97818  
Continuation-in-part of Ser. No. 816,614, Dec. 31, 1991,  
abandoned. This application Apr. 26, 1993, Ser. No. 51,850  
Int. Cl.<sup>6</sup> G01B 5/14

U.S. Cl. 33—810

5 Claims



1. A wheel and hub gauge for making multiple measurements of automotive wheels and hubs with a plurality of lug bolts, which comprises: an elongated frame member generally forming a channel, the recessed side of said channel being the back and opposite the face, with at least one divided scale of graduated indicia on said face, said divided scale having a first scale portion in inches and fractions of an inch and a second scale portion in millimeters, representative of the manufactures published mounting pattern in trade sizes, respective of the number of lug bolts; a pair of members extending perpendicular to the longitudinal axis of said frame member, having a first end portion attached to said frame member, an elongated mid portion and a tapered second end portion, one of said members being in a fixed position on said frame member proximate one end thereof, the other member being mounted on and adjustable along the length of said frame member, said first end portion defining a channel open at its opposite edges with the recessed side of said channel being the back and opposite the front, said members having a predetermined width that enables only one of said opposite edges of said first end portion of said adjustable member to intersect a graduation of said divided scale, of either said first scale portion which is in correlation with the first edge or said second scale portion which is in correlation with the second edge of said opposite edges, when moved along said frame member; wherein when said tapered second end portions engage adjacent lug bolt holes when gauging a wheel or where the same side of the opposite edges of said elongated mid portions abut adjacent lug bolts when gauging a hub, directly reading said manufactures published mounting pattern in trade sizes, where one of said opposite edges intersects a graduation of said divided scale of graduated indicia.

5,412,879

## HAIR DRYER HANDLE STRUCTURE

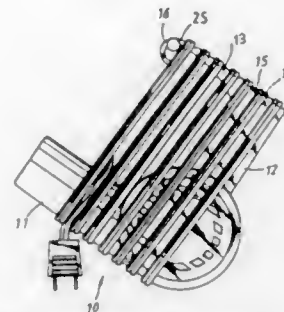
Otto Wu, Room 918, 15 Fu Hsing N. Road, Taipei, Taiwan,  
Prov. of China

Filed Nov. 24, 1993, Ser. No. 156,729

Int. Cl.<sup>6</sup> A45D 20/00

U.S. Cl. 34—97

2 Claims



1. A hair dryer comprising a housing with an elongated barrel extending forward therefrom, a handle having an upper end with said housing mounted thereon and an electrical cord extending out of said hair dryer from an opposite lower end of said handle, said handle having an elongated cord support member extending from the lower end thereof, the support member being spaced from and substantially parallel with said barrel to allow said electrical cord to be wound around said cord support member and said barrel, and said cord support member comprises a corrugated surface having a number of troughs alternating with a number of ridges to respectively receive the windings of said electrical cord therein.

5,412,880

## METHOD OF CONSTRUCTING A 3-DIMENSIONAL MAP OF A MEASURABLE QUANTITY USING THREE DIMENSIONAL COORDINATE MEASURING APPARATUS

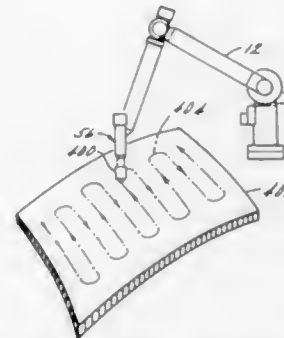
Simon Raab, Longwood, Fla., assignor to Faro Technologies Inc., Lake Mary, Fla.

Continuation-in-part of Ser. No. 21,949, Feb. 23, 1993. This  
application Aug. 26, 1993, Ser. No. 112,605

Int. Cl.<sup>6</sup> G01B 7/03, 11/03

U.S. Cl. 33—503

21 Claims



1. A method for generating a 3-dimensional map of a measurable quantity including the steps of:

- (1) scanning at least a portion of an item to be measured with a passive coordinate measuring machine having a measuring arm with at least three degrees of freedom, said measuring arm being capable of measuring dimensional measurements including at least one of (a) position and (b) orientation, said measuring arm having attached thereto a transducer capable of measuring a selected measurable quantity, said measuring by said transducer being independent of said dimensional measurements by said arm;
- (2) generating measurement signals from the transducer

related to the selected measurable quantity and associating the signals with at least one of the dimensional measurements of (a) position and (b) orientation as measured by said measuring arm; and

- (3) generating a 3-dimensional map of the portion of the item measured which displays the selected measurable quantity measured by the transducer with respect to at least one of its (a) position and (b) orientation in the item as measured by the measuring arm.

5,412,882

## METHOD AND HEAT-EXCHANGER FOR PREHEATING BROKEN GLASS AND GLASS-BATCHING MELT-GOODS OR SIMILAR BULK GOODS USING A HEATING GAS

Bernd H. Zippe, Kreuzwertheim; Erich Weis, Rauenberg, and  
Hilmar Leichtenschlag, Eichenbühl, all of Germany, assignors  
to Zippe, GmbH & Co., Germany

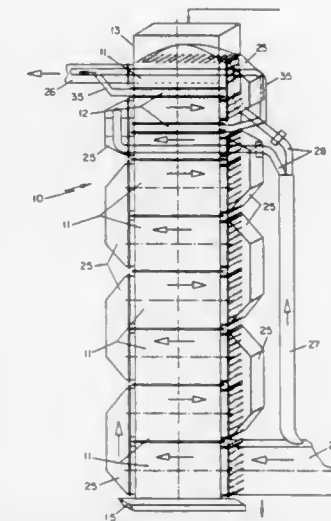
Filed Apr. 23, 1993, Ser. No. 51,736

Claims priority, application Germany, Apr. 24, 1992, 42 13  
481.1

Int. Cl.<sup>6</sup> F26B 17/12

U.S. Cl. 34—521

1 Claim



5,412,881

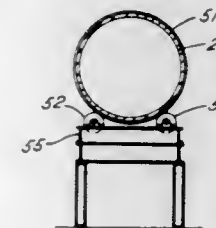
## METHOD AND APPARATUS FOR CONDITIONING REFUSE

Frank T. Romweber, Olympia Fields, and Dennis F. Sowa, Wood Dale, both of Ill., assignors to RSS, Inc., Olympia Fields, Ill. Division of Ser. No. 698,355, May 6, 1991, Pat. No. 5,116,363, which is a continuation-in-part of Ser. No. 475,995, Feb. 6, 1990, abandoned, which is a continuation-in-part of Ser. No. 410,093, Sep. 20, 1989, abandoned. This application May 22, 1992, Ser. No. 888,562

Int. Cl.<sup>6</sup> F26B 11/02

U.S. Cl. 34—136

1 Claim



1. A trash conditioner for shrinking refuse, comprising:  
a rotatable chamber;  
means for rotating said chamber;  
refuse inlet means providing an entrance into said chamber for movement of refuse therein;  
liner means disposed within said chamber for separating the refuse into a first range of size refuse and a second range of size refuse, said liner means dividing the chamber to maintain the separated refuse separate within the chamber;  
means for generating hot gas at a temperature between 250° F. and 500° F. and for forcing said gas into said chamber; and  
means for moving refuse within and through said chamber during a minimum period of time during rotational movement of said chamber, said means for moving including:  
(i) flute members fixed to the inside surface of said liner means, said flute members being arranged in an auger arrangement; and  
(ii) a plurality of lifters mounted on the inside surface of said liner means, said lifters being arranged and sized for tumbling the trash;  
refuse outlet means providing an exit out of said chamber for movement of refuse thereout; and  
said liner means rotates during movement of refuse through said chamber.

1. A method for preheating a melt-good, i.e., goods to be melted, consisting of broken glass and glass batching, by using a heating gas, wherein the melt-good vertically descends by gravity in a plurality of narrow columns and during this descent is preheated in the course of indirect heat-exchange by flows of heating gas moving in the opposite direction, the temperature of the melt-good columns increasing from the top toward the bottom whereas the temperature of the hot-gas flows gradually decreases from the bottom toward the top, characterized in that the preheating stage is preceded by a drying stage for moist melt-goods during which a separate feed of hot heating gas into the already cooled heating-gas flows evaporates the moisture, and in that the melt-good columns so heated are made to pass through cavities through which the steam may escape to the outside in such manner that its condensation shall be precluded and only dry, fluid or friable melt-good arrives at the preheating stage.

5,412,883

## SKI BOOT AND SKI BOOT-BINDINGS

Elmer B. Wulf, 1907 Jasmine, Denton, Tex. 76205, and Mark E. Wulf, 24447 Blvd. DeJohn, Naperville, Ill. 60564

Filed Jul. 12, 1993, Ser. No. 89,841

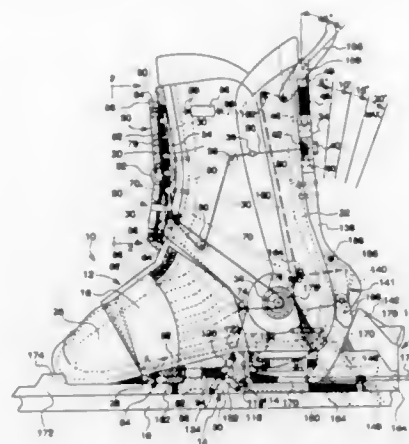
Int. Cl.<sup>6</sup> A43B 5/04

U.S. Cl. 36—50.5

20 Claims

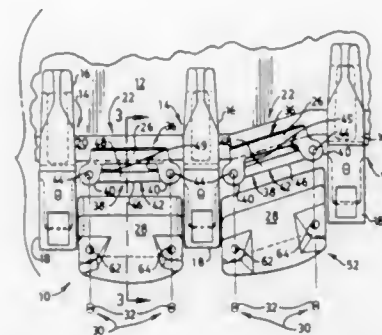
1. A ski boot for attachment to a ski, comprising  
a. a foot shell shaped to encompass at least a portion of a foot when the ski boot is worn,  
b. a forward cuff and a hinged rear cuff attached to said foot shell,  
c. means for releasably securing said rear cuff to said forward cuff, said securing means further including means responsive to rearward pressure on said rear cuff for releasing said rear cuff so that under predetermined rearwardly-directed load on said rear cuff said rear cuff will separate from said forward cuff to permit free movement of said rear cuff, and  
d. closing means mounted on said forward cuff, said closing

means including a vertically repositionable closure lever on said forward cuff, said closure lever being positionable



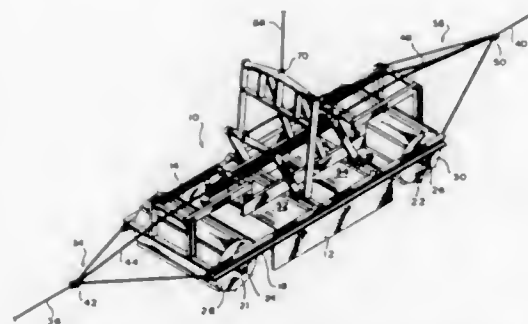
in a first orientation for engaging said rear cuff with said forward cuff and being positionable in a second orientation to disengage said rear cuff from said forward cuff.

5,412,885  
**BUCKET BASE EDGE PROTECTOR ASSEMBLY**  
 Erwin D. Cornelius, Bloomington, Ill., assignor to Caterpillar Inc., Peoria, Ill.  
 Filed Jul. 2, 1993, Ser. No. 85,372  
 Int. Cl.<sup>6</sup> E02F 3/36; A01B 15/00  
 U.S. Cl. 37—451 7 Claims



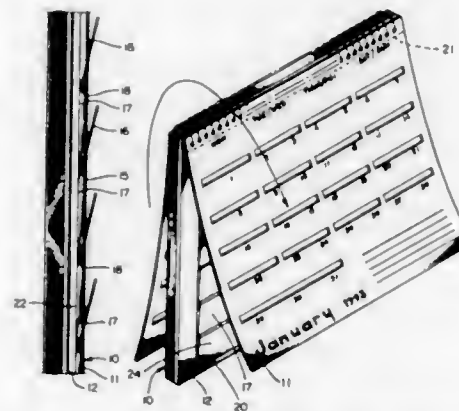
1. A bucket base edge protector assembly adapted for protecting a leading lip portion of a bucket base edge located between respective tip assemblies comprising:
  - a lip protector having a leading portion operative to engage the material being worked and a trailing portion having an upper strap and a lower strap defining a cavity therebetween, first and second spaced apart pairs of aligned openings are defined in the trailing portion in intersecting relation with the cavity;
  - a protector mounting lug having a forward portion operative to mate with the cavity in the lip protector and a rearward portion being adapted, when assembled, to be secured to the leading lip portion of the bucket, the forward portion having a pair of spaced apart bosses separated by a laterally disposed flange and an opening being defined in each boss of the pair of bosses; and
  - a retainer mechanism operative to releasably secure the lip protector to the protector mounting lug.

5,412,884  
**WASTE MATERIAL POND CLEANING APPARATUS**  
 Wesley A. Staples, Rte. 3, Box 1512, and Russell E. Staples, Rte. 5, Box 8082, both of Palatka, Fla. 32177  
 Filed Oct. 4, 1993, Ser. No. 130,985  
 Int. Cl.<sup>6</sup> E02F 3/00  
 U.S. Cl. 37—342 4 Claims



1. Apparatus for cleaning waste material and sludge in clarifier and settling ponds, comprising a pair of side walls and a rear wall defining a frame open at the top, front and bottom, rotatable support means supporting the frame at the front and back of the frame, at least one blade pivotally mounted for swinging movement from an active to an inactive position between said side walls of the frame and cables attached to the front and rear of the frame, a lever arm connected to the at least one blade, and further cable means connected at one end to the lever arm and connected at the other end to the cables attached to the front and rear of the frame for moving the at least one blade to its active and inactive position, wherein the support means comprise floatation rollers supporting the frame at the front and the back of the frame, said support floatation rollers extending at least substantially the width of the frame and enabling said apparatus to float substantially on top of the waste material and sludge.

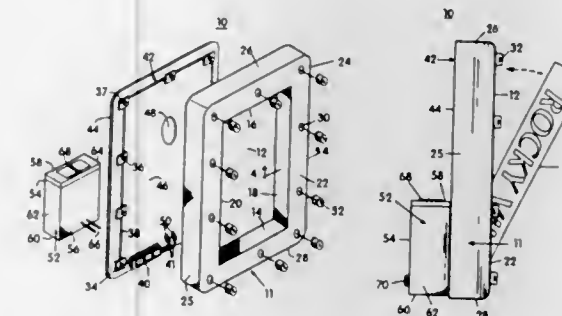
5,412,886  
**CALENDAR ORIENTED MONTHLY BILL PAYMENT SORTER**  
 Maureen T. Quinn, 1408 Tulip Ct., Apt. B1, Wheeling, Ill. 60090  
 Filed Mar. 24, 1993, Ser. No. 36,479  
 Int. Cl.<sup>6</sup> G09D 3/02; B42D 5/04  
 U.S. Cl. 40—119 21 Claims



1. A calendar and sorting structure comprising a series of calendar sheets joined to a single bottom sheet member by a binding along top edges of the calendar sheets and of the single bottom sheet member, and with the calendar sheets being rotatable on the binding enabling each calendar sheet to be successively rotated into a front viewing position, the calendar

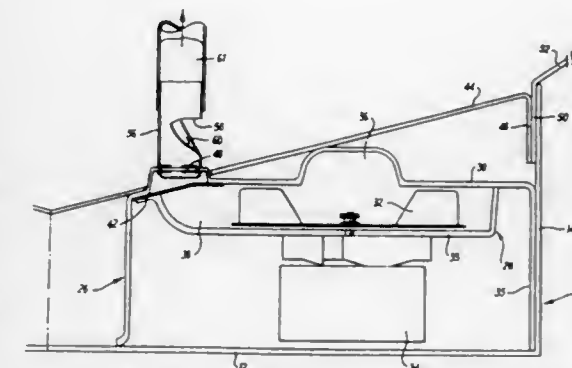
sheet rotated into the front viewing position, namely the current calendar sheet, having a front side facing the viewer and an opposed side facing the bottom sheet member, and the bottom sheet member having a front side facing the opposed side of the current calendar sheet, each of the calendar sheets having a series of rows of slots, indicia mounted on the front side of the calendar sheets in adjacency to the slots, and means for supporting time-sensitive material attached to the bottom sheet member and positioned between the bottom sheet member and the current calendar sheet whereby the time-sensitive material can be inserted through said slots of the current calendar sheet.

5,412,887  
**ILLUMINATED DISPLAY ASSEMBLY FOR CONSUMER PRODUCTS**  
 James R. Layne, 5673 E. Eastland, Tucson, Ariz. 85711  
 Filed Jan. 22, 1993, Ser. No. 7,515  
 Int. Cl.<sup>6</sup> A47G 1/06; G09F 13/00  
 U.S. Cl. 40—152.2 5 Claims



1. A display assembly for a three dimensional retail consumer product comprising:
  - a frame casing having a general opening adapted to receive said consumer product therewithin, said opening defined by parallel top and bottom interior end walls joined by interior side walls;
  - said frame casing having a front side through which said consumer product can be placed in said consumer product receiving opening and a rear side opposite thereof;
  - said top and bottom interior end walls and said interior side walls having dimensions substantially the same as the corresponding horizontal and vertical dimensions of said three dimensional retail consumer product;
  - barrier means integrally associated with said rear side of said frame casing so as to permit insertion of said consumer product into said consumer product receiving opening only through said front side thereof, said barrier means defined by a back plate integral with said rear side of said frame casing;
  - a multi-light illumination system encased between said frame casing and said back plate, defined by one or more light elements interconnected by way of conductor wires to a circuit control module;
  - said light elements being disposed within a front wall of said frame casing through a directly corresponding number of light holes and lenses;
  - said multi-light illumination system connected to an associated source of electrical power and switch means, whereby upon activation of said switch means, said light elements are illuminated to draw the attention of the consumer to said display assembly and said consumer product displayed therein.

5,412,888  
**ASSEMBLY FOR PRODUCING ARTIFICIAL SNOWFALL**  
 Ian Rickuss, Cannock Staff's, and Daniel O'Leary, Kent, both of Great Britain, assignors to Manthorpe Engineering Limited, Derby, England  
 Filed Dec. 3, 1993, Ser. No. 162,483  
 Claims priority, application United Kingdom, Dec. 5, 1992, 9225468  
 Int. Cl.<sup>6</sup> G09F 19/00  
 U.S. Cl. 40—410 19 Claims



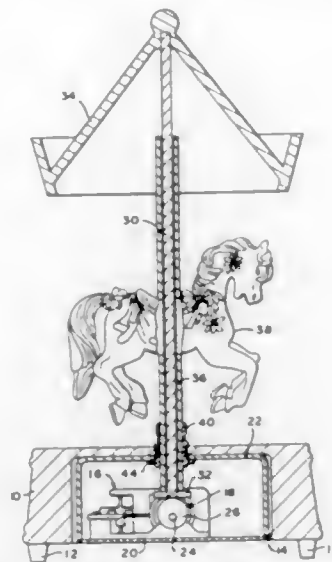
1. For use with a display arrangement, an assembly comprising a base part with a removable cover, air movement means disposed in the base part and having an air inlet in a wall of the base part and means for moving air from the inlet to an air outlet accessible through the cover, and air transporting means connected through the cover to the air outlet, and providing for the movement thereof of means taking the form of artificial snow, collecting means for the artificial snow means being mounted around an internal peripheral wall or walls of the base part to provide an extension of the cover, and being movable from a folded position, overlying the cover, to an unfolded position, lying outwardly of the base part and upwardly angled in use, the artificial snow means being located, in use, on the cover, whereby, when the air transporting means extends upwardly from the base part, the air transporting means can move air with the artificial snow means upwardly to a location remote from the air outlet and enable the artificial snow means to fall under gravity to be collected on the cover for re-distribution.

5,412,889  
**ORNAMENTAL DISPLAY ASSEMBLY HAVING RECIPROCATING AND ROTATING DECORATIVE ELEMENTS**  
 Jack Hou, Taipei, Taiwan, Prov. of China, assignor to Giftex Ltd., Alexandria, Va.  
 Filed Apr. 6, 1993, Ser. No. 43,786  
 Int. Cl.<sup>6</sup> G09F 19/08

- U.S. Cl. 40—411 19 Claims
1. An ornamental device comprising:
    - a) a base;
    - b) first and second coaxially arranged support members having a common axis and supported on the base; and
    - c) a common drive means connected to the first and second support members for rotating one of the first and second support members and linearly reciprocating without rota-



tion the other of the first and second support members, wherein the common drive means comprises a music box

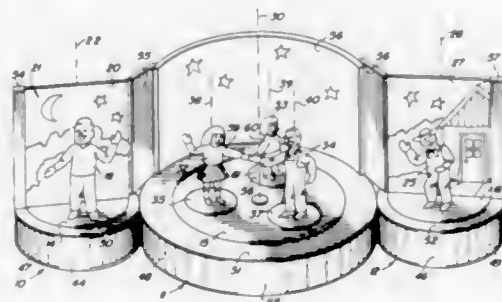


mechanism as a power source having a rotatable output shaft.

5,412,890  
NESTED TURNABLE ARRANGEMENT FOR ELECTRONICALLY ANIMATED CHARACTERS  
Aaron Fechter, 47 W. Jefferson St., Orlando, Fla. 32801  
Filed Mar. 17, 1993, Ser. No. 33,298  
Int. Cl.<sup>6</sup> G09F 19/08

U.S. Cl. 40—414

14 Claims

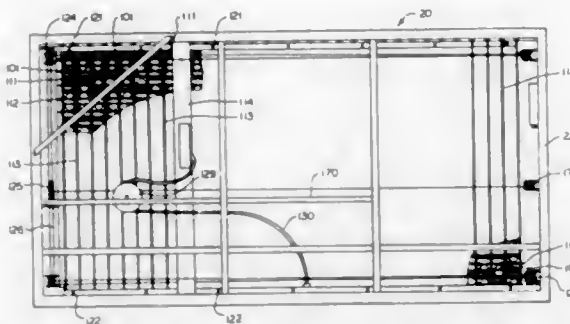


10. In a stage setup for use in an animated show multimedia performance presentation utilizing sound synchronized robotics, said setup including a stage, animated characters supported on said stage, each character having arm body part segments with hand ends, and means for electronically-controllably articulating said arm segments, the improvement comprising: said stage comprising a base turntable; means for rotating said base turntable about a first axis; a plurality of pedestal turntables mounted on said base turntable; and means for, independently of said rotating of said base turntable, separately rotating said pedestal turntables about respective second axes; and said characters being respectively mounted on different ones of said pedestal turntables.

5,412,891  
CHANGEABLE SIGN  
F. Martin Black, Greensboro; Steven H. Brenia, Kernersville, and G. Frank Dye, Greensboro, all of N.C., assignors to FMB Communications, Inc., Greensboro, N.C.  
Filed Mar. 10, 1993, Ser. No. 28,889  
Int. Cl.<sup>6</sup> G09F 3/00

U.S. Cl. 40—447

24 Claims

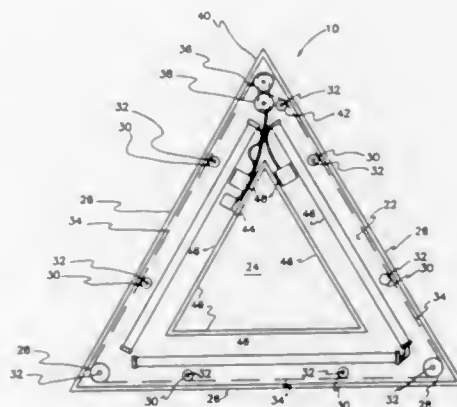


1. A changeable sign display having an array of pixel elements rotatable about axes with facets selectively displayable in at least one of two modes wherein said facets of said pixel elements are cylindrically concave, with the axis of the cylinder of concavity being parallel with the axis of the rotation for said pixel element and first and second ramp elements on said pixel elements opposed to said facets, said first and second ramp elements having different configurations so that said orientation of said pixel element may be determined by touch.

5,412,892  
SCROLLING DISPLAY SIGN FOR VEHICLES  
John Filippakis, 10114 Bayard Ct., Orlando, Fla. 32836  
Filed Sep. 9, 1993, Ser. No. 118,400  
Int. Cl.<sup>6</sup> G09F 11/18, 21/04

U.S. Cl. 40—471

9 Claims



1. A display sign comprising: a base plate, a top plate, and at least one peripheral transparent side plate sandwiched therebetween, said base plate, said top plate, and said at least one peripheral transparent side plate defining a housing having a three dimensional polygonal shape; a plurality of pins disposed within said housing and extending between said top plate and said base plate, with said pins each having a roller installed thereon and disposed adjacent said peripheral transparent side plate; a scrolling display sheet disposed about said rollers, with said rollers providing guidance for said scrolling display sheet along a path substantially about the periphery of said housing and between said rollers and said peripheral trans-

parent side plate, and said display including a message having a first message portion and a second message portion;

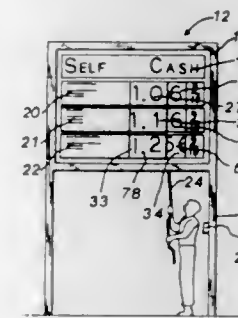
first and second reels disposed within said housing and including motorized means for dispensing said scrolling display sheet, with said first reel being installed adjacent said at least one peripheral transparent side plate at a corner of said polygonal shape, and said second reel being installed adjacent said first reel and inwardly towards a geometric center of said housing, said scrolling display sheet being scrolled from said first reel to said second reel to display said message thereon and visible through said at least one peripheral transparent side plate; means providing for the reversal of said first and second reels, whereby the direction of travel of said scrolling display sheet is reversed; and a timer controlling said motorized means to pause said scrolling display sheet to allow said first message portion to be displayed for a predetermined period of time before said second message portion is displayed.

5,412,893  
MANUALLY OPERABLE SCROLLING WEB SIGN  
Robert B. Aiken, Sr., Grafton, Wis., assignor to Milwaukee Sign Co., Inc., Grafton, Wis.

Filed Aug. 10, 1992, Ser. No. 927,454  
Int. Cl.<sup>6</sup> G09F 11/18

U.S. Cl. 40—518

14 Claims

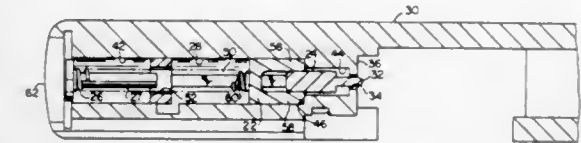


1. A scrolling sign comprising: a cabinet; a sign face with a window in which indicia may appear, said sign face being supported by said cabinet and having a frame hingedly secured to said cabinet; a pair of rotatable web rolls with a web containing serially arranged indicia wound thereon, said web extending along a path between the web rolls and across the window for selectively displaying the indicia in the window; and means for advancing the web past the window, comprising: a first drive means in driving relationship with one of said rolls, said first drive means adapted for rotating said one roll in a direction maintaining the web in tension for pulling the web past the window in a forward direction; a second drive means in driving relationship with the other of said rolls, said second drive means adapted for rotating said other roll in a direction maintaining the web in tension for pulling the web past the window in a reverse direction; and a manual actuator selectively engageable with either of said first and second drive means for manually driving and rotating the respective roll for selectively advancing the web in either the forward direction or the reverse direction, said rotatable web rolls and said first and second drive means being supported on a support means pivotally mounted in said cabinet whereby said web rolls and first and second drive means may be pivoted relative to said cabinet, said sign face being adapted to pivot relative to said cabinet independently of said support means.

5,412,894  
INERTIA DRIVEN STRIKER FOR A FIREARM  
Kook-Jin Moon, 630 Rte. 303, Blaauvelt, N.Y. 10913  
Filed Oct. 4, 1993, Ser. No. 130,873  
Int. Cl.<sup>6</sup> F41A 19/13

U.S. Cl. 42—69.02

11 Claims

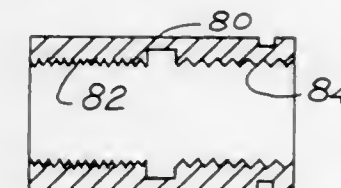


1. An inertia striker mechanism for a firearm and comprising a slide body having a forwardly facing breech face and a bore extending through a portion of said slide body and opening through said breech face, a striker assembly supported for reciprocal sliding movement within said bore and including a striker having a tip at its forward end and supported for reciprocal axial movement within the bore between cocked and firing position, said tip projecting thorough and forwardly beyond said breech face when said striker is in its firing position, a generally U-shaped spacer straddling an associated portion of said striker, biasing means for urging said spacer and said striker in the direction of said firing position, and arresting means on said slide body for halting movement of said U-shaped spacer toward said firing position before said striker reaches said firing position, said striker being freely moveable relative to said slide body and said U-shaped spacer in response to inertia during the final portion of its travel from said cocked position to said firing position.

5,412,895  
FLOATING GUN BARREL MOUNT  
John M. Krieger, W. 509 Hwy. 0, Hartford, Wis. 53027  
Filed Mar. 9, 1993, Ser. No. 28,432  
Int. Cl.<sup>6</sup> F41A 21/48

U.S. Cl. 42—75.02

1 Claim



1. A floating gun barrel mount for a gun having a forward end, a sling and a stock, the sling extended from the stock away from the forward end of the gun, a receiver to receive a barrel, threads having a rotational position around a barrel receiving opening, the barrel having a rib to pull the barrel tightly against the receiver, and a barrel nut to engage the rib of the barrel, the floating gun barrel mount comprising: the barrel nut being two pieces, a first piece having opposite ends and two sets of threads, one of each of the sets of threads being located at the opposite ends, and each said set of threads having a different pitch; one set of the threads of the first piece engaging the threads of the receiver opening; a second piece engaging the second set of threads of the first piece and engaging the rib of the barrel to secure the barrel to the receiver.

5,412,896

## UTILITY DEVICE FOR A FISHERMAN

James G. Morgan, 1950 Bee Creek Rd., Corbin, Ky. 40701

Filed Apr. 26, 1993, Ser. No. 53,066

Int. Cl.<sup>6</sup> A01K 97/00; B25F 1/02; F21L 15/00

U.S. Cl. 43—4

7 Claims



1. A utility device for a fisherman user particularly adapted to aid in rigging a line for fishing, comprising:
  - a housing;
  - a neck strap connected to and extending upwardly from said housing for positioning over the head and around the neck of the user;
  - a light source on said housing including means for directing a beam of light forwardly of and downwardly from said housing;
  - a magnifying lens connected to said housing and selectively positionable for viewing by the user forwardly and downwardly from said housing into said beam of light whereby said user is allowed to better see to rig a fishing line at night; and
  - means in said housing for providing flotation in water;
- said utility device being further characterized by including:
  - a clock on said housing, said light source being directed downwardly and forwardly from a front face of said housing at an angle of between substantially 30°-40° and said clock having a face directed upwardly and forwardly on said housing at an angle from said front face between substantially 60°-70° so as to be presented in said beam of light from said light source.

5,412,897

## DOWNRIGGER WEIGHT ASSEMBLY AND LINE RELEASE DEVICE

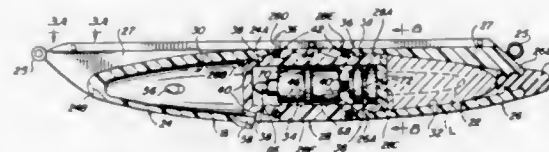
Donald D. Smith, 257 10th St., Burlington, Colo. 80807

Filed Nov. 3, 1993, Ser. No. 147,389

Int. Cl.<sup>6</sup> A01K 95/00, 97/02, 91/08, 97/12

U.S. Cl. 43—4

25 Claims



9. A downrigger weight assembly, comprising:
  - (a) an elongated casing including a pair of forward and rearward compartments defining respective front and rear hollow cavities and means for attaching said compartments of said casing together in a tandem relationship with

one another such that said respective cavities are sealably isolated from one another;

- (b) means for holding a fish attractant material being disposed in said respective cavity of one of said forward and rearward compartments of said casing; and
- (c) at least one weighted body being disposed in said respective cavity of the other of said forward and rearward compartments of said casing for providing ballast for said casing;
- (d) said fish attractant material holding means including a cartridge for holding the fish attractant; and a basket for receiving and enclosing said cartridge and being removably disposed in said cavity of said one of said compartments of said casing.

5,412,898

## WIND DRIVEN FISH BAIT BOBBER AND FISHING REEL

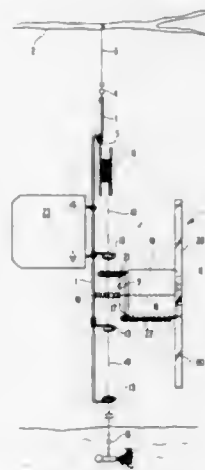
Emmett W. Crain, 214 Tighe St., Calion, Ark. 71724

Filed Jan. 10, 1994, Ser. No. 179,372

Int. Cl.<sup>6</sup> A01K 97/12

U.S. Cl. 43—19.2

12 Claims



1. A wind driven fish bait bobber and fishing reel comprising:
  - a vertical support means having a top portion and being vertically disposed in the use position, means for suspending said vertical support means from the top portion thereof vertically over a body of water, a fishing reel mounted on said vertical support means, a fishing line extending substantially vertically downwardly from the fishing reel into said body of water, a fish hook connected to the free end of said fishing line, a wind driven rotary motor having a rotor mounted for rotation on said vertical support means in substantially vertical alignment with said fishing reel, a pin carried on said rotor and extending in proximity to said vertically downwardly extending fishing line, whereby upon rotation of the rotor the pin engages and deflects the vertically extending fishing line, to thereby impart a reciprocating jiggling motion to the fishing line and associated hook.

5,412,899

## ARTIFICIAL BAIT WITH STABILIZERS

Hauser G. Reboul, 4316 Lake Villa Dr., Metairie, La. 70002

Filed Dec. 20, 1993, Ser. No. 170,535

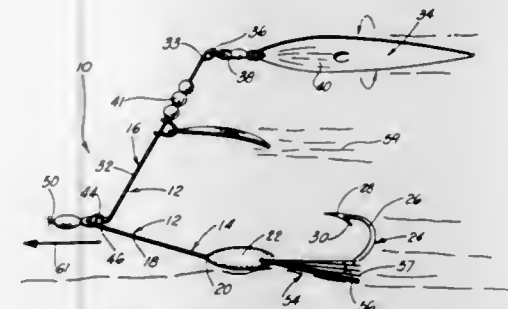
Int. Cl.<sup>6</sup> A01K 85/02

U.S. Cl. 43—42.13

11 Claims

1. An improved artificial bait, comprising:
  - a) a bait body having at least an upper leg and a lower leg;
  - b) a head portion on the lower leg of the bait body, and providing a hook means extending rearwardly therefrom; and
  - c) stabilizing means positioned on the head of the bait body

of substantial rigidity for allowing the hook means to remain upright while the bait is being pulled through the water or being pulled over obstacles present in the water,



the stabilizing means extending rearwardly of the bait body, from two points off the centerline of the bait body, and at an angle to the plane of the hook shaft and below the plane of the hook shaft.

5,412,900

## SPINNER DEVICE FOR VERTICAL RETRIEVE FISHING LURE

William A. Rosek, Rte. 4, Box 244, Waverly, Va. 23890

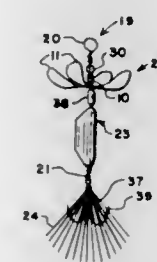
Filed Nov. 17, 1993, Ser. No. 153,033

The portion of the term of this patent subsequent to Apr. 13, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> A01K 85/00

U.S. Cl. 43—42.19

3 Claims



1. A fishing lure comprising:
  - a) a length of stiff wire of round cross-section having a forward extremity equipped with an eyelet and a rear extremity bent to form a looped snap member,
  - b) a spinner comprising a hub containing elongated bearing means in the form of a circular bore centered within said hub and extending between forward and rearward extremities, the distance between said extremities being at least four times the diameter of said bore, and a number of identical blades emergent radially from said rearward extremity and terminating in rounded distal extremities, said blades being equidistantly spaced about said hub in a circular array, each blade being concavely curved in the forwardly facing direction and having the same forwardly directed lift angle of between 10 and 25 degrees, and the same pitch angle of between 10 and 20 degrees,
  - c) said spinner mounted by virtue of said hub upon said wire in a manner causing said blades to be angled toward said eyelet, the diameter of the bore of said hub being greater than the diameter of said wire by an amount in the range of 0.004 to 0.020 inch,
  - d) a weight unit disposed upon said wire behind said spinner,
  - e) a first bearing bead disposed upon said wire between said eyelet and said spinner,
  - f) a second bearing bead disposed upon said wire between said spinner and said weight unit,
  - g) a fish hook engaged by said looped snap member, and
  - h) attractor means disposed upon said fish hook.

5,412,901

## FLEXIBLE BODY FISHING LURE

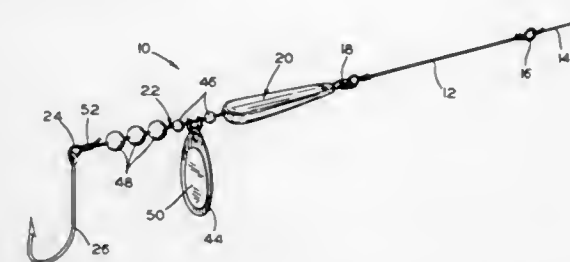
Gilbert S. Matinez, 4224 Birchall, Toledo, Ohio 43612

Filed Sep. 17, 1992, Ser. No. 946,556

Int. Cl.<sup>6</sup> A01K 85/00

U.S. Cl. 43—42.22

4 Claims



1. A fishing lure comprising:
  - a) an elongate deformable body having a forward end, a rear end, and a longitudinal center axis, said deformable body including a generally flat top, and a curved bottom extending arcuately from a first longitudinal edge of the top to a second longitudinal edge of the top;
  - b) a shank extending longitudinally through said deformable body, said shank offset from and extending generally parallel to the longitudinal center axis of said deformable body and provided with a retrieval means formed in said shank at the forward end of said deformable body for attaching a retrieval line, an exposed shank segment extending longitudinally from the rear end of said deformable body, and a loop formed in a free end of the exposed shank segment of said shank, said deformable body and said shank being formed to allow bending of the deformable body along the longitudinal center axis, whereby the depth and path of the lure in the water may be changed by bending the deformable body and whereby the lure is pulled through a body of water by the retrieval line;
  - c) blade means rotatably mounted on the exposed segment of said shank, whereby said blade means may be caused to spin when the lure is pulled through the water by the retrieval line; and
  - d) a hook pivotally connected to the loop formed in the free end of said shank.

5,412,902

## FISHING FLOAT METHOD AND APPARATUS

Thomas W. Hicks, P.O. Box 28234, Atlanta, Ga. 30358-0234

Continuation-in-part of Ser. No. 885,311, May 18, 1992, abandoned, which is a continuation of Ser. No. 619,234, Nov. 28, 1990, Pat. No. 5,129,178. This application Mar. 30, 1993, Ser. No. 39,877

The portion of the term of this patent subsequent to Jul. 14, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> A01K 91/00

U.S. Cl. 43—44.87

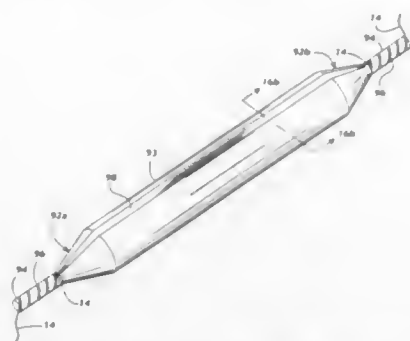
12 Claims

7. A tubular fishing float for attachment to a fishing line, said tubular fishing float comprising:

- a center tube section;
- a first end section;
- a second end section, wherein said first end section and said second end section enclose said center tube section to define a float interior cavity within said center tube section, and wherein said first end section, said second end section, and said center tube section are constructed from a single continuous piece of material, whereby said tubular fishing float is unitary;



posts protruding from said first end section and said second end section; and



groove means for attaching the fishing line, wherein said groove means spans said center tube section and said end sections, and spirals around said posts.

5,412,903

## SEA CAGE FISH FARMING SYSTEM

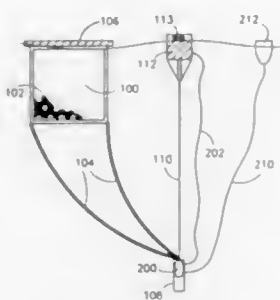
Shalom Zemach, Kfar Yona, and Yitzhak Farin, Ganei Tikva, both of Israel, assignors to Mefalim Ymiem Vashkoht Ltd., Tel Aviv, Israel

Filed Feb. 17, 1994, Ser. No. 197,993

Int. Cl.<sup>6</sup> A01K 71/00

U.S. Cl. 43—102

11 Claims



1. A fish cage system, comprising:

- a fish cage including at least one fish cage cable of fixed length connected to said fish cage, said fish cage and said fish cage cable having a combined buoyancy such that at least a portion of said fish cage is located at or above the water surface when no external forces are exerted upon said fish cage or on said fish cage cable;
- a displaceable sinker connected to said fish cage cable, the weight of said sinker being sufficient to overcome said combined buoyancy of said fish cage and said fish cage cable, said sinker being further connected to a sinker cable which is different from said fish cage cable;
- a floating device connected to said sinker cable; and
- means for alternately shortening and lengthening the effective length of said sinker cable so that, when said effective length is sufficiently short, said sinker is supported by said sinker cable and at least a portion of said fish cage is located at or above the water surface and, when said effective length is sufficiently long said sinker is supported by said at least one fish cage cable and said fish cage is submerged below the water surface.

5,412,904

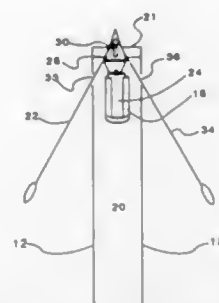
## INSECT DESTROYING APPARATUS

Willie H. Hansbrough, 1987 Big Bend, Memphis, Tenn. 38116  
Filed Apr. 29, 1994, Ser. No. 235,360

Int. Cl.<sup>6</sup> A01M 7/00

U.S. Cl. 43—132.1

6 Claims



1. Apparatus for destroying flies and insects in the airspace between the inner and outer doors of a building doorway without opening either door comprising:

- a doorway to a building having an inner door opening into said building and an outer door opening to the outdoors, said doorway having a vertical doorjamb and an airspace separating said doors;
- a holder having a bottom member for supporting an aerosol can and a hinged, vertically movable lever projecting over said bottom member; said holder being mounted on said vertical doorjamb;
- an aerosol can of insecticide having an upwardly extending spray nozzle; said can being positioned on said bottom member;
- a cam element mounted on said lever so as to engage said nozzle when said lever is moved downwardly;
- a first cable connected to said lever extends through said inner door to inside said building; and
- a second cable connected to said lever extends through said outer door to outside said building, whereby insecticide may be sprayed into said airspace by pulling either said first or second cable to move said lever downwardly to cause said cam to engage said nozzle.

5,412,905

## TOMATO GREEN HOUSE

Ian T. Allison, P.O. Box 1705, Santa Rosa, Calif. 95402

Filed Jun. 21, 1993, Ser. No. 93,635

Int. Cl.<sup>6</sup> A01G 13/00

U.S. Cl. 47—30

5 Claims



1. A single unit plant protector device for forming an insulating blanket comprising a sheet of green plastic including a series of trapped air cells, said blanket being cone-shaped and of a size adapted to enclose young plants whereby they may be protected from early frost.

5,412,906

## WRAPPING APPARATUS HAVING SPRINGABLE BASE

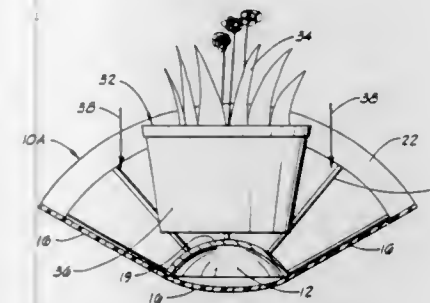
Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 979,494, Nov. 19, 1992, Pat. No. 5,373,942. This application Sep. 17, 1993, Ser. No. 123,506

Int. Cl.<sup>6</sup> A01G 9/02

U.S. Cl. 47—72

20 Claims



1. An apparatus for wrapping an item selected from a group of items consisting of a flower pot having an outer peripheral surface and a floral grouping comprising:

- a wrapping material comprising a sheet of material sized and shaped to be wrapped about at least a portion of the item;
- a springable base having an upper surface with a central area and a perimeter area, said base being biased to sustain itself in either an arched configuration or a substantially flat configuration, wherein said springable base flexibly springs from the arched configuration into the flat configuration in response to pressure on the central area of the base; and
- a plurality of arms connected to and extending from the perimeter area of said springable base, said arms being in an open position to receive said item when said base is in the arched configuration and said arms being in a closed position to wrap at least a portion of said item when said springable base is in the flat configuration, said sheet of material connected to said arms for movement with said arms;

wherein said plurality of arms and said sheet of material cooperate to move said sheet of material around at least a portion of said item when said item is disposed on said springable base, said springable base snapping from the arched configuration into the flat configuration in response to pressure on the central area of said base by said item, said plurality of arms simultaneously snapping to a closed position from an open position in response to the flat configuration of the base, said sheet of material extending about at least a portion of said item thereby wrapping at least a portion of said item.

5,412,907

## DEEP, FREE-STANDING, CONVERTIBLY SUBDIVIDED, PLANT CONTAINER ASSEMBLY

George C. Anderson, 2425 SE. Moores St., Portland, Oreg. 97222

Filed Sep. 19, 1994, Ser. No. 308,693

Int. Cl.<sup>6</sup> A01G 9/02

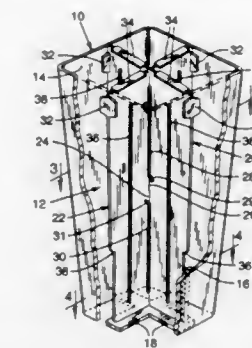
U.S. Cl. 47—85

11 Claims

1. A deep, free-standing, convertibly sub-divided, plant container assembly comprising:

- an outer case having side walls and a floor comprising a plurality of bands arranged in a selected pattern predetermined to define in the floor a plurality of ventilating openings; and
- an inner, removable divider comprising a plurality of

telescoping, interfitting partition plates having a cross sectional pattern predetermined to position the plates in



bearing engagement with the bands when the divider is inserted in the case.

5,412,908

## AUTOMATIC VAULT HATCH

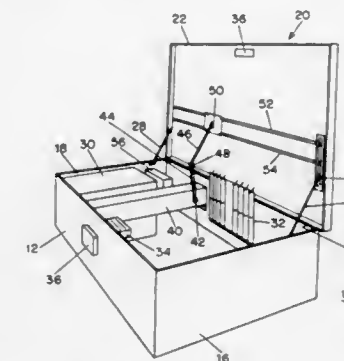
Paul Wild, Elk Grove, Calif., assignor to Wild Automatic Door, Inc., Elk Grove, Calif.

Filed Apr. 8, 1993, Ser. No. 45,493

Int. Cl.<sup>6</sup> E05F 11/24

U.S. Cl. 49—340

5 Claims



1. A motorized operator system for a utility vault hatch having a rectangular vault shroud having a horizontal width and length, and a horizontally oriented access opening of corresponding width and length, and having a vault hatch for closing said access opening, said hatch having a horizontal orientation in the closed position and being hinged to said vault shroud along one edge corresponding to the shroud length, said operator comprising a swing door operator having a rotating shaft, means for mounting said operator across the width of said shroud on the interior thereof, with the axis of said shaft oriented horizontally and parallel to the swing axis of said hatch, a first pivot arm fixedly connected to said shaft for rotation therewith, a second pivot arm pivotably connected to said first pivot arm and said hatch, and control means for operating said door operator to swing said hatch between open and closed positions.

5,412,909

## PLASTIC CASING FOR A DOOR FRAME

Ming-Hsin Wu, 20, Lane 92, Shing Eli Street, Tao Yuan City, Tao Yuan County, Taiwan, Prov. of China

Continuation-in-part of Ser. No. 42,635, Apr. 5, 1993, abandoned. This application Mar. 28, 1994, Ser. No. 219,175

Int. Cl.<sup>6</sup> E06B 1/04

U.S. Cl. 49—505

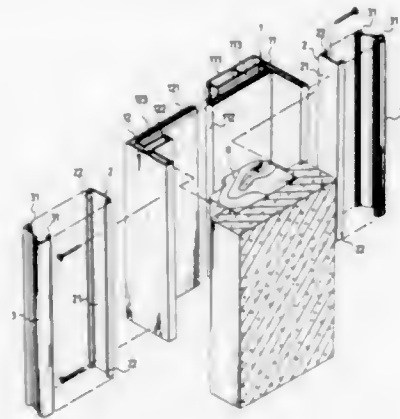
2 Claims

1. A plastic casing for a door frame configured to fit over an existing door frame and comprising:

- a first slat having a generally "F" shaped cross sectional

configuration with a first base leg, a first outer panel extending from the first base leg and a first inner panel extending from the first base leg and spaced apart from the first outer panel so as to form a first groove therebetween, the first slat positioned against a first side of the existing door frame;

- b) a second slat having a generally "F" shaped cross sectional configuration with a second base leg, a second outer panel extending from the second base leg and a second inner panel extending from the second base leg and spaced apart from the second outer panel so as to form a second groove therebetween, the second slat positioned against a second, opposite side of the existing door frame such that



the first inner panel extends into the second groove and the second outer panel extends into the first groove;

- c) first and second elongated holding slats each having a plurality of elongated latching plates extending therefrom, and positioned such that at least a portion of the first and second elongated holding slats are in contact with one of the first and second base legs;
- d) fastening means extending through an elongated holding slat, the corresponding base leg and into the existing door frame; and
- e) first and second elongated caps, each cap having a plurality of elongated catching slats configured to releasably engage the plurality of elongated latching plates such that the elongated caps cover the fastening means.

5,412,910

# WET ABRASIVE BLASTING METHOD AND APPARATUS

Jerry P. Woodson, and Lawrence M. Camarota, both of Houston, Tex., assignors to Whittemet, Inc., Houston, Tex. Continuation-in-part of Ser. No. 893,456, Jun. 4, 1992, Pat. No. 5,239,788, which is a continuation of Ser. No. 668,747, Mar. 13, 1991, Pat. No. 5,123,206, which is a continuation of Ser. No. 415,033, Sep. 29, 1989, abandoned, which is a continuation of Ser. No. 128,589, Dec. 4, 1987, Pat. No. 4,878,320. This application Mar. 15, 1993, Ser. No. 31,693

Int. Cl.<sup>6</sup> B24C 1/00

U.S. Cl. 451—38

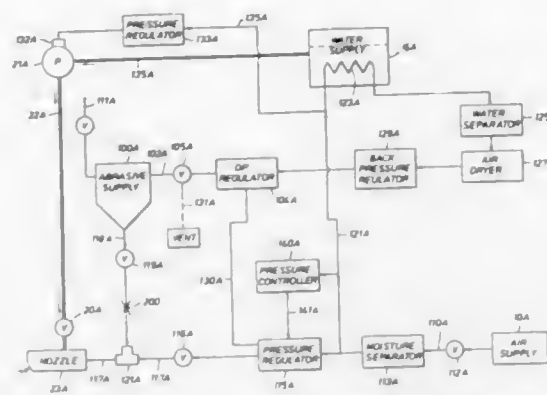
18 Claims

1. Apparatus for use in an abrasive blasting system, comprising:
- hopper means (100A) for containing a quantity of abrasive particles;
- conduit means (102A) for supplying a dry gas under pressure to the interior of said hopper means;
- transport line means (117A) connected to a source 10A of pressurized air for transporting abrasive in said abrasive blasting system;
- an abrasive particle feed line 118A connecting the interior of said hopper means to said transport line means (117A);
- first pressure regulating means (115A) disposed in said trans-

port line means (117A) for regulating the pressure of air in said transport line means;

second pressure regulating means (104A) disposed in said conduit means for controlling the pressure of said dry gas as applied to said interior of said hopper means; and

said second pressure regulating means (104A) being a differential pressure regulating valve set at a predetermined



pressure differential between said first and second pressure regulating means so that the pressure in said hopper means (100A) is maintained automatically at a predetermined pressure level above the pressure in said transport line means (117A) to permit a controlled flow of said abrasive from said hopper means (100A) into said transport line (117A).

5,412,911

# IN-FLOOR ACCESS PIT FRAME AND COVER SYSTEM

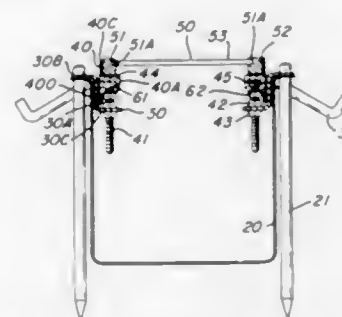
Gene C. Schlegel, 2723 R.D. #2, Mohnton, Pa. 19540

Filed Oct. 15, 1993, Ser. No. 138,289

Int. Cl.<sup>6</sup> E02D 29/14

U.S. Cl. 52—20

10 Claims



1. An access pit assembly for disposition on a substrate for a floor located on the substrate, the floor having a floor covering thereon, the floor covering having a top surface, said assembly comprising:

a hollow liner, a lower frame, an intermediate frame, an upper frame, a cover plate, height adjustment means, and stand-alone securement means;

said hollow liner having a hollow interior defining an interior periphery and being arranged for disposition on a portion of the substrate and for securement thereto by said stand-alone securement means before the floor is located on the substrate, said liner having a peripheral flange;

said lower frame having a sidewall, a horizontal support flange, and a hollow interior, with said sidewall and said horizontal support flange being disposed within said hollow interior of said liner and with a portion of said lower frame mounted on said peripheral flange of said liner, said sidewall of said lower frame having an outer periphery corresponding to the interior periphery of said liner;

said intermediate frame having a hollow interior, a horizon-

tal support surface, a vertical upwardly depending flange, and a vertical downwardly depending flange aligned with said upwardly depending flange, said aligned flanges defining the outer periphery of said intermediate frame and corresponding to the hollow interior of said lower frame, said intermediate frame being disposed within said hollow interior of said lower frame and supported by said height adjustment means above said horizontal support flange at a variable distance, said downwardly depending flange of said intermediate frame being located immediately adjacent said sidewall of said lower frame to prevent material from gaining ingress between said intermediate frame and said lower frame irrespective of said distance said intermediate frame is disposed over said lower frame;

said upper frame having an outer periphery corresponding to said hollow interior of said intermediate frame and being supported on said horizontal support surface within said hollow interior of said intermediate frame;

said cover plate being a generally planar member that is fixedly secured within said upper frame to form a first recess having a first depth on one side of said upper frame and a second recess having a second depth on the opposite side of said upper frame, with the depth of one of said recesses being greater than the depth of the other of said recesses,

said upper frame and said cover plate being releasably mounted as a unit within the interior of said intermediate frame so that said upper frame and said cover plate can be inverted as a unit, whereupon either of said recesses can be directed upward to be immediately adjacent the floor covering, said upwardly-directed recess being arranged to receive a flooring panel of a thickness corresponding to the depth of the upwardly-directed recess, the flooring panel having a top surface; and,

said height adjustment means being adjustable to adjust the distance that said intermediate frame is disposed above said horizontal support flange of said lower frame so that the top surface of the flooring panel is flush with the top surface of the floor covering.

5,412,912

# MODULAR SLATWALL ASSEMBLY

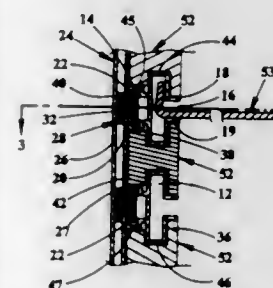
Manuel J. Alves, Charlotte, N.C., assignor to Bo-Man, Inc., Charlotte, N.C.

Filed Mar. 15, 1994, Ser. No. 213,844

Int. Cl.<sup>6</sup> A47H 27/00

U.S. Cl. 52—36.5

13 Claims



1. A wall assembly for receiving display devices, comprising:

an outer member having a front channel adapted to receive said display devices and a rear channel;

an inner support member fixably attachable to a wall support structure;

means for slidably connecting said outer member to said inner support member; and

means for adjustably fixing said outer member relative to said inner support member.

5,412,913

# SELF-ALIGNING BEAM JOINT SUITED FOR USE IN MODULAR CONSTRUCTION

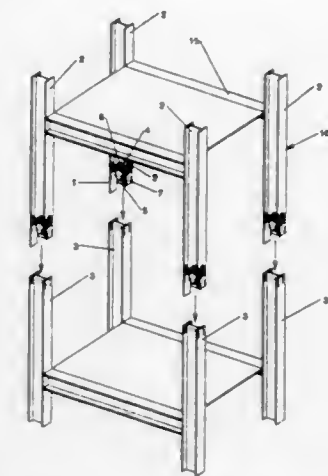
Harold F. Daniels, Tallahassee, Fla., and David M. Williams, Cincinnati, Ohio, assignors to Fluor Corporation, Irvine, Calif.

Filed May 28, 1993, Ser. No. 68,650

Int. Cl.<sup>6</sup> E04H 1/00

U.S. Cl. 52—79.13

21 Claims



1. A self-aligning joint for coupling an end portion of a first structural member with an end portion of a second structural member, said joint comprising four splice plates secured to and each extending a different distance from said end portion of said first member, with at least one of said splice plates capable of being secured to said second structural member.

5,412,914

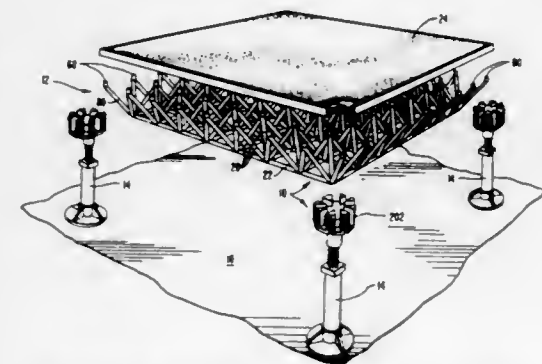
# RAISED ACCESS FLOORING SYSTEM

Terry L. Daw, 785 Woodshire Ave., Murray, Utah 84017, and Kevin D. Moss, 1023 E. Deborah Dr., Bountiful, Utah 84010 Continuation-in-part of Ser. No. 726,988, Jul. 8, 1991, abandoned. This application Jul. 7, 1992, Ser. No. 910,638

Int. Cl.<sup>6</sup> E04B 5/00

U.S. Cl. 52—126.6

13 Claims



1. A modular raised access flooring system comprising:

(a) a plurality of flooring modules capable of independent load bearing, each flooring module comprising:

(i) substantially planar grid;

(ii) a plurality of elongate structural members formed integrally with the grid and extending upward from the grid, the grid and accompanying elongate structural members forming a space frame web; and

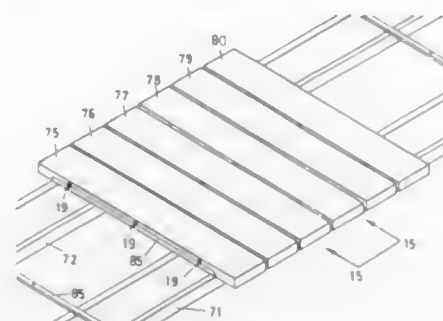
(iii) a flooring member affixed to the web; and

means for maintaining and supporting each flooring module above a subfloor.



**5,412,915**  
**DOCK PLANK ASSEMBLY**  
 Richard D. Johnson, 19400 Orwell Ave., Marine-On-St. Croix,  
 Minn. 55047  
 Filed Jan. 19, 1993, Ser. No. 5,707  
 Int. Cl.<sup>6</sup> E01D 19/02; E04D 5/02  
 U.S. Cl. 52—177

8 Claims



1. A dock comprising:
  - a pair of support members;
  - a cross channel extending transversely across said pair of support members, said cross channel having a first side and a second side;
  - a first plank having a top surface for walking on, a backside with a plurality of openings therein and a front side, said first plank located on said first side of said cross channel with said backside proximate said first side of said cross channel;
  - a second plank, said second plank located on said second side of said cross channel, said second plank having a top surface for walking on, a back side with a plurality of openings therein and a front side with a plurality of extension pins extending therefrom, said plurality of extension pins of said second plank having an outside dimension smaller than the interior of the openings in said first plank and extending therethrough to thereby shiftably and laterally restrain said first plank with respect to said second plank;
  - a third plank having a top surface for walking, said third plank having a front side located proximate said backside of said second plank; and
  - a fastening member engaging said third plank and said second plank to form said second and third planks into a modular section so that the modular section of said second plank and said third plank are held in a shiftable relationship with respect to said first plank.

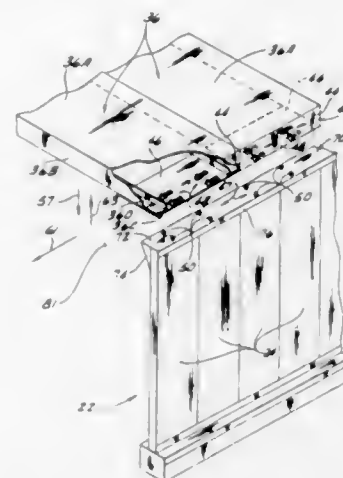
**5,412,916**  
**STRUCTURE HAVING QUICK-CONNECT COMPONENTS**  
 William R. Kennedy, and John M. Kennedy, both of Taylorville, Ill., assignors to Jack Kennedy Metal Products and Buildings Inc., Taylorville, Ill.  
 Continuation of Ser. No. 854,369, Mar. 19, 1992, abandoned.  
 This application Jul. 8, 1993, Ser. No. 88,910  
 Int. Cl.<sup>6</sup> E04B 1/343

- U.S. Cl. 52—262
1. An underground mine structure comprising:
    - at least two generally parallel, space-apart side walls;
    - a plurality of roof panels extending between the side walls and forming the roof of the structure, each roof panel having opposite ends overlying the upper ends of respective side walls;
    - bayonet connection means associated with the side walls and the roof panels forming a bayonet connection of the roof panels to the side walls, said bayonet connection means comprising first connector means associated with the side walls and second connector means associated with the roof panels, said first and second connector means interengaged by movement relative to one another in a first

generally vertical direction, and releasably interlocked by movement relative to one another in a second generally horizontal direction generally perpendicular to said first direction;

said second connector means comprising pulling means engageable by said first connector means for drawing the roof panel down and into engagement with the top of a respective side wall upon said generally horizontal movement of said first connector means relative to said second connector means thereby to releasably secure the roof panel to the side walls;

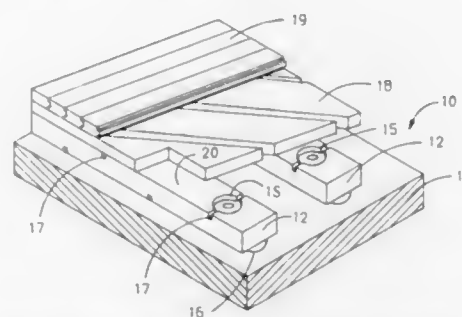
said first connector means comprising a plurality of pins disposed at the top of each side wall, and projecting gener-



ally upward from the top of the side wall, and said second connector means further comprising a plurality of slot in each end of the roof panels, each slot including a first portion opening generally downwardly for receiving a respective pin upon downward movement of the roof panel toward the tops of the side walls in the first generally vertical direction, and a second portion sized for receiving the pin upon movement of the roof panel in the second generally horizontal direction relative to the side walls, each pin being received in said second portion of a respective slot, said second portion of the slot being sized for preventing withdrawal of the pin from the slot by movement in a third generally vertical direction opposite said first direction.

**5,412,917**  
**FIXED RESILIENT SLEEPER ATHLETIC FLOORING SYSTEM**  
 Floyd Shelton, 803 Jefferson St., Wausau, Wis. 54401  
 Filed Oct. 14, 1993, Ser. No. 135,540  
 Int. Cl.<sup>6</sup> E04F 15/22  
 U.S. Cl. 52—403.1

8 Claims



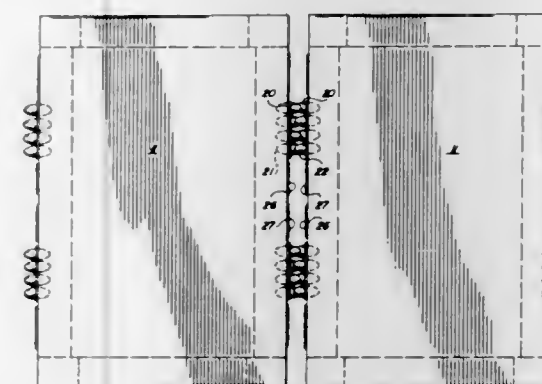
1. A fixed resilient sleeper athletic flooring system comprising:

- A) a slab base,
- B) a multiplicity of floating sleepers which contain sleeper segments which abut each other anchored to the base, said sleepers being in parallel relationship with each other and parallel to a wall of a venue in which the floor is assembled, said sleepers being elongate nominal two inch by three inch boards having a top surface and a bottom surface and the top surface is provided with at least two transverse saw kerfs, each of said transverse saw kerfs positioned approximately two feet in from each end of the sleeper, and the bottom surface of the sleeper is provided with transverse saw kerfs positioned midway between each pair of saw kerfs on the top of the sleeper and also midway between the top saw kerfs and the ends of the sleeper,
- C) a multiplicity of individual resilient pads secured to the bottom of the sleeper at the locations of the top and bottom saw kerfs,
- D) a multiplicity of drilled and counter bored holes defined on the sleeper and centered on each saw kerr in the top of the sleeper,
- E) a multiplicity of sleeve members, which are insertable through said drilled and counter bored holes, and each sleeve member having a cylindrical body and a broad head and the sleeve member defines a central bore and the length of the cylindrical body is equal to the distance between the bottom of the counter bore hole and the base when the sleeper rests on the pads and the pads are compressed a preestablished amount;
- F) each sleeve member having passing through said central bore an anchor, said anchor having a head which rests against said broad head of said sleeve member and anchors said sleeve member to said base,
- G) and where a first sleeper abuts a second sleeper the sleepers are bridged by an individual pad having at least two fastening tabs and one fastening tab is secured to the first sleeper and the other fastening tab is not fastened to the second sleeper,
- H) a subfloor secured to said sleepers by conventional means, and
- I) an outer floor of high quality maple secured to said subfloor by conventional means.

**5,412,918**  
**ATTACHMENT SYSTEM FOR MODULAR PANELS**  
 Christopher M. Wendel, Westfield, N.J., and Donald A. Whamond, Downers Grove, Ill., assignors to Exhibit Group, Inc., Roselle, Ill.

Filed Oct. 29, 1993, Ser. No. 145,790  
 Int. Cl.<sup>6</sup> E04C 3/00  
 U.S. Cl. 52—582.1

18 Claims



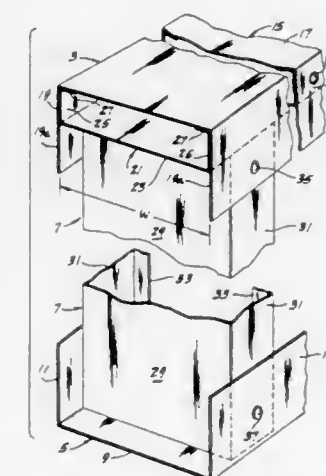
1. An alignment device for attachment to modular panels, said device facilitating assembly with adjacent panels, said device comprising:

- a) a planar substrate for attachment to a panel, said planar substrate having opposing side edges;
- b) a plurality of pairs of pin and socket formed in the planar substrate; each pair being laterally aligned and displaced from an adjacent pair, each said pair comprising:
  - i) a receiving socket formed in the substrate;
  - ii) a pin projecting from the substrate and positioned laterally adjacent to said socket, each pair of pin and socket being received by a like pair affixed to an adjacent panel.

**5,412,919**  
**METAL WALL FRAMING**  
 Michael A. Pellock, Edwardsville, Ill., and Arturo P. Sordo, St. Louis, Mo., assignors to MiTek Holdings, Inc., Wilmington, Del.

Filed Dec. 21, 1993, Ser. No. 171,229  
 Int. Cl.<sup>6</sup> E04B 2/60  
 U.S. Cl. 52—656.1

5 Claims



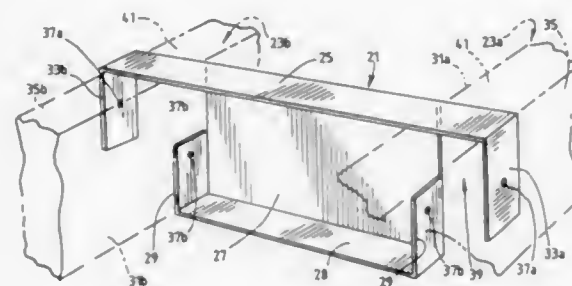
1. A metal wall framing section comprising spaced apart top and bottom tracks and a plurality of parallel elongate stud means formed of sheet metal extending between the top and bottom tracks spaced at intervals along the length of the tracks, the upper track comprising a first sheet metal channel member which opens downwardly in the erected position of the section, said first channel member having a web which constitutes the top of the section as erected and flanges extending down from the web at opposite sides thereof, and a second sheet metal channel member inside the first, said second channel member opening upwardly having a web spaced downwardly from the web of the first channel member and flanges extending up from the web of the second channel member at opposite sides thereof, the flanges of the first channel member being wider than the flanges of the second channel member, the flanges of the second channel member extending up to the web of the first channel member, the two channel members forming a box beam, the flanges of the first channel member having portions extending down below the flanges of the second channel member, one end of each stud means constituting its upper end extending up between and secured to said portions of the first channel member and engaging the bottom face of the web of the second channel member, and the flanges of the first and second channel members being secured together, the section being adapted for application to the upper track of structure at positions not in alignment with the stud means.

5,412,920  
ARTICLE FOR CONNECTING LATERALLY SPACED BEAMS

Tommy M. Hess, 115 S. Office St., Braidwood, Ill. 60408  
Filed Jun. 8, 1993, Ser. No. 73,774  
Int. Cl.<sup>6</sup> E04B 1/38

U.S. Cl. 52—712

11 Claims



1. An article suitable for connecting laterally spaced beams, each of such beams having respective inner and outer surfaces, the article comprising:

- (a) spanning means adapted to extend between the beams;
- (b) a cross-web member having opposite ends and side edges extending between the opposite ends, the cross-web member connected to the spanning means along one of the side edges of the cross-web member, the ends adapted to abut the respective inner surfaces of the beams;
- (c) inside clamping means located at each of the ends of the cross-web member and adapted to engage the inner surfaces of the beams, thereby resisting flexion of the beams in an inward direction; and
- (d) outside clamping means adapted to engage the outer surfaces of the beams, thereby resisting flexion of the beams in an outward direction.

5,412,921  
I-BEAM STRUCTURE

Benjamin A. Tripp, R.R. #2, Orangeville, Ontario, Canada L9W 2Y9

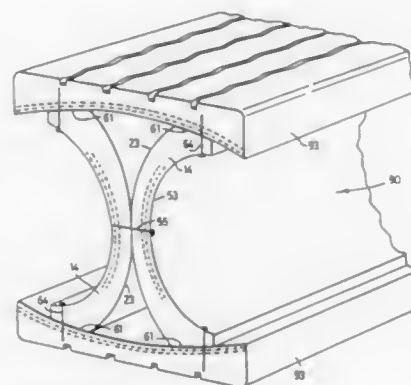
Continuation-in-part of Ser. No. 64,910, May 24, 1993, Pat. No. 5,285,616, which is a continuation-in-part of Ser. No. 37,385, Mar. 26, 1993, which is a continuation-in-part of Ser. No. 750,936, Aug. 28, 1991, abandoned. This application Jan. 13, 1994, Ser. No. 181,088

The portion of the term of this patent subsequent to Feb. 15, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> E04C 3/36

U.S. Cl. 52—729

13 Claims



1. An I-beam structure, comprising:  
a web formed from two tire belts attached together tread surface to tread surface centrally along their lengths, the

web having longitudinal side portions capable of being bonded to flange forming members; and  
first and second flange forming members of a single ply structural material, comprising a continuous ply of light or heavy truck tire belts consisting of a plurality of tread bearing tire belts from individual tires joined end to end so that the continuous ply is capable of carrying a load in tension which is at least 10% of the magnitude of a load in tension which an individual tire belt can carry, said first and second flange forming members being bonded to the longitudinal side portions of the web to make an I-beam structure.

5,412,922  
REPLACEMENT WINDOW AND METHOD

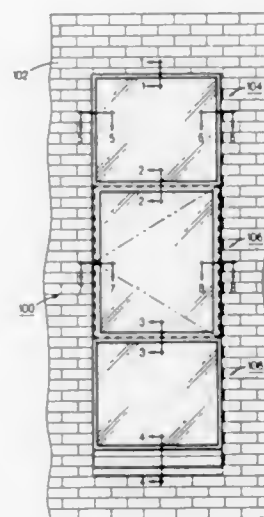
Bernardo Vittori, Bridgeport, and Robert A. Harbinson, Shelton, both of Conn., assignors to A.M.S.-Derby Inc., Derby, Conn.

Filed Nov. 15, 1993, Ser. No. 153,021

Int. Cl.<sup>6</sup> E04G 23/02

U.S. Cl. 52—745.16

14 Claims



1. A method of replacing an existing window of the type having an existing fixed metal frame mounted in an existing window opening, comprising:

- (a) removing elements of said existing window, except said existing fixed metal frame, while leaving said existing fixed metal frame in place and without rebuilding said existing window opening, including the step of removing an existing glass pane sealed directly to said existing fixed metal frame;
- (b) providing a replacement window having a monolithic frame member; and
- (c) attaching said monolithic frame member to said existing metal frame by inserting fasteners through said monolithic frame member directly into said existing fixed metal frame.

5,412,923

TRAY PACKAGING OF STACKED ARTICLES

Jeffrey A. Lashyro, and Allen L. Olson, both of Crosby, Minn., assignors to Riverwood International Corporation, Denver, Colo.

Filed Oct. 18, 1993, Ser. No. 138,599

Int. Cl.<sup>6</sup> B65B 13/02, 11/58, 35/50

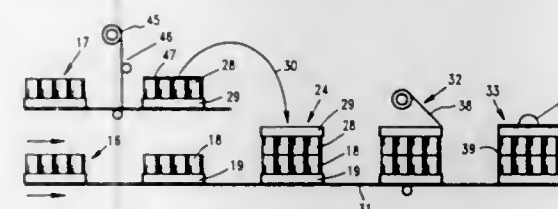
U.S. Cl. 53—399

16 Claims

13. A continuous method to form and package stacked article units comprising:

- a) providing a first stream of preselected article groups in a base tray member;

- b) providing a second stream of preselected article groups in a base tray member;
- c) wrapping a flexible film about each said article group of said second stream to form a stream of unitary structures;
- d) rotating each said unitary article group of said second stream 180 degrees to face said base tray member in an upward direction and directing said rotated unitary



groups onto the tops of said first stream of article groups to form stacked article units, each unit having base members disposed on the bottom and the top thereof; and  
e) uniting each said stacked article unit by lowering a preformed open sleeve structure over each stacked article unit and fixing said sleeve structure to said base tray members to thereby form unitary stacked article units.

5,412,924

METHOD OF MAKING RECLOSABLE PLASTIC BAGS ON A FORM, FILL AND SEAL MACHINE

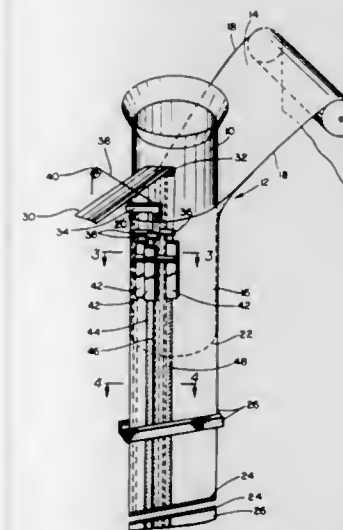
Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed Apr. 11, 1994, Ser. No. 226,288

Int. Cl.<sup>6</sup> B65B 61/18, 9/20

U.S. Cl. 53—412

10 Claims



1. A method for forming reclosable packages from a sheet of thermoplastic film on a form-fill-and-seal machine comprising the steps of:

- feeding a continuous supply of zipper strip having first and second interlocking members toward a filling spout of said form-fill-and-seal machine, and longitudinally along a surface of said filling spout each of said interlocking members including a web portion and a profile portion;
- feeding a continuous supply of said thermoplastic film having two lateral edges toward said filling spout;
- wrapping said thermoplastic film about said filling spout and about said zipper strip;
- forming a longitudinal seam in said thermoplastic film by sealing said two lateral edges to one another to produce a tube enclosing said zipper strip and said filling spout;
- attaching said zipper strip web portions to said thermoplastic film on an inside surface of said tube;

periodically forming a transverse seam across said tube to produce individual reclosable packages; and  
separating said individual reclosable packages from one another.

5,412,925

METHOD AND APPARATUS FOR INSERTING A CORE PACKAGING LAYER INTO A CLEAN ENVIRONMENT

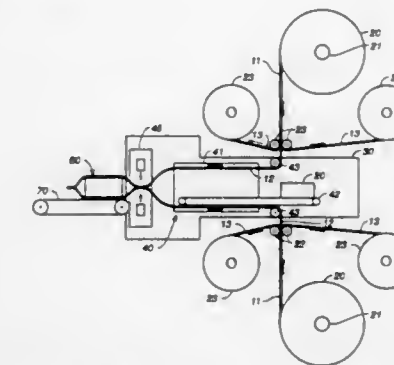
Kazunori Tani, and Toshiaki Kimura, both of Tokyo, Japan, assignors to Y.A.C. Corporation, Tokyo, Japan

Filed Mar. 14, 1994, Ser. No. 212,535

Int. Cl.<sup>6</sup> B65B 9/00, 55/02

U.S. Cl. 53—450

22 Claims



1. A method of clean packaging comprising the steps of:  
providing a multi-layer film with two peelable outer layers and a multi-layer core sheet sandwiched between said outer layers;  
peeling at least one of said outer layers off said core sheet; immediately thereafter introducing said core sheet inside a clean room means for providing a dust-free clean environment; and  
producing a bag with an opening from said core sheet inside said clean environment.

5,412,926

PROCESS AND APPARATUS FOR REJECTING DEFECTIVE PACKAGES IN THE REGION OF A PACKAGING MACHINE

Heinz Focke, Verden, Germany, assignor to Focke & Co. (GmbH & Co.), Verden, Germany

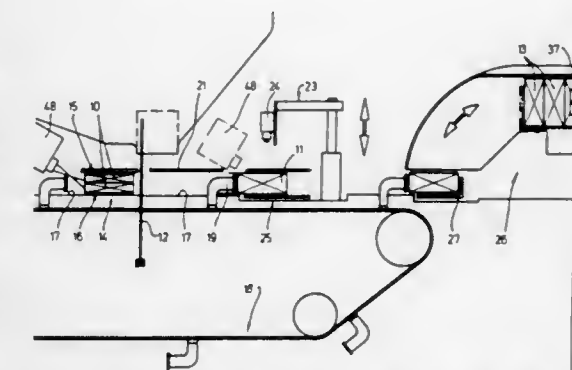
Filed Mar. 23, 1993, Ser. No. 35,792

Claims priority, application Germany, Mar. 24, 1992, 42 09 454.2

Int. Cl.<sup>6</sup> B65B 11/00, 49/00, 57/00

U.S. Cl. 53—466

12 Claims



1. A process for production of packages (13), wherein a group (11) of individual cigarette packs (10) is surrounded by an outer wrapper (12) to form a package, and wherein groups



of said individual packs are conveyed in a forward conveying direction, said process comprising the following steps:

- forming each group (11) to consist of at least one row of individual packs (10) and to extend transversely relative to said conveying direction of the groups (11);
- transporting the group (11) on a support (17), such that a blank for an outer wrapping (12), which blank is held ready in a plane located transverse relative to said conveying direction, is folded around the group (11) in a U-shaped manner, and taken along with the group (11);
- inspecting the group (11), with respect to a complete number of individual packs in the group (11), by at least one contactless inspection means (48) that is directed towards a rearward face of the group (11), which face extends transversely relative to said conveying direction, and which is formed from faces of all the individual packs of the group (11);
- if the group (11) is incomplete, identifying the package as defective and causing the inspection means to generate an error signal which subsequently causes the defective package (13) to be provided with a marking which is visible from outside the package;
- rejecting a defective, marked package (13) from a feed stream in a region of a discharge track (26); and
- in the package (13) which is identified as being defective, providing the outer wrapping (12) with the visible marking by folding over a portion of an outer lower folding tab (33) of the outer wrapping, said folding tab (33) being located outside in a complete package (13).

5,412,927

# LONGITUDINAL BAG-MAKING, FILLING AND PACKAGING MACHINE

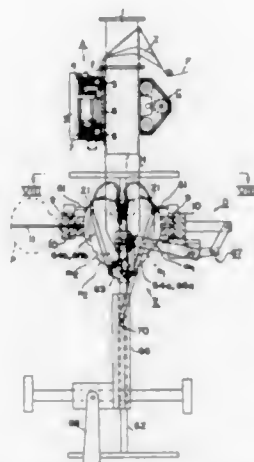
Kiyoshi Miyazaki, Tokyo; Tomoyuki Wakai, Saitama; Akira Isosaka, Saitama; Yoshiro Watanabe, Saitama, and Yukio Koyano, Saitama, all of Japan, assignors to Kawashimasakusyo Co., Ltd., Saitama, Japan

Filed Nov. 18, 1993, Ser. No. 154,609

Int. Cl.<sup>6</sup> B65B 9/20, 51/26, 51/30

U.S. Cl. 53—552

2 Claims



1. A longitudinal bag-making, filling and packaging machine, wherein in an outer surface of a product falling and filling tube wrapped by a packaging film folded into a tubular shape by a bag-making device, the packaging film is continuously fed downward by a film feeding device and an edge of the packaging film of which film inner surfaces are superposed each other in a rib-like fashion is held by a longitudinal sealing device provided at the pivot end of a horizontal pivoted arm to longitudinally deposition-seal said end edge to form a packaging tube, an article to be packaged supplied through said product falling and filling tube is filled into a packaging tube and hung down from the product falling and filling tube, and upper and lower portions of the article to be packaged of said packag-

ing tube are laterally deposition-sealed into two strips by a lateral sealing and cutting device and the sealed portion of said two strips is cut, characterized in that:

said longitudinal sealing device comprises: a pair of rod-like longitudinal heaters, a pair of film draw-in rolls, a front edge of said packaging film superposed in a rib-like fashion is sandwiched between said pair of film draw-in rolls for drawing-in said front edge and guiding said front edge into slidable close contact between said pair of rod-like longitudinal heaters, a pair of heater rolls for sandwiching therebetween said front edge and roll sealing said front edge while feeding the film at a rate greater than the draw-in rate of the film draw in roll, and an upper and lower power transmission mechanism mounted on said horizontal pivot arm for respectively driving said film draw-in rolls and said heater rolls;

said sealing and cutting device comprises: a pair of lateral heater mounting plates, a lateral heater provided on each of said pair of lateral heater mounting plates, annular grooved cams, cam engagement rods provided at both ends of each of said lateral heater mounting plates, said cam engagement rods engaging with said annular grooved cams, and a pivot lever which extends through said annular grooved cams for turning said cam engagement rods, whereby the lateral heater mounting plates are moved upward in the state where a pair of lateral heaters are opened, at which up position the mounting plates are registered with register marks printed on the packaging film and closed to provide a deposition seal for lateral two strips, and the lateral heater mounting plates move down a predetermined distance in synchronism with the film rate, at which down position the lateral heater mounting plates are opened to avoid interference with the article to be packaged so as to perform a pair of symmetrical box motions and is moved up and returned; and

the lateral sealing and cutting device further comprises: a packaging tube flattening device comprising a pair of horizontal and parallel drawing rods operatively connected to the box motion of the lateral heater mounting plates to effect a pair of longitudinal box motions between the lateral heaters when the lateral heaters are opened and move upward to a position higher than an initial position of the lateral heaters to hold the packaging tube therebetween and move downward to flatten the packaging tube over the required length.

5,412,928

# DEHYDRATION DEVICE

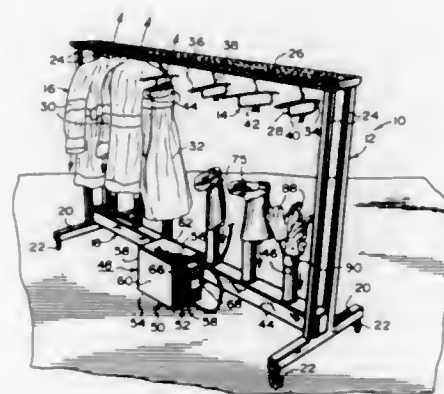
Frederick Reithel, 623 Caldonia Rd., Dix Hills, N.Y. 11746

Filed Jan. 21, 1994, Ser. No. 183,819

Int. Cl.<sup>6</sup> F26B 25/00

U.S. Cl. 34—104

13 Claims



1. A dehydration device which comprises:

- a portable framework comprising a pair of spaced apart horizontal leg bases, two pair of casters, each said pair of

casters mounted on opposite ends of each said horizontal leg base, two pair of stanchions, each said pair of stanchions affixed in an upstanding spaced apart position onto each said horizontal leg base, so that each said horizontal leg base is transversely aligned with respect to each said pair of stanchions, a perforated top rack extending horizontally between the upper ends of said two pair of stanchions, and a manifold conduit extending horizontally between the lower ends of said pair of stanchions adjacent said leg bases directly below and parallel with said top rack;

- means comprising special hangers for suspending from said top rack various components of turnout uniforms that are used by fire and rescue personnel; and
- means coupled to said portable framework for removing moisture in an accelerated time interval from the various components of the turnout uniforms comprising a plurality of air outlet pipes spaced apart in upright positions on top of said manifold conduit said pipes communicating with the interior of said conduit and means fluidly connected to a side of said manifold conduit for forcing air through said manifold conduit and out of all of said air outlet pipes, so that any wet turnout coats and bunker pants hanging down from said top rack will be dried by the forced air.

5,412,929

# STEERABLE TANDEM IMPLEMENT HITCH

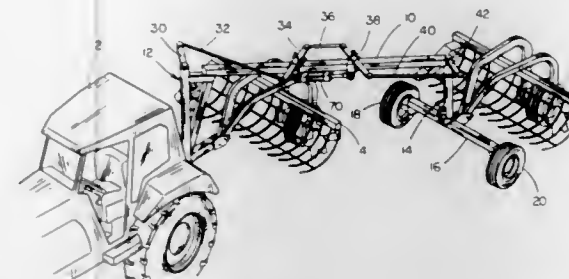
Clete Urbain, 425 4th Ave. NE., and Gene Prier, Rte. 2, Box 153, both of Dyersville, Iowa 52040

Filed Oct. 25, 1993, Ser. No. 140,930

Int. Cl.<sup>6</sup> A01D 80/00

U.S. Cl. 56—15.4

7 Claims



1. A steerable tandem implement hitch for hay rakes and other agricultural equipment whereby two implements may be towed by a single vehicle and selectively positioned to track in tandem or offset to the left or right, comprising:

- a main longitudinal frame member having an elongate, substantially horizontal beam member, a forward support member depending from one end of said elongate beam member, and a rear support member depending from the other end of said elongate beam member;
- said forward support member having a forward vertical shaft and sleeve assembly, hitch means for securing said forward vertical shaft to the towing vehicle, and a forward pivot arm affixed to the upper end of said forward vertical shaft;
- said rear support member having a rear vertical shaft and sleeve assembly, a transverse frame member supporting a wheel assembly at each end thereof and affixed to the lower end of said rear vertical shaft, and a rear pivot arm affixed to the upper end of said rear vertical shaft;
- means for pivoting said transverse frame member whereby said transverse frame member tracks offset and parallel with the towing vehicle; and
- linkage means for transferring rotation of the forward vertical shaft through said forward pivot arm and said rear pivot arm to the rear vertical shaft whereby said trans-

verse frame member pivots in response to turning of the towing vehicle.

5,412,930

# VEGETATION CUTTER FOR A COTTON HARVESTER

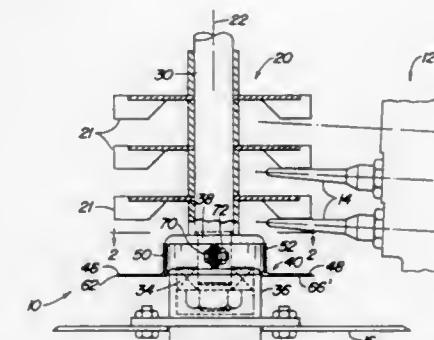
Donald H. Sheldon, Jr., Johnston, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 19, 1994, Ser. No. 246,000

Int. Cl.<sup>6</sup> A01D 46/18

U.S. Cl. 56—44

16 Claims



1. In a cotton harvester having a row unit with upright harvesting drum and an upright doffer column connected for rotation about an upright axis adjacent the drum and including a plurality of vertically spaced doffers of preselected radius, a vegetation cutting device for preventing row unit plugging comprising:

- a blade structure having a sharpened cutting edge; and
- means connecting the blade structure to the doffer column for rotation with the doffer column with the edge extending from the doffer column axis.

5,412,931

# SLIDABLE GRASS CATCHER

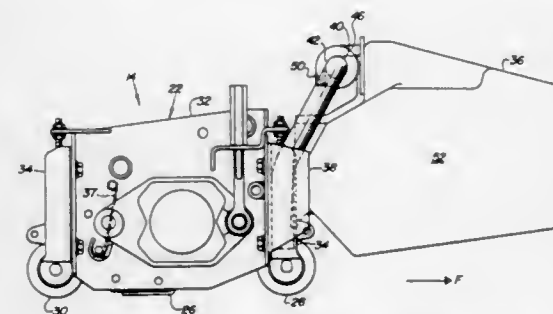
Ronald L. Reichen, Horicon, and Phillip O. Swenson, Beaver Dam, both of Wis., assignors to Deere & Company, Moline, Ill.

Filed Aug. 12, 1993, Ser. No. 105,548

Int. Cl.<sup>6</sup> A01D 34/48

U.S. Cl. 56—199

26 Claims



1. A mechanism for collecting grass clippings, said mechanism comprising:

- a cutting unit for cutting grass and dispersing grass clippings, a laterally extending member having a substantially horizontal middle portion and downwardly extending outer end portions, said outer end portions being operatively coupled with the cutting unit,
- a pair of stops on said laterally extending member, one of said stops proximate to each of said outer end portions,
- a container positioned on said laterally extending member for receiving clippings cut by the cutting unit,
- first and second laterally spaced engagement members operatively coupled with the container for engaging the later-

ally extending member to operatively couple the container with the cutting unit, one of said engagement members being shiftable along substantially the entire lateral length of the laterally extending member when the other engagement member has been disengaged from between the stops on the laterally extending member.

5,412,932

**MOTOR-POWERED LAWN MOWER**

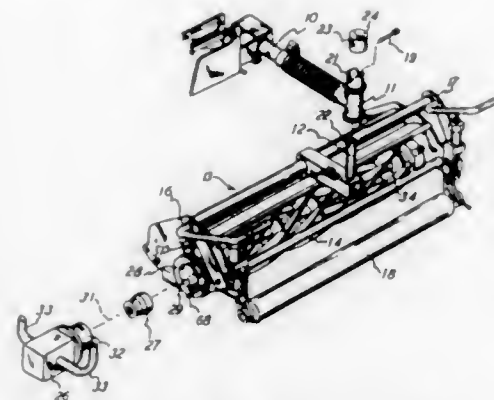
Robert A. Schueler, Franklin, Wis., assignor to Textron Inc., Providence, R.I.

Filed Aug. 10, 1994, Ser. No. 288,403

Int. Cl.<sup>6</sup> A01D 34/00

U.S. Cl. 56—249

21 Claims



1. A motor-powered lawn mower comprising a mower frame, a rotation-bearing housing mounted on said frame and having a cylindrical cavity with a longitudinal axis, a rotation bearing disposed in said housing and having a rotation axis co-axial with said longitudinal axis, a lawn mower reel having a reel shaft with a longitudinal axis and being rotationally supported on said bearing with said respective axes aligned for rotatably supporting said reel, a motor having a cylindrical extension therein snugly releasably telescoped in said cylindrical cavity to have said motor cantilever supported on said housing and have its cylindrical axis axially aligned with said reel shaft axis for the rotation of said reel, and a releasable fastener releasably connected between said housing and said motor and being operatively movable in a direction transverse to the telescoping axes of said housing and said motor for selectively engaging and disengaging said motor to releasably hold said motor in said cavity.

5,412,933

**AUTOMATIC LINK FORMING APPARATUS**

Joel D. Mallett, P.O. Box 216, Jamestown, R.I. 02835, and Robert M. Mulligan, 382 Fairview Ave., Coventry, R.I. 02816, assignors to Joel D. Mallett, Jamestown, R.I.

Filed Sep. 17, 1992, Ser. No. 945,905

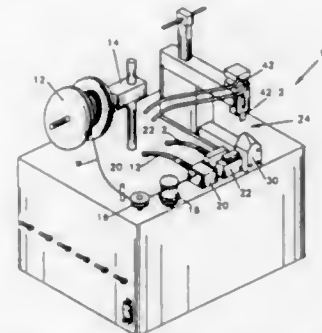
Int. Cl.<sup>6</sup> B21L 1/02, 13/00

U.S. Cl. 59—23

15 Claims

1. Link forming apparatus comprising: a forming station defining a forming area, means to grasp a wire and feed a length into the forming area, an arbor having a longitudinal axis movable horizontally along its longitudinal axis between a retracted position out of the forming area and a protracted position in the forming area with the longitudinal axis of the arbor generally perpendicular to the direction of the wire feed, forming and cutting means vertically movable between a first lower position below the forming area and a second upper position in the forming area wherein a length of wire is severed and formed into a generally U-shaped configuration around the arbor, a face plate mounted in vertical alignment with and above

the forming area, the face plate having a channel extending vertically therethrough, pusher blade means for moving a U-shaped length of wire through the channel along a straight line from the location where the U-shaped length was formed around the arbor, the pusher blade means mounted in vertical alignment with the forming area, the pusher blade means having a distal end vertically movable through the forming area so that the distal end of the pusher blade means is among a first lower position below the forming area, a second presentation position in the channel of the face plate with the distal ends of the U-shaped length extending above the face plate, and a third ejection position above the face plate, the pusher blade means including a pusher blade and a first cylinder for moving the pusher blade between the first and second pusher blade positions and a second cylinder connected in tandem with the first cylinder for moving the pusher blade between the second and third pusher blade positions, and



a forming head in alignment with and vertically movable between an upper position above the forming area and a second lower position complimentary to the presentation position, the length of wire being positioned below the arbor with the arbor in the protracted position and with the forming and cutting means severing the length and forming the length into a generally U-shaped configuration, the pusher blade, with the arbor in the retracted position, moving the U-shaped length through the forming area and into the face plate channel to the presentation position with the free ends of the length projecting above the face plate, the forming head then descending downwardly into engagement with the free ends of the U-shaped length bending the free ends into a ring configuration and after the forming head ascends back to the upper position the pusher blade moving to its third position to eject the ring configured length of wire.

5,412,934

**BUSHED CHAIN WITH ROLLER FITTED ON OUTSIDE DIAMETER OF OIL-IMPREGNATED SINTERED BUSHING**

Masaru Furuyama, Tokyo, Japan, assignor to Yamakyu Chain Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 106,876, Aug. 16, 1993, abandoned. This application Mar. 25, 1994, Ser. No. 218,311

Claims priority, application Japan, Aug. 17, 1992, 4-57512

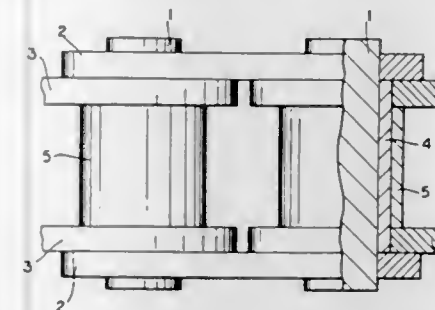
Int. Cl.<sup>6</sup> F16G 13/08

U.S. Cl. 59—78

3 Claims

1. A roller chain comprising, a link pin fixed to a pair of outer link plates therebetween, a sintered oil-retaining bushing fixed to a pair of inner link plates therebetween and fitted rotatably on an outer peripheral surface of said link pin, and a roller fitted rotatably on an outer peripheral surface of said bushing, wherein said link pin is fixed to a hole bored through the outer link plate without riveting at a top of said link pin; a surface of said bushing having a hardened surface layer; a diameter of said link pin being larger than a corresponding dimension defined in ANSI standard by 6 to 18 percent;

wherein a wall thickness of said bushing and a wall thickness of said roller is substantially equal and wherein a sum of said wall thickness of said bushing and said wall thickness of said roller



is thinner than a corresponding dimension defined in ANSI standard, and a diameter of the roller is substantially equal to a corresponding dimension defined in ANSI standard.

5,412,935

**FINE JEWELRY CHAIN, LINK THEREFOR, AND METHOD OF MANUFACTURE THEREOF**

David Rozenwasser, Savion, Israel, assignor to Avraham Moshe Rozenwasser, Savion, Israel

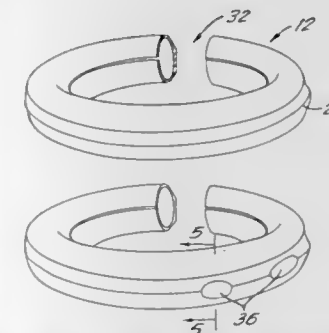
Filed Jul. 9, 1993, Ser. No. 89,266

Claims priority, application Israel, May 31, 1993, 105850

Int. Cl.<sup>6</sup> B21L 5/02

U.S. Cl. 59—80

26 Claims



1. A link for a fine jewelry chain, comprising: a tubular member having a generally uniform wall thickness in cross section and having a peripheral outer wall surface; said link being shaped into a link configuration and having an outwardly facing link perimeter; a raised wall section formed integrally with and protruding outwardly from a portion of said peripheral outer wall surface to define at said portion a wall section of greater thickness than said uniform wall thickness, said raised wall section extending longitudinally along said link at said outwardly facing link perimeter, and at least one diamond cut high luster surface formed along said raised wall section.

5,412,936

**METHOD OF EFFECTING START-UP OF A COLD STEAM TURBINE SYSTEM IN A COMBINED CYCLE PLANT**

Daniel T. Lee, Clifton Park, and Leroy O. Tomlinson, Schenectady, both of N.Y., assignors to General Electric Co., Schenectady, N.Y.

Filed Dec. 30, 1992, Ser. No. 997,966

Int. Cl.<sup>6</sup> F02C 6/18

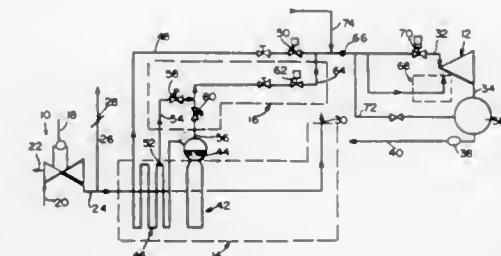
U.S. Cl. 60—39.02

15 Claims

1. In a combined cycle power generation system which includes a gas turbine; a steam turbine; and a heat recovery steam generator which includes a superheater section and an

evaporator section, and wherein condensate from the steam turbine is reheated in the heat recovery steam generator by exhaust gas from the gas turbine and returned via a main steam outlet to the steam turbine, a method of effecting start-up of the steam turbine comprising the steps of:

a) passing gas turbine exhaust gas through the heat recovery steam generator;



b) extracting steam from an intermediate location in the superheater;  
c) controlling the temperature of the extracted steam to minimize a temperature differential between the extracted steam and metal components of the steam turbine; and  
d) utilizing the extracted steam, at controlled temperature and pressure, to start up the steam turbine.

5,412,937

**STEAM CYCLE FOR COMBINED CYCLE WITH STEAM COOLED GAS TURBINE**

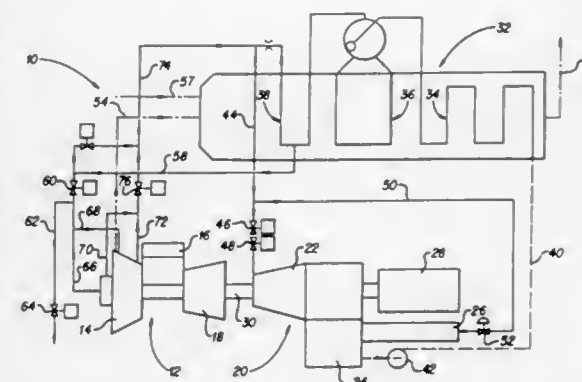
Leroy O. Tomlinson, Schenectady, and Raub W. Smith, Clifton Park, both of N.Y., assignors to General Electric Co., Schenectady, N.Y.

Filed Nov. 4, 1993, Ser. No. 145,633

Int. Cl.<sup>6</sup> F02C 6/18

U.S. Cl. 60—39.02

7 Claims



1. In a combined cycle system including a gas turbine, a steam turbine and a heat recovery steam generator including means for generating steam and a high pressure superheater, wherein gas turbine exhaust is used in the heat recovery steam generator for reheating steam for the steam turbine, the improvement comprising means for extracting steam from the high pressure superheater of the heat recovery steam generator where steam pressure is highest and conducting the extracted steam to the gas turbine for cooling hot gas turbine parts, and means for delivering the extracted steam to a high pressure section of the steam turbine.



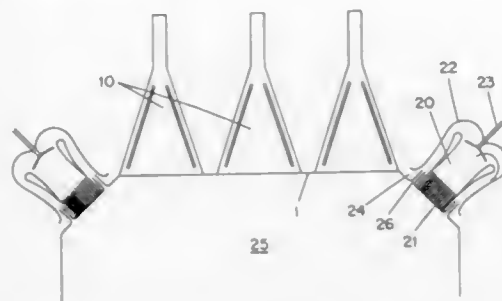
5,412,938

**COMBUSTION CHAMBER OF A GAS TURBINE HAVING PREMIXING AND CATALYTIC BURNERS**  
 Jakob Keller, Redmond, Wash., assignor to ABB Research Ltd., Zurich, Switzerland  
 Filed Jun. 29, 1993, Ser. No. 83,898  
 Claims priority, application European Pat. Off., Jun. 29, 1992, 92110969

Int. Cl. F02C 3/34

U.S. Cl. 60—39.21

3 Claims



1. A combustion chamber for gas turbines, comprising: a plurality of pre-mixing burners for performing a main combustion; and a plurality of catalytically supported gas-operated burners to support the main combustion, each catalytic burner having at least one exhaust gas nozzle to duct exhaust gas directly from the combustion chamber into the catalytic burner and a combustion air inlet formed as a jet pump for aspirating exhaust gas from the combustion chamber through the exhaust gas nozzle into the catalytic burner along with inflowing combustion air.

5,412,939

**SEAL COMPRESSION TOOL FOR GAS TURBINE ENGINE**

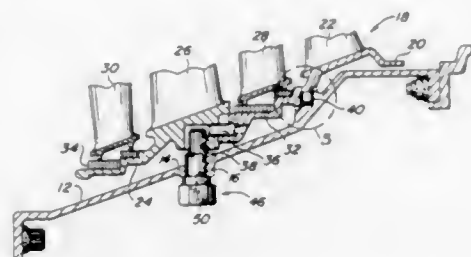
Forest H. Hoyer, Chandler, and Henry J. Ruzicka, Mesa, both of Ariz., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Filed Dec. 20, 1993, Ser. No. 170,466

Int. Cl. F02C 7/28

U.S. Cl. 60—39.33

9 Claims



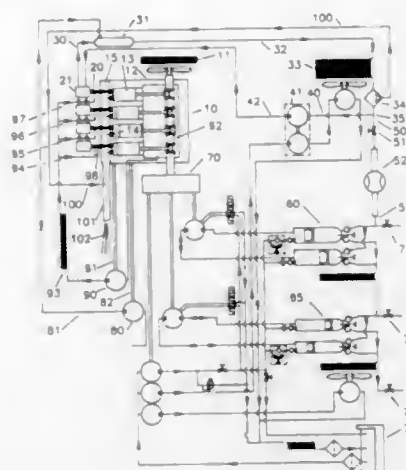
1. In a gas turbine engine: an axially extending turbine casing having a radial boss with an opening therein; a turbine nozzle having an annular support ring disposed within and adjacent said casing, and a plurality of stator vanes extending radially inwardly from said ring; an axially compressible static seal engageable with said casing and said support ring; and a seal compression member extending radially inwardly through said opening in the boss, said member having a cylindrical reaction surface engaging and rotatable on said boss, and a cam surface engaging said support ring, said member rotatable about a radial axis to urge said cam surface to axially shift said support ring and axially compress said static seal between said ring and said casing.

5,412,940

**HIGH PRESSURE EXHAUST CLEANING SYSTEM**  
 Benton F. Baugh, 14626 Oak Bend, Houston, Tex. 77079  
 Filed Feb. 3, 1994, Ser. No. 190,860  
 Int. Cl. F01N 3/20

U.S. Cl. 60—274

18 Claims



8. A method for cleaning and dehydrating the flow of the gas mixture produced by the extraction of exhaust gas from the combustion chamber of a combustion engine, comprising maintaining said gas mixture at a pressure and a temperature such that water vapor within said gas mixture will condense into a liquid, collecting said liquid in a collection chamber and directing the flow of said gas mixture toward said liquid such that additional liquids and particulate matter within said gas mixture will be entrained within said liquid, actuating a valve means venting said liquid out of said collection chamber, directing said liquid to the exhaust system of said combustion engine and allowing the heat of said exhaust system to revaporize said liquid as exhaust gases.

5,412,941

**DEVICE FOR DETERMINING DETERIORATION OF A CATALYTIC CONVERTER FOR AN ENGINE**

Katsuhiro Suzuki, Toyota; Katsuhiko Hayashi, Nagoya, and Akira Itoh, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

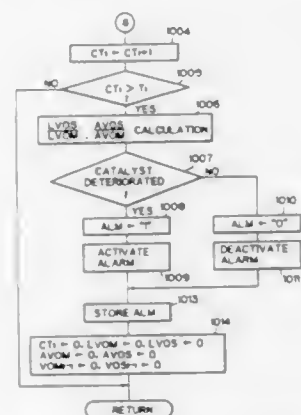
Filed Mar. 2, 1993, Ser. No. 25,640

Claims priority, application Japan, Mar. 23, 1992, 4-064883

Int. Cl. F01N 3/20

U.S. Cl. 60—276

3 Claims



1. A device for determining deterioration of a three-way

catalyst disposed in an exhaust passage of an internal combustion engine, said engine comprising, an upstream air-fuel ratio sensor disposed in the exhaust passage upstream of said three-way catalyst for detecting an air-fuel ratio of the exhaust gas upstream of said three-way catalyst, a downstream air-fuel ratio sensor disposed in the exhaust passage downstream of said three-way catalyst for detecting the air-fuel ratio of the exhaust gas downstream of said three-way catalyst, and a feedback control means for controlling the air-fuel ratio of the engine by a feedback control based on, at least, the output of said upstream air-fuel ratio sensor, said device comprising:

- a determining means for determining whether said three-way catalyst has deteriorated based on, at least, the output of said downstream air-fuel ratio sensor when the air-fuel ratio of the engine is controlled by said feedback control means;
- a condition determining means for determining that the engine operating conditions are not appropriate for said determination of the deterioration of said three-way catalyst in which a period of a cycle of said feedback control of the air-fuel ratio by said feedback control means becomes larger than a value appropriate for said determination of the deterioration of said three-way catalyst; and,
- a means for prohibiting said determination of the deterioration of said three-way catalyst when said condition determining means determines that the engine operating conditions are not appropriate for said determination of the deterioration of said three-way catalyst, wherein said determining means comprises a means for calculating lengths of the output signal response curves of said upstream and downstream air-fuel ratio sensors when the air-fuel ratio of the engine is feedback controlled by said feedback control means, a means for calculating areas surrounded by the output signal response curves and reference value lines of said upstream and downstream air-fuel ratio sensors when the air-fuel ratio of the engine is feedback controlled by said feedback control means, a means for calculating a ratio of said length of the output signal response curve of said upstream air-fuel ratio sensor to said length of the output signal response curve of said downstream air-fuel ratio sensor, a means for calculating a ratio of said area of the output signal response curve of said upstream air-fuel ratio sensor to said area of the output signal response curve of said downstream air-fuel ratio sensor, and determines whether said three-way catalyst has deteriorated in accordance with said ratio of the lengths and said ratio of said areas.

5,412,942

**CATALYTIC CONVERTER DETERIORATION DETECTING SYSTEM FOR ENGINE**

Yasuo Mukai, Kariya; Yasuhito Takasu, Toyohashi, and Masaaki Nakayama, Toyooka, all of Japan, assignors to Nippondenso Co., Ltd., Aichi, Japan

Filed Aug. 26, 1993, Ser. No. 112,209

Claims priority, application Japan, Aug. 27, 1992, 4-228564; Mar. 8, 1993, 5-046777; Apr. 15, 1993, 5-088547

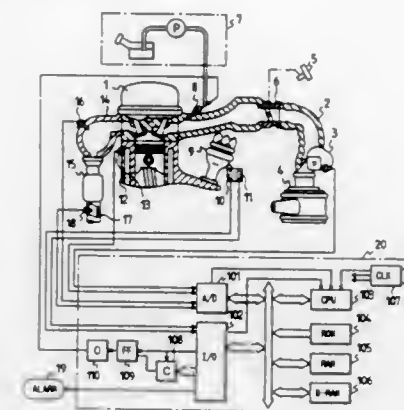
Int. Cl. F01N 3/20

U.S. Cl. 60—276

19 Claims

1. A system for an engine, comprising: a catalytic converter, provided in an exhaust system of said engine, for purifying exhaust gas discharged from said engine; an upstream-side oxygen sensor, provided upstream of said catalytic converter, for detecting whether an air-fuel ratio of an air-fuel mixture is rich or lean with respect to a stoichiometric air-fuel ratio, based on exhaust gas upstream of said catalytic converter; a downstream-side oxygen sensor, provided downstream of said catalytic converter, for detecting whether said air-fuel ratio of said air-fuel mixture is rich or lean with re-

spect to said stoichiometric air-fuel ratio, based on exhaust gas having passed through said catalytic converter; means for deriving a main air-fuel ratio correction coefficient based on an output of said upstream-side oxygen sensor, said main air-fuel ratio correction coefficient being derived for correcting an air-fuel ratio of an air-fuel mixture to be fed to said engine so as to be near said stoichiometric air-fuel ratio;



- engine control means for controlling said air-fuel ratio of said air-fuel mixture to be fed to said engine so as to be near said stoichiometric air-fuel ratio, using said main air-fuel ratio correction coefficient; means for deriving a low-frequency component in an output of said downstream-side oxygen sensor; and means for detecting deterioration of said catalytic converter based on said low-frequency component.

5,412,943

**APPARATUS AND METHOD FOR INTRODUCING SECONDARY AIR FOR CLEANING EXHAUST EMISSIONS FROM INTERNAL COMBUSTION ENGINE**

Yasuhiko Hosoya, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

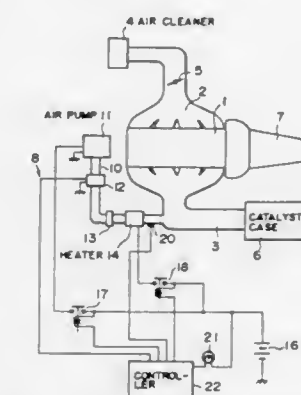
Filed Feb. 24, 1994, Ser. No. 200,466

Claims priority, application Japan, Feb. 25, 1993, 5-036581; Jun. 28, 1993, 5-157157; Aug. 31, 1993, 5-216213

Int. Cl. F01N 3/20

U.S. Cl. 60—276

7 Claims



1. A secondary air introduction apparatus for cleaning exhaust gases emitted from an internal combustion engine, comprising: air introduction means for introducing secondary air into an exhaust system of the engine having a catalyst for cleaning the exhaust gases; heating means for heating the secondary air to be introduced into said exhaust system;

temperature detecting means for detecting the temperature of the secondary air heated by said heating means; and determining means for determining whether any abnormal state has occurred, based on the temperature detected by said temperature detecting means.

5,412,944

## SEVERE SERVICE EXTRACTOR VALVE

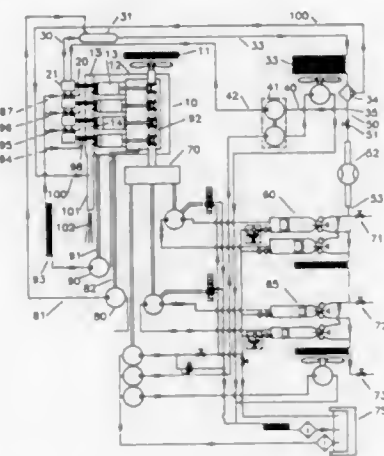
Benton F. Baugh, 14626 Oak Bend, Houston, Tex. 77079

Filed Feb. 3, 1994, Ser. No. 190,858

Int. Cl.<sup>6</sup> F01N 3/20

U.S. Cl. 60—281

20 Claims



18. A method for the extraction of a gas mixture under pressure from the combustion chamber of an internal combustion engine into a receiver circuit comprising:

- a riser tube for communicating said gas mixture from said combustion chamber within said internal combustion engine to a location outside said engine,
- a sleeve around said riser providing an annular area between said riser tube and said sleeve
- an oil pumping means which pumps oil down said annular area between said riser tube and said sleeve to cool said riser tube and said gas mixture as said gas mixture flows within said riser tube.

5,412,945

## EXHAUST PURIFICATION DEVICE OF AN INTERNAL COMBUSTION ENGINE

Kenji Katoh, Shizuoka; Tokuta Inoue; Hidetaka Nohira, both of Mishima; Kiyoshi Nakanishi, Susono; Satoshi Iguchi, Mishima; Tetsuro Kihara, Susono, and Hideaki Muraki, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toyota Cho Kenkusho and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

PCT No. PCT/JP92/01710, § 371 Date Aug. 26, 1993, § 102(e) Date Aug. 26, 1993, PCT Pub. No. WO93/12863, PCT Pub. Date Jul. 8, 1993

PCT Filed Dec. 25, 1992, Ser. No. 107,829

Claims priority, application Japan, Dec. 27, 1991, 3-358125

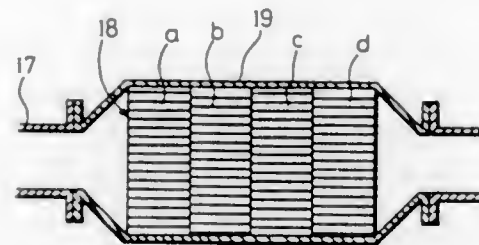
Int. Cl.<sup>6</sup> F01N 3/28

U.S. Cl. 60—285

28 Claims

1. An exhaust purification device of an internal combustion engine wherein an NO<sub>x</sub> absorbent which absorbs NO<sub>x</sub> when an air-fuel ratio of an inflowing exhaust gas is lean and releases absorbed NO<sub>x</sub> when the oxygen concentration of the inflowing exhaust gas is lowered is arranged in an exhaust passage of the engine, and an amount of alkali metals, alkali-earth metals or rare-earth metals, contained in the NO<sub>x</sub> absorbent positioned on the downstream side, is made lower than an amount of alkali metals, alkali-earth metals or rare-earth metals, contained in the NO<sub>x</sub> absorbent positioned on the upstream side, to improve the reducing ability of the NO<sub>x</sub> absorbent positioned on the downstream side as compared to the reducing ability of the

NO<sub>x</sub> absorbent positioned on the upstream side, NO<sub>x</sub> absorbed in the NO<sub>x</sub> absorbent being released from the NO<sub>x</sub> absorbent



when the oxygen concentration of the exhaust gas flowing into the NO<sub>x</sub> absorbent is reduced.

5,412,946

NO<sub>x</sub> DECREASING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Yujiro Oshima; Hideaki Muraki; Koji Yokota, all of Nagoya, and Kiyoshi Nakanishi, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Kabushiki Kaisha Toyota Chuo Kenkyusho, Toyota, Japan

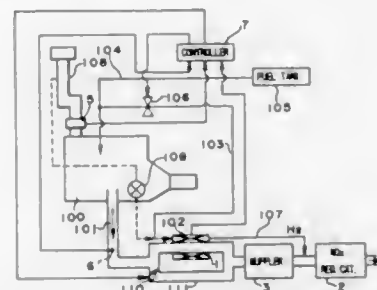
Filed Oct. 15, 1992, Ser. No. 961,230

Claims priority, application Japan, Oct. 16, 1991, 3-298252

Int. Cl.<sup>6</sup> F01N 3/36, 3/20

U.S. Cl. 60—286

27 Claims



1. An NO<sub>x</sub> decreasing apparatus for an internal combustion engine comprising:

- an internal combustion engine capable of fuel combustion at lean air-fuel ratios, the engine having an exhaust conduit, an upstream end of which is connected to the engine, and an exhaust muffler installed in the exhaust conduit;
- an NO<sub>x</sub> reduction catalyst installed at a downstream, low temperature location in the exhaust conduit, the NO<sub>x</sub> reduction catalyst being a zeolite catalyst capable of causing H<sub>2</sub> to selectively react NO<sub>x</sub> at temperatures lower than 300° C. under a predetermined engine running condition, wherein the predetermined engine running condition includes an excess oxygen condition, to thereby decompose the NO<sub>x</sub> into N<sub>2</sub> and H<sub>2</sub>O;
- an H<sub>2</sub> generator for generating H<sub>2</sub>, the H<sub>2</sub> generator including an inner core constructed of a tube inserted in the exhaust conduit, an electro-magnetic valve for injecting one of methanol and hydrocarbons into one end of the tube, and a reforming catalyst housed in the inner core; and
- means for supplying the generated H<sub>2</sub> to an inlet side of the NO<sub>x</sub> reduction catalyst, wherein the means for supplying the generated H<sub>2</sub> comprises a mixer for mixing H<sub>2</sub> with exhaust gas from the engine, wherein the mixer is located in the exhaust conduit at an inlet side of the NO<sub>x</sub> reduction catalyst.

5,412,947

## CONTINUOUSLY VARIABLE TRANSMISSION

Yoshihisa Hirose, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

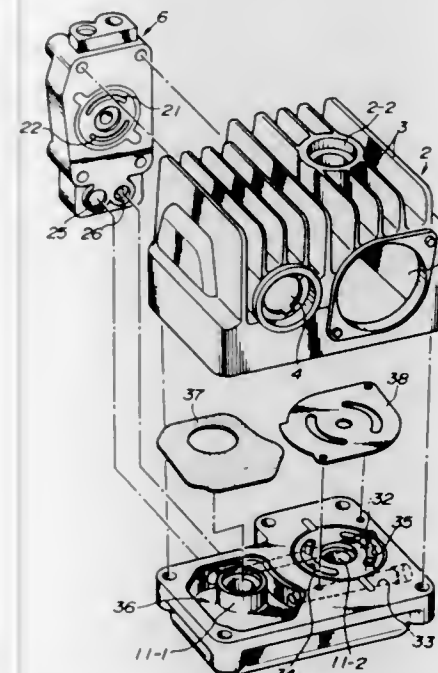
Continuation of Ser. No. 921,700, Jul. 30, 1992, abandoned. This application Oct. 12, 1993, Ser. No. 135,144

Claims priority, application Japan, Apr. 2, 1992, 4-109242

Int. Cl.<sup>6</sup> F16D 31/02

U.S. Cl. 60—454

16 Claims



14. A continuously variable transmission for transmitting the power of an engine to wheels at a variable speed reduction ratio, comprising:

- a case;
- an axial-plunger-type hydraulic pump disposed in said case for producing hydraulic pressure, said hydraulic pump having a pump cylinder with a plurality of pump plungers axially movably disposed therein, said pump cylinder having an axis of rotation; and
- an axial-plunger-type hydraulic motor disposed in said case for producing rotary motion in response to the hydraulic pressure produced by said hydraulic pump, said hydraulic motor having a motor cylinder with a plurality of motor plungers axially movably disposed therein, said motor cylinder having an axis of rotation;
- said pump and motor cylinders being close to each other, with said axes of rotation being perpendicular to each other; and
- wherein said hydraulic pump has an input shaft and said hydraulic motor has an output shaft, said input and output shafts extending coaxially through said pump and motor cylinders, respectively, in spaced perpendicular relationship to each other, said hydraulic pump and said hydraulic motor having respective base plates for distributing hydraulic pressure to said pump and motor cylinders, said base plates serving as covers for said case, said base plates being mounted on said case; and
- wherein said hydraulic motor has a cylinder plate held against said motor cylinder, said hydraulic pump having a filter for filtering oil to be supplied to said pump cylinder, said filter being fixed in place by said case, said base plate of the hydraulic motor, and a portion of said cylinder plate.

5,412,948

## HYDROSTATIC CONTINUOUSLY VARIABLE TRANSMISSION

Norio Komura; Hiroshige Makita, both of Tokyo; Tomoaki Ishikawa, Saitama, and Taro Miyakawa, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

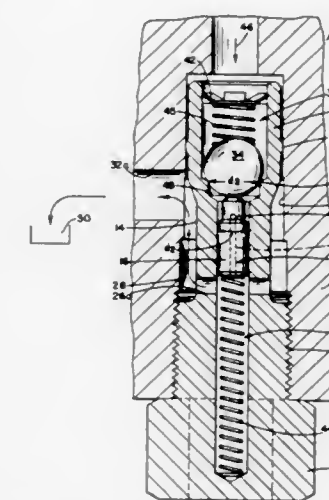
Continuation-in-part of Ser. No. 987,752, Dec. 9, 1992, Pat. No. 5,356,347. This application Sep. 14, 1993, Ser. No. 120,524

Claims priority, application Japan, Oct. 23, 1992, 4-309680

Int. Cl.<sup>6</sup> F16D 31/02

U.S. Cl. 60—468

6 Claims



1. A hydrostatic continuously variable transmission comprising:

- a hydraulic pump actuable by a power source for generating an oil pressure;
- a hydraulic motor drivable by the oil pressure generated by said hydraulic pump;
- an oil tank,
- oil passage means for supplying oil from said hydraulic pump to said hydraulic motor; and
- pressure-responsive valve means connected to said oil passage means for draining the oil from said oil passage means to the oil tank in response to a first oil pressure generated by said hydraulic pump and applied through said oil passage means,
- said pressure-responsive valve means being closable in response to a second oil pressure in said oil passage means higher than said first oil pressure, and
- said pressure-responsive valve means remaining closed upon changing of the oil pressure from the second oil pressure to an oil pressure below said second oil pressure.

5,412,949

## FUEL-DISTRIBUTION SYSTEM FOR A GAS TURBINE ENGINE

Patrick R. D. Joland, Evry-Cergy SUR Yerres, France, assignor to Societe Nationale D'Etude et de Construction de Moteurs D'Aviation S.N.E.C.M.A., Paris, France

Filed Sep. 22, 1994, Ser. No. 310,703

Claims priority, application France, Sep. 29, 1993, 93 11525

Int. Cl.<sup>6</sup> F02C 7/228

U.S. Cl. 60—739

6 Claims

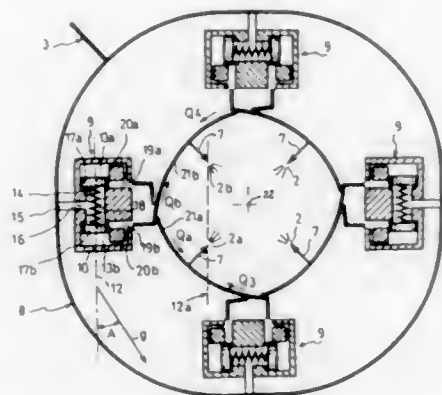
1. A fuel distribution system for a gas turbine engine having a plurality of fuel injectors arranged in an annular array and a fuel feed line, the system comprising:

- a) a closed loop fuel connection line in fluid communication with the fuel feed line;
- b) a plurality of fuel distributors, each fuel distributor comprising:
  - i) a casing defining a first and second end chambers in



communication with a central chamber, the chambers having a common axis;

- ii) a fuel inlet connected to the fuel connection line allowing fuel to flow from the fuel connection line into the central chamber;
- iii) a first fuel outlet communicating with the first end chamber;
- iv) a second fuel outlet communicating with the second end chamber;
- v) first and second pistons movably located in the first and second end chambers, respectively, such that movement of the pistons controls the opening and closing of the first and second fuel outlets, respectively, and;



- vi) biasing means acting on the first and second pistons so as to urge the pistons toward the central chamber in opposition to forces acting on the pistons caused by fuel in the central chamber;
- c) a first crossing conduit in fluid communication with the first fuel outlet of a first fuel distributor, a fuel outlet of another fuel distributor, and a first fuel injector; and
- d) a second crossing conduit in fluid communication with the second fuel outlet of the first fuel distributor, a fuel outlet of another fuel distributor and a second fuel injector, whereby each fuel distributor is oriented such that the common axis extends generally parallel to a line extending between the two fuel injectors to which the fuel distributor is fluidly connected.

5,412,950

## ENERGY RECOVERY SYSTEM

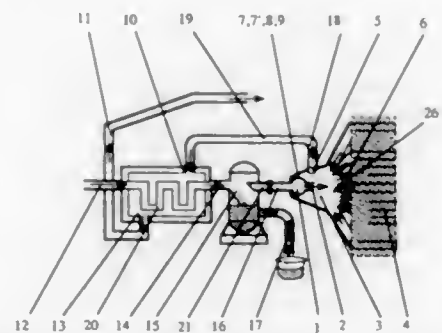
Zhimin Hu, 101 Natick Ave., Cranston, R.I. 02921

Filed Jul. 27, 1993, Ser. No. 97,974

Int. Cl.<sup>6</sup> F25B 9/00; F25J 3/00

U.S. Cl. 62—6

14 Claims



1. A gaseous wave refrigeration apparatus comprising:
  - (a) a gaseous wave refrigeration apparatus having a convergent nozzle, an oscillating chamber connected to said convergent nozzle, a plurality of resonant tubes having open end connected at apertures to said oscillating cham-

ber, and a flow stabilizer crossing over said oscillating chamber at the apertures of said resonant tubes, and

- (b) a resonant refrigeration means using a pulsating flow of a periodic jet oscillation from said convergent nozzle in said oscillating chamber driven alternatively by each of said resonant tubes, wherein said jet oscillation, maintained by a pressure positive feedback loop comprising said stabilizer and said resonant tubes, couples with the intrinsic resonant frequency of a gaseous column in said resonant tubes and governs a resonant cooling effect accompanied with said intrinsic resonant frequency of gaseous column in said resonant tubes.

5,412,951

## CYROGENIC COOLING SYSTEM WITH ACTIVE VIBRATION CONTROL

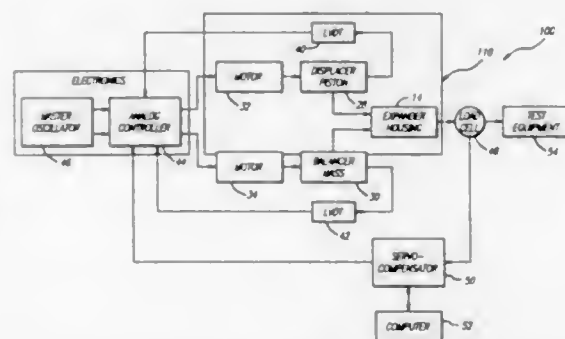
Yeog-Wei A. Wu, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 22, 1993, Ser. No. 179,636

Int. Cl.<sup>6</sup> F25B 9/00

U.S. Cl. 62—6

17 Claims



1. A cryogenic cooling system with active vibration control comprising:
  - first means for cooling a mass, said first means creating a first vibration at a first frequency and a second frequency;
  - second means for substantially eliminating said vibration at said first frequency, said second means including a mass and motor means for driving same, said mass being disposed to counter said first vibration, and said motor means being driven by a first current; and
  - third means for substantially eliminating said vibration at said second frequency, said third means including:
    - means for sensing said vibration at said second frequency and providing an output in response to a sensed force F resulting therefrom and
    - feedback means for providing a second current for driving said motor means, said second current being the sum of said first current and a feedback current  $I_{b2}$ , said feedback current  $I_{b2}$  being equal to  $-G(s)F$  where  $-G(s)$  is a feedback transfer function which is a product of a first transfer function  $H_1(s)$  representing dynamics of said second means required to cancel said vibration at said first frequency and a second transfer function  $G_D(s)$  representing the dynamics of said second means required to cancel said harmonic vibration.

5,412,952

## PULSE TUBE REFRIGERATOR

Yasumi Ohtani; Hideo Hatakeyama; Toru Kuriyama, all of Yokohama; Hideki Nakagome, Tokyo, and Yoichi Matsubara, Funabashi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 65,900, May 25, 1993, Pat. No. 5,335,505.

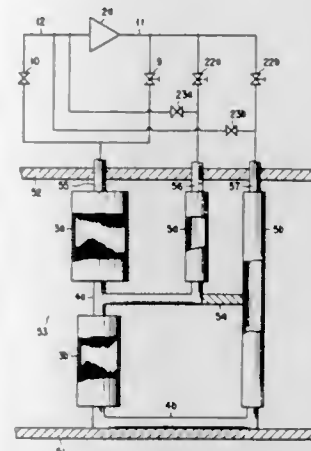
This application Jun. 1, 1994, Ser. No. 252,270

Claims priority, application Japan, May 25, 1992, 4-132523; Sep. 18, 1992, 4-249988

Int. Cl.<sup>6</sup> F25B 9/00

U.S. Cl. 62—6

41 Claims



1. A pulse tube refrigerator system, comprising:
  - a first regenerator having an inlet port and an outlet port;
  - a first pulse tube having one end portion connected in series to the outlet port of said first regenerator;
  - a second regenerator having an inlet port and an outlet port, said inlet port being connected to the outlet port of said first regenerator;
  - a second pulse tube having one end portion connected in series to the outlet port of said second regenerator;
  - a housing containing said first regenerator, said first pulse tube, said second regenerator, and said second regenerator;
  - a first conduit hermetically extending through a wall of said housing and connected to another end portion of said first pulse tube;
  - a second conduit hermetically extending through a wall of said housing and connected to another end portion of said second pulse tube; and
  - a gas compressor connected to the inlet port of said first regenerator by means of a pipe hermetically extending through a wall of said housing.

5,412,953

## PROCESS AND INSTALLATION FOR THE PRODUCTION OF GASEOUS OXYGEN AND/OR GASEOUS NITROGEN UNDER PRESSURE BY DISTILLATION OF AIR

Bernard Darredu, Sartrouville; Catherine Garnier; Alain Guillard, both of Paris; Philippe Frayse, Fontenay aux Roses; Jean-Yves Lehman, Maisons Alfort, and Norbert Rieth, Paris, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procédes Georges Claude, Paris, France

Filed Mar. 17, 1994, Ser. No. 214,296

Claims priority, application France, Mar. 23, 1993, 93 03295

Int. Cl.<sup>6</sup> F25J 3/02

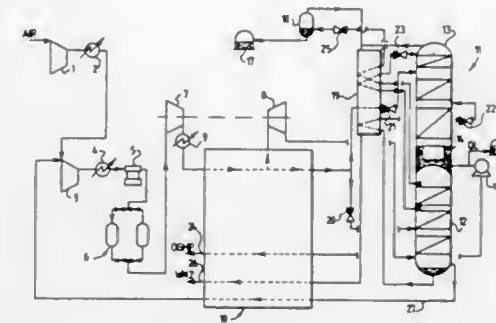
U.S. Cl. 62—25

11 Claims

1. In a process for the production of at least one of gaseous oxygen and gaseous nitrogen under pressure, comprising:
  - distilling air in a double distillation column comprising a low pressure column operating under a low pressure and a

medium pressure column operating under a medium pressure;

- compressing all the air to be distilled to at least one high air pressure substantially greater than the medium pressure;
- cooling the compressed air to an intermediate temperature, and expanding a portion of the cooled air in a turbine to the medium pressure, and then introducing the cooled and expanded air into the medium pressure column;
- liquefying the air which has not been expanded and introducing the same after expansion into the double column; and



- bringing at least one liquid product withdrawn from the double column to the production pressure, and vaporizing this liquid product by heat exchange with at least one portion of the air to be distilled in the course of cooling; the improvement comprising withdrawing an additional cycle fluid from a point downstream of said cooling, compressing the same to a high cycle pressure, cooling the same, expanding a fraction thereof with the production of external work, and liquefying the rest of the compressed additional cycle fluid.

5,412,954

## APPARATUS FOR CRYOGENIC TREATMENT, SUCH AS AIR DISTILLATION

Maurice Grenier, Paris, France, assignor to Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procédes Georges Claude, Paris Cedex, France

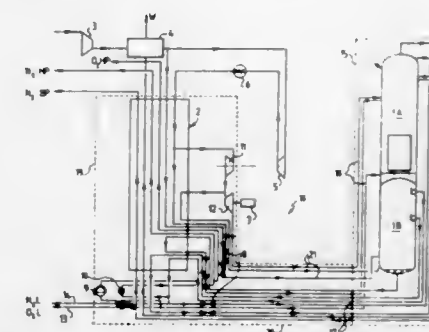
Filed Sep. 10, 1993, Ser. No. 119,359

Claims priority, application France, Sep. 16, 1992, 92 11051

Int. Cl.<sup>6</sup> F25J 3/00

U.S. Cl. 62—36

12 Claims



1. Apparatus for cryogenic treatment comprising a cryogenic treatment column, a heat exchange line to cool at least one fluid to be treated, means for supplying said at least one fluid through said heat exchange line a main sheath under vacuum disposed about said column for insulating said column, and a main cold box under atmospheric pressure containing a solid insulating material for insulating said heat exchange line, said heat exchange line being disposed within said main cold box.

5,412,955

## NON-CONDENSABLE PURGE CONTROL FOR REFRIGERANT RECYCLING SYSTEM

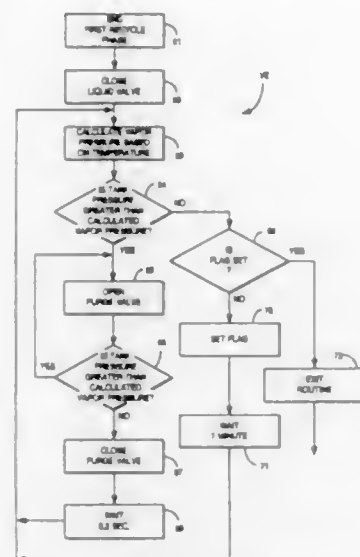
Roger L. Husarik, Bartlett, and J. Steven Martin, McHenry, both of Ill., assignors to Snap-on Incorporated, Kenosha, Wis. Division of Ser. No. 78,044, Jun. 18, 1993, Pat. No. 5,369,959.

This application Aug. 19, 1994, Ser. No. 293,082

Int. Cl.<sup>6</sup> F25B 47/00

U.S. Cl. 62—85

7 Claims



1. A method for purging non-condensables from refrigerant in a first volume through a valve to atmosphere, said method comprising the steps of: measuring the pressure in the first volume, comparing the measured pressure to a predetermined pressure, opening the valve if it is closed when the measured pressure exceeds the predetermined pressure, closing the valve if it is open when the measured pressure does not exceed the predetermined pressure, and waiting a predetermined time period after closing of the valve and then repeating the measuring and comparing steps.

5,412,956

## VARIABLE SIZED HINGED RING

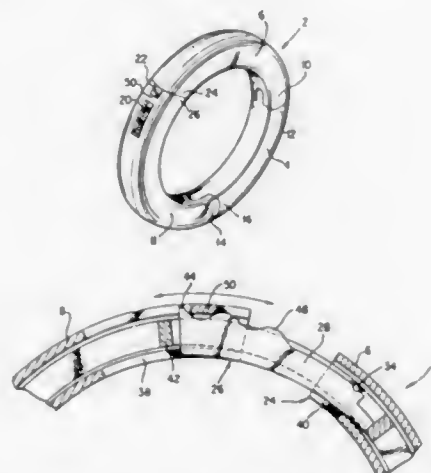
David Levy, Surfside, Fla., assignor to David Enterprises, Inc., Miami, Fla.

Filed Jan. 19, 1994, Ser. No. 183,380

Int. Cl.<sup>6</sup> A44C 9/02

U.S. Cl. 63—15.65

7 Claims



1. An adjustable finger ring comprising:

a center shank member; first and second side shank members, each side shank member being hinged at a first end portion thereof to a respective end of the center shank member and a second end portion thereof being hollow; and an elongated sizing section having a plurality of stops thereon, said sizing section comprising a first end secured within said hollow second end portion of said first side shank member and a second end with said stops thereon continuously retained within said hollow second end portion by a fixed part of said second side shank member, said sizing section being movable to locate one of said plurality of stops in position against said fixed part of said hollow second end portion of said second side shank member, whereby the circumferential size of the ring is determined.

5,412,957

## KNIT THERAPEUTIC STOCKING WITH ANTI-SLIP FEATURE

Laylon Bradberry, and John Pendergrass, both of Seneca, S.C., assignors to The Kendall Company, Mansfield, Mass.

Filed Oct. 20, 1993, Ser. No. 138,110

Int. Cl.<sup>6</sup> D04B 11/00

U.S. Cl. 66—178 A

11 Claims



1. A therapeutic stocking for covering a patient's leg and foot having circumferentially elastic leg and foot portions, the foot portion having an anti-slip feature comprising: an instep portion having elastomeric yarns knit in a repeating pattern; a sole portion having an exterior surface and being knit in a repeating pattern having courses of knit and float stitches of a covered elastomeric yarn and jersey courses of a bare elastomeric yarn, the bare elastomeric yarn being substantially on the exterior surface of the knitted sole portion, the sole portion being located to contact the exterior surface of the sole portion with a floor beneath the patient's foot to minimize slippage of the patient's foot on the floor;

the repeating pattern of the instep portion being a six course, two wale pattern having first, second, fourth and fifth courses of alternating knit and float stitches of a covered elastomeric yarn and third and sixth jersey courses of a bare elastomeric yarn, the knit stitches of the first and second courses and the float stitches of the fourth and fifth courses being in one wale, the float stitches of the first and second courses and the knit stitches of the fourth and fifth courses being in the other wale; and the repeating pattern of the sole portion being a twenty-four course, four wale pattern including two alternating twelve course patterns having four repetitions of a three course pattern having two adjacent courses of knit and float stitches of a covered elastomeric yarn in a 2:2 selection

followed by a jersey course of a bare elastomeric yarn, the float stitches of the first twelve course pattern and the knit stitches of the second twelve course pattern being in the first and second wales and, the knit stitches of the first twelve course pattern and the float stitches of the second twelve course pattern being in the third and fourth wales.

5,412,958

## LIQUID/SUPERCritical CARBON DIOXIDE/DRY CLEANING SYSTEM

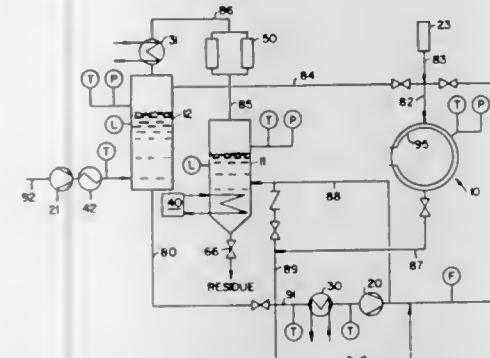
Robert J. Iliff, Oakley; James D. Mitchell, Alamo; Daniel T. Carty, Danville; James R. Latham, Livermore, and Stephen B. Kong, Alameda, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Continuation-in-part of Ser. No. 912,932, Jul. 13, 1992, Pat. No. 5,267,455. This application Dec. 6, 1993, Ser. No. 162,563

Int. Cl.<sup>6</sup> D06F 43/02

U.S. Cl. 68—5 C

3 Claims



1. An apparatus for cleaning a substrate with a densified gas comprising: a sealable cleaning vessel defining a compartment with temperature change means operatively associated therewith for adjusting the temperature within said compartment; a rotatable drum adapted to receive the substrate, the drum being positionable inside the cleaning vessel compartment, the substrate being selectably in contact with a densified first gas when within the compartment; a storage vessel in fluid communication with the compartment; a gas vaporizer vessel in fluid communication with the compartment, wherein the storage vessel is in fluid communication with the gas vaporizer vessel by first conduit means; a container containing means for imparting an aesthetic or commercially enhancing material soluble or dispersible in said densified first gas in fluid communication with the compartment; and means for introducing a compressed second gas at a selected pressure into said compartment for displacing said first densified gas.

5,412,959

## GUN LOCK ASSEMBLY

James K. Bentley, 29100 N. Lower Valley Rd., Tehachapi, Calif. 93561

Filed Nov. 23, 1993, Ser. No. 155,805

Int. Cl.<sup>6</sup> E05B 65/00; F41A 17/02

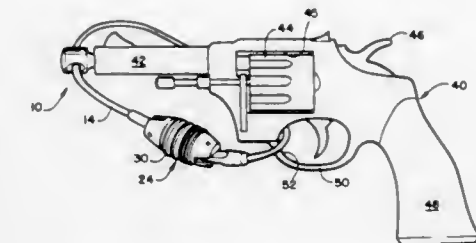
U.S. Cl. 70—30

6 Claims

1. A gun lock assembly in combination with a gun having a gun barrel having a front end and a rear end, said gun having a breech located at the rear end of said gun barrel having a front end and a rear end, said gun having a trigger guard having a central aperture, comprising:

an elongated rod member having a front end and a rear end, said rod member having a head portion integrally formed at its front end, said head portion having an aperture therein, a shank portion extends rearwardly from said

head portion and has a predetermined length D1 which would be inserted into the front end of said gun barrel; an elongated flexible cable having a predetermined length having a front end and a rear end, said cable being remov-



ably threaded through the aperture in the head portion of said rod member; and means for locking the front and rear ends of said cable together after the cable has been threaded together through (the) said trigger guard of said gun.

5,412,960

## LOCK STRUCTURE

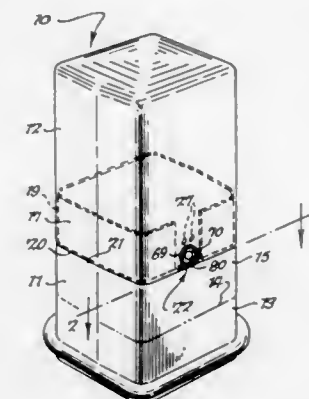
Brent A. James, and Garrick D. James, both of Williamsville, N.Y., assignors to Diversified Control, Inc., Orchard Park, N.Y.

Filed Nov. 8, 1993, Ser. No. 149,329

Int. Cl.<sup>6</sup> E05C 19/10; E05B 65/52

U.S. Cl. 70—63

9 Claims



1. In an enclosure having first and second sections which are assembled and disassembled by a relative rectilinear sliding engagement, a lock structure comprising a first channel having a first web and a first pair of legs secured to said first section, a latch, pivot means pivotally mounting said latch on said first channel, spring means biasing said latch to a locking position, a second channel having a second web and a second pair of legs secured to said second section, said first pair of legs fitting between said second pair of legs and being located between said first and second webs when said first and second sections are being rectilinearly moved into assembled relationship and after said first and second sections are in fully assembled relationship, and an end on one of said second legs for functioning as a keeper for said latch when said first and second sections are in fully assembled locked relationship.

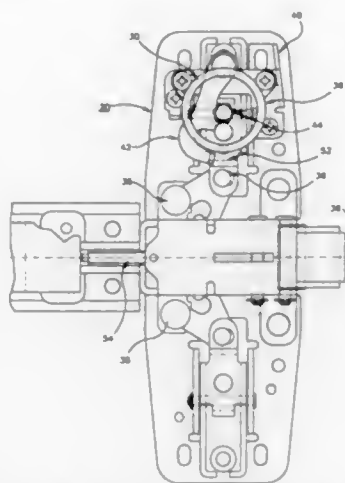


5,412,961

**EXIT DELAYING MECHANISM FOR PANIC EXIT DOOR**  
Michael L. Cain, Noblesville, and Marlin D. Austin, Speedway,  
both of Ind., assignors to Von Duprin, Inc., Indianapolis, Ind.  
Filed Jun. 1, 1993, Ser. No. 70,064  
Int. Cl.<sup>6</sup> E05C 15/02

U.S. Cl. 70—92

9 Claims



1. A mechanism for dogging a door latch assembly of a panic exit device having a retractable door latch biased to move outward from the door latch assembly, with inward movement of the door latch being activated by a push bar, the mechanism comprising:

- means for removably holding a key cylinder positioned adjacent to the door latch assembly,
- a catch mechanism linked to the door latch, the catch mechanism being configured to move as the door latch is retracted,
- a retaining arm pivotally mounted adjacent to but separate from the key cylinder holding means, the arm being configured to retain the catch mechanism so that the door latch is prevented from outwardly moving with respect to the door latch assembly, and
- a key cylinder having an attached sweep arm removably mounted in the key cylinder holding means, the sweep arm being configured alternatively to pivot the retaining arm to engage the catch mechanism when a key is turned in the key cylinder, dogging the door latch assembly, and to disengage the catch mechanism from the arm by sweeping around to break the attachment between the arm and catch mechanism, allowing the door latch to move from its retracted position to its normally biased outward position with respect to the door latch assembly.

5,412,962

**SAFETY LOCKING DEVICES FOR PVC BALL VALVES**  
Robert A. Thompson, 54 Dumfries Dr., Dumfries, Va. 22026  
Filed Dec. 2, 1993, Ser. No. 160,264  
Int. Cl.<sup>6</sup> F16K 35/00

U.S. Cl. 70—178

3 Claims

1. A new and improved safety locking device for PVC ball valves and the like comprising, in combination:

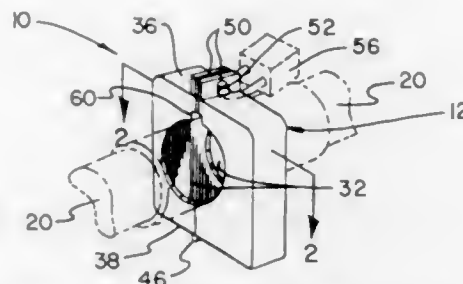
- a housing positionable over a PVC ball valve of the type having a on/off handle rotatable about a vertical axis, the handle including a horizontal section positionable in the direction of flow of fluid within coupled pipes when in an open orientation and positionable perpendicular to the direction of flow when in a closed orientation;
- the housing being formed of a pair of similarly shaped mating halves, each half having a front face and a rear face with each face having a semi-circular opening which, when the housing halves are coupled for operation and use, define a circular opening with a central axis coexten-

sive with the axis of the ball valve and pipes coupled with respect thereto, each housing half also having a top face and a bottom face and an exterior side face coupling the front and rear faces but leaving open the interior face with the semi-circular openings;

the front and rear faces of the housing halves being sufficient in size to form a chamber for a ball valve;

a hinge pivotally coupling the housing halves at their adjacent interior edges of their bottom faces;

an upwardly extending plate with an aperture on each housing half at the adjacent interior edges of their top faces, the apertures of the plates being aligned for the receipt of a lock;



a rectangular cut out formed in the front and rear faces of each housing half opposite the hinge extending upwardly as an extension of the circular openings, the cut out being positioned and sized to receive the handle of the ball valve when in the open orientation but to preclude movement of the handle from one orientation to the other when the housing halves are coupled and locked; and

supplemental aligned apertures in the upwardly extending plates one further including a tamper indicator within such apertures, such tamper indicator including a rupturable container of elastomeric material having adhesive on the exterior for coupling to the aperture and a dye on the interior for being dispensed in the event of tampering.

5,412,963

**REMOTE CONTROL ANTI-THEFT DEVICE**

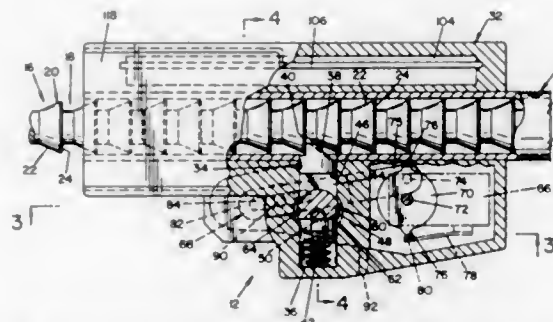
Louis D. Carlo, Litchfield; Larry A. Wise, Atwater; Danut Voiculescu, Cleveland, and John Rutkowski, Cuyahoga Falls, all of Ohio, assignors to Winner International Royalty Corporation, Sharon, Pa.

Filed Jun. 21, 1993, Ser. No. 78,831

Int. Cl.<sup>6</sup> B60R 25/10

U.S. Cl. 70—209

62 Claims



47. An anti-theft device for attachment to a steering wheel of an automotive vehicle, said anti-theft device comprising: connection means for attaching said anti-theft device to said steering wheel, means for restricting rotation of said steering wheel when said device is attached thereto, electrically operated locking means for locking and unlocking said connection means, a continuously energized electrical control circuit for said locking means, said control circuit having first and second

conditions, means for activating said locking means to unlock said connection means when said control circuit is in said first condition and to lock said connection means when said control circuit is in said second condition, and control means for operating said control circuit from outside said vehicle, said control means including means for continuously transmitting a control signal at given intervals from outside said vehicle for maintaining said control circuit in said first condition when said control means is within a predetermined distance from said vehicle, and said control circuit including means for shifting from said first condition to said second condition when said control means is beyond said predetermined distance.

5,412,964

**ANTI-THEFT DEVICE FOR A MOTOR VEHICLE**

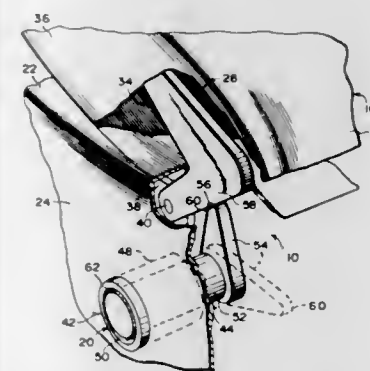
Shoony A. Yee, 88-17 Corona Ave., Elmhurst, N.Y. 11373

Filed Mar. 28, 1994, Ser. No. 218,244

Int. Cl.<sup>6</sup> A47C 31/00

U.S. Cl. 70—261

4 Claims



1. An anti-theft device for a motor vehicle having a steering wheel which comprises:

- a) a driver bucket seat assembly mounted on a floor behind the steering wheel in the motor vehicle, said bucket seat assembly including a seat cushion having a skirt thereabout, a backrest, and means for pivoting said backrest on said seat cushion, so that said backrest can go into the forward tilted position towards the steering wheel;
- b) means for locking said driver bucket seat assembly in a forward tilted position towards the steering wheel, so that a thief will not be able to sit in said driver bucket seat assembly and drive the motor vehicle away to steal it;
- c) said pivoting means including a pair of L-shaped legs, each secured within one side of said backrest adjacent said seat cushion, a pair of plates, each secured within one side of said skirt of said seat cushion adjacent one said L-shaped leg, and a pair of pins, each extending through one said L-shaped leg and one said plate, so that said backrest can go into the forward tilted position towards the steering wheel;
- d) said locking means including a lock built into said skirt of said seat cushion adjacent one said L-shaped leg, means on an interior portion of said lock for engaging with said L-shaped leg to retain said backrest in the forward tilted position towards the steering wheel, said lock including a cylinder having a keyway to receive a key when inserted, said engaging means including a stub shaft extending from a rear portion of said cylinder and turnable by said key within said keyway of said cylinder, and a wing bit on a distal end of said stub shaft, said wing bit being rotatable between one position to bear against said L-shaped leg when said backrest is in the forward tilted position to prevent said backrest from being moved out of the tilted position and a second position unblocking said L-shaped leg, said engaging means being operated by said key within said keyway and turned in the proper direction to both block and unblock said L-shaped leg, said L-shaped leg having a notch located on a side to engage a tip of said wing bit when moved into a blocking position.

leg having a notch located on a side to engage a tip of said wing bit when moved into a blocking position.

5,412,965

**METHOD OF DETERMINING THE OPTIMUM RATIOS OF ROLL ROTATION SPEEDS IN A COLD ROLL FORMING MILL**

Ryusuke Kuramoto, Tondabayashi, Japan, assignor to Nakata Manufacturing Co., Ltd., Osaka, Japan

PCT No. PCT/JP92/00943, § 371 Date Oct. 2, 1992, § 102(e)  
Date Oct. 2, 1992, PCT Pub. No. WO93/01900, PCT Pub. Date Feb. 4, 1993

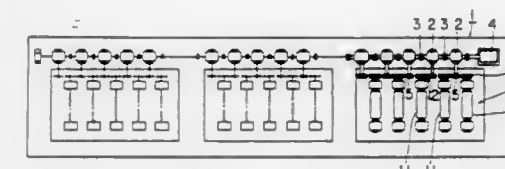
PCT Filed Jul. 24, 1992, Ser. No. 930,658

Claims priority, application Japan, Jul. 24, 1991, 3-208660

Int. Cl.<sup>6</sup> B21B 1/28, 37/00

U.S. Cl. 72—19

6 Claims



1. The method of operating a cold roll forming mill having a sequence of powered roll stands to shape a sheet of material of substantially constant thickness into a desired shape by passing through upper and lower shaping rolls at each of the roll stands, comprising the steps of:

- supplying the sequence of powered roll stands with means for variably controlling the speeds of the upper and lower rolls, determining a set of optimized roll speed ratios between the upper and lower rolls of each roll stand for attaining appropriate changes of shape of the sheet of material without accelerating and decelerating movement of the sheet of material through the rolls, and
- adjusting the roll speed ratios between the upper and lower rolls at each of the roll stands to the set of optimized roll speed ratios, and maintaining the adjusted roll speed ratios during passage of the sheet of material through the rolls.

5,412,966

**PUSH-PULL PICKLE LINE**

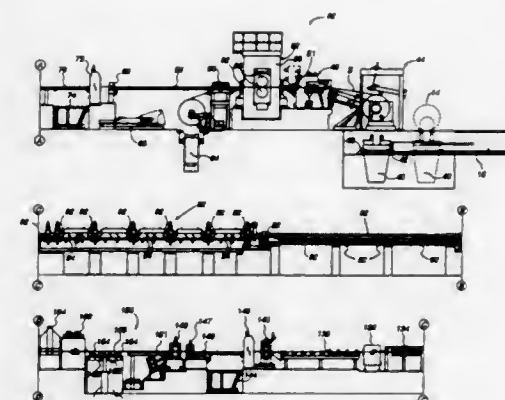
Edward D. Neese, Sewickley, and Matthew W. Botsford, Jr., Pittsburgh, both of Pa., assignors to WorldClass Industries, Inc., Ambridge, Pa.

Filed Jul. 16, 1993, Ser. No. 93,257

Int. Cl.<sup>6</sup> B21B 45/06; B08B 3/08

U.S. Cl. 72—37

35 Claims



1. A pickle line operable to remove oxides from steel strip, said pickle line comprising:  
a strip treatment portion including:  
means for uncoiling steel strip from a coil of said strip;

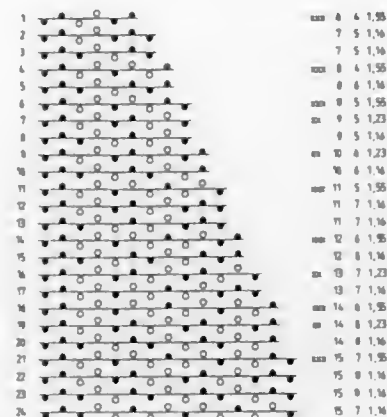
means for pickling said strip in an acid solution to remove oxides therefrom;  
means for enabling simultaneous visual inspection of the surface quality of opposite surfaces of said strip following pickling thereof; and  
means for recoiling said strip following inspection thereof.

5,412,968  
METHOD FOR LEVELING SHEET METAL  
Willi Benz, Neuss, Germany, assignor to SMS Schloemann-Siemag Aktiengesellschaft, Duesseldorf, Germany  
Continuation of Ser. No. 4,398, Jan. 14, 1993, abandoned. This application May 3, 1994, Ser. No. 237,430  
Claims priority, application Germany, Jan. 16, 1992, 42 00 922.7

Int. Cl.<sup>6</sup> B21D 1/02

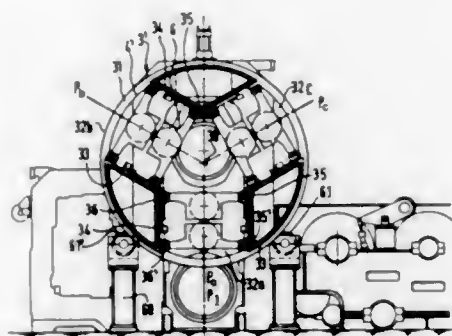
U.S. Cl. 72—164

10 Claims



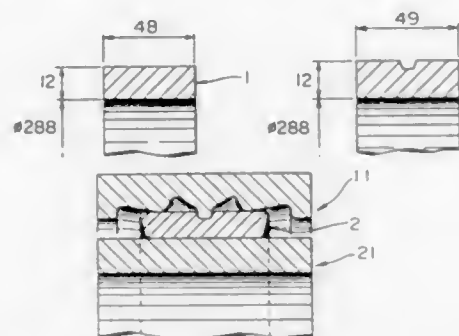
1. A method for leveling metal sheets comprising the steps of:  
conveying the sheets through leveling gaps formed by a plurality for adjustable upper and lower leveling rollers and adjusted as a function of sheet cross-section and nominal sheet strengths;  
initially deforming the sheet;  
subsequently repeatedly bending the sheet in alternative directions with diminishing degrees of deformation; and  
expanding the leveling range of a leveling machine toward a thicker metal sheet by reducing a number of leveling rollers in engagement with the metal sheet by at least one of targeted lifting of individual upper leveling rollers and targeted lowering of individual lower leveling rollers so that a variable non-symmetrical pitch is provided between at least one of the individual upper leveling rollers and the individual lower leveling rollers, respectively.

5,412,969  
ROLL REPLACEMENT INSTALLATION  
Gérard Bertholon, Saint-Etienne, France, assignor to Cieclm, France  
Filed Jun. 16, 1993, Ser. No. 77,079  
Claims priority, application France, Jun. 16, 1992, 92 07289  
Int. Cl.<sup>6</sup> B21B 31/10  
U.S. Cl. 72—239  
21 Claims



1. A roll replacement installation in a rolling mill for rolling a product passing along a feed axis, said installation comprising (a) a fixed stand;

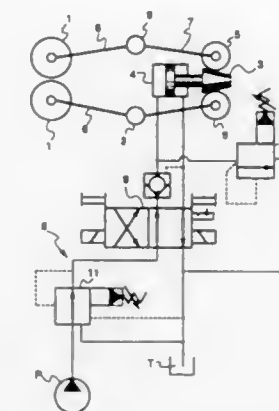
5,412,967  
METHOD OF MAKING A METALLIC RING-SHAPED BODY  
Takeshi Ishihara, Tokyo, Japan, assignor to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 33,325, Mar. 18, 1993, abandoned. This application Aug. 10, 1994, Ser. No. 288,879  
Claims priority, application Japan, Apr. 6, 1992, 4-084106; Apr. 6, 1992, 4-084107  
Int. Cl.<sup>6</sup> B21H 1/06  
U.S. Cl. 72—70  
20 Claims



1. A method of fabricating surface shapes on a peripheral surface of a metallic ring body by roll forming a stock material having a ring-shape between a pair of nonconjugate rolls, the rolls consisting of a shaping roll and a forming roll, the axial cross sectional area of said stock material being roughly rectangular and larger than an axial cross sectional area of said metallic ring body, and the inner diameter of said stock material being smaller than an inner diameter of said metallic ring body, said method comprising the steps of:  
preparing said pair of rolls so that a shape change section is provided on a radial peripheral surface of said shaping roll;  
placing said stock material between said shaping roll and said forming roll, and pressing said shape change section against said stock material so as to form a shape change region on said peripheral surface of said stock material;  
continuing to roll form while constantly maintaining a separation gap between said shaping roll and said forming roll to form surface shapes on said peripheral region of said stock material, the separation gap extending along an axial direction of the stock material and functioning to increase the axial dimension of said stock material until the exterior dimensions of said stock material approach the exterior dimensions of said metallic ring body;  
forming an initial ring-shaped depressed region in a central axial region of said stock material; and  
engaging a ring-shaped protrusion section of said shaping roll with said initial ring-shaped depressed region to prevent shifting of said stock material in the axial direction during roll forming.

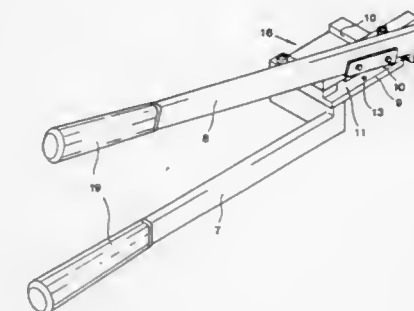
(b) at least four superposed rolls, including two live rolls placed in a working zone of said stand and at least two pressure rolls, said live rolls bearing on said pressure rolls;  
(c) each live roll having two ends carried respectively by chocks each having guiding parts symmetrical with respect to a tightening plane passing through axes of said live rolls;  
(d) said chocks sliding, respectively, on two pairs of fixed guide rails extending parallel to said axes of said rolls and provided on said stand on each side of said tightening plane, for removal of said live rolls by a sliding axial movement;  
said installation being fitted with storage and replacement means comprising  
(e) at least one drum arranged on one side of said stand, said drum being mounted for rotation about a rotational axis parallel to said axes of the rolls, and positioned in said tightening plane;  
(f) said drum comprising at least three compartments, each of said compartments being symmetrical with respect to a median plane passing through said rotational axis;  
(g) means for controlling rotation of said drum about said rotational axis in order to successively place each compartment of said drum in front of a working zone of said stand in a roll replacement position in which the median plane of each said compartment coincides with said tightening plane;  
(h) two pairs of guide rails inside each said compartment of said drum arranged symmetrically with respect to the median plane of said compartment, said rails being placed in alignment with, respectively, two pairs of fixed rails of said stand, in the roll replacement position of a corresponding compartment;  
(i) one of said compartments being vacant and all others of said compartments containing, on standby, a pair of live rolls having chocks bearing, respectively, on corresponding rails of said compartment;  
(j) each compartment of said drum having means for holding the pair of rolls in position inside said compartment in any angular position of said drum;  
(k) at least one transfer means for transferring, by axial sliding movement, the pair of live rolls located in said stand to a withdrawn position outside said stand located in alignment with said working zone, and inversely, the pair of rolls stored in the corresponding compartment of said drum to a working zone of said stand, said compartment being brought into alignment with said working zone by rotating said drum.

guide rollers placed between rolling stand means in a roller guide portion, said method comprising the steps of:  
providing that a ratio (K/M) of an elastic constant (K) of said roller guide portion of said roller guide apparatus to a gradient (M) in a plasticity characteristic curve which is



obtained when pressing said steel material guided between said guide rollers in rolling is at least equal to be 0.5.

5,412,971  
TOOL  
Stig Axelsson, Tranås, Sweden, assignor to AB Hammarprodukter, Bjursås, Sweden  
PCT No. PCT/SE92/00276, § 371 Date Oct. 28, 1993, § 102(e) Date Oct. 28, 1993, PCT Pub. No. WO92/20493, PCT Pub. Date Nov. 26, 1992  
PCT Filed Apr. 28, 1992, Ser. No. 146,021  
Claims priority, application Sweden, May 13, 1991, 9101421  
Int. Cl.<sup>6</sup> B21D 39/00  
U.S. Cl. 72—326  
13 Claims



1. An apparatus for constructing signs wherein selective sign display elements are assembled on a base section by engagement with opposite edge portions of the base section said apparatus comprising at least two tool members relatively displaceable with respect to each other, said tool members defining cutting means for severing the base section, said tool members further including means for deforming the base section to secure the sign display elements from disengagement with the base section.

5,412,970  
GUIDING METHOD FOR STEEL MATERIALS TO BE ROLLED AND ROLLER GUIDE SYSTEM THEREFOR  
Tadashi Kawamura; Yoshiaki Yamaguchi; Sadao Yoshizawa; Shoji Okada; Makoto Edo; Tatsuya Kutsuwada; Atsumu Nakamura; Akira Manabe; Takaya Suzuki, and Kyouhei Murata, all of Sapporo, Japan, assignors to Kotobuki Sangyo Kabushiki Kaisha, Kokkaido, Japan  
Filed Jul. 6, 1993, Ser. No. 88,062  
Claims priority, application Japan, Nov. 6, 1992, 4-321420; Jan. 18, 1993, 5-021611  
Int. Cl.<sup>6</sup> B21B 39/16  
U.S. Cl. 72—250  
2 Claims

1. In a method for guiding a steel material to be rolled into a rolling mill machine by use of a roller guide apparatus having



5,412,972

## METHOD OF MAKING A GASKET

Peter Congelliere, Villa Park, Calif., assignor to Crenshaw Die and Manufacturing Corporation, Orange, Calif.

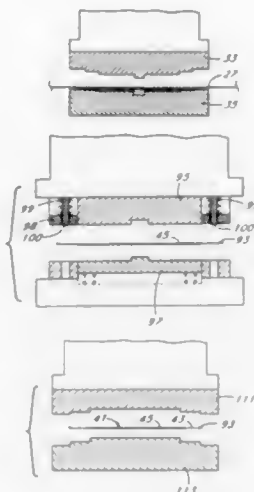
Filed Nov. 3, 1993, Ser. No. 147,335

Int. Cl.<sup>6</sup> B21D 53/84, 28/26

U.S. Cl. 72—333

15 Claims

1. A process of forming a gasket comprising the steps of: providing a first disk having an aperture track of relatively thin material and comprising a plurality of apertures, the axis of each aperture perpendicular to the surface thereof bounded by a radially inward thicker portion and a radially outward thicker portion; punching said radially outward thicker portion away; and



punching away a portion of said radially inward thicker portion.

5,412,973

Patent Not Issued For This Number

5,412,974

METHOD OF PRODUCING SEAMLESS PIPES UTILIZING A PLUG ROLLING PROCEDURE

Karl H. Häusler, Korsebenbroich, Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Germany

Filed Apr. 16, 1993, Ser. No. 49,059

Claims priority, application Germany, Apr. 16, 1992, 42 13 276.2

Int. Cl.<sup>6</sup> B21B 17/06

U.S. Cl. 72—370

3 Claims

1. A method of producing seamless pipes by carrying out a plug rolling procedure in a rolling direction, the method com-

prising expanding and stretching a hollow ingot into a bloom by carrying out at least two consecutive passes in a single roll stand having rolls defining a box-groove and by using a stationary plug supported by a rod, pulling the bloom after each pass by means of a driving unit from the rod in a direction opposite the rolling direction, turning the bloom after each pass by 90° C. about a longitudinal axis thereof before carrying out a subsequent pass, wherein the plug is exchanged after each pass, the groove having a bottom, the rolls being adjustable relative to each other to be spaced apart by a roll distance, the bloom having a wall and a circumference, further comprising the step of adjusting in a first pass a wall thickness of the bloom in a wall portion of the bloom at the groove bottom by changing and maintaining the roll distance in order to take into account thin-stretch of said wall portion in a subsequent pass such that the wall thickness of finish-rolled bloom is uniform over the circumference thereof thereby eliminating a need for any subsequent reeling installation processing of the finish-rolled bloom.

5,412,975

UNIVERSAL INLET FOR AIRBORNE-PARTICLE SIZE-SELECTIVE SAMPLING

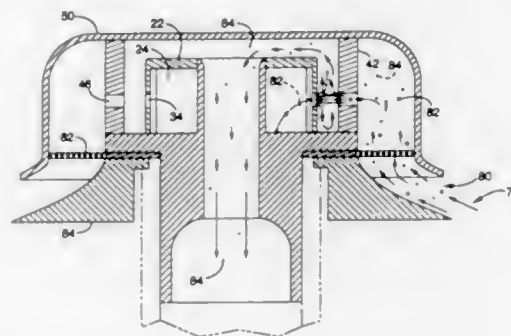
Otto G. Raabe, and Stephen V. Teague, both of Davis, Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Nov. 12, 1993, Ser. No. 152,461

Int. Cl.<sup>6</sup> G01N 1/02

U.S. Cl. 73—28.04

15 Claims



1. A size-selective particle sampling inlet apparatus, comprising:

- (a) flow director means for receiving a stream of air containing particles having aerodynamic equivalent diameters larger and smaller than a specified cut size and for converting said particle containing stream of air into a jet stream, said flow director means comprising a ring having a plurality of flow orifices;
- (b) particle collector means for receiving said particles having aerodynamic equivalent diameters larger than said cut size, said particle collector means including an outer wall having a plurality of collector orifices, each of said collector orifices spaced apart from and axially aligned with a corresponding one of said flow orifices; and
- (c) stagnation chamber means for containing said received particles.

5,412,976

APPARATUS FOR DETERMINING THE AIR PERMEABILITY OF A CLOTH WEB

Horst Vogt, Zuerich, Switzerland, assignor to Textest AG, Zuerich, Switzerland

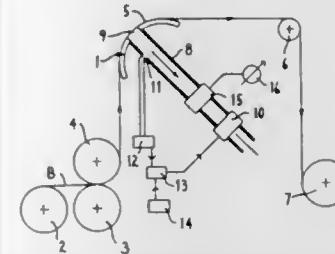
Filed Feb. 4, 1994, Ser. No. 192,012

Claims priority, application Switzerland, Feb. 9, 1993, 00389/93

Int. Cl.<sup>6</sup> G01N 15/08

U.S. Cl. 73—38

17 Claims



1. In an apparatus for determining the air permeability of a sheet-like cloth web held tensioned in spread-out form between rollers, including: a measuring tube opening through an outer surface of a measuring head in order to form a measuring orifice; means for sealing off in an airtight manner, around a circumference of said measuring orifice, a region of the cloth web guided over said measuring orifice; a pump for generating a vacuum in said measuring tube; and means for determining the air quantity sucked through the cloth web; the improvement comprising said surface of said measuring head being convexly curved in the region of said measuring orifice and causing a deflection of the cloth web, through which the latter is automatically pressed sealingly against said surface around said measuring orifice, there being arranged in said measuring head concentrically around said measuring orifice an annular channel having therein during operation the same vacuum as in said measuring tube at said measuring orifice.

5,412,977

TURBO MACHINE WITH AN AXIAL DRY GAS SEAL

Hans Schmohl, Galgenen, and Heinrich Lorenzen, Untersiggen-

thal, both of Switzerland, assignors to Sulzer Escher Wyss AG, Zurich, Switzerland

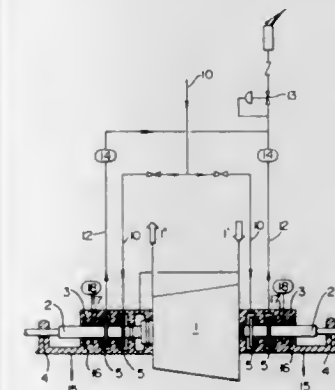
Filed May 11, 1993, Ser. No. 59,279

Claims priority, application Switzerland, Jul. 2, 1992, 02088/92

Int. Cl.<sup>6</sup> F01D 3/00; F16J 15/34; G01M 3/28

U.S. Cl. 73—46

23 Claims



1. A turbo machine, such as a gas turbine or a turbo compressor, having a barrier gas at high pressure, a high-speed rotating shaft in a machine housing, and including an axial shaft seal arrangement in said housing wherein said shaft seal arrangement comprises:

at least one dry gas seal(s), which consists of a rotating

sealing body rotating with said shaft and of a non-rotating sliding ring in said housing for permitting planned limited leakage of said barrier gas through a sealing gap between said rotating sealing body and said non-rotating, axially-sliding ring to a low pressure area;

a further restriction being located between said housing and said shaft, said restriction taking the form of a circular orifice surrounding said shaft with a small clearance, but not touching said shaft, whereby said further restriction is located downstream of said dry gas seal in said low pressure area and define a chamber towards said dry gas seal, where, via a reduced pressure level, said pressure increases with increasing leakage through said dry gas seal; and

a pressure inspection device, said pressure inspection device being connected to said chamber for detecting changes of said planned limited leakage by means of different pressure indications and for providing a signal when a predetermined pressure is exceeded.

5,412,978

LEAK DETECTION SYSTEM

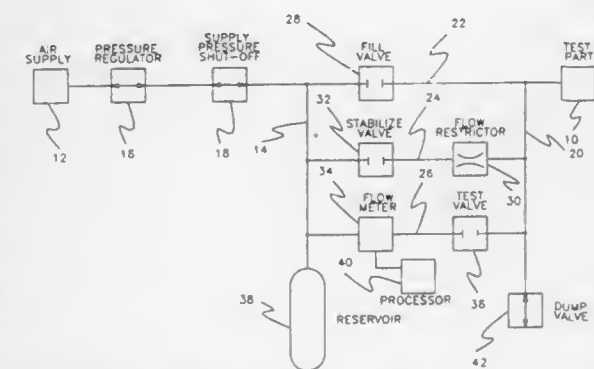
George R. Boone, Spring Valley, and Max E. Weitz, Beaver-creek, both of Ohio, assignors to Phase 1 Instruments, Inc., Dayton, Ohio

Filed Jun. 22, 1993, Ser. No. 81,083

Int. Cl.<sup>6</sup> G01M 3/26

U.S. Cl. 73—49.2

13 Claims



1. A leakage test apparatus comprising: first means for filling a part to be tested for leakage at a first range of flow rates, second means for filling said part at a second range of flow rates wherein a maximum flow rate of said second range of flow rates is less than a maximum flow rate of said first flow rates, and third means associated with said first and second means for sensing flow to said part and also for initiating said second means in response to said sensed flow when a flow rate of said first range of flow rates approaches a predetermined value.

5,412,979

METHOD AND APPARATUS FOR DISSOLUTION TESTING OF A DOSAGE FORM

Alireza D. Fassihi, Philadelphia, Pa., assignor to Temple University - Of the Commonwealth System of Higher Education, Philadelphia, Pa.

Filed May 3, 1993, Ser. No. 56,636

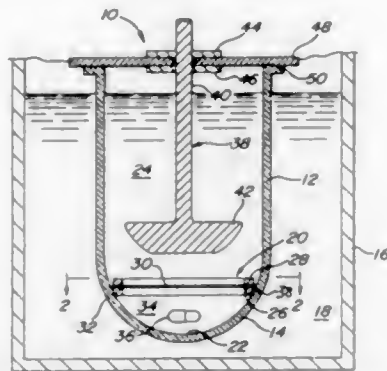
Int. Cl.<sup>6</sup> B01D 11/02

U.S. Cl. 73—53.01

13 Claims

8. An apparatus for limiting floatation of a dosage form in a drug dissolution testing vessel comprising an annular ring assembly circumferentially enclosing and surrounding a screen

mesh, the ring assembly having an outwardly circumferentially edge for contacting the vessel wall a selected distance from the



vessel bottom to form a dosage form retaining space defined by the volume intermediate to the disk and the vessel bottom.

5,412,980

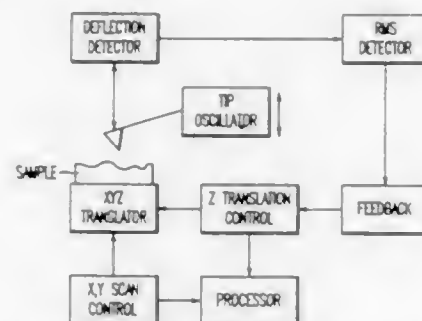
## TAPPING ATOMIC FORCE MICROSCOPE

Virgil B. Elings, and John A. Gurley, both of Santa Barbara, Calif., assignors to Digital Instruments, Inc., Santa Barbara, Calif.

Filed Aug. 7, 1992, Ser. No. 926,175  
Int. Cl.<sup>6</sup> G01B 7/34

U.S. Cl. 73—105

28 Claims



1. In a method of operating an atomic force microscope including a probe including a probe tip mounted on one end of a lever arm and wherein the probe tip is scanned across the surface of a sample and data representative of the surface of the sample is gathered in relation to the positioning of the lever arm as the probe tip is scanned, the improvement comprising: oscillating the probe tip at or near a resonant frequency of the probe or a harmonic of said resonant frequency and with a free oscillation amplitude  $A_0$  sufficiently great so that the oscillating probe tip does not stick to the surface of the sample when the oscillating probe tip contacts the surface of the sample;

positioning the oscillating probe tip so that the oscillating probe tip repeatedly taps the surface of the sample with the probe tip repeatedly contacting and breaking contact with the surface of the sample without sticking to the surface of the sample;

translating the oscillating probe tip across the surface of the sample with the oscillating probe tip repeatedly tapping the surface of the sample so that the oscillation amplitude of the probe tip is stably affected due to changes in topography of the surface of the sample; and

producing signals indicative of variations in the topography of the surface of the sample in relation to changes in the oscillation of the oscillating probe tip upon repeated tapping of the oscillating probe tip against the surface of the sample during translation of the oscillating probe tip across the surface of the sample.

5,412,981

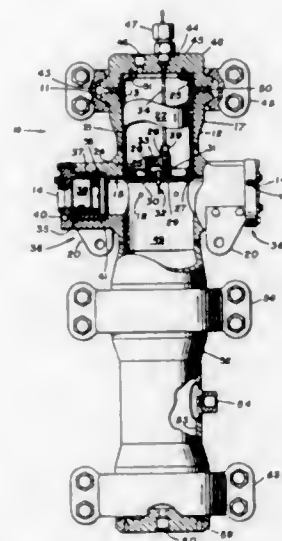
## APPARATUS FOR TESTING HIGH PRESSURE INJECTOR ELEMENTS

W. Neill Myers; Ewell M. Scott; John C. Forbes, and Michael D. Shadoan, all of Huntsville, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 7, 1993, Ser. No. 117,587  
Int. Cl.<sup>6</sup> G01M 15/00; F02M 65/00

U.S. Cl. 73—119 A

20 Claims



1. An apparatus for testing the efficiency of an injector element having an inlet and an outlet and from which at least one fluid is directed comprising:

a housing assembly enclosing an injector chamber into which said fluid is injected;

said injector element being mounted in said housing assembly and disposed for communication between a source of said at least one fluid and said injector chamber;

first purge means disposed for communication with a source of purge gas for directing said purge gas into said chamber adjacent said injector element outlet for purging the area around said injector element outlet to permit unobstructed viewing thereof; and

window means mounted in said housing assembly adjacent said chamber to permit visual observation and analysis of the pattern of the injected said at least one fluid in said injection chamber.

5,412,982

## WINDSOCK SUPPORT

James K. Potts, 12750 W. Montana Dr., Lakewood, Colo. 80228  
Filed Mar. 10, 1994, Ser. No. 208,366

Int. Cl.<sup>6</sup> A63B 53/00

U.S. Cl. 73—170.05

6 Claims

1. A windsock support comprising:

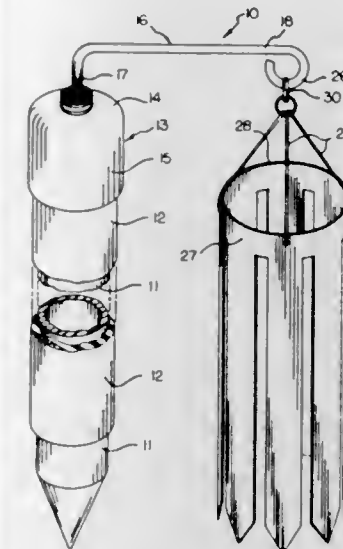
a support post having an upper end;

a mounting tube received over said upper end of said support post, said mounting tube having an uppermost distal end; a cup member fixedly secured to said uppermost distal end of said mounting tube, the cup member having a cup member top wall and a cup member skirt;

an L-shaped rod having a first leg and a second leg orthogonally mounted in a fixed relationship relative to the first leg, with the first leg rotatably mounted to the top wall and the second leg extending laterally beyond the cup member skirt, the second leg having a second leg outermost distal end and a second leg loop at said second leg outermost distal end, said second leg loop being operable

to support a windsock structure, said cup member top wall has a through-extending aperture and the first leg is directed through said aperture of said cup member; a first abutment plate fixedly mounted to the first leg within the cup member; a second abutment plate fixedly mounted to the first leg spaced from the first abutment plate, with the second abutment plate positioned exteriorly of the cup member; a guide bushing positioned concentrically within said aperture in said cup member top wall and slidably receiving the first leg therethrough, with the guide bushing posi-

tioned between the first abutment plate and the second abutment plate, the guide bushing having an abutment flange abutting with the cup member top wall exteriorly of the cup member, wherein said first abutment plate is spaced from said second abutment plate along said first leg a distance greater than an axial length of said guide bushing so as to permit a reciprocating axial translation of said first leg through said guide bushing; and, a lock ring receiving the guide bushing therethrough with the cup member top wall being positioned between the lock ring and the cup member top wall.



tioned between the first abutment plate and the second abutment plate, the guide bushing having an abutment flange abutting with the cup member top wall exteriorly of the cup member, wherein said first abutment plate is spaced from said second abutment plate along said first leg a distance greater than an axial length of said guide bushing so as to permit a reciprocating axial translation of said first leg through said guide bushing; and, a lock ring receiving the guide bushing therethrough with the cup member top wall being positioned between the lock ring and the cup member top wall.

5,412,983

## DEVICE FOR DETERMINING THE FLOW VELOCITY AND FLOW DIRECTION OF GASES OR LIQUIDS

Martin Rombach, and Manfred Streicher, both of Lenzkirch, Germany, assignors to Testo GmbH & Co., Lenzkirch, Germany

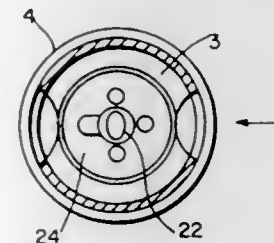
Filed Mar. 18, 1994, Ser. No. 214,413

Claims priority, application Germany, Mar. 19, 1993, 43 08 877.5

Int. Cl.<sup>6</sup> G01F 1/68; G01P 5/12

U.S. Cl. 73—170.12

18 Claims



1. Device for determining the flow velocity and flow direction of gases or liquids, comprising: a holding pipe; a hollow substantially cylindrical pipe segment having a

5,412,984

## VESSEL SPEED MEASURING SYSTEM FOR THE MARINE PROPULSION MACHINE

Ryozo Okita, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

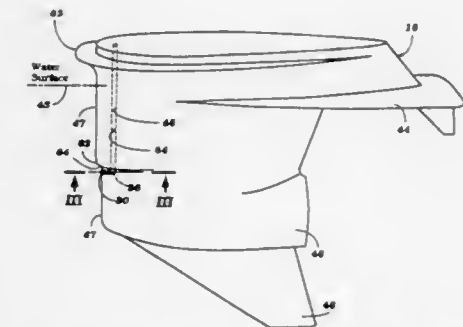
Filed Mar. 20, 1992, Ser. No. 860,052

Claims priority, application Japan, Apr. 2, 1991, 3-096344

Int. Cl.<sup>6</sup> G01C 21/10

U.S. Cl. 73—182

24 Claims



1. In a vessel speed measuring and indicating arrangement having a propulsion unit, an outboard portion of said propulsion unit, an intake port formed along a forward region of said outboard portion, an operator interfacing display assembly, and a line communicating said intake port with said display assembly, the improvement comprising a debris blocking projection formed in close proximity to said intake port and extending laterally forward of said intake port, wherein said debris blocking projection is operable to prevent pieces of debris from entering and lodging within said port.

5,412,985

## SYSTEM AND METHOD FOR RATIONOMETRICALLY PROCESSING SENSED SPEED AND VIBRATION SIGNALS FOR A NON-UNIFORMLY ROTATING BODY

David L. Garcia, Salem, N.H.; Robert G. Bianchi, Billerica, and Robert J. Hueston, Stoneham, both of Mass., assignors to Ametek Aerospace Products, Inc., Wilmington, Mass.

Filed Sep. 18, 1992, Ser. No. 947,425

Int. Cl.<sup>6</sup> G01M 1/16; G06F 15/20

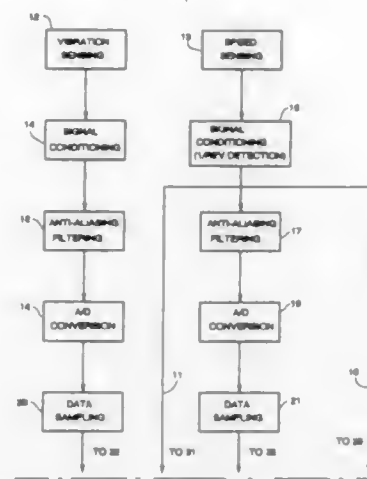
U.S. Cl. 73—460

24 Claims

1. A method for characterizing the vibration of a rotating body comprising the steps of: monitoring vibration signals during a measurement period; asynchronously monitoring rotational speed signals during said measurement period, simultaneously with said monitoring of vibration signals;



concurrently processing said simultaneously monitored vibration and speed signals; and



rationometrically combining said vibration and speed signals to yield the absolute magnitude and relative phase of vibration of said body.

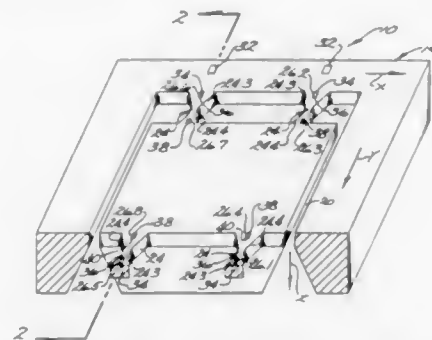
#### 5,412,986 ACCELEROMETER WITH IMPROVED STRAIN GAUGE SENSING MEANS

Steven Beringhouse, N. Attleboro; W. Donald Rolph, III, E. Walpole, both of Mass.; Raymond E. Mandeville, Cumberland, R.I.; Siegfert Hartauer, Landshut, and Vaclav F. Vilmek, Vlecht, both of Germany, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 21, 1990, Ser. No. 631,563  
Int. Cl. G01D 15/12

U.S. Cl. 73-517 R

11 Claims



1. An accelerometer device comprising a member having a support, a mass, at least one beam mounting the mass on the support for movement relative to the support in response to acceleration, and means to sense strain in the beam during movement of the mass to provide an output signal corresponding to the acceleration, the beam having an end secured to the support and an end secured to the mass and having two tapered beam sections which have tapers which extend from the wider parts of the beam adjacent respective ends of the beam to narrower central parts of the beam, said two tapered beam sections containing said sensor means and being selected to provide substantially uniform strain along a section of the beam between the support and mass in response to selected device acceleration to enhance device response to the acceleration force.

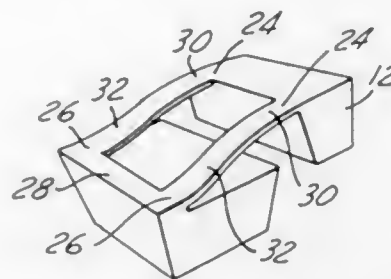
#### 5,412,987 FOLDED CANTILEVER BEAM ACCELEROMETER

John S. Bergstrom, and Robert E. Sulouff, Jr., both of Williamsburg, Va., assignors to Siemens Automotive L.P., Auburn Hills, Mich.

Filed Sep. 24, 1992, Ser. No. 950,615  
Int. Cl. G01P 15/09

U.S. Cl. 73-517 R

2 Claims



1. An accelerometer comprising a mount and a proof mass that are spaced apart along a longitudinal direction, said mount and said proof mass are joined by a pair of longitudinally extending, laterally spaced apart, parallel cantilever beams that are flat and straight in the absence of the application of external acceleration forces to the proof mass along a sensing axis that is transverse to the longitudinal direction, but that flex to S-shapes when such forces are applied, said proof mass extending longitudinally back toward said mount from locations where said beams join with said proof mass such that the bulk of said proof mass is spaced from said cantilever beams in the direction of said sensing axis, the center of gravity of said proof mass is disposed longitudinally between the locations where said beams join with said proof mass and where said beams join with said mount, said proof mass has a lateral extent spanning the lateral distance between said beams, and the center of gravity of said proof mass is laterally centered between said beams, including sensing means mounted on said beams for sensing flexing of said beams in response to acceleration forces along said axis.

#### 5,412,988 ACCELERATION SENSOR

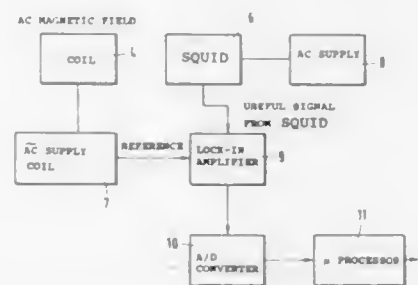
Helmut Neff, Hermannsburg, and Joachim Beeck, Soltau, both of Germany, assignors to TZN Forschungs-und Entwicklungszentrum Unterlüss GmbH, Unterlüss, Germany

Filed Sep. 1, 1993, Ser. No. 114,170  
Claims priority, application Germany, Sep. 4, 1992, 42 29 558.0

Int. Cl. G01P 15/08; G01B 7/24

U.S. Cl. 73-517 R

11 Claims



1. An acceleration sensor, comprising:  
a silicon substrate;  
a micromechanical bender bar constituting a testing mass having one end mounted on said silicon substrate and a free end opposite said one end;

a ferromagnetic core mounted on the free end of said micromechanical bender bar;  
an excitation coil supported on said ferromagnetic core for furnishing an inhomogeneous magnetic field when supplied with an alternating current;  
a cooled superconducting quantum interference detector (SQUID) arrangement mounted adjacent said ferromagnetic core for detecting changes in the inhomogeneous magnetic field produced by said excitation coil and producing a useful signal in dependence of changes in the inhomogeneous magnetic field; and  
a lock-in amplifier having a first input for receiving the useful signal from said SQUID arrangement and a reference signal input for receiving an alternating current having the same frequency as the alternating current supplied to said excitation coil for activating said lock-in amplifier for amplifying the useful signal.

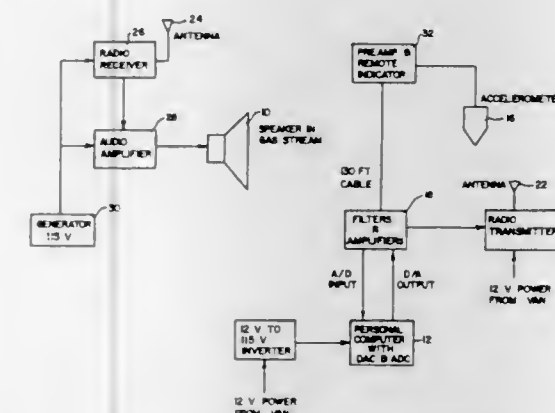
#### 5,412,989 ACOUSTIC TRACING OF BURIED CONDUITS

Arthur C. Eberle, Upper Arlington; John L. Fabian, and Jerry E. Farstad, both of Columbus, all of Ohio, assignors to Columbia Gas of Ohio, Inc., Columbus, Ohio

Filed Dec. 28, 1992, Ser. No. 997,312  
Int. Cl. G01S 3/808

U.S. Cl. 73-592

26 Claims



13. A method for locating buried fluid containing conduit comprising:

- providing variable frequency sinusoidal excitation acoustic signals over a broad frequency range to the fluid content of said conduit so that the conduit will vibrate and cause elastic vibrations in the media in which such conduit is buried;
- taking a plurality of measurements of said vibrations on the surface of the media in which said conduit is buried, at least some of said measurements being taken at locations laterally of an estimated position of the conduit; and
- determining the position of said conduit by comparing the magnitude of said measurements.

#### 5,412,990 METHOD FOR MEASURING CEMENT THICKENING TIMES

Ralph D'Angelo, New Fairfield; Thomas Plona, New Milford; Lawrence M. Schwartz, Westport, all of Conn., and Peter Coveney, Theydon Bois, England, assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Mar. 20, 1992, Ser. No. 854,551  
Int. Cl. G01H 5/00; G01N 9/24, 29/18

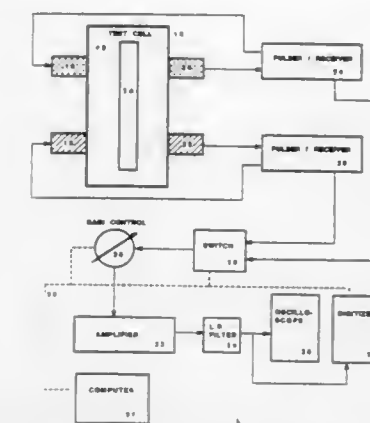
U.S. Cl. 73-597

19 Claims

1. A method of determining a thickening time for a cement slurry, comprising the steps of:

- preparing said slurry
- generating an acoustic shear wave signal in the slurry;

(c) monitoring the slurry so as to detect transmission of the acoustic shear wave signal therethrough; and



(d) determining, from detection of transmission of the acoustic shear wave signal, a time after preparation of the slurry at which shear wave energy is first propagated through the slurry, said time being the thickening time.

#### 5,412,991 SCREENING APPARATUS FOR IMPARTING MULTIMODAL AND MULTI-AXIAL VIBRATIONS TO A DEVICE

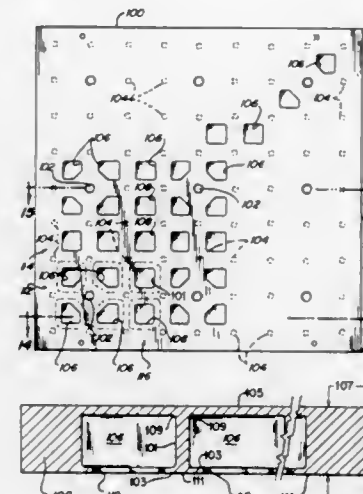
Gregg K. Hobbs, Westminster, Colo., assignor to QualMark Corporation, Denver, Colo.

Division of Ser. No. 950,631, Aug. 27, 1992, Pat. No. 5,365,788, which is a continuation-in-part of Ser. No. 487,757, Mar. 1, 1990, abandoned. This application Jul. 23, 1993, Ser. No. 97,282

Int. Cl. G01M 7/02

U.S. Cl. 73-663

41 Claims



1. Vibration screening apparatus for imparting multimodal and multi-axial vibrations to a device to be screened, comprising:

mounting table means for supporting said device, for converting stress waves from impact forces into multimodal and multi-axial vibrations, and for transmitting said multimodal and multi-axial vibrations to said device, said mounting table means including a rigid core structure fabricated with material that has a length, width, and thickness, which material has a plurality of abrupt discontinuities in thickness;  
impact actuator means connected to said mounting table means for imparting sequential impact forces to said rigid core structure; and

mounting means on said mounting table means for mounting said device securely on said mounting table means in substantially immovable relation to said rigid core structure.

5,412,992

# DIFFERENTIAL PRESSURE SENSOR CAPABLE OF REMOVING INFLUENCE OF STATIC PRESSURE AND A METHOD OF ASSEMBLING THE SAME

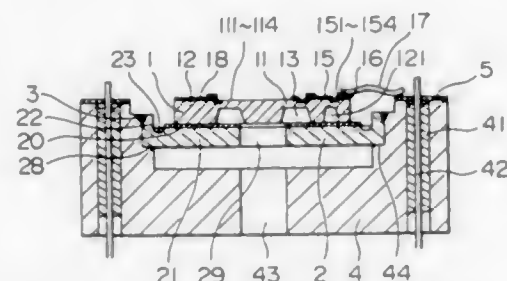
Tomoyuki Tobita, Katsuta, Akira Sase, Tokyo; Yoshimi Yamamoto, Ibaraki, and Kenichi Aoki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 4, 1992, Ser. No. 986,023

Claims priority, application Japan, Dec. 9, 1991, 3-324226  
Int. Cl.<sup>6</sup> G01L 9/06

U.S. Cl. 73-721

29 Claims



1. A differential pressure sensor including a semiconductor chip having a pressure sensitive part for sensing a difference between pressures respectively applied to a first surface of said semiconductor chip and to a second surface of said semiconductor chip opposite to said first surface, and a fixing base joined, on a joining surface at a joining part of said fixing base, to said semiconductor chip such that said semiconductor chip is fixed thereto, a path for guiding one pressure of said pressures to said pressure sensitive part on said second surface of said semiconductor chip, said path being provided in said fixing base, wherein a thickness of said joining part of said fixing base at which said fixing base is joined to said semiconductor chip is made less than or equal to a thickness of a body part of said semiconductor chip at which said semiconductor chip is joined to said fixing base and

said pressure which is applied to said second surface of said semiconductor chip is also applied to said fixing base on a surface opposite to said joining surface at a portion which opposes said joining part.

5,412,993

# PRESSURE DETECTION GAGE FOR SEMICONDUCTOR PRESSURE SENSOR

Keizo Ohtani, Kanagawa, Japan, assignor to Yamatake-Honeywell Co., Ltd., Tokyo, Japan

Filed Jan. 3, 1994, Ser. No. 177,112

Claims priority, application Japan, Jan. 14, 1993, 5-020856  
Int. Cl.<sup>6</sup> G01L 7/00

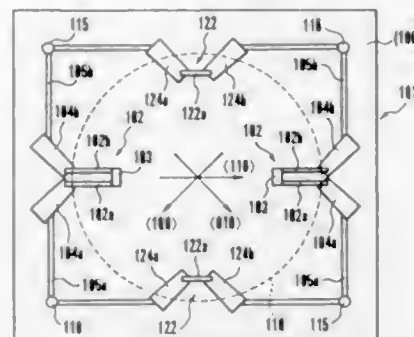
U.S. Cl. 73-727

13 Claims

1. A pressure detection gage for a semiconductor pressure sensor, comprising:

- a semiconductor substrate of a first conductive type;
- a gage portion formed on a surface of said semiconductor substrate, said gage portion serving as a piezoelectric resistance region with a predetermined sheet resistance;
- a pair of lead out portions electrically connected to two ends of said gage portion, respectively, said pair of lead out portions comprising heavily doped semiconductor regions of a second conductivity type formed on or within said semiconductor substrate; and
- a first isolation layer disposed between said semiconductor

substrate and pair of lead out portions from said semiconductor substrate, said first isolation layer comprising a



lightly doped semiconductor region of the second conductivity type formed in said semiconductor substrate.

5,412,994

# OFFSET PRESSURE SENSOR

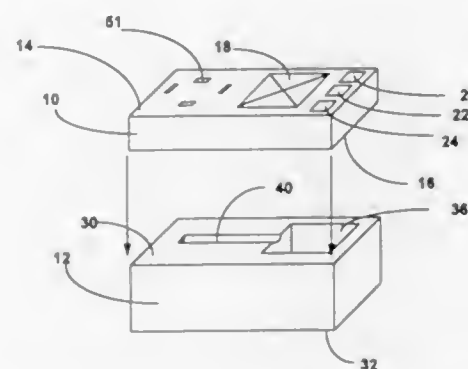
James D. Cook, 1558 W. Harrison Ave.; Albert W. Drabowicz, 2847 Rte. 20 West, both of Freeport, Ill. 61032; D. Joseph Maurer, 785 N. Silberman Rd., Pearl City, Ill. 61062; Mark R. Plagens, 1805 Normandy Dr., Richardson, Tex. 75082; Uppili Sridhar, 5238 Wood Creek La., Garland, Tex. 75044, and Carl E. Stewart, 2401 Fountain Head Dr., Plano, Tex. 75023

Filed Jun. 14, 1994, Ser. No. 259,429

Int. Cl.<sup>6</sup> G01L 7/00

U.S. Cl. 73-756

18 Claims



1. A pressure sensor, comprising:

- a pressure sensor die with first and second surfaces, said sensor die having a diaphragm portion of said first surface extending across an etched cavity formed in said pressure sensor die;
- a pressure sensing component disposed on said first surface of said sensor die proximate said diaphragm portion and an electronic circuit connected in signal communication with said pressure sensing component, said cavity being formed in a second surface of said pressure sensor die;
- a buffer member having a first opening extending through said buffer member and a first channel formed in a first surface of said buffer member, said first opening extending between said first surface of said buffer member and a second surface of said buffer member, said first channel being in fluid communication with said first opening, said first surface of said buffer member being attached to said second surface of said pressure sensor die to form a combined structure, said first channel being disposed in fluid communication with said cavity, said first opening being disposed in nonaligned association with said cavity, said diaphragm portion and said first opening being disposed at opposite ends of said structure; and

a first fluid conduit being disposed in fluid communication with said first opening.

5,412,995

# SINGLE-PLY ROOF COVER FATIGUE TESTER

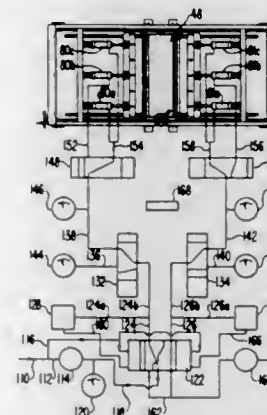
Phillip J. Smith, Belmont, and George A. Smith, Littleton, both of Mass., assignors to Factory Mutual Research Corporation, Norwood, Mass.

Filed Jun. 10, 1994, Ser. No. 258,061

Int. Cl.<sup>6</sup> G01N 3/08

U.S. Cl. 73-808

14 Claims



1. Apparatus for testing the fatigue of single-ply roof covers, comprising:

- a support structure;
- a movable structure for receiving a roof cover test sample and associated fasteners, said movable structure being mounted for movement relative to said support structure;
- means for applying a tension force to the roof cover test sample on opposite sides of the fasteners; and
- means for alternately increasing first the tension force applied to the roof cover test sample on one side of the fasteners and then on the opposite side of the fasteners while maintaining a minimum tension force on the side whose tension force is not being increased.

5,412,996

# TESTING EQUIPMENT AND METHOD OF MANUFACTURING THE SAME

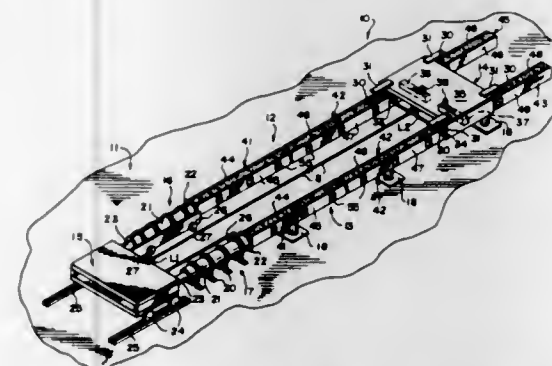
Joseph E. Roberts, Savannah, Ga., assignor to Roberts Testing Equipment, Inc., Savannah, Ga.

Filed Jan. 28, 1993, Ser. No. 10,251

Int. Cl.<sup>6</sup> G01N 3/08

U.S. Cl. 73-830

22 Claims



1. Equipment for testing a relatively elongated product comprising at least one rail, a carriage, first means for connecting a portion of a product which is to be tested to said carriage, second means for connecting a second portion of the product

which is to be tested to said at least one rail, means for moving said carriage in a direction away from said second means to load the product in tension and incident thereto load the rail in compression, said rail having at least one joint, said joint including compression means for carrying a compression load when the product is loaded in tension, said joint further including tension means for absorbing tension loading upon the rail when the tension loading of the product is abruptly terminated, said rail including at least a pair of longitudinally aligned rail members having opposing ends in spaced relationship to define a space therebetween, and said joint compression means including material in situ molded in said space.

5,412,997

# NONDESTRUCTIVE TESTING APPARATUS AND METHOD

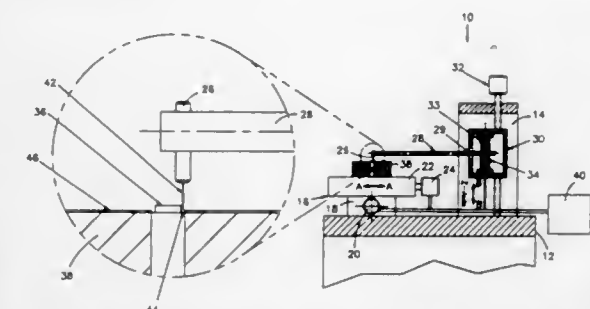
Dyi-Chung Hu, Shuang-Shi, and Jen-Huang Jeng, Chien-Kung, both of Taiwan, Prov. of China, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China

Filed Dec. 11, 1992, Ser. No. 989,603

Int. Cl.<sup>6</sup> G01N 19/04, 3/08

U.S. Cl. 73-827

13 Claims



1. An apparatus for non-destructively testing the attachment strength of a first object attached to a second object at an attachment point comprising:

- a force asserting means including a fine elongated straight testing pin for asserting a controlled amount of pressing force against said first object near said attachment point thus urging said first object to tear away from said second object; and
  - a control means for controlling and positioning said fine elongated straight testing pin to apply said controlled amount of pressing force.
8. A method for non-destructively and individually testing the attachment strength of a first object attached to a second object at an attachment point comprising the steps of:
- (a) positioning a fine elongated straight testing pin near said attachment point;
  - (b) asserting a controlled amount of pressing force against said first object near said attachment point thus urging said first object to tear away from said second object; and
  - (c) measuring said controlled amount of force for determining if a failure occurs at said attachment point.

5,412,998

# TORQUE MEASURING SYSTEM

Akira Nakamoto; Shiro Takada; Akiyoshi Hanazawa; Kazunori Sakunaga; Takuji Mori; Taro Saito, and Mutsumi Sunahata, all of Yao, Japan, assignors to Kubota Corporation, Japan

Filed Sep. 15, 1993, Ser. No. 121,791

Claims priority, application Japan, Oct. 8, 1992, 4-269804

Int. Cl.<sup>6</sup> G01F 1/00

U.S. Cl. 73-862.335

14 Claims

1. A torque measuring system including:

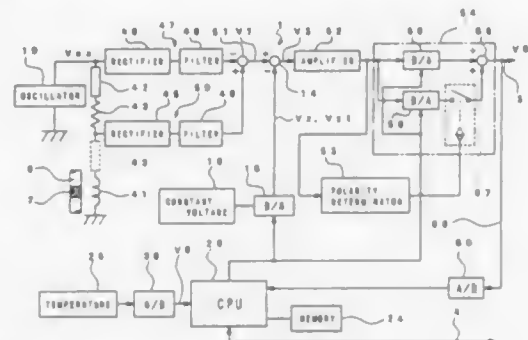
- a torque sensor capable of detecting the magnitude of a torque applied to a torque sensing shaft and producing a torque signal therefor,



said torque sensor being electrically connectable to and electrically releasable from a characteristic check device isolated therefrom,

said torque sensor being operable to alternatively set, by means of a switching signal sent from the characteristic check device while the device is connected to the torque sensor, a correction mode for correcting the detecting characteristics thereof and a measurement mode for outputting a torque signal from the torque sensor whose detecting characteristics have been corrected in the correction mode,

said torque sensor being isolatable from the characteristic check device for use in the measurement mode,



said characteristic check device being able to collect check data with respect to the torque sensor in the correction mode and to compute characteristic correction data for correction of the detecting characteristics of the torque sensor on the basis of the collected check data, and

said torque sensor including memory means for recording thereinto, in the correction mode, characteristic correction data from the characteristic check device and for causing the characteristic correction data to be read therefrom in the measurement mode for correction of the detecting characteristics.

5,412,999

# POSITION SENSING WITH MAGNETOSTRICTIVE STRESS SENSOR

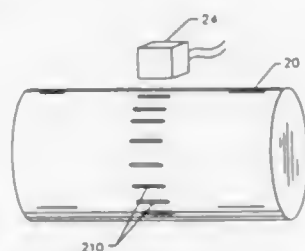
Erik B. Vigmostad, and Robert D. Klauber, both of Fairfield, Iowa, assignors to Sensortek L.P., Fairfield, Iowa

Filed Feb. 26, 1993, Ser. No. 23,110

Int. Cl.<sup>6</sup> G01L 3/02

U.S. Cl. 73—862.333

38 Claims



1. A device for monitoring both stress variation and position of a torque transmitting element, the device comprising:

a magnetostriuctive sensing element which induces magnetic flux in at least a portion of the torque transmitting element and which generates a magnetostriuctive sensing element signal and allows detection of the stress variation in said torque transmitting element, and said portion of the torque transmitting element including at least two regions on said torque transmitting element, one of said regions being a variation in structure on said torque transmitting element with respect to said other region so that a difference exists in said torque transmitting element between reluctance for magnetic flux produced by the magnetostriuctive sensing

element when the at least one region of the torque transmitting element is near said magnetostriuctive sensing element and reluctance for magnetic flux produced by the magnetostriuctive sensing element when the other region of the torque transmitting element is near said magnetostriuctive sensing element, and said difference effects a variation in the magnetostriuctive sensing element signal so that said signal is used to monitor the position of the torque transmitting element.

5,413,000

# ASSEMBLY FOR REMOVING WASTE FROM CLOSED SAMPLE CONTAINERS

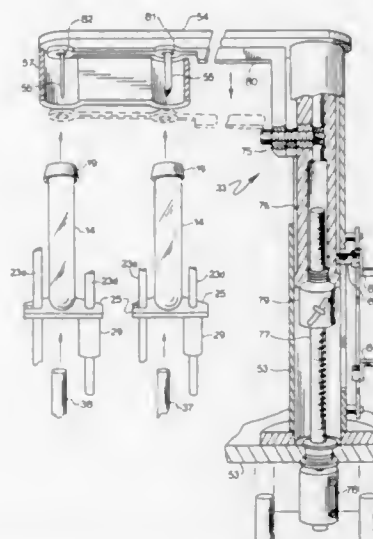
William A. Stark, Costa Mesa; Kenneth R. Rogers, Redlands, and Antoine E. Haddad, El Toro, all of Calif., assignors to Dade International Inc., Deerfield, Ill.

Continuation of Ser. No. 655,248, Feb. 13, 1991, abandoned, which is a continuation of Ser. No. 376,714, Jul. 7, 1989, abandoned, which is a continuation-in-part of Ser. No. 210,695, Jun. 23, 1988, Pat. No. 4,951,512. This application Jul. 22, 1992, Ser. No. 918,929

Int. Cl.<sup>6</sup> G01N 1/00

U.S. Cl. 73—864.23

6 Claims



1. An automated cleaning assembly for, prior to sampling, removing material from a top inner portion of an elongate sample container which has an open top and a closure means for normally closing the open top, said assembly comprising: a movable holding means for holding the container and moving it generally horizontally to a predetermined location; an elongate needle member disposed at said predetermined location, said member defining an elongate bore, at least one inlet opening proximate a first end, and an outlet opening, said needle member being closed and sharpened at the distal portion of said first end; driving means for providing relative, generally vertical displacement between the container and the needle member, said driving means providing the force for moving the sharpened end of the needle member through the closure means into the container and placing the distal end of the needle member proximate the closure means; a waste enclosure; tube means for connecting the needle member with the waste enclosure; and pump means communicating with the needle member for varying the pressure in the bore of the needle member and displacing the material from the top inner portion of the container through the tube means and into the waste enclosure.

5,413,001

# METHOD AND APPARATUS FOR SAMPLING GAS FROM A HOT DUST-FILLED GAS STREAM

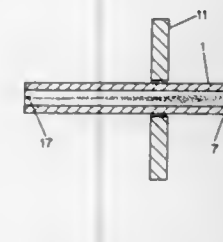
Gyula Jarolics, Valby, Denmark, assignor to FLS Automation A/S, Denmark

Filed Jul. 19, 1993, Ser. No. 101,383

Claims priority, application Denmark, Jul. 21, 1992, 0936/92 Int. Cl.<sup>6</sup> G01N 1/14

U.S. Cl. 73—863.83

3 Claims



1. A method for sampling gas from a hot dust-filled gas stream using a gas probe so arranged as to protrude into a gas- and dust-filled atmosphere, wherein the probe samples a gas portion of said stream, wherein the sample gas portion is sucked through the probe by a gas pump connected to the probe, and wherein at least a portion of the sample gas portion is first separated from suspended impurities and then fed to an analysis apparatus, said method further characterized by the step of preventing dust suspended in the sample gas portion from clogging or forming bakings in the probe by activating said dust in the probe by means of a dust activation device comprising at least a laser emitter.

5,413,002

# LIQUID SAMPLER

Mark A. Jiskoot, Wells, and Barry R. Baker, Kent, both of United Kingdom, assignors to Jiskoot Autocontrol Limited, Kent, United Kingdom

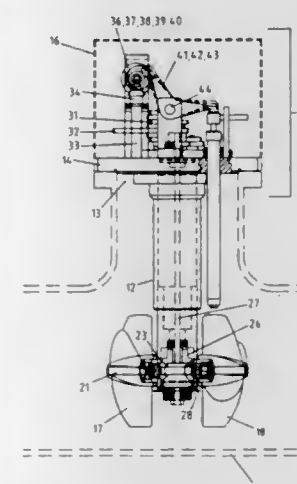
Filed Jun. 17, 1993, Ser. No. 77,361

Claims priority, application United Kingdom, Jul. 2, 1992, 9214154.8

Int. Cl.<sup>6</sup> G01N 1/00

U.S. Cl. 73—863.03

15 Claims



1. A sampler for sampling liquid flowing in a pipeline, said sampler comprising:

a pump assembly situated within the flowing liquid for pumping the liquid under pressure;

sampling means connected to said pump assembly to provide a sample of said liquid; and

drive means to operate said pump assembly, said drive means including driven means including a propeller mounted within said flowing liquid to be driven by the flowing

liquid, said drive means including a shaft extending from the propeller into a housing outside the pipeline;

said drive means being coupled to said driven means such that a rate of providing liquid samples is proportional to a rate at which the liquid is flowing in the pipeline;

whereby the flowing liquid drives the driven means which in turn drives the drive means and the pump assembly.

5,413,003

# ATMOSPHERIC PRECIPITATION COLLECTOR AND METHOD OF EMPLOYING SAME

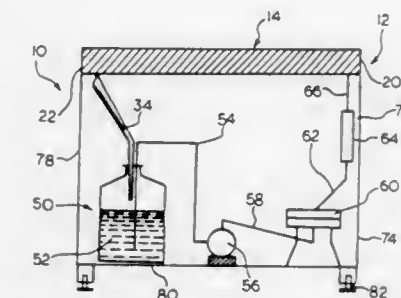
Donald T. Waite, Regina, and James A. Banner, Saskatoon, both of Canada, assignors to Her Majesty the Queen in Right of Canada as represented by The Minister of the Environment, Hull, Canada

Filed Nov. 2, 1993, Ser. No. 144,449

Claims priority, application Canada, Nov. 4, 1992, 2082113 Int. Cl.<sup>6</sup> G01W 1/00

U.S. Cl. 73—170.18

19 Claims



1. A method for collecting precipitation comprising the steps of:

providing a sampling vessel having an inlet and an outlet, said vessel for receiving precipitation therein;

providing a reservoir containing a carrier fluid, said fluid for transporting said precipitation;

passing said carrier fluid through said vessel; and

collecting precipitation in said carrier fluid and recirculating said carrier fluid through said vessel.

5,413,004

# METHOD AND APPARATUS FOR SAMPLING COAL

George F. Johnson, Jr., Pikeville, and Arneemann R. Gredner, Pippa Passes, both of Ky., assignors to Johnson Industries, Inc., Pikeville, Ky.

Continuation of Ser. No. 97,361, Jul. 23, 1993, abandoned. This application Jun. 2, 1994, Ser. No. 253,430

Int. Cl.<sup>6</sup> G01N 1/20

U.S. Cl. 73—863.41

17 Claims

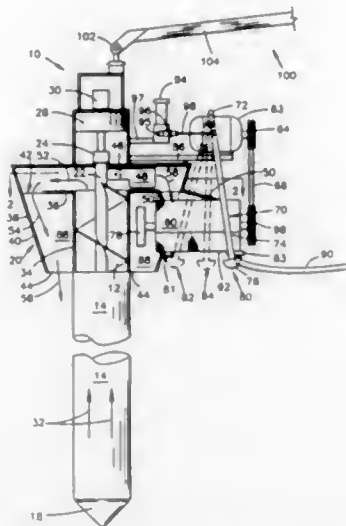
1. A coal sampling apparatus, comprising:

(a) a coal extractor comprising an auger for extracting uncrushed coal from a container, thereby creating a primary coal sample, said coal extractor having an outlet through which the extracted coal is moved;

(b) an integral coal separator for separating said primary coal sample received from the outlet of said coal extractor, said coal separator including a sampling outlet, through which a portion of said primary coal sample is directed, thereby creating a secondary coal sample that automatically exits said sampling outlet via gravity, said coal separator further including at least one discharge outlet that is open at its bottom portion thereby creating an open window through which the remaining portion of said primary coal sample automatically passes via gravity;

(c) a coal crusher for crushing said secondary coal sample that passes through said sampling outlet into particles small enough for useful analysis thereby creating a

crushed coal sample, said coal crusher having an outlet; and



(d) a coal collector for collecting said crushed coal sample received from the outlet of said coal crusher, for analysis.

5,413,005

# SAMPLE COLLECTOR FOR FOG-CONTAINING WASTEWATER

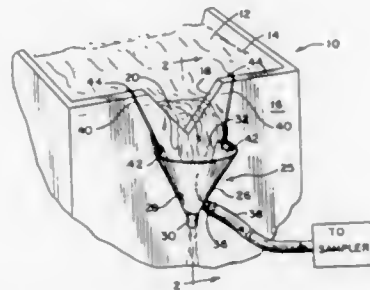
Keith Gray, Deerfield, Ill., assignor to Environmental Monitoring and Technologies, Inc., Morton Grove, Ill.

Filed Jan. 3, 1994, Ser. No. 177,075

Int. Cl.<sup>6</sup> G01N 1/20

U.S. Cl. 73—863.43

7 Claims



1. A wastewater liquid sampling device comprising: a funnel having a wide mouth and a smaller discharge hole; a sample port in the wall of the funnel above said discharge hole; a sample withdrawing conduit connected to said funnel in communication with said sample port; and hangers projecting upwardly from said funnel and adapted to operationally mount said funnel from a weir so that wastewater flowing thereover flows into said funnel and is agitated before exiting through said discharge hole or sample port.

5,413,006

# PIPETTE FOR SAMPLING AND DISPENSING ADJUSTABLE VOLUMES OF LIQUIDS

Eric M. D'Autry, Paris, France, assignor to Gilson Medical Electronics (France) S.A., France

Filed Sep. 28, 1993, Ser. No. 128,370

Claims priority, application France, Sep. 28, 1992, 92 11529

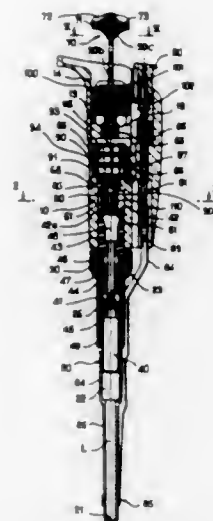
Int. Cl.<sup>6</sup> B01L 3/02

U.S. Cl. 73—864.18

16 Claims

1. Pipette for sampling and dispensing adjustable volumes of liquid of the type comprising a pipette body extending along a

longitudinal axis and a piston mounted in sliding fashion along this axis inside the said pipette body so as to define a chamber of variable volume emerging at a sampling orifice, said piston being driven over a limited distance of travel in the direction of the sampling orifice by means of pressure manually exerted on a push rod mounted in sliding fashion in the pipette body, and in the opposite direction by the reaction of elastic return means until the piston abuts against an axial extremity of a metal sheath extending along the said longitudinal axis inside the pipette body, the sheath having an external thread which works with a thread inside the pipette body in such a way as to move the sheath longitudinally when driven in rotation, in order to adjust the distance of travel of the piston in the opposite direction and the volume of the chamber, a first adjustment



knob being secured to the sheath, and also the sheath intermeshing with means for displaying the volume to be dispensed, the push rod being mounted in sliding fashion in the sleeve, wherein:

the push rod has a non-symmetrical cross-section of revolution over at least a portion of its length, the sheath being rigidly locked by locking means to a sleeve arranged coaxially with respect to the sheath and in which the portion of the push rod with a non-symmetric cross-section of revolution is also engaged, the sleeve having an internal profile complementary or homologous to the said portion of the push rod so as to rigidly lock the push rod and sheath in rotation while allowing the push rod to move longitudinally inside the sheath to provide rapid adjustment of the volume to be dispensed.

5,413,007

# GAUGE ASSEMBLY FOR HANDLEBAR ATTACHMENT

Curtis Vernon, 1451 Underwood Rd., McKinleyville, Calif. 95521

Filed Aug. 4, 1994, Ser. No. 285,702

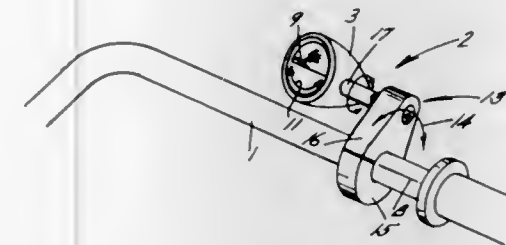
Int. Cl.<sup>6</sup> G01D 7/02

U.S. Cl. 73—866.3

7 Claims

6. In combination, a motorcycle handlebar, housing having an internal cylindrical wall defining an open area, a bracket for attachment to said handlebar, adjustable coupling means joining said housing to said bracket and supporting said housing in upwardly spaced relationship to said handlebar, an oil pressure gauge for monitoring engine operation disposed in said housing and including a cylindrical outer wall corresponding to said internal cylindrical wall of said

housing and permitting rotational positioning of the gauge in said housing, and



locking means carried by said housing and engageable with said gauge for locking the gauge to said housing in a selected position.

5,413,008

# ADJUSTMENT MECHANISM FOR RIGID BOOT OF A VEHICLE TRANSMISSION SHIFTER

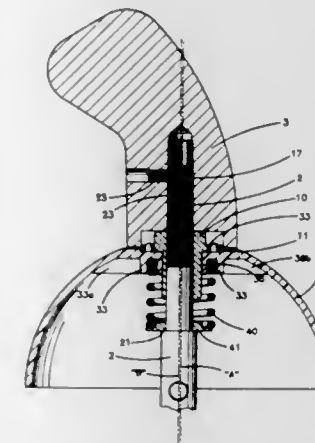
Robert D. Brock, Grand Haven, Mich., assignor to Grand Haven Stamped Products, Div. of JSJ Corporation, Grand Haven, Mich.

Filed Oct. 8, 1993, Ser. No. 133,967

Int. Cl.<sup>6</sup> G05G 1/00; B60K 20/02

U.S. Cl. 74—18

20 Claims



first means connected to said lever and movable therewith, said first means having a plurality of first positioning means, the locus of which is a circle located around the longitudinal axis of said lever; second means on said boot having a plurality of second positioning means, the locus of which is on said circle, said second positioning means cooperatively engaging said first positioning means to establish the position of said face of said rigid boot in relationship to said periphery; said circle having its center of radius offset from the longitudinal axis of said lever and centerline of said semi-spherical boot; said second positioning means being adjustable laterally of said longitudinal axis of said lever to selectively engage different ones of said first positioning means to move said boot laterally in said opening whereby the gap between

said face of said boot and the periphery of said opening can be adjusted to substantially provide a uniform gap.

5,413,009

# VARIABLE SPEED TRANSMISSION ASSEMBLY

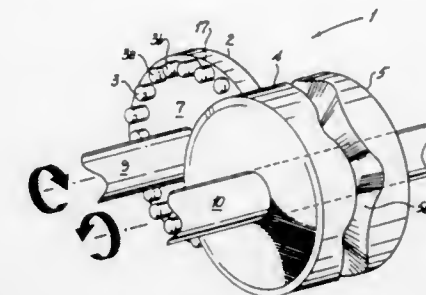
Frank Fragnito, 11 Holmes Ave., North Babylon, N.Y. 11703

Filed Mar. 16, 1994, Ser. No. 213,680

Int. Cl.<sup>6</sup> F16H 15/04

U.S. Cl. 74—63

16 Claims



1. A type of gear assembly comprising a plurality of facing ruffled wheel plates holding therein a type of slide pin gear, said ruffled wheel plates and said slide pin gear traveling in combination as said ruffled wheel plates and said slide pin gear turn in a positively infinitely variable speed assembly, and further wherein a plurality of slide pins traverse said slide pin gear between said ruffled wheel plates for imparting force upon said ruffled wheel plates.

5,413,010

# ELECTRIC MOTOR HAVING A SPHERICAL ROTOR AND ITS APPLICATION APPARATUS

Teruo Nakanishi; Yohei Ando, and Kiyokatsu Sakakibara, all of Komaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

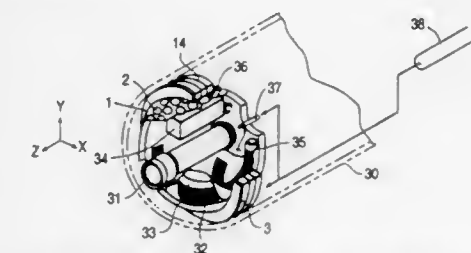
Filed Jul. 31, 1992, Ser. No. 922,836

Claims priority, application Japan, Jul. 31, 1991, 3-060422 U; Aug. 29, 1991, 3-218567; Aug. 30, 1991, 3-220001; Nov. 13, 1991, 3-297251

Int. Cl.<sup>6</sup> G01C 19/30; H02K 21/12; B64C 17/02

U.S. Cl. 74—5.22

11 Claims



1. A multi-freedom electric motor comprising: a rotor consisting of a shell, said shell having a spherical outer surface and a hollow interior; a plurality of permanent magnets arrayed along a series of intersecting lines and embedded in the shell at the outer surface thereof, and all adjacent magnetic poles of all of said permanent magnets having polarities opposite to one another; a support having a spherical surface confronting the spherical surface of said rotor which allows the rotor to rotate freely in any direction of rotation relative to the support, said support including a stator extending along the outer surface of said rotor, said stator having an inner surface confronting said rotor; a plurality of electromagnets disposed on said inner surface of said stator opposite said permanent magnets; and a controller connected to said electromagnets.

5. A space stabilizer for maintaining an attitude of an article regardless of a change in attitude of an apparatus to which the



article is mounted, said stabilizer comprising: a rotor consisting of a shell, said shell having a spherical outer surface and a hollow interior; a plurality of permanent magnets arrayed along a series of intersecting lines and embedded in the shell at the outer surface thereof, and all adjacent magnetic poles of all of said permanent magnets having polarities opposite to one another; a support having a spherical surface confronting the spherical surface of said rotor which allows the rotor to rotate freely in any direction of rotation relative to the support, said support including a stator extending along the outer surface of said rotor, said stator having an inner surface confronting said rotor; a plurality of electromagnets disposed on said inner surface of said stator opposite said permanent magnets; a gyro disposed in the hollow interior of said shell; and control means responsive to a signal issued from said gyro for transmitting an operation signal to said electromagnet which will maintain said rotor at a predetermined orientation relative to said stator.

5,413,011

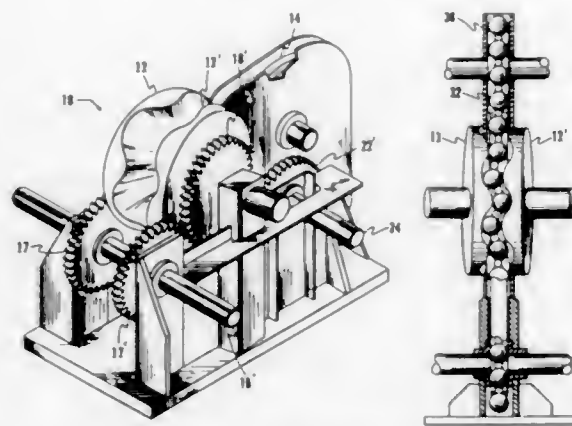
**POSITIVE VARIABLE SPEED TRANSMISSION SYSTEM**  
Frank Fragnito, 11 Holmes Ave., North Babylon, N.Y. 11703

Filed May 10, 1993, Ser. No. 58,210

Int. Cl.<sup>6</sup> F16H 21/12

U.S. Cl. 74—63

5 Claims



1. A positive, variable speed transmission system comprising input and output shafts, a pair of moveable mating beveled plates driven by said input shaft and having opposing surfaces with continuous concentric alternate crests and valleys extending away from the highs in the centers of the plates to the lows at the outer edge of the plates with the distance between crests and valleys being smaller at the centers of said plates and with the same depth of said crests and valleys maintained from the centers to the outer edge of said plates and a plurality of slidable balls in an assembly driven by said output shaft for movement between said plates, the position of said slidable balls determining the relative speed of one plate to the other.

5,413,012

**VARIABLE SYNCHRONOUS WINDOW**

Alan R. Davis, Plainwell, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 7, 1993, Ser. No. 116,627

Int. Cl.<sup>6</sup> B60K 41/10

U.S. Cl. 74—335

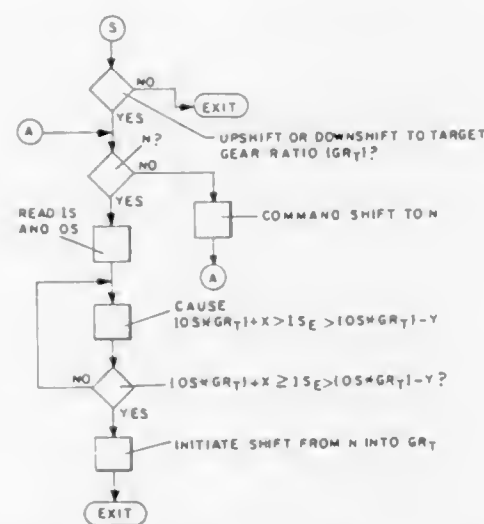
10 Claims

1. A method for controlling dynamic non-compound shifting of a vehicular automated mechanical transmission system (10) of the type comprising a multiple-speed mechanical transmission having a plurality of selectable gear ratios (GR), each having engageable and disengageable pairs of non-blocked positive jaw clutch members (112/114, 116/118) associated therewith, said transmission having an input shaft (16) drivingly connected to a prime mover (E) by a non-positive coupling (C) and an output shaft (90) for driving connection to vehicular drive wheels, each of said pairs of positive jaw

clutch members including a first jaw clutch member (114/118) drivingly associated with said input shaft and a second jaw clutch member (112/116) drivingly associated with said output shaft, a control unit (CPU) for receiving input signals including input signals indicative of input shaft rotational speed (IS) and output shaft rotational speed (OS) and for processing same according to predetermined logic rules to issue command output signals to system actuators (23, 27, 29), including a transmission actuator (27) effective to selectively engage and disengage selected pairs of said positive jaw clutch members, said transmission actuator having a response time comprising the time required for said actuator to respond to a command output signal and move a selected pair of positive jaw clutch members from a normally disengaged position to a position of initial positive engagement, said method comprising the steps of:

determining a requirement for a non-compound shift from a transmission neutral condition into a target gear ratio (GR<sub>T</sub>);

determining a maximum acceptable value of difference of rotational speed of the first and second jaw clutch members associated with said target gear ratio at initial positive engagement thereof as the greater of (i) a minimum value and (ii) a function of the numerical value of the target gear



ratio increasing and decreasing, respectively, with increasing and decreasing values, respectively, of said numerical value;

sensing current values of said input signals indicative of input shaft and output shaft rotational speed;

determining, as functions of at least one of (i) said current value of said input signal indicative of input shaft rotational speed, (ii) said current value of said input signal indicative of output shaft rotational speed, and (iii) said response time, values indicative of expected rotational speeds of said first and second jaw clutch members associated with said target gear ratio at initial positive engagement thereof in the event of an instantaneous command to said actuator to initiate engagement of said first and second jaw clutch members associated with said target gear ratio;

if the difference between said expected rotational speeds is no greater than said maximum acceptable value of difference, issuing command output signals to said actuator to initiate engagement of the pair of positive jaw clutch members associated with said target gear ratio; and responsive to said command output signals, causing initiation of engagement of said pair of positive jaw clutch members associated with said target gear ratio.

5,413,013

**TIE ROD ASSEMBLY FOR SAND MOLDING MACHINE**

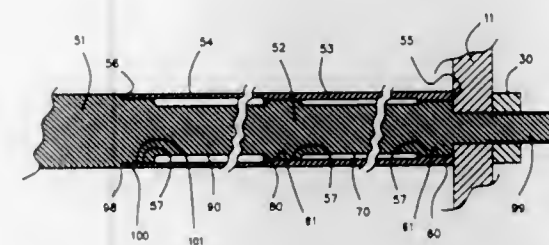
George Zambo, Avon Lake, Ohio, assignor to HACA Spare Parts Technology Inc., Westlake, Ohio

Filed Mar. 22, 1993, Ser. No. 35,286

Int. Cl.<sup>6</sup> G05G 1/00

U.S. Cl. 74—587

20 Claims



driving means in spaced relationship to said output means; driven means operably responsive to said driving means for powering said output means; said driving means having a pair of clutch driving members coaxially disposed with respect to each other and having opposing spaced-apart surface faces; biasing means interposed between said driving surface faces comprising at least a pin in alignment with a spring assembly consisting of two concentric springs bearing against one end of said pin; said springs and said pin in axial alignment disposed in an elongated passageway jointly provided in each of said pair of clutch drive members; each of said clutch drive members has inspection and access openings communicating with said passageway so as to expose said springs and said pins respectively; and said spring passageway is of oblong configuration in transverse cross-section.

5,413,016

# METHOD FOR MANUFACTURING CUTTING TOOLS AND CUTTING TOOLS MADE THEREBY

Uwe Kranz, Horb-Nordstetten; Roland Brobell, Rottenburg-Ergenzingen, and Bernd Hamann, Horb-Nordstetten, all of Germany, assignors to Ledermann GmbH, Horb a.N., Germany

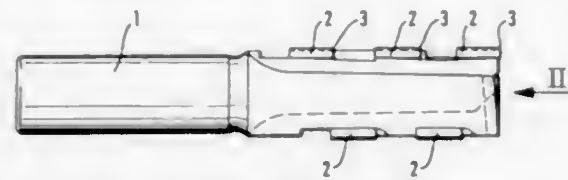
Filed Jun. 11, 1993, Ser. No. 75,766

Claims priority, application European Pat. Off., Apr. 5, 1993, 93105583.4

Int. Cl.<sup>6</sup> B21K 5/02

U.S. Cl. 76—108.1

11 Claims



1. A method of manufacturing cutting tools having attached thereto cutting plates with a cutting edge coated with a hard cutting material, said method comprising the steps of:

- positioning cutting plates on a cutting tool body in a desired position;
- fixing the cutting plates on the cutting tool body in said desired position by electric spot welding;
- applying soldering material to each cutting plate;
- soldering the cutting plates to the cutting tool body at a temperature of 720° C. to 850° C. in a vacuum of 10<sup>-4</sup> to 10<sup>-6</sup> mbar; and
- slowly cooling the cutting tool body with the cutting plates soldered thereto.

5,413,017

# COUNTER-ROTATING KNIFE PAPER TAIL RIPPER

Stanley H. Mah, Burnaby, Canada, assignor to Fibron Machine Corp., British Columbia, Canada

PCT No. PCT/CA91/00369, § 371 Date Jun. 21, 1993, § 102(e) Date Jun. 21, 1993, PCT Pub. No. WO92/08005, PCT Pub. Date May 14, 1992

PCT Filed Oct. 11, 1991, Ser. No. 39,456

Claims priority, application Canada, Oct. 24, 1990, 2028443 Int. Cl.<sup>6</sup> D21G 9/00; B26D 1/29

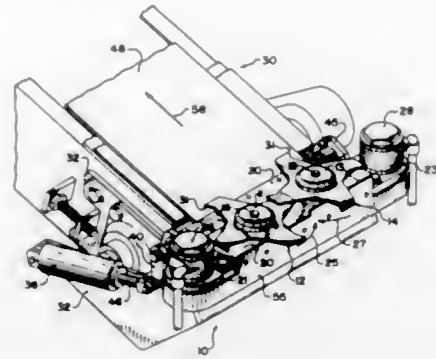
U.S. Cl. 83—152

20 Claims

1. A paper tail ripper for transversely severing a moving paper tail, said ripper comprising:

- a first knife having a first center of rotation;
- a second knife having a second center of rotation;
- drive means for counter-rotating said knives about said respective centers of rotation, while maintaining an axis

intersecting said centers of rotation generally parallel to said moving paper tail; and,



(d) deflector means for deflecting said paper tail toward said knives.

5,413,018

# PIEZO-ELECTRIC ACTUATOR OPERATED PRESS

Tatsuya Wada; Syouji Murayama; Kazuhiko Kuroda; Yukiyoji Satomura; Tadashi Matsuoka; Mitsuharu Nonami; Kozo Matsumoto; Yukinori Kawamura; Norikatsu Matsumoto; Hiroshi Hikita, and Hideo Iwata, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 896,584, Jun. 10, 1992, abandoned.

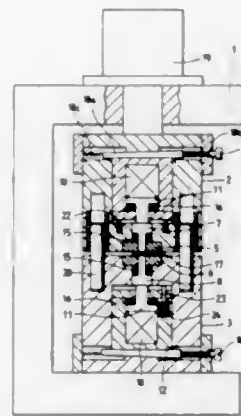
This application Mar. 31, 1994, Ser. No. 220,464

Claims priority, application Japan, Jun. 20, 1991, 3-147676; Oct. 25, 1991, 3-278127

Int. Cl.<sup>6</sup> B26F 1/02

U.S. Cl. 83—456

9 Claims



1. A piezoelectric actuator operated press for punching a metallic foil workpiece, comprising:

- a frame;
- a die shifting mechanism mounted to the frame;
- a first die set having a face mounted to the frame;
- a second die set mounted to the die shifting mechanism, said second die set having a face opposing the face of said first die set, said second die set being movable selectively by the die shifting mechanism toward the face of the first die set to a specific closed position to hold the workpiece; and movable away from said face to a specific open position, wherein the second die set is spaced a greater distance from the face of the first die set than when in the closed position to permit the work piece to be inserted between the faces of the first and second die sets;
- a casing mounted to and movable with said one of the first and second die sets and a spring disposed in the casing urging the actuator in a direction away from the face of the other of the first and second die sets;
- a punch movably mounted to at least one of said first and

second die sets, the punch having an end opposing said face of another of the first and second die sets; position adjusting means including a member having a wedge configuration movable in a direction substantially different from the movement of the punch, said member being disposed between opposing surfaces of said casing and said one die set for positioning the punch in said one die set, and means pressing said casing against said wedge member; and

a piezoelectric actuator mounted to said at least one of said first and second die sets disposed to drive said punch to punch a workpiece disposed between the opposing faces of the first and second die sets at times when the second die set is in the closed position.

5,413,019

# GUITAR TREMOLO APPARATUS

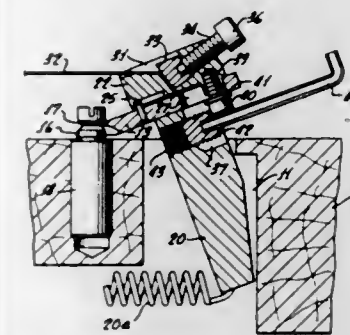
George F. Blanda, Jr., Aliso Viejo, Calif., assignor to Fender Musical Instruments Corporation, Scottsdale, Ariz.

Filed May 26, 1993, Ser. No. 68,654

Int. Cl.<sup>6</sup> G10D 3/00

U.S. Cl. 84—298

21 Claims



1. Bridge apparatus for guitars, which comprises:

- a bridge plate,
- means to mount said bridge plate over and in proximity to the face of a guitar body,
- a plurality of string-engaging elements movably mounted on the upper surface of said bridge plate, and
- means mounted beneath said bridge plate to effect controlled individual movements of each of said string-engaging elements relative to said bridge plate to thereby individually affect the conditions of guitar strings associated with said string-engaging elements.

5,413,020

# RETRACTING GUITAR PICK HOLDER

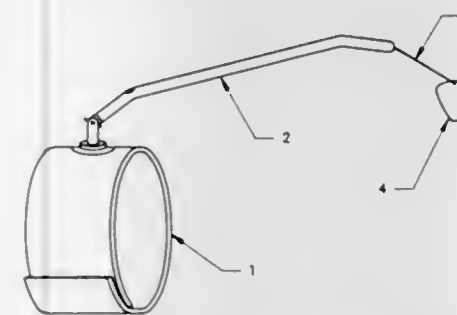
Tok Thompson, P.O. Box 217, Kenai, Ak. 99611

Filed Dec. 10, 1993, Ser. No. 164,930

Int. Cl.<sup>6</sup> G10D 3/00

U.S. Cl. 84—329

4 Claims



1. A retracting guitar pick holder, comprising:

- a band of material for fastening around a wrist or lower arm of a user;
- a tube having a first end and a second end and further dimensioned to extend over a hand of the user;
- means for joining said first end of said tube and said band;
- a retracting line having a first and second end; the retracted line positioned within said tube; said first end of said line attached approximate the first end of the tube;
- clasp means for attaching said second end of the line to a pick.

5,413,021

# TACTILE CHROMATIC HARMONICA

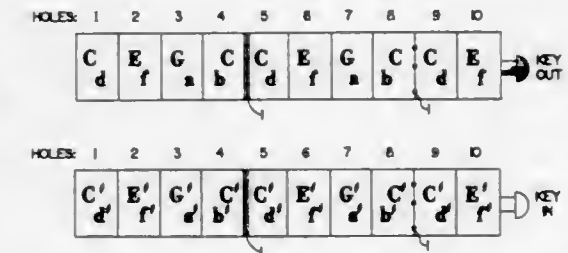
Desmond W. Margetson, 515 W. 122 St., New York, N.Y. 10027

Filed May 20, 1994, Ser. No. 247,096

Int. Cl.<sup>6</sup> G10D 7/12

U.S. Cl. 84—377

7 Claims



1. In a chromatic harmonica comprising a body having provided therein a series of adjacent cavities and a plurality of reeds, each of said reeds being adapted to produce a musical note of a predetermined pitch upon passage of air thereover, wherein each cavity has a pair of corresponding reeds, including a blow-reed which produces a blow-note responsive to the blowing of air into said cavity, and a draw-reed which produces a draw-note responsive to the drawing of air from said cavity,

said harmonica further comprising a slide key which, when activated, raises the pitch of the note formed by each reed by a half tone,

said cavities being arranged in a sequentially arranged cavity set, each of said cavity set representing an identical scale in one of a plurality of octaves, a blow note of a final cavity of each cavity set forming the blow note of the first cavity thereof, raised by one octave, each cavity set being adjacent to a cavity set corresponding to at least one of a higher and lower octave, the blow note of a final cavity of said cavity set being a repeating note, identical to that formed by a first cavity of an adjacent, higher octave cavity set, said cavities each terminating at one end to form a planar playing surface,

the improvement comprising placement of at least one tactile divider between at least two adjacent blow-holes corresponding to said repeating notes comprising a highest note of a first cavity set, and a lowest note of an adjacent cavity set, set tactile divider projecting from said playing surface in a direction opposite said cavities.

5,413,022

# DRUM WITH FREE FLOATING TENSION ASSEMBLY

Donald E. Sleishman, Unit 11, 127-129 Newbridge Road, Chip-ping Norton, New South Wales, 2170, Australia

Filed Mar. 22, 1993, Ser. No. 35,160

Claims priority, application Australia, Mar. 27, 1992, PL1574 Int. Cl.<sup>6</sup> G10D 13/02

U.S. Cl. 84—413

6 Claims

1. A drum comprising:

- a shell;
- a pair of skins disposed at opposite ends of said-shell; and
- a substantially free floating tensioning assembly disposed to stretch each of said pair of skins over one of two ends of

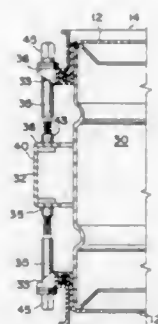


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said shell, said tensioning assembly comprising a pair of engagement means each for gripping a periphery of a respective one of said pair of skins, immediately adjacent said shell a stabilizing ring disposed in spaced apart relation to said shell around said shell intermediate said two ends thereof, and a plurality of adjustable spaced apart tensioning elements connected to said stabilizing ring and said engagement means, each connecting a respective one



of said engagement means to said stabilizing ring, whereby said stabilizing ring and said tensioning elements are disposed in spaced apart relation to said shell and supported by said engagement means without direct fixture of said stabilizing ring to said shell such that tension is transferred directly between said skins via said engagement means, tensioning elements and stabilizing ring substantially independently of said shell, thereby permitting substantially undamped vibration of said shell.

5,413,023

## ELASTOMERIC PREPREG ROVING COMPOSITE

Henry W. Babel, Huntington Beach, and Robert F. Relzer, Stanton, both of Calif., assignors to McDonnell Douglas Corporation, Huntington Beach, Calif.

Filed Dec. 27, 1985, Ser. No. 813,812  
Int. Cl.<sup>6</sup> F42D 1/08

U.S. Cl. 86—21

5 Claims

1. An elastomeric prepreg comprising a carrier impregnated with an elastomeric polymer system wherein said elastomeric polymer system is 95 to 99.5% free of solvents and is essentially in the uncured condition.

5,413,024

## DISPOSABLE FLARE DISPENSER MAGAZINE FOR INFRARED DECOY FLARES

Thomas W. Plummer, Germantown, Tenn., assignor to Alliant Techsystems Inc., Hopkins, Minn.

Filed Jul. 16, 1993, Ser. No. 92,775  
Int. Cl.<sup>6</sup> F41F 3/042

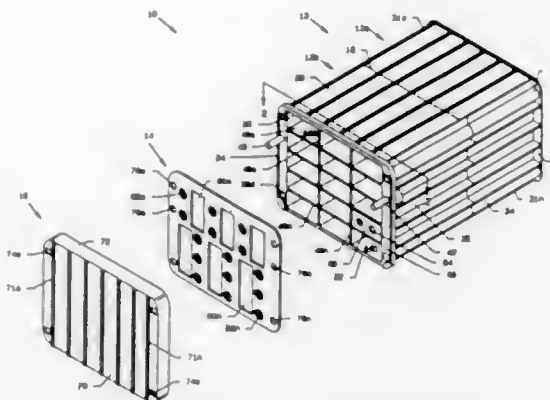
U.S. Cl. 89—1,816

3 Claims

3. A disposable flare dispenser magazine for infrared decoy flares comprising:

- a. a magazine including aligned substantially equal front half and back half sections, each section including four corners, means for engaging said halves together, a plurality of compartment means spaced in said magazine for receiving

ing a disposable flare in each of said compartment means, and alignment means extending from said rear half; and,



b. a rear retainer plate including a plurality orifice means and spaced holes to receive said alignment means.

5,413,025

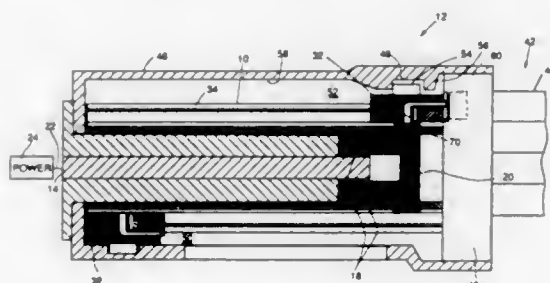
## ELECTRO-THERMAL GATLING GUN

Scott G. Martin, Alta Loma, Calif., assignor to Hughes Missile Systems Company, Los Angeles, Calif.

Filed Jun. 25, 1993, Ser. No. 81,894  
Int. Cl.<sup>6</sup> F41A 19/68

U.S. Cl. 89—8

14 Claims



1. An electro-thermal gatling gun for firing an electro-thermal round, comprising:

- a plurality of gun barrels;
- a gun rotor defining a plurality of channel means each for guiding a breechblock between a rear position and a breech position, each said guide channel means being aligned with and rotatably fixed to one of said plurality of gun barrels;

cam guide means for moving said breechblocks reciprocally and in series from said rear position to said breech position as said gun rotor rotates; and

rotating electrical means for providing an electrical connection between a high power electrical cable and said one of said breechblocks when said one of said breechblocks is in said breech position and for maintaining said electrical connection during gun rotation said rotating electrical means comprising:

- a stator connected to said high power electrical cable;
- a rotor contact fixed for rotation with said gun rotor; and
- a brush contact means for electrically connecting said rotor contact and said stator as said rotor rotates, wherein said rotor contact connects said stator to said one of said breechblocks in said breech position.

5,413,026

## REMOVABLE BULLETPROOF APPARATUS FOR VEHICLES

James R. Madden, Jr., 4410 W. Acoma Dr., Glendale, Ariz. 85306

Division of Ser. No. 139,313, Oct. 19, 1993, Pat. No. 5,370,035, which is a continuation-in-part of Ser. No. 792,645, Nov. 15, 1991, Pat. No. 5,271,311. This application Sep. 30, 1994, Ser. No. 316,253

The portion of the term of this patent subsequent to Dec. 21, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> F41H 5/06

U.S. Cl. 89—36.08

10 Claims



1. Removable bulletproof apparatus for a vehicle having a door and a window in the door comprising in combination: transparent panel means disposed adjacent to the door window;
- a frame for securing the transparent panel means to the door, including a rod for supporting a flexible curtain; and
- a flexible curtain extending downwardly from and removably secured to the frame and substantially covering the door below the door window, and the flexible curtain comprises a plurality of layers of cloth.

5,413,027

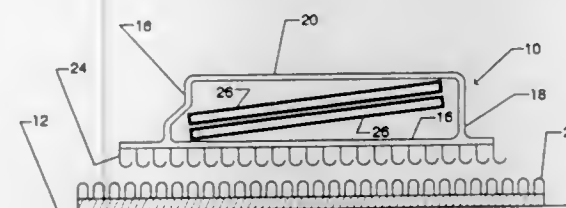
## REACTIVE ARMOR WITH RADAR ABSORBING STRUCTURE

Larry C. Mixon, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 19, 1993, Ser. No. 55,954  
Int. Cl.<sup>6</sup> F41H 5/007

U.S. Cl. 89—36.17

20 Claims



1. A reactive armor box for use in protecting armor surfaces from projectiles, comprising:

- a) a base for attachment to the armor surface to be protected;
- b) a plurality of walls extending from said base at an angle to said base to provide an enclosed space;
- c) a plurality of explosive cassettes disposed within said enclosed space and supported and contained within said walls; and
- d) a top attached to said walls to contain said cassettes in said enclosed space, composed of a composite material having radar absorbing characteristics for absorbing radio waves of said radar to avoid detection of said protected armor surface and to protect said armor surface from projectiles utilizing radio frequency guidance seekers.

5,413,028

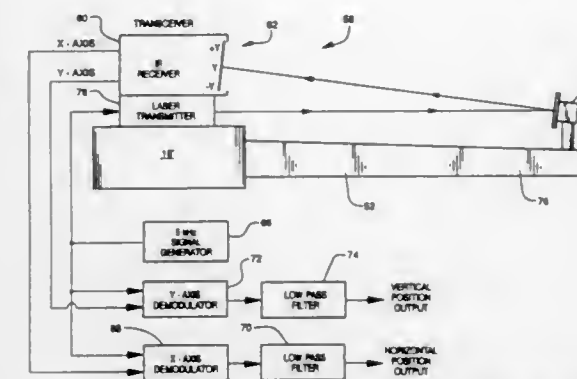
## WEAPON STABILIZATION SYSTEM

Michael S. Ng, Grosse Pointe Park, and Arthur J. Wroble, Grosse Pointe Shores, both of Mich., assignors to Cadillac Gage Textron Inc., Warren, Mich.

Filed Nov. 12, 1993, Ser. No. 150,890  
Int. Cl.<sup>6</sup> F41G 5/16

U.S. Cl. 89—41.09

15 Claims



1. In a stabilization system for use with a hydraulic actuator that moves a member which is subjected to dynamic external accelerations that backdrive the actuator, the stabilization system being of the type utilizing an actuator command to control the hydraulic actuator and pressure feedback from the hydraulic actuator to dampen the response of the hydraulic actuator to the actuator command, the improvement comprising:

- a sensor operable to detect the dynamic external accelerations when said sensor is coupled to the member; and
- a feedforward circuit responsive to said sensor and operable to compensate for pressure feedback resulting from the dynamic external accelerations.

5,413,029

## SYSTEM AND METHOD FOR IMPROVED WEAPONS SYSTEMS USING A KALMAN FILTER

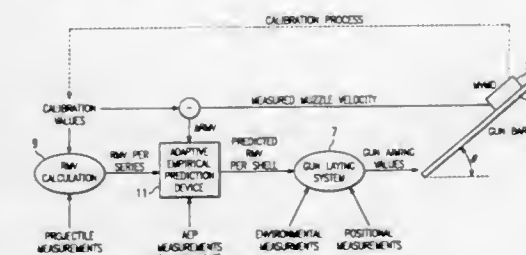
Christopher R. Gent, Crowthorne, and Steven A. Bryant, Camberley, both of England, assignors to Electronic Data Systems Corporation, Plano, Tex.

Continuation of Ser. No. 101,684, Aug. 4, 1993, abandoned, which is a division of Ser. No. 880,454, May 8, 1992, Pat. No. 5,267,502. This application Aug. 15, 1994, Ser. No. 290,413  
Claims priority, application United Kingdom, May 8, 1991, 9109954; Jun. 13, 1991, 9112793

Int. Cl.<sup>6</sup> F41G 3/12

U.S. Cl. 89—41.30

76 Claims



1. A method of predicting a future muzzle velocity of an indirect-fire weapon, the method comprising measuring a muzzle velocity and using a Kalman filter in combination with a first round prediction algorithm in order to predict a future muzzle velocity, wherein said Kalman filter is a multi-state Kalman filter that functions to estimate major sources of errors in muzzle velocity prediction and said Kalman filter utilizes:

- A) a definition of the errors and their stochastic behavior

- in time;  
B) the relationship between the errors and the measured muzzle velocity; and  
C) how the errors influence the prediction of muzzle velocity.

5,413,030

## SELF-ENERGIZING SNUBBER FOR A HYDRAULIC MOTOR

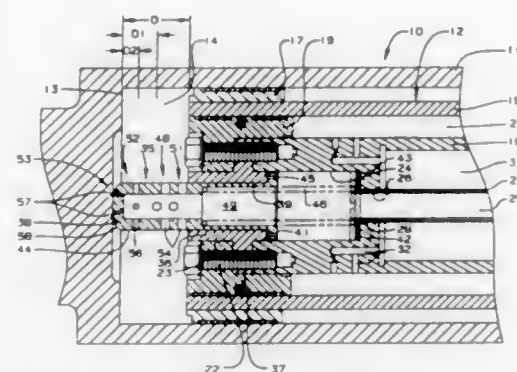
Warner G. Richardson, Shorewood, and Steven R. Wells, Aurora, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Feb. 17, 1994, Ser. No. 198,759

Int. Cl.<sup>6</sup> F15B 15/22; F01B 15/00

U.S. Cl. 91—408

5 Claims



1. A self-energizing snubber for a hydraulic motor having a cylinder and a piston rod assembly reciprocally mounted within the cylinder defining an actuating chamber adjacent an end surface, the piston rod assembly having a fluid passage therein as the only means for transmitting hydraulic fluid into and out of the actuating chamber, comprising:

- means defining a bore opening into the actuating chamber;
- a snubber piston reciprocally disposed within the bore and having an end portion extending into the actuating chamber when the piston is spaced from the end surface greater than a predetermined distance;
- a spring resiliently biasing the snubber piston toward the end surface; and

means defining a variable rate flow path in the snubber piston for continuously communicating the actuating chamber with the passage, the snubber piston having a first operative position establishing a maximum flow rate through the flow path, a second operative position establishing a minimum flow rate through the flow path, and an intermediate operative position establishing an intermediate flow rate through the flow path, the snubber piston being initially shifted from the first position to the intermediate position by abutment between an end of the snubber piston and the end surface as the piston rod assembly approaches the end surface, the intermediate flow rate being selected to establish a pressure differential between the actuating chamber and the passage sufficient to move the snubber piston away from the end surface to the second position against the bias of the spring.

5,413,031

## ALIGNMENT COUPLER FOR LINEAR DEVICE

Bruce E. Kohlmeier, Wadsworth, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Jan. 6, 1994, Ser. No. 178,168

Int. Cl.<sup>6</sup> B23Q 1/00; F16J 7/00

U.S. Cl. 92—165 R

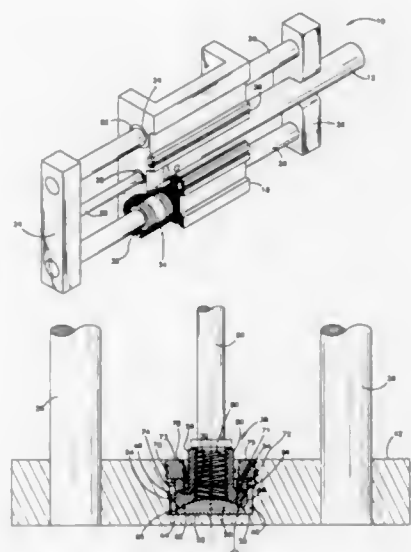
23 Claims

1. An alignment coupler assembly for a linear device, comprising:

- a tooling plate having a cavity extending from an outer surface through a portion of the tooling plate, said cavity defining an inner, laterally-extending planar end wall and

a sidewall extending longitudinally away from said end-wall; and

an alignment coupler received in the tooling plate cavity, said alignment coupler including i) an end cap having a central aperture attached to the tooling plate and at least partially covering the opening to the cavity, ii) a bearing pad disposed within the cavity with a planar surface adjacent to the inner end wall in the cavity, and an outer curved surface facing away from the inner end wall, iii) an operating rod disposed within the cavity having a stem extending outwardly through the aperture in the end cap and a shoulder flange having an inner curved surface adjacent to and concentric with the outer curved surface of the bearing pad, and iv) a bearing washer disposed in the cavity between the shoulder flange of the operating rod and the end cap such that said operating rod shoulder flange can slide between and against the bearing pad and the bearing washer in rotational and angular relation with respect to the tooling plate; said bearing pad, operating rod shoulder flange, and bearing washer having an outer peripheral dimension which is less than the inner dimension of the cavity defined by the sidewall such that the bearing pad, operating rod and bearing washer can also move laterally across the sidewall in the tooling plate cavity.



9. A linear device, comprising:

- i) a cylinder housing having longitudinal bores formed therein for a pair of support shafts;
- ii) a central cylinder mounted within said housing, said central cylinder having a longitudinally-moveable drive piston and sealing means surrounding said drive piston to prevent fluid from leaking around said piston, said drive piston also having lateral, angular and rotational components of motion as said drive piston moves longitudinally;
- iii) a pair of support shafts disposed on opposite sides of said central cylinder in said housing and extending through the bores for linear movement therein;
- iv) a plate attached to a distal end of each of the support rods and a distal end of the piston rod, said plate including a central cavity extending longitudinally through a portion of the plate, the central cavity defining an inner, laterally-extending endwall, and a cylindrical sidewall extending longitudinally away from said endwall; and
- v) an alignment coupler received in the plate cavity, said alignment coupler including a) a bearing pad disposed within the cavity with an inner, generally planar surface in sliding engagement with the inner endwall in the cavity, and an outer curved surface facing away from the inner endwall, b) an operating rod disposed within the cavity having a stem extending outwardly from the cavity and

fixed to the drive piston of the central cylinder and a shoulder flange having an inner curved surface adjacent to and concentric with the outer curved surface of the bearing pad such that said operating rod can slide against the bearing pad in rotational and angular relation with respect to the plate, and c) a bearing disposed in the cavity adjacent the shoulder flange of the operating rod and retained in the cavity against longitudinal movement; said bearing pad, operating rod shoulder flange and bearing having an outer peripheral dimension which is less than the inner dimension of the cavity defined by the sidewall such that the bearing pad, the operating rod, and the bearing can move laterally across the sidewall in the plate cavity.

5,413,032

## RESTAURANT TYPE GRIDDLE WITH MODULAR CONSTRUCTION AND WHICH IS LOAD SENSITIVE

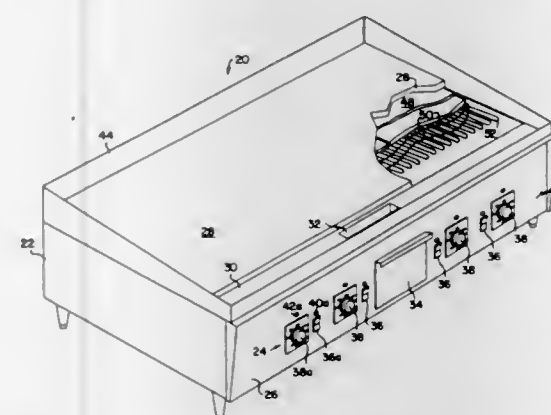
Adrian A. Bruno, Rolling Meadows; William S. Schjervén, Sr., Schaumburg, and Roberto Nevárez, Kirkland, all of Ill., assignors to The Middleby Corporation, Ill.

Filed Aug. 18, 1994, Ser. No. 292,738

Int. Cl.<sup>6</sup> A47J 37/10; H05B 3/00

U.S. Cl. 99—331

20 Claims



1. A griddle comprising a griddle plate having a cooking surface on a top side of a steel plate, a second plate made of a metal having a good heat spreading characteristic in intimate contact with a bottom side of said steel plate, at least one heating module comprising a housing containing an electrically and thermally insulating block of material having electrically conductive heating element wires embedded therein, said second plate being a top member of said module housing and in intimate contact with said block of insulating material contained in said housing, and a blanket of thermal insulating material in close proximity with the underside of said block of insulating material.

5,413,033

## OVEN WITH A STONE COVERED BOTTOM

Renato S. Riccio, 11350 Pagemill, Dallas, Tex. 75243

Filed Oct. 22, 1993, Ser. No. 141,349

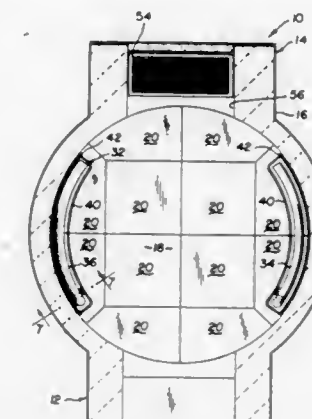
Int. Cl.<sup>6</sup> A21B 1/02

U.S. Cl. 99—339

21 Claims

1. An oven for baking a food product, comprising: a stone covered bottom including a baking area in which the food product may be baked; a top connected to said bottom and constructed to form a domed chamber over the baking area; a constant heat source connected to said bottom to provide a constant heat within the chamber, said constant heat source including a burner located above said bottom and laterally spaced from the baking area at the periphery of said bottom so as to direct heat emanating therefrom inwardly toward the baking area; a first passageway extending through the top and

having a size sufficient to pass an unbaked food product into the chamber; and a second passageway extending through the



top and having a size sufficient to remove a baked food product from the chamber.

5,413,034

## RESISTANCE MEMBER ADJUSTING MECHANISM OF ABRASIVE TYPE GRAIN MILLING MACHINE

Satoru Satake, Tokyo; Yutaka Okada, and Shigeru Aiji, both of Higashihirashima, all of Japan, assignors to Satake Corporation, Tokyo, Japan

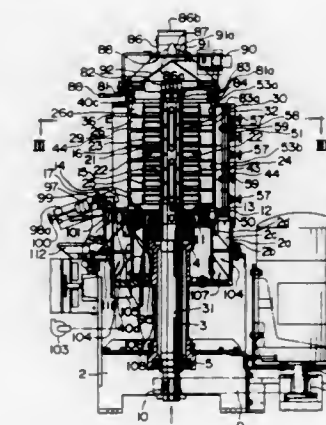
Filed Jun. 10, 1994, Ser. No. 259,171

Claims priority, application Japan, Aug. 6, 1993, 5-215072

Int. Cl.<sup>6</sup> B02B 3/00

U.S. Cl. 99—519

10 Claims



1. An abrasive type vertical grain milling machine comprising:

- a main shaft;
  - an abrasive type grain milling roll assembly mounted on said main shaft and extending straight in a vertical direction, said roll assembly having an outer peripheral surface facing radially outward from said main shaft;
  - a perforated cylindrical body extending vertically around and spaced apart from said roll assembly, said cylindrical body having an inner surface facing said outer peripheral surface of said roll assembly; and
  - a cylindrical grain milling chamber defined between said outer peripheral surface of said roll assembly and said inner surface of said cylindrical body;
- wherein grains to be milled are introduced into said grain milling chamber from one vertical upstream end of said grain milling chamber and grains that have been milled are discharged from another downstream end of said grain milling chamber, and bran produced in said grain milling



chamber is released through holes in said perforated cylindrical body; and wherein said cylindrical body comprises: at least one set of a plurality of resistance members aligned vertically with each other, each said resistance member extending vertically and being projected radially into the grain milling chamber so as to impart resistances to motions of the grains in a circumferential direction of said roll assembly, an amount of projection of each of said resistance members being independently adjustable, and projection amount adjusting means for adjusting independently the respective amounts of projection in the radial direction of said plural resistance members located in different vertical positions.

5,413,035

## STEERING WHEEL SUPPORTED TRAY

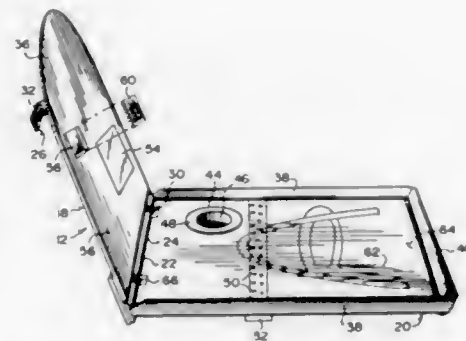
Eugene Fernandez, 460 Old Town Rd. No. 13G, Port Jefferson Station, N.Y. 11776

Filed Sep. 13, 1993, Ser. No. 120,673

Int. Cl.<sup>6</sup> A47B 23/00

U.S. Cl. 108—44

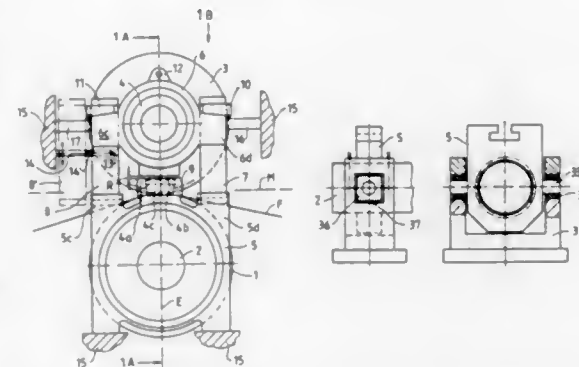
11 Claims



1. A tray supported on a steering wheel of a motor vehicle comprising:

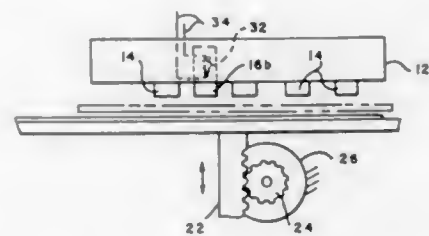
- a back panel, said back panel having an upper edge being curved to conform to the curvature of the steering wheel;
- a base panel secured along one inner edge to a lower edge of said back panel, said base panel including a pair of upwardly extending side walls, an upwardly extending front wall to prevent any article placed upon said base panel from falling off, a circular aperture therethrough, a beverage container holder having a cup portion and a flat annular flange portion, so that said cup portion can fit into said circular aperture with said annular flange portion resting upon said base panel, a plurality of small drain holes thereacross, and a sump member mounted to the underside of said base panel directly under said drain holes, so that any liquid spilled onto said base panel will enter said sump member;
- means for attaching in a removable manner said back panel to the steering wheel, so that said base panel will generally extend horizontally and outwardly therefrom, to allow a person sitting on a seat in the motor vehicle to eat off of and work upon said base panel, said removable attaching means including a pair of hooks spaced apart and affixed to a rear surface of said back panel, to engage with the steering wheel; and
- means for pivotally engaging the one inner edge of said base panel to the lower edge of said back panel, to permit relative pivotal movement between said back panel and said base panel, so as to pivot between a folded position and an open position.

5,413,036  
ROLL PRESS, SPECIFICALLY FOR THE PAPER INDUSTRY  
Christian Schiel, Heidenheim, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany  
Filed Dec. 7, 1993, Ser. No. 163,840  
Claims priority, application Germany, Dec. 12, 1992, 42 42 022.9  
Int. Cl.<sup>6</sup> B30B 3/04  
U.S. Cl. 100—168  
4 Claims



1. A roll press comprising: two press rolls forming with each other a press gap, each press roll having an axis, the respective axes of the press rolls being situated in a press plane; a journal situated at each end of each of said press rolls; a respective pillow block for receiving each journal; a rack for supporting the pillow blocks; a tie rod arranged on each side of the press plane and arranged generally parallel to said press plane, each tie rod extending between respective pillow blocks; a respective cradle for supporting each pillow block, each cradle and the pertaining pillow block being movable relative to each other in the direction of the roll axis; and an articulated joint arranged between each of the cradles and the pillow blocks to enable the pillow blocks to pivot about an axis which extends perpendicular to the press plane and generally in the axial plane of the respective press roll.

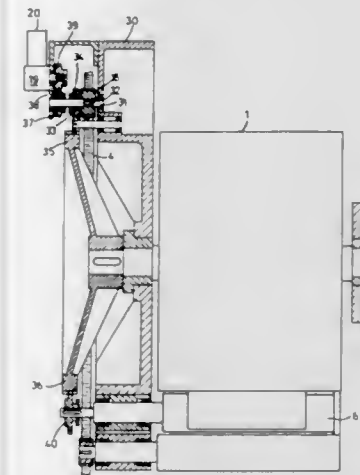
5,413,037  
USE OF ENCAPSULATED INK FOR ENHANCING POSTAGE METER SECURITY  
Judith D. Auslander, Westport, and William Berson, Weston, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.  
Filed Jun. 20, 1994, Ser. No. 262,430  
Int. Cl.<sup>6</sup> B41F 19/02  
U.S. Cl. 101—9  
13 Claims



1. In a postage meter printing station for printing a postage indicia that evidences the payment of postage, the combination comprising: a print head, means for applying ink to said print head,

said ink comprising a fluorescent dye and an encapsulated fluorescent quenching substance, said print head having means thereon for rupturing a portion of said encapsulated fluorescent quenching substance, a platen for supporting a mail piece, and means for driving said platen into printing engagement with said print head to cause said means for rupturing to rupture said portion of said encapsulated fluorescent quenching substance.

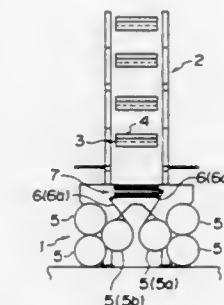
5,413,038  
PRINTING MACHINE  
Werner Josl-Enneking, Lotte, and Guenter Rogge, Lienen, both of Germany, assignors to Windmüller & Hölscher, Lengerich-Westf., Germany  
Filed Mar. 11, 1994, Ser. No. 208,522  
Claims priority, application Germany, Mar. 17, 1993, 43 08 492.3  
Int. Cl.<sup>6</sup> B41F 5/18, 5/24  
U.S. Cl. 101—178  
6 Claims



1. A flexographic printing machine, comprising: a printing machine frame (3) in which an impression roll (1) and a central drive gear (36) connected thereto are mounted, printing cylinder units, each unit including a printing cylinder (6) arranged around said impression roll, guides on the printing machine frame (3), each guide respectively receiving bearings of each said printing cylinder (6), an inking device slide for each printing cylinder movably mounted on each guide, and a screen roll (2) respectively mounted on each said inking device slide for mounting each said screen roll for movement substantially radially with respect to the impression roll (1), wherein each said printing cylinder and each said screen roll are driven by the central drive gear (36) and each said screen roll is movably connected via a freewheel (33) with the central drive gear (36), a continuous drive for each said screen roll (2) comprising a toothed belt (4), a servomotor (19, 20) for driving said toothed belt, said toothed belt (4) being engaged in a loop around a respective toothed drive wheel located on each said screen roll (2), said toothed belt passing across idle wheels (8-14, 7, 15), each printing cylinder unit having three said idle wheels immovably attached to said frame and one idle wheel (7) arranged on each said inking device slide, said toothed belt (4) having lengths (25, 26) which run onto and off respective ones of said idle wheels (7, 15), arranged radially outside and on both sides of each respective said screen roll toothed drive wheel (24), which extend in parallel with each other, and lengths (26, 27) of the toothed belt (4) enclosing respective ones of said idle wheels, arranged on one side of each respective said

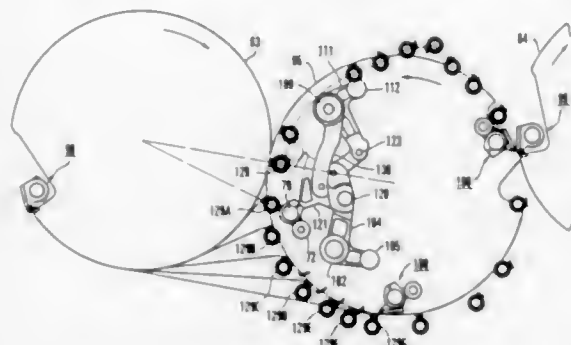
screen roll toothed drive wheel (24), which extend in parallel with each other, and means for moving each respective inking device slide on each said guide in a direction parallel with lengths (25, 26, 27) of the toothed belt (4) which extend parallel with each other.

5,413,039  
ROTARY PRESS AND FEEDER UNIT FOR THE SAME  
Isao Sobma, Yokohama, Japan, assignor to Tokyo Kikai Seisakusho, Ltd., Tokyo, Japan  
Continuation of Ser. No. 54,252, Apr. 30, 1993, abandoned. This application Aug. 4, 1994, Ser. No. 285,629  
Claims priority, application Japan, Jul. 22, 1992, 4-215744  
Int. Cl.<sup>6</sup> B41F 13/56  
U.S. Cl. 101—225  
9 Claims



1. A rotary press, comprising: a feeder unit provided with a paper roll support frame, said paper roll support frame including means for supporting at least two paper rolls with each of the paper rolls having a central axis in a generally horizontal position and in a generally parallel side-by-side relation to one another in said feeder unit such that the outside cylindrical surfaces of the paper rolls are side-by-side and facing each other; a printing unit provided with a printing means, said printing means including at least two printing cylinders, each having a central axis supported in a generally horizontal position; means for simultaneously feeding at least two of said at least two paper rolls to said printing unit; said central axes of said paper rolls in said feeder unit being disposed in a non-parallel and vertical relation with respect to said central axis of each said at least one printing cylinder in said printing unit so that said feeder unit can support a plurality of paper rolls thereon and pay out paper webs at once from at least two paper rolls out of said paper rolls; web turning means for changing the directions of advance of the paper webs, which are fed from said paper rolls supported on said feeder unit, and sent to said printing means, in such a manner that the surfaces of said paper webs are opposed to at least one of said at least two cylinders of said printing means, wherein said web turning means has a first member which turns a first web from a first of the paper rolls at a first location and a second member which turns a second web from a second of the paper rolls at a second location above said first location such that said second web extends at least partially over said first web and creates a compact structure.

**5,413,040**  
**SHEET REVERSING APPARATUS FOR SHEET-FED ROTARY PRESS WITH REVERSING MECHANISM**  
 Hiroyuki Sugiyama, and Kenji Kida, both of Ibaragi, Japan, assignors to Komori Corporation, Tokyo, Japan  
 Filed Aug. 31, 1994, Ser. No. 298,577  
 Claims priority, application Japan, Sep. 2, 1993, 5-240325  
 Int. Cl.<sup>6</sup> B41F 5/02  
 U.S. Cl. 101—230 8 Claims

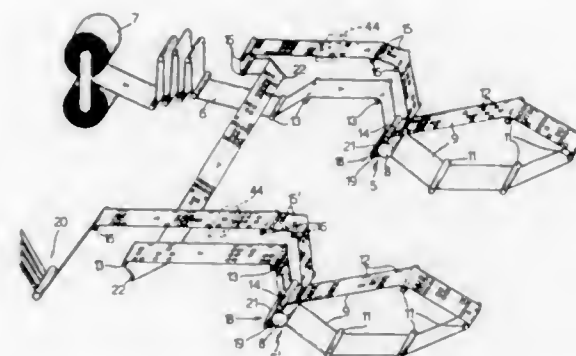


1. A sheet reversing apparatus for a sheet-fed rotary press with a reversing mechanism, comprising:
  - a paper convey cylinder disposed between an upstream cylinder and a downstream cylinder with respect to a paper convey direction to be in contact with each other;
  - a gap formed along an axial direction of said paper convey cylinder at a position which divides a circumference of said paper convey cylinder into halves in a circumferential direction;
  - a reversing mechanism, disposed in said gap, for holding a trailing end of a paper sheet passing through a contact point between said paper convey cylinder and said upstream cylinder and wound on said upstream cylinder, and then reversing and transferring said paper sheet to said downstream cylinder, said reversing mechanism having a paper holding unit, having a gripper member and a gripper pad member for receiving and holding said reversed paper sheet, for transferring said paper sheet held between said gripper member and said gripper pad member to said downstream cylinder;
  - a gripper moving unit for moving said gripper member of said paper holding unit from said gap to an outer surface of said paper convey cylinder in accordance with a pivotal movement of said paper convey cylinder; and
  - a gripper pad moving unit for moving, in accordance with the pivotal movement of said paper convey cylinder, said gripper pad member of said paper holding unit between an operating position at which a distal end of said gripper member presses a paper grip surface of said gripper pad member to grip said paper sheet and a retreat position at which a space is formed to entirely receive said gripper member moved by said gripper moving unit from said outer surface of said paper convey cylinder into said gap.

**5,413,041**  
**HIGH-SPEED WEB-FED FLEXOGRAPHIC PRINTER**  
 Luigino De Concini, Domenico Fasoli, both of Cles; Sergio Pimazzoni, and Gabriele Rullini, both of Verona, all of Italy, assignors to Arnoldo Mondadori Editore S.p.A., Italy  
 Filed Dec. 29, 1993, Ser. No. 175,147  
 Claims priority, application Italy, May 7, 1993, TO93A0320  
 Int. Cl.<sup>6</sup> B41F 1/46  
 U.S. Cl. 101—348 9 Claims

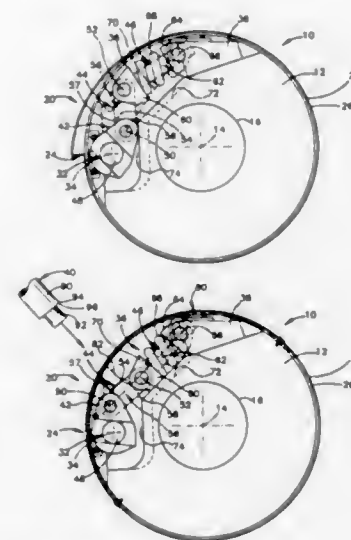
1. A high-speed web printer for web printing with flexographic matrix means, comprising at least a printing roller supporting said matrix means:
  - a pressure roller for pressing said web against said matrix means at a first portion of said printing roller; and

an inking unit including an inking roller contacting said matrix means at a second portion of said printing roller; wherein the cylindrical outer surface of said inking roller presents microincisions, and is partially immersed in water-based ink inside a tank; blade type doctoring means being provided for removing surplus ink from said surface prior to transferring the ink on to said matrix means; and



wherein said inking roller includes a cylindrical support made of steel and covered with a 0.5 to 2 mm thick layer of copper in which said microincisions are formed, said microincisions consisting of microdepressions of a depth of about 15 to 25  $\mu\text{m}$ , and defined by symmetrical, undulated microribs.

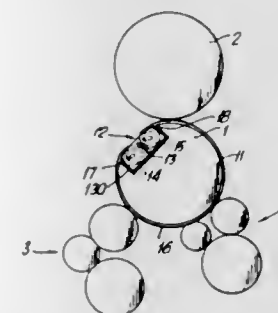
**5,413,042**  
**LOCK-UP ASSEMBLY FOR SECURING A PRINTING PLATE ON A PLATE CYLINDER**  
 Gregory W. Weiss, Barrington, N.H.; John M. Gaffney, Kittery Point, Me., and John J. Dowling, Somersworth, N.H., assignors to Heidelberg Druckmaschinen AG, Heidelberg, Germany  
 Filed Feb. 22, 1994, Ser. No. 199,618  
 Int. Cl.<sup>6</sup> B41F 27/06, 27/12  
 U.S. Cl. 101—415.1 12 Claims



1. Apparatus comprising:
  - a cylinder body (12) with a cylindrical outer surface means (26) for receiving a printing plate (22) in overlying engagement;
  - a rotatable lock bar (32) means for engaging the printing plate (22) to secure the printing plate (22) on said cylinder body (12) upon rotation of said lock bar means (32) in a first direction, and to release the printing plate (22) for

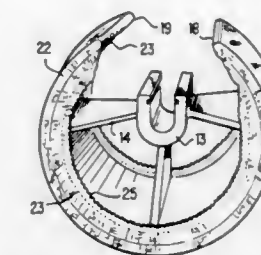
removal from said cylinder body (12) upon rotation of said lock bar means (32) in a second direction; spring means (68) for providing a spring force for rotating said lock bar means (32); linkage means (36) for rotating said lock bar means (32) under the influence of said spring force, said linkage means (36) having a first over-center condition in which said linkage means (36) rotates said lock bar means (32) in said first direction and having a second over-center condition in which said linkage means (36) rotates said lock bar means (32) in said second direction; blocking means (82) for blocking said linkage means (36) from switching from said first over-center condition to said second over-center condition, said blocking means (82) including a movable blocking member (82) having a first position in which said blocking member (82) blocks such switching of said linkage means (36) and a second position in which said blocking member (82) does not block such switching of said linkage means (36); and a hand held tool (40) having means (92, 96) for engaging said linkage means (36) to switch said linkage means (36) between said first and second over-center conditions upon manual manipulation of said tool (40), said tool (40) further having means (94) for engaging said blocking member (82) to move said blocking member (82) from said first position to said second position upon manual manipulation of said tool (40).

**5,413,043**  
**PRINTING APPARATUS INCLUDING A FORME CYLINDER AND METHOD OF PREPARING THE FORME CYLINDER FOR PRINTING**  
 Hartmut Fuhrmann, Bobingen; Josef Götting, Friedberg, and Wolfram Fischer, Neusäss, all of Germany, assignors to MAN Roland Druckmaschinen AG, Offenbach am Main, Germany  
 Filed Apr. 19, 1993, Ser. No. 49,179  
 Claims priority, application Germany, Apr. 24, 1992, 42 13 503.6  
 Int. Cl.<sup>6</sup> B41F 27/12  
 U.S. Cl. 101—415.1 24 Claims



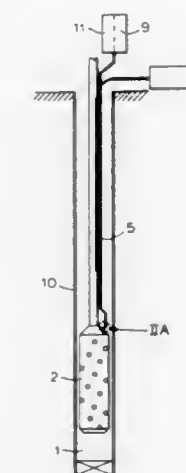
1. A printing apparatus comprising a forme cylinder, the forme cylinder having an outer circumferential surface and end faces, the outer surface defining a single opening, the forme cylinder having a groove in communication with the single opening, a first roller mounted in the groove and a second roller mounted in the groove, and a printing foil provided on the first roller and windable off the first roller through the opening onto the outer surface of the forme cylinder, around the outer surface of the forme cylinder, through the opening and onto the second roller, the printing foil being windable by rotation of the rollers.

**5,413,044**  
**SACK NET FOR PRINTING PRESS ANTI-SMEAR TRANSFER CYLINDER**  
 William B. Wu, 1651 Taraval St., San Francisco, Calif. 94116, and Brian Yu, 5626 Chestnut Common, Fremont, Calif. 94538  
 Filed Sep. 4, 1992, Ser. No. 941,226  
 Int. Cl.<sup>6</sup> B41F 30/04  
 U.S. Cl. 101—420 10 Claims



1. An antismear covering in combination with a transfer cylinder in a printing press, said cylinder having a longitudinal slot in the surface thereof defined by two arcuately spaced edges, said cylinder having a rim portion at each end thereof, said covering comprising a sack formed of an open weave fabric material, said sack having an opening, an elastic string attached to and surrounding said opening, said sack receiving said cylinder through said opening with said elastic string embracing said slot edges at internal cylindrical portions and extending around said rim portions internally spaced therefrom whereby said sack covers said cylinder external surface providing a smooth resilient fabric covering.

**5,413,045**  
**DETONATION SYSTEM**  
 Antoni Miszewski, 10 Boucher Rd., Budleigh Salterton, Devon, United Kingdom EX9 6JF  
 Filed Sep. 7, 1993, Ser. No. 116,883  
 Claims priority, application United Kingdom, Sep. 17, 1992, 9219666  
 Int. Cl.<sup>6</sup> F42C 19/00; E21B 43/11  
 U.S. Cl. 102—201 15 Claims



1. A subterranean detonation system comprising:
  - a well;
  - at least one detonating means extending below the surface in said well which comprises exclusively secondary explosives and operable to detonate in response to a first predetermined optical signal;
  - a first optical signal emission means above the surface and which has a power rating in the range of 0.8 to 5 Joules and which is operable to provide the first predetermined optical signal;



transmission means coupled to the detonating means and the first optical signal emission means for transmitting the first predetermined optical signal to the detonating means to actuate detonation of the detonating means; and a sensor which senses that the detonation has occurred, the transmission means including means for transmitting an optical signal to the surface signalling that the detonation has occurred.

5,413,046

## SHOCK TUBE ASSEMBLY

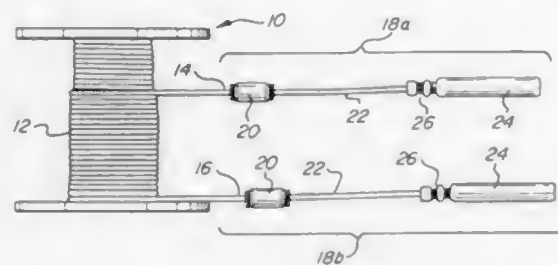
Brian R. Sobczak, Granby; Frank J. Lucca, North Granby; J. Donaldson Thomas, Simsbury; Craig F. Adams, and Ernest L. Gladden, both of Granby, all of Conn., assignors to The Ensign-Bickford Company, Simsbury, Conn.

Filed Mar. 11, 1994, Ser. No. 212,200

Int. Cl.<sup>6</sup> C06C 5/04

U.S. Cl. 102—275.7

14 Claims



1. A signal transmission tube assembly comprises a signal transmission tube having opposite terminal ends and containing a reactive material, and sealing means connected to both terminal ends of the signal transmission tube to seal the assembly against escape therefrom of a signal engendered by reaction of the reactive material.

5,413,047

## OVERBURDEN REMOVAL METHOD WITH BLAST CASTING AND EXCAVATING APPARATUS

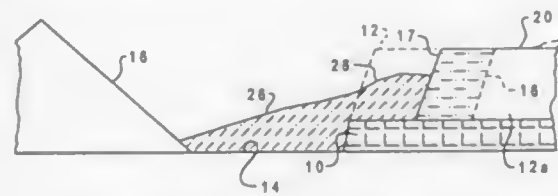
Randall N. Evans, Upton; Monica S. Cummins; Marilyn G. King, both of Gillette, and Robert L. Ferguson, Wright, all of Wyo., assignors to Atlantic Richfield Company, Plano, Tex.

Filed Oct. 15, 1993, Ser. No. 137,681

Int. Cl.<sup>6</sup> F42D 3/00

U.S. Cl. 102—302

6 Claims



1. A method for removing overburden from a mineral seam in the earth comprising the steps of:  
determining a seam width to be uncovered of said overburden material;  
predetermining a portion of said seam width covered by overburden to define an overburden panel which may be blast cast into a pit area adjacent to said seam;  
drilling a predetermined pattern of blastholes into said overburden to receive explosive charges and blast casting said overburden from over said predetermined portion of said seam width;  
drilling a predetermined pattern of substantially vertical blastholes in the remaining portion of said overburden over said seam width and blast fragmenting said remaining portion of said overburden by detonating explosive charges in said substantially vertical blastholes; and  
placing an excavating apparatus at least partially on said

fragmented portion of said overburden and excavating overburden from above said seam.

5,413,048

## SHAPED CHARGE LINER INCLUDING BISMUTH

Andrew T. Werner, East Bernard, and James G. Rider, Missouri City, both of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

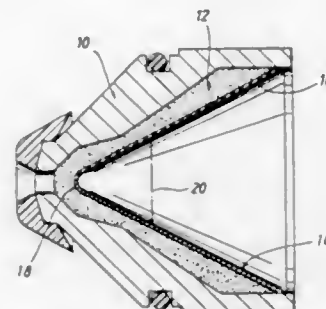
Continuation-in-part of Ser. No. 778,434, Oct. 16, 1991, Pat. No. 5,221,808. This application Jun. 17, 1993, Ser. No. 80,430

The portion of the term of this patent subsequent to Jun. 22, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> F42B 1/02

U.S. Cl. 102—307

29 Claims



1. A liner adapted for use in a charge, comprising:  
Bismuth powder; and  
a metal powder having a particle density of over 6 grams/cubic centimeter, said metal powder including nickel powder.

5,413,049

## REDUCTION OF VELOCITY DECAY OF FIN STABILIZED SUBCALIBER PROJECTILES

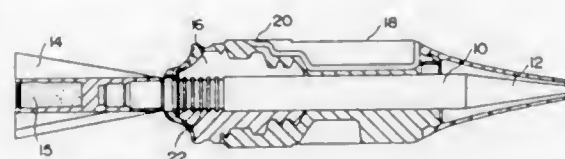
Fritz K. Feldmann; Craig Christenson, and Paul J. Griffith, all of Santa Barbara, Calif., assignors to Pacific Armatechnica Corporation, Santa Barbara, Calif.

Filed Jul. 13, 1993, Ser. No. 91,226

Int. Cl.<sup>6</sup> F42B 14/06

U.S. Cl. 102—521

19 Claims



1. A subcaliber fin stabilized armor piercing projectile fabricated of a high density, high strength alloy, having a large length to diameter ratio, and having a discarding sabot including a base having an inside force transmitting interface for launching from the barrel of a cannon;  
said projectile comprising a slender nose, a cylindrical mid-portion, a fin assembly attached on the rear and a force transmitting interface provided on the cylindrical portion of the projectile and engaging the mating force transmitting interface provided on the inside of the base of the discarding sabot as needed to transmit the axial acceleration from the sabot to the subcaliber projectile during launch from the cannon,  
said projectile force transmitting interface occupying the minimum space on the projectile as determined by the magnitude of the longitudinal acceleration and the dynamic strength properties of the mating sabot base,  
said entire projectile force transmitting interface being located on the cylindrical portion of the subcaliber projec-

tile aft of the point of natural transition from laminar to turbulent boundary layer, and said location assuring the maximum advantage of the low friction coefficient of laminar boundary layer.

5,413,050

## PATTERN CONTROLLER USED WITH SHOTSHELL

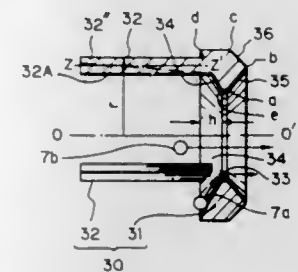
Nagatoshi Maki, 2-48-4, Kamiishihara, Chofu-shi, Tokyo, Japan

Filed Aug. 18, 1993, Ser. No. 108,318

Int. Cl.<sup>6</sup> F42B 7/00

U.S. Cl. 102—457

5 Claims



1. A pattern controller for a shotshell including a case which is comprised of a metal head and a cylindrical hull connected thereto and defining a cylindrical bore, and a primer, said case being provided therein with powder, a wad, and shotpellets successively charged therein in this order, said cylindrical hull being deformed inward to form a crimp at an open end thereof to thereby complete the shotshell,

wherein the pattern controller provided between the shotpellets and said crimp comprises an adjuster and a support coaxial thereto,  
said adjuster having a substantially circular periphery for snugly fitting in the cylindrical hull of the case,  
said adjuster being provided with pattern controlling means generated by revolving a predetermined shape about an axis of the pattern controller,  
said pattern controlling means being comprised of a guide face which is provided with at least one inclined surface opposed to the shotpellets to move the shotpellets in a lateral direction, and center hole means through which at least some of the shotpellets pass in the axial direction,  
said support being provided with a plurality of stays which integrally project from the guide face, each of said stays having a center axis which lies in the same imaginary plane as the center axis of the adjuster,  
said stays being separate from one another and located at an equiangular distance in a symmetrical arrangement with respect to the center axis of the adjuster,  
said stays being provided with outer extreme portions which are spaced from the center axis of the adjuster,  
said pattern controller being elastically rigid to substantially uniformly straighten out said crimp, while maintaining the shape and posture of the pattern controller when the latter has been loaded between the shotpellets and the crimp.

5,413,051

## DRAWING TABLE

Chun-Chu Tseng, Taipei, Taiwan, Prov. of China, assignor to Chin JWU Enterprise Co., Ltd., Taipei, Taiwan, Prov. of China

Filed Nov. 30, 1993, Ser. No. 159,329

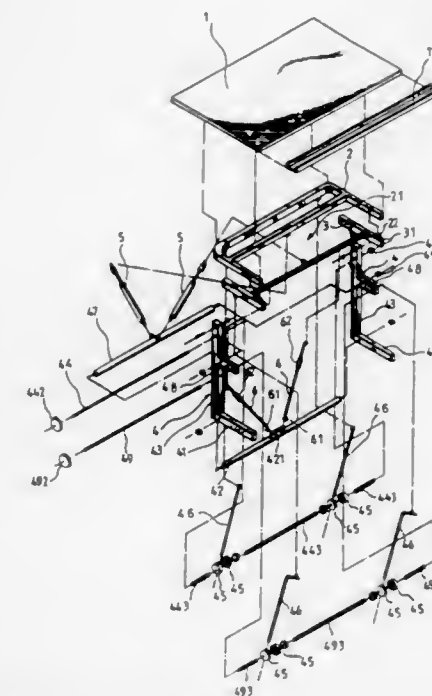
Int. Cl.<sup>6</sup> A47F 5/12

U.S. Cl. 108—6

5 Claims

1. A drawing table comprising a drawing board mounted on a drawing board mounting frame supported on a base frame wherein said base frame comprises two symmetrical stands, each stand having a long horizontal rod at the bottom; a vertical rod connected to the long horizontal rod at right angles; and a short horizontal rod extended from the vertical rod above the long horizontal rod; a bottom cross rod connected

between the long horizontal rods of said stands; two top supports connected between said stands and said drawing board mounting frame, each top support having a rear end pivoted to the vertical rod of either stand at the top and a front end pivoted to either side of said drawing board mounting frame at the front; an upper cross rod connected between the short horizontal rods of said stands; a first adjusting device fastened to said vertical rods of said stands and connected to a rear side of said drawing board mounting frame for adjusting the elevation of the rear side of said drawing board mounting frame; a second adjusting device fastened to said short horizontal rods of said stands and connected to said top supports to adjust the elevation of the front ends of said top support; said first adjusting device comprising a first horizontal supporting rod extending between each vertical rod of said stands, and being adjustably fastened at one end; a plurality of first sleeves mounted around said first horizontal supporting rod; two first clamping devices mounted around said first horizontal supporting rod and retained between said first sleeves; and two first adjustment rods connected between the rear side of said drawing board mounting frame and said first clamping devices, each



first adjustment rod having a fixed top end pivoted to said drawing board mounting frame and a free bottom end clamped by at least one of said first clamping devices; said second adjusting device comprising a second horizontal supporting rod extending between each short horizontal rod of said stands and being adjustably fastened at one end; a plurality of second sleeves mounted around said second horizontal supporting rod; two second clamping devices mounted around said second horizontal supporting rod and retained between said second sleeves; and two second adjustment rods connected between the said top supports and said second clamping devices, each second adjustment rod having a fixed top end pivoted to either top support and a free bottom end clamped by at least one of said second clamping devices; and whereby the drawing board elevation can be adjusted by loosening of either of said first or second adjusting devices at the adjustable end of the respective horizontal support rods, and the respective clamping devices are released from the respective sleeves to release the respective adjustment rods for permitting the respective adjustment rods to be moved vertically on the respective clamping devices.

5,413,052

## PLASTIC PALLET WITH TWO DECKS

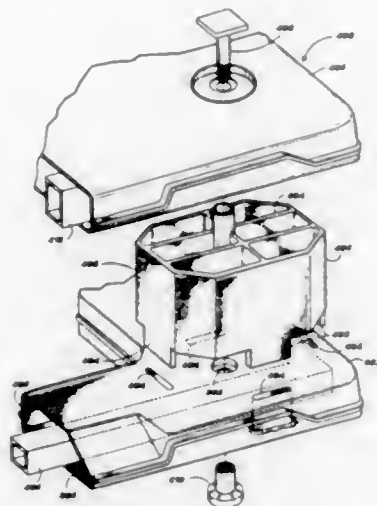
Harlon W. Breezer, Portage, Wis.; Kenneth C. Wilken, Minneapolis, Minn.; Michael J. Wolfe, Pardeeville, and William Price, Portage, both of Wis., assignors to TriEnda Corporation, Portage, Wis.

Continuation-in-part of Ser. No. 740,374, Aug. 5, 1991, Pat. No. 5,197,396. This application Mar. 29, 1993, Ser. No. 39,723. The portion of the term of this patent subsequent to Mar. 30, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> B65D 19/12

U.S. Cl. 108—56.1

8 Claims



## 1. A pallet comprising:

- a sealed twin-sheet thermoformed top deck having an upper thermoplastic sheet and a lower thermoplastic sheet wherein portions of the lower thermoplastic sheet are fused to the upper sheet at a plurality of pinch points, and a plurality of bolt holes are formed at top deck pinch points;
- a metal reinforcing substrate located between the top deck upper sheet and lower sheet, wherein the fused portions are spaced from the substrate;
- a sealed twin-sheet thermoformed bottom deck having an upper thermoplastic sheet fused to a lower thermoplastic sheet at a plurality of pinch points, wherein portions of the pinch points define bolt holes extending through the bottom deck;
- a plurality of plastic posts extending between the top deck and the bottom deck, wherein each post has portions which underlie the metal reinforcing substrate; and
- fasteners which extend through the posts and through the bolt holes in the top deck and the bottom deck to connect the top deck to the bottom deck.

5,413,053

## PALLET LEG ASSEMBLY

Truman J. Vannatta, Lynchburg, Va., assignor to Rock-Tenn Company, Norcross, Ga.

Division of Ser. No. 892,257, Jun. 2, 1992, Pat. No. 5,339,746. This application May 6, 1994, Ser. No. 239,376

Int. Cl.<sup>6</sup> B65D 19/00, 19/34

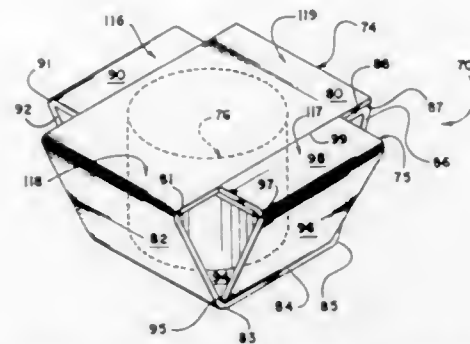
U.S. Cl. 108—56.3

7 Claims

## 1. A pallet leg assembly comprising:

- an outer sleeve defining a top and a bottom thereon and defining a tubular axis extending substantially horizontally;
- an inner sleeve defining a top and a bottom thereon journaled at least partially in said outer sleeve, said inner sleeve's tubular axis being substantially horizontal and

extending substantially perpendicular to said tubular axis of said outer sleeve; and



a vertically-oriented support member positioned in said inner sleeve between the top and bottom of both said outer and inner sleeves.

5,413,054

## PLASTIC CRADLE PALLET FOR LOADING, STORING AND TRANSPORTING HEAVY STEEL OR OTHER METAL COILS IN A VERTICAL POSITION

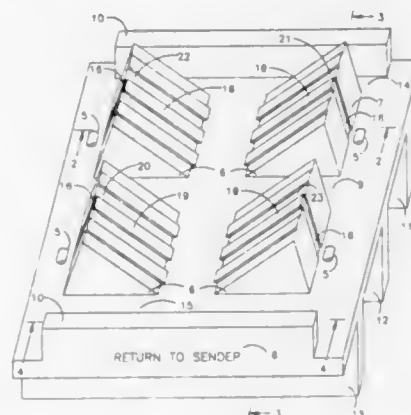
Eric H. Collins, Box 172, Pompton Plains, N.J. 07444

Filed Jun. 28, 1993, Ser. No. 82,789

Int. Cl.<sup>6</sup> B65D 19/44

U.S. Cl. 108—55.3

3 Claims



## 1. A one piece plastic cradle pallet for use in loading, storing and transporting heavy coils of steel or other metal in a vertical position, said pallet comprising:

- three support legs, extending the length of the pallet, of such height and distance apart to allow for two way entry of a variety of lifting and handling device blades;
- two safety walls located on the top surface edges of said pallet, partially extending along the length of said pallet;
- four triangular coil supports, positioned on the top side of the upper surface of said pallet, located equidistant from the center of said pallet;
- said four triangular coil supports forming two cradle pairs, each cradle pair capable of supporting a coil of steel or other metal, having grooved interior coil support walls facing each other, sloped at such an angle to the horizontal, being of such height above the top surface of said pallet and spaced at such a distance apart to limit coil contact to the middle portion of said sloped interior coil support walls;
- said cradle pairs being located equidistant from the center of said pallet and at such a distance apart, to allow a middle support leg of an identical pallet to be placed between said two cradle pairs across the length of said pallet for nesting purposes;

- said cradle pairs located, at a sufficient distance apart from said safety walls, on the upper surface edges of said pallet, to allow two outside support legs of an identical plastic pallet to be placed between said cradle pairs and the adjacent safety walls, across the length of said pallet for nesting purposes;
- four triangular indents, located on the underside of the bottom surface of said plastic pallet, equidistant from the center of said pallet, positioned so as to correspond with and indent the bases, of said four triangular coil supports, between said support legs, each triangular indent having size and dimensions sufficiently greater than said triangular support upper portion size and dimensions, to allow four triangular coil supports, of an identical pallet, to be inserted into said four triangular indents, at such a depth, to allow said three support legs to rest on an identical pallets flat top side upper surface for nesting purposes; and
- four strapping holes located on the top upper surface of said pallet positioned adjacent to four feed grooves located centrally on said four triangular coil supports outer surface walls.

5,413,055

## ALL TERRAIN SEEDER

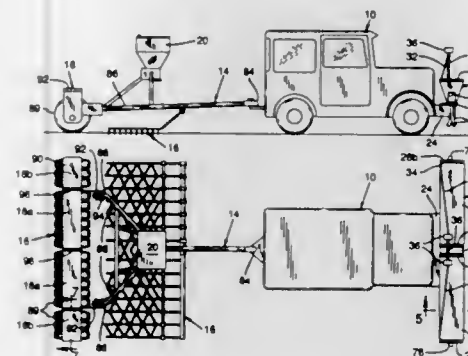
George K. Dern, 30 Squaw Creek Ct., Lander, Wyo. 82520

Filed Jul. 22, 1993, Ser. No. 95,532

Int. Cl.<sup>6</sup> A01C 5/00

U.S. Cl. 111—130

19 Claims



## 1. An all terrain seeding mechanism for a vehicle comprising:

- at least one seeder box capable of mounting transversely on the front of a vehicle and capable of spreading seed by driven movements of the vehicle,
- a plurality of outlet feed tubes depending in spaced lateral position from each other and receiving seed from said seeder box, said feed tubes having a bottom discharge end disposed closely adjacent the ground,
- said feed tubes being sufficiently flexible such that said feed tubes oscillate and wiggle by movement of said vehicle and other forces to the extent that seed discharged therefrom is deposited on the ground in a haphazard, non-symmetrical pattern.

5,413,056

## METHOD AND APPARATUS FOR NO-TILL PLANTING

Brian E. Freed, Lexington, and David E. Freed, Towanda, both of Ill., assignors to Agricom Technology, Inc., Bloomington, Ill.

Filed Jan. 19, 1994, Ser. No. 183,697

Int. Cl.<sup>6</sup> A01B 5/00, 13/02

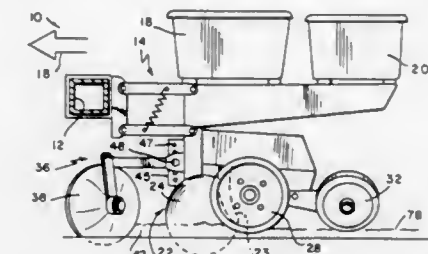
U.S. Cl. 111—139

21 Claims

- A no-till farming apparatus for use with a planter unit which plants seeds as the planter unit is pulled along a predetermined path, the planter unit including at least one gauge wheel, the apparatus comprising:

a disk hiller configured to form an elevated ridge including

a mixture of soil and residue remaining from a previous crop; and  
means for coupling the disk hiller directly to the planter unit to position the disk hiller in front of and aligned with the planter unit so that the planter unit plants seeds a predetermined



5,413,057

## EMBROIDERY HOOP SET HOLDER AND METHOD

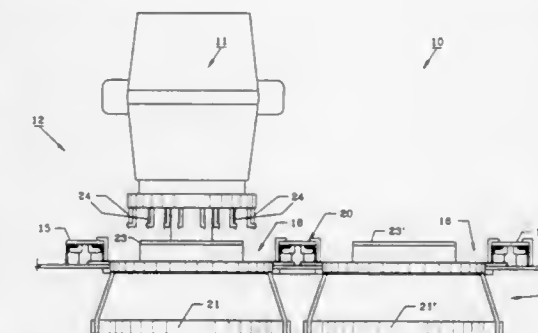
E. Frank Moore, III, 4447 Old Randleman Rd., Greensboro, N.C. 27406

Filed Dec. 3, 1993, Ser. No. 160,967

Int. Cl.<sup>6</sup> D05C 9/04

U.S. Cl. 112—103

18 Claims



- Apparatus for an embroidering machine having a sewing head, said apparatus for releasably maintaining a plurality of embroidery hoop sets for said sewing head, said hoop sets for holding embroidable fabric, said embroidering machine having a pair of conventional hoop receiving arms for said sewing head affixed to the embroidering machine, said apparatus comprising: an elongated base, means to releasably attach said base between a pair of conventional hoop receiving arms, an intermediate hoop receiving arm, said intermediate hoop receiving arm positioned between said pair of conventional hoop receiving arms, said intermediate arm for receiving a plurality of embroidery hoop sets between said pair of conventional hoop receiving arms, and, a means to open fabric layers to accommodate needle passage, said fabric opening means joined to said elongated base.



5,413,058  
INNER BOBBIN CASE HOLDER OF A FULLY  
ROTATING HOOK

Tokuzo Hirose, Ashiya, and Kiyoshi Nakamura, Matsubara,  
both of Japan, assignors to Hirose Manufacturing Co., Ltd.,  
Osaka, Japan

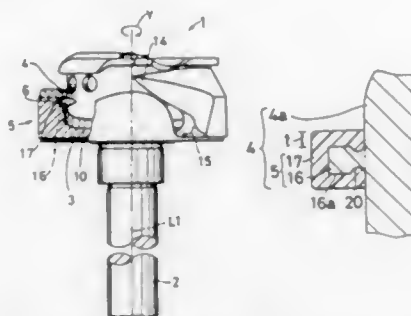
Filed Oct. 5, 1993, Ser. No. 131,657

Claims priority, application Japan, Dec. 9, 1992, 4-329337;  
Feb. 19, 1993, 5-030936

Int. Cl.<sup>6</sup> D05B 57/26

U.S. Cl. 112-231

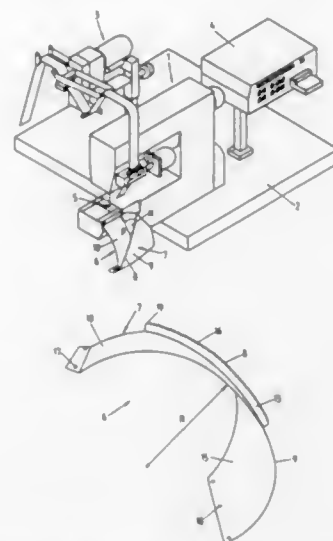
18 Claims



1. An inner bobbin case holder to be fitted in a rotatable  
outer loop taker of a full rotary hook, said inner bobbin case  
holder comprising:

- a body having an outer circumference;
- a track projection on said outer circumference of said body  
and extending circumferentially thereof between a loop  
spreading portion of said track projection and a thread  
releasing portion thereof; and
- said track projection comprising a portion made of metal and  
a coating member made of synthetic resin integrally fixed  
to and covering said metal portion, with a part of said  
metal portion at an upstream end thereof relative to a  
direction of rotation of the rotatable outer loop taker  
being uncovered and exposed from said coating member.

boundary of the strip-shaped projection on the curved  
slide surface of the guide element; and



wherein the unrolling edge of the strip-shaped projection is  
provided with teeth.

5,413,060  
COMPOSITE MATERIAL SAIL BATTEN AND METHOD  
OF MANUFACTURE

Peter A. Quigley, Cataumet, Mass., assignor to Composite De-  
velopment Corporation, West Wareham, Mass.

Division of Ser. No. 907,866, Jul. 2, 1992, Pat. No. 5,352,311.

This application Jun. 15, 1994, Ser. No. 260,066

Int. Cl.<sup>6</sup> B63H 9/06

U.S. Cl. 114-102

6 Claims



1. A sail batten comprising a hollow tube formed of a ther-  
moplastic fiber reinforced composite material extending along  
a first axis and varying in cross section transverse to said first  
axis from an elliptical cross section at one end to a flattened  
elliptical cross section at the other end, the sail batten maintain-  
ing a substantially constant cross sectional area along its  
length.

5,413,061  
MASTHEAD SPINNAKER HALYARD TURRET AND  
METHOD

Malcolm K. Smith, 362 Riverside Dr., Ormond Beach, Fla.  
32176

Filed Aug. 9, 1993, Ser. No. 103,213

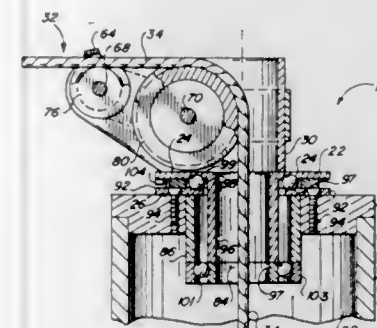
Int. Cl.<sup>6</sup> B63H 9/04

U.S. Cl. 114-105

20 Claims

1. A masthead spinnaker halyard turret, comprising:  
means for guiding a halyard from within a mast to a position  
outboard of the mast and any standing rigging, the guiding  
means maintaining the halyard within a plane;  
means for rotating the plane about an axis of the mast, the  
rotating means providing a continuous fair lead to the

spinnaker, the rotating means responsive to a force from  
the spinnaker head; and



means for restricting the rotation of the plane to within a  
predetermined range of arc about the axis.

5,413,062  
REMOTELY CONTROLLED STEERING APPARATUS  
FOR OUTBOARD MOTOR

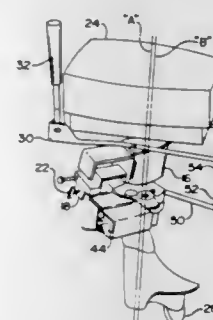
Edward S. Koss, 8187 Whitefield, Dearborn Heights, Mich.  
48127

Continuation of Ser. No. 878,686, May 5, 1992, abandoned. This  
application Feb. 22, 1994, Ser. No. 200,919

Int. Cl.<sup>6</sup> B63H 25/00

U.S. Cl. 114-144 A

20 Claims

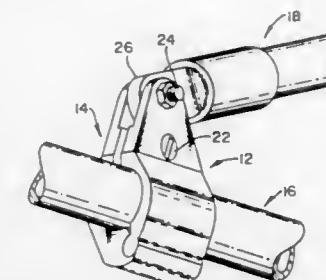


1. An apparatus for steering a boat having an outboard  
motor, the outboard motor having a base fixedly mounted on  
the boat, and an engine carried with a steering frame pivotally  
mounted on the base, and propeller means connected to the  
engine so as to be pivotal therewith about an upright first axis  
to change the direction of thrust of the propeller means, com-  
prising:

- a frame;
- an electrically-powered steering motor mounted on the  
frame, the steering motor having a selectively reversible  
shaft;
- a gear sector having a series of gear teeth formed about a  
second axis;
- means pivotally mounting the gear sector on the frame;
- means for support of the frame on the boat;
- linkage means for connection of the gear sector to a gener-  
ally rearward portion of the steering frame of the engine  
such that the engine and the propeller means are pivoted  
about the first axis as the gear sector is pivoted about the  
second axis;
- a pinion carried on the steering motor shaft and meshed with  
the gear sector to pivot the gear sector in the direction  
depending upon the direction of rotation of the steering  
motor shaft; and
- switch means for energizing the electric motor to rotate the  
pinion in either a first direction or in a second direction in  
order to change the direction of thrust of the propeller  
means with respect to the boat.

5,413,063  
RAIL FITTING FOR MARINE APPLICATIONS  
William E. King, 6758 S. Heggenes Rd., Clinton, Wash. 98236  
Filed Jan. 21, 1994, Ser. No. 183,760  
Int. Cl.<sup>6</sup> B63B 17/00  
U.S. Cl. 114-221 R

7 Claims



1. A rail fitting which comprises first and second rail fitting  
parts designed to slide together on opposite sides of a rail and  
thereby interlock, and fastening means for fastening the two  
rail fitting parts together around a rail; each rail fitting part  
being provided with an arcuate concavity designed to fit  
around a rail, a first end on one side of the concavity designed  
to interlock with a first end of the other rail fitting part, and a  
second end on an opposite side of the concavity designed to be  
fastened to a second end of the other rail fitting part by said  
fastening means; the first end of said first rail fitting part being  
provided with an arcuate cavity having a degree of wrap of at  
least 180°; the first end of said second rail fitting part being  
provided with a hinge arm having an arcuate end formed to fit  
and rotate within the arcuate cavity in the first end of said first  
rail fitting part; said hinge arm being so constructed and ar-  
ranged with respect to said arcuate cavity that the arcuate end  
of said hinge arm may be longitudinally inserted into said  
arcuate cavity whereby the first and second rail fitting parts  
are interlocked.

5,413,064  
BOAT HAVING AN ELEVATED AND AFT LOCATED  
CON POSITION

Leo Paraskevopoulos, 12/2 Charnwood Street, St. Kilda 3182,  
Australia

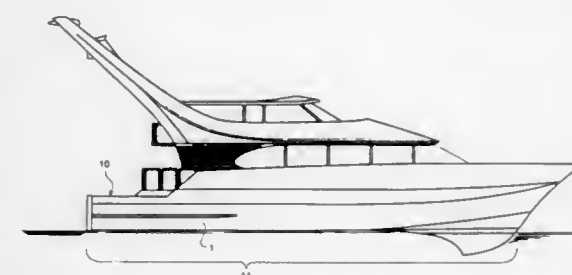
PCT No. PCT/AU91/00584, § 371 Date Aug. 16, 1993, § 102(e)  
Date Aug. 16, 1993, PCT Pub. No. WO90/11180, PCT Pub.  
Date Jul. 9, 1990

PCT Filed Dec. 17, 1991, Ser. No. 107,679

Claims priority, application Australia, Dec. 18, 1990, PK3934  
Int. Cl.<sup>6</sup> B63B 17/00

U.S. Cl. 114-255

9 Claims



1. A fishing, sport or pleasure boat having a fishing cockpit  
area and a tower supporting a wing tower control position  
provided with controls for maneuvering the boat, adjacent the  
upper end thereof, the wing tower control position having a  
sole with an aft end located not more than 10% of the load  
water line length of the boat forward of a stern of the boat the  
sole being located not lower than 25% of the load water line  
length of the boat above the load water line of the boat, the  
construction of the tower being such as to leave the fishing

cockpit area unobstructed and to allow an unobstructed view from the wing tower control position directly down into the water behind the stern.

5,413,065

## FLEXIBLE FABRIC BARGE

Terry G. Spragg, 420 Highland Dr., Manhattan Beach, Calif. 90266, and Clifford A. Goudey, Charlestown, Mass., assignors to Terry G. Spragg, Manhattan Beach, Calif.

Filed Aug. 6, 1993, Ser. No. 103,287

Int. Cl.<sup>6</sup> B63B 35/28

U.S. Cl. 114—256

7 Claims



1. A set of flexible barges for transporting cargo therein comprising:
  - a front flexible barge comprising a first elongated cargo container of flexible fabric construction;
  - a towing cone connected to said front barge adjacent the forward end thereof;
  - a back flexible barge comprising a second elongated cargo container of flexible fabric construction;
  - a flexible fabric towing sleeve connecting said first container in towing relationship to said second container with said containers spaced apart endwise, said sleeve being interconnected with said towing cone only via the fabric of said container;
  - and releasable fastening elements on said sleeve for optionally disconnecting said barges from one another, the flexible fabric of said containers and sleeve being arranged and adapted to sustain the entire towing load resulting from applying a towing force to said towing cone while both barges are loaded with cargo.

5,413,066

## POND BOAT

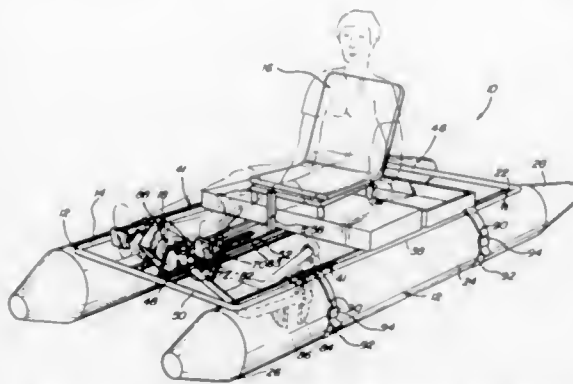
William R. Spencer, Jr., Santa Rosa Beach, Fla., and Rodney L. Bridges, Norcross, Ga., assignors to Wotter Cycle, Inc., Santa Rosa Beach, Fla.

Continuation-in-part of Ser. No. 104,915, Aug. 12, 1993, abandoned. This application Jun. 2, 1994, Ser. No. 252,771

Int. Cl.<sup>6</sup> B63B 7/00

U.S. Cl. 114—354

4 Claims



1. A pond boat that can be readily assembled and disassembled at the site of use thereby enabling easy transporting of said boat within an automotive vehicle, said boat comprising:
  - a pair of spaced apart pontoons, each of said pontoons being inflatable and having an elongated shape;
  - a frame made up of a plurality of axial and transverse rails being supportable by said pontoons, said axial rails extend-

ing lengthwise of said pontoons and said transverse rails extending transversely relative to said axial rails, said frame adapted to maintain said pontoons spaced apart from one another and including mounting means for removably mounting said frame to said pontoons, said mounting means having mounting members extending transversely relative to said axial rails and at least partially around said pontoons, a flexible strap secured to opposing ends of each of said mounting members and extending the remaining way around said pontoon, said strap including an adjustment means for tightening said strap to said pontoon and retaining said strap and said frame with said pontoons, said strap thereby securing said frame to said pontoons, said frame further having a plurality of subsections and including a front section and a rear section being removably interconnected to one another;

propulsion means for propelling said boat, said propulsion means including a propeller and drive mechanism having at least one set of manually operable pedals coupled to said propeller by a flexible shaft, rotation of said shaft by said pedals thereby causing rotation of said propeller and propulsion of said boat, said propulsion means being removably mounted to said frame in a pair of brackets;

resistance means for permitting rotation of said propulsion means about an axis upon contact between said propulsion means and a submerged object with a predetermined amount of force, said resistance means including at least one friction block engaging a portion of said propulsion means and providing limited resistance to rotation of said propulsion means about said axis, said resistance means resisting rotation of said propulsion means up to a predetermined load being applied to said propulsion means;

a rudder removably mounted to said frame to steer said boat; and

a seat supported by said frame generally between said pontoons in a position allowing an occupant of said boat to operate said propulsion means and said rudder.

5,413,067

## METHOD OF OBTAINING A CRYSTAL BY CRYSTAL GROWTH IN THE LIQUID PHASE FROM A SEED

Albert Zarka, Paris; Jacques Detaint, Villemomble; Jacques Schwartzel, Palaiseau; Yves Toudic, Lannion; Bernard Capelle, Antony; Yun L. Zheng, Ivry sur Seine; Etienne Philippot, Saint Mathieu de Trevier; Xavier Buisson, Annecy le Vieux, and Roger Arnaud, Crangevriev, all of France, assignors to France Telecom & Centre National de la Recherche Scientifique (CNRS), Paris, France

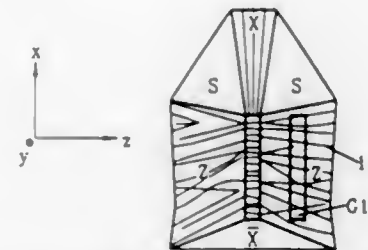
Filed Nov. 13, 1992, Ser. No. 976,280

Claims priority, application France, Nov. 14, 1991, 91 14007

Int. Cl.<sup>6</sup> C30B 29/18

U.S. Cl. 117—54

5 Claims



1. A method for obtaining a crystal by crystal growth in the liquid phase from a seed in the form of a plate taken from a primary crystal, which method comprises the steps of:
  - taking a first seed plate from said primary crystal in a first growth zone or sector, said first seed plate having a thickness which lies perpendicular to the direction of growth of said first growth zone and being elongated in said direction of growth;

forming a first crystal growth to obtain a secondary crystal from said first seed plate;

taking a second seed plate from said secondary crystal in a second growth zone, said second seed plate having a thickness which lies perpendicular to the direction of growth of said second growth zone and being elongated in said direction of growth; and

forming a second crystal growth to obtain the final crystal from said second seed plate.

5,413,068

## PORTABLE BIRD PLAYGYM

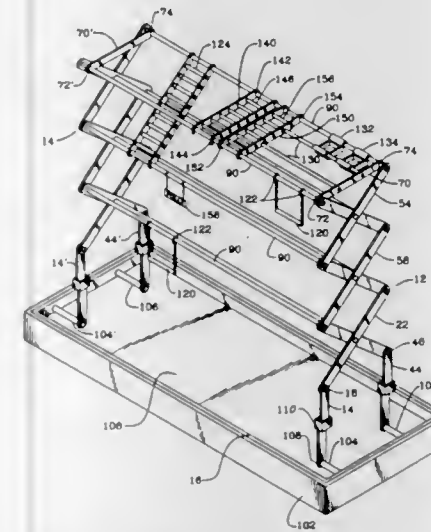
Rene Segal, 5900 Camino Del Bol, Boca Raton, Fla. 33433

Filed Oct. 12, 1993, Ser. No. 135,259

Int. Cl.<sup>6</sup> A01K 31/12

U.S. Cl. 119—26

7 Claims



1. A portable bird playgym comprising:
  - a foldable first frame side and a foldable second frame side, each frame side having an accordion structure comprised of a top portion, a bottom portion, and a plurality of spaced apart connector elements pivotally coupled therebetween;
  - means for positioning said first frame side and said second frame side a horizontal distance apart, said means for positioning being suitable as perching surfaces for a bird;
  - a catch basin operatively adapted for catching bird droppings being coupled to said bottom portion of said frame sides having an upright extension lifting said bottom portion of each said frame side a suitable distance above an inner surface of said catch basin to inhibit a bird from climbing down into said catch basin; and
  - a means for locking said top portion of said frame sides a vertical distance from said bottom portion and stably maintaining said vertical distance while a bird moves from perch to perch.

5,413,069

## MULTI-FACETED BIRD FEEDER WITH INTEGRAL LIGHT

Richard L. Currie, 1504 Elf Stone Ct., Casselberry, Fla. 32707

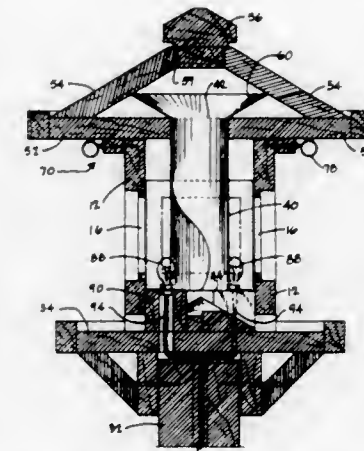
Filed Oct. 22, 1993, Ser. No. 139,732

Int. Cl.<sup>6</sup> A01K 39/01

U.S. Cl. 119—52.2

23 Claims

1. A multisided bird feeder for dispensing bird seed from a plurality of spaced-apart locations, said bird feeder having a plurality of vertically disposed, substantially identical side members secured in an edge-to-edge relationship to form a closed perimeter, a base member and a roof member common to said side members, with said base member and roof member together with said side members forming an enclosed multi-



sided bird feeder, a repository for bird seed located in a central interior portion of said feeder, an elongate trough portion operatively associated with a lower part of said bird feeder, an aperture located in certain of said side members, just above the trough portion, each aperture enabling seed to flow from said repository into the trough portion, a perch formed along an

5,413,070

## AQUARIUM DISPLAY CONFIGURATION WITH LIGHTING AND CANTILEVERED SUPPORT RACK

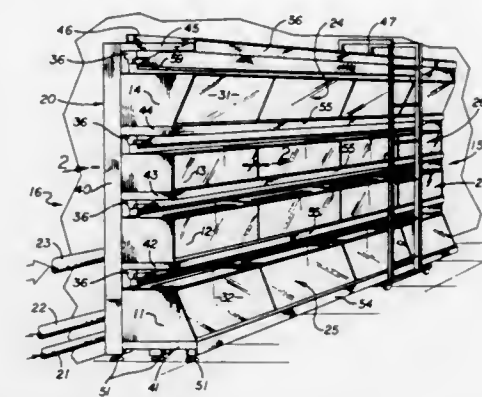
Craig A. DeWalt, Long Beach, Calif., assignor to California Aquarium Supply Co., Cerritos, Calif.

Filed Jun. 24, 1993, Ser. No. 82,251

Int. Cl.<sup>6</sup> A01K 63/06

U.S. Cl. 119—247

10 Claims



1. An aquarium display system, comprising:
  - an aquarium tank adapted to contain a volume of water, having a rear side, a front side, and a front transparent wall portion viewable from a viewing location, the transparent front wall portion of said aquarium tank being inclined at an oblique angle to a horizontal reference plane to refract light from within said aquarium tank to said viewing location, whereby the volume of water within the tank is viewable from the viewing location due to refraction of light passing through said inclined transparent front wall portion irrespective of the relative vertical



relationship of the aquarium tank and the viewing location;

- a cantilevered horizontal support member for supporting said tank from the rear side;
- a support rack incorporating said cantilevered horizontal support member, having a plurality of column members for carrying said horizontal support member, said plurality of column members being positioned on the rear side of said display system;
- a light fixture carried on said support rack, and positioned adjacent to said aquarium tank to illuminate said tank.

5,413,071

# VALVE ACTUATING MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

Michael Paul, Bad Friedrichshall; Klaus Fuoss, and Wilhelm Hannibal, both of Neckarsulm, all of Germany, assignors to Audi AG, Ingolstadt, Germany

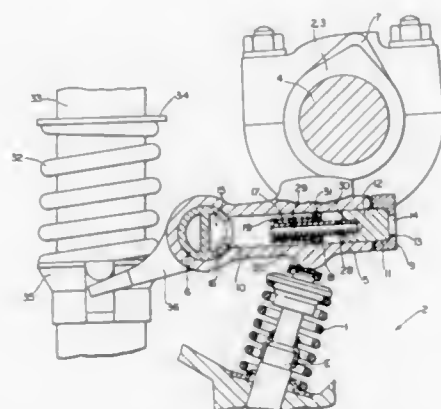
Filed May 13, 1994, Ser. No. 242,363

Claims priority, application Germany, May 19, 1993, 43 16 860.4

Int. Cl.<sup>6</sup> F01L 1/12, 1/18, 1/26

U.S. Cl. 123—90.16

2 Claims



1. A valve actuating mechanism for at least one intake or exhaust valve of an internal combustion engine comprising:

- a low-speed actuator including a low-speed cam and a first rocker lever, the first rocker lever being mounted on a rocker lever shaft and including a bore perpendicular to the rocker lever shaft and communicating with a pressure medium duct in the rocker lever shaft;
- a high-speed actuator including a high-speed cam and a second rocker lever, the second rocker lever including a bore aligned with the first rocker lever bore;
- a coupling device for connecting the first rocker lever to the second rocker lever, the coupling device including a coupling bolt movably mounted in the first rocker lever bore and adapted to be received within the second rocker lever bore, a means for urging the coupling bolt away from the second rocker lever bore, a means for selectively supplying pressure to the pressure medium duct for moving the coupling bolt between the first rocker lever bore and the second rocker lever bore, a pipe connected to the coupling bolt at one end and including a flange at the other end thereof, and an insert disposed in the first rocker lever bore surrounding the pipe and against which the coupling bolt rests when in the first rocker lever bore, the urging means comprising a spring mounted on the pipe between the pipe flange and the insert, the pipe including at least one cross hole originating in the interior space of the pipe and ending adjacent to a reverse side of the coupling bolt when the coupling bolt is in the second rocker lever bore.

## 5,413,072 VEHICLE STARTER AND ELECTRICAL SYSTEM PROTECTION

Christian J. Andersen, Cadillac; Duane W. Gebauer, and Ronald D. Ingraham, both of Reed City, all of Mich., assignors to Nartron Corporation, Reed City, Mich.

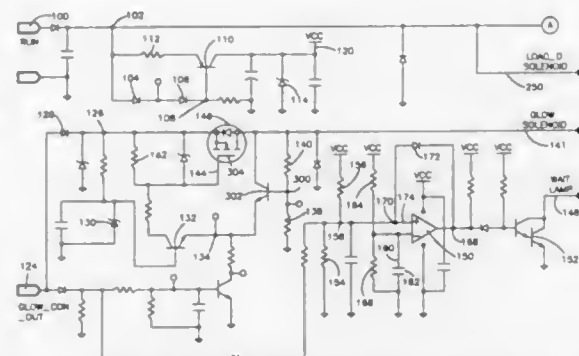
Division of Ser. No. 745,511, Aug. 15, 1991, Pat. No. 5,287,831.

This application Dec. 10, 1993, Ser. No. 165,968

Int. Cl.<sup>6</sup> F02P 19/02

U.S. Cl. 123—145 A

8 Claims



1. A glow plug actuation indicator for equipment having an internal combustion diesel engine including at least one glow plug, an engine ignition switch, toggleable between an on and an off position, and a glow plug controller circuit for energizing the glow plug in a pre-glow mode of operation for a period of time subsequent to the engine ignition switch being toggled to the on position, the controller circuit generating a signal at an output node when the glow plug is energized in the pre-glow mode of operation, said glow plug actuation indicator comprising:

- a) a wait-to-start lamp actuated when the glow plug is energized in the pre-glow mode of operation;
- b) a voltage regulator circuit coupled to the ignition switch generating a voltage signal at an output node when the ignition switch is in the on position; and
- c) lamp actuation circuitry coupled to the wait-to-start lamp, the controller circuit output node and the voltage regulator circuit output node for actuating said lamp in response to a signal at the controller circuit output node indicative of pre-glow operation of said glow plug and the ignition switch is in the on position, the lamp actuation circuitry including:
  - i) a switch coupled to the lamp for actuating said lamp;
  - ii) a timing circuit;
  - iii) a comparator having first and second input terminals and an output terminal for activating the switch, the output terminal being connected to the switch and further being coupled to the voltage regulator circuit output node, one of the first and second input terminals connected to the timing circuit and the other of the first and second input terminals coupled to the controller circuit output node, the comparator generating a high output signal when a signal magnitude at the input terminal coupled to the controller circuit output node exceeds a signal magnitude at the input terminal connected to the timing circuit;
  - iv) the switch being turned on when both the ignition switch is in the on position and the comparator output signal is high.

7. A power control system for controlling application of high electrical power to a glow plug in an internal combustion diesel engine to actuate the plug in a pre-glow mode of operation for a period of time subsequent to toggling an ignition switch to an on position, the engine having associated therewith a glow plug controller including circuitry for generating an output signal at an output node indicating that the glow

plug is to be actuated in the pre-glow mode of operation, said power control system comprising:

- a) a solenoid coupled to said glow plug, the solenoid actuating the glow plug in the pre-glow mode of operation when a high power signal is applied to the solenoid;
- b) circuitry coupled to the glow plug controller output node and to the solenoid whereby a high power signal is applied to the solenoid when said glow plug controller output signal is present at the glow plug controller output node, said circuitry comprising:
  - i) a field effect transistor coupled to the glow plug controller output node and the solenoid, the field effect transistor adapted to be turned on when the output signal is present at the glow controller output node and be turned off otherwise; and
  - ii) voltage regulation and transistor actuation circuitry including a pair of matched transistors coupled between the glow plug controller output node and said field effect transistor for providing a regulated source of voltage to a gate of the field effect transistor for gating said field effect transistor such that the transistor is turned on in response to the output signal at the glow plug controller output node.

5,413,074

## PISTON AND A CONNECTING ROD APPARATUS

Shigeaki Horiuchi, Fujisawa, Japan, assignor to Isuzu Motors, Ltd., Tokyo, Japan

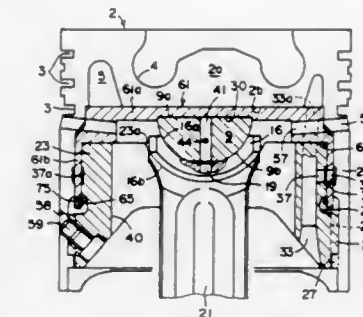
Filed Jul. 26, 1994, Ser. No. 280,418

Claims priority, application Japan, Jul. 31, 1993, 5-208358; Jul. 31, 1993, 5-208360; Aug. 20, 1993, 5-228180; Oct. 20, 1993, 5-280530

Int. Cl.<sup>6</sup> F16J 1/14, 1/22, 1/06; F02B 75/32

U.S. Cl. 123—197.2

18 Claims



18. Internal combustion engine apparatus comprising: piston means having a crown portion with a bottom surface, and a skirt projecting therefrom and defining a cavity; a cup shaped sleeve retained in said cavity and having a bottom wall engaging said bottom surface and a sidewall engaging said skirt; a connecting rod having at one end a yoke portion with a pair of parallel, spaced apart, semicylindrical arms each having an upwardly directed concave surface and a downwardly directed convex surface; a guide member slidably retained between said bottom wall and said concave surfaces; said guide member defining spaced apart, parallel and juxtaposed arcuate grooves, each receiving one of said arms and slidably engaging said concave and convex surfaces thereof; and a cylindrical means projecting into said sleeve and engaged between said guide member and said skirt.

5,413,073

## ULTRA LIGHT ENGINE VALVE

Jay M. Larson, Marshall, and David L. Bonesteel, Richland, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 1, 1993, Ser. No. 41,749

Int. Cl.<sup>6</sup> F01L 3/14, 3/20

U.S. Cl. 123—188.3

18 Claims



1. An ultra light poppet valve for an internal combustion engine comprising a stem portion, a cap portion, a tip portion and a flared fillet portion defining a transition region between said stem portion and said cap portion; said stem portion, said tip portion and said fillet portion being defined by a one-piece, thin-walled cylindrical member which is open at the fillet end thereof and closed at the tip end; and said cap portion being defined by a disk-like cap member fixed to said fillet portion characterized by said fillet portion having a first maximum wall thickness, said stem portion having a second maximum wall thickness thinner than said first maximum wall thickness, and said tip portion having a third wall thickness thicker than said second maximum wall thickness.

5,413,075

## GASEOUS FUEL ENGINE AND AIR-FUEL RATIO CONTROL SYSTEM FOR THE ENGINE

Kiyotaka Mamiya; Tohru Shiraishi; Katuhiro Yokomizo, and Takafumi Teramoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

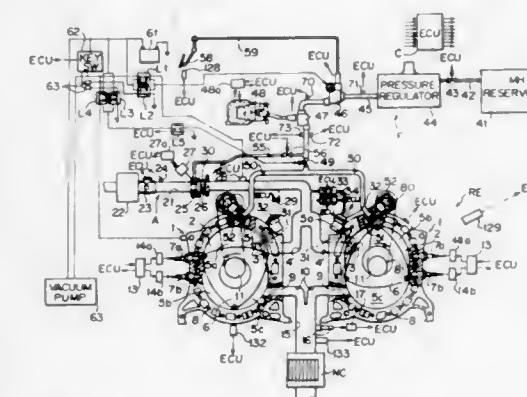
Filed Dec. 27, 1993, Ser. No. 172,894

Claims priority, application Japan, Dec. 28, 1992, 4-348364; Dec. 28, 1992, 4-348366; Feb. 12, 1993, 5-24076

Int. Cl.<sup>6</sup> F02B 43/04; F02D 41/40

U.S. Cl. 123—431

13 Claims



1. An air-fuel ratio control system for a gaseous fuel engine which runs on gaseous fuel containing at least partly hydrogen

gas comprising a fuel supply adjustment means which adjusts the amount of said gaseous fuel supplied to the engine and a control means which controls the fuel supply adjustment means to control the air-fuel ratio according to the engine load, characterized in that

said control means controls said fuel supply adjustment means so that the air-fuel ratio becomes higher than a NO<sub>x</sub>-maximizing air-fuel ratio, at which the amount of NO<sub>x</sub> emitted from the engine is maximized, in a predetermined operating range of the engine, and in the predetermined operating range of the engine, the control means controls said fuel supply adjustment means so that the air-fuel ratio becomes higher in a high engine speed range than in a low engine speed range.

5,413,076

# FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Rudolf Koenigswieser, Steyr, and Peter Reisenbichler, Traun, both of Austria, assignors to Robert Bosch GmbH, Stuttgart, Germany

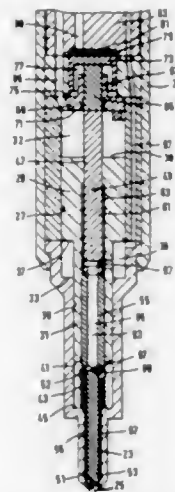
Filed Apr. 8, 1994, Ser. No. 225,101

Claims priority, application Germany, Apr. 8, 1993, 43 11 627.2

Int. Cl.<sup>6</sup> F02M 47/02, 63/00

U.S. Cl. 123—446

27 Claims



1. A fuel injection system for internal combustion engines, having a high-pressure fuel pump (1), which pumps fuel from a low-pressure chamber (3) into a pressure-regulatable high-pressure collecting common rail (9), which communicates via high-pressure lines (11) with injection valves (13) that protrude into a combustion chamber of the engine to be supplied and that each have a pistonlike valve member (49) that cooperates with a valve seat (53), the valve member being guided by a portion of its jacket face in a bore in the valve housing and with a free end, toward the valve seat (53) that protrudes into an injection pressure chamber (43) that communicates with the high-pressure line (11), which chamber (43) is separated from a control pressure chamber (81), which can be made to communicate with the high-pressure line (11) and a relief line (17), containing a control valve (105), into the low-pressure chamber (3), the pressure of which control pressure chamber (81) acts upon the valve member (49) in the closing direction, the valve member (49) on a part that protrudes into the injection pressure chamber (43) that has a cross-sectional enlargement (52) in the direction of the control pressure chamber (81), by way of which enlargement the fuel at high pressure lifts the valve member (49) from its valve seat (53) upon a pressure relief of the control pressure chamber (81), the injection valve (13) has a booster piston (29) in the form of a stepped piston, which with an end face (30) of a larger-diameter part defines a first work chamber (32) that can be made to communicate with

the high-pressure line (11) and with the end face (41) of a small-diameter part at least indirectly borders on the injection pressure chamber (43), which can be made to communicate with the high-pressure line (11) via a controlled valve.

5,413,077

# NON-RETURN FUEL SYSTEM WITH FUEL PRESSURE VACUUM RESPONSE

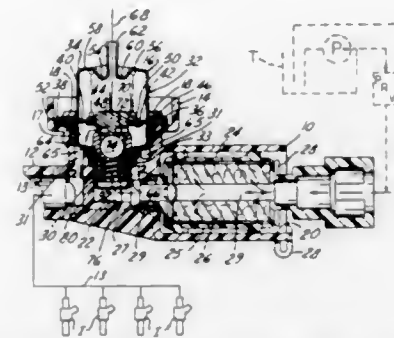
Michael J. Hornby, Williamsburg, and Barry S. Robinson, Newport News, both of Va., assignors to Siemens Automotive L.P., Auburn Hills, Mich.

Filed May 9, 1994, Ser. No. 239,661

Int. Cl.<sup>6</sup> F02M 69/16

U.S. Cl. 123—457

8 Claims



5. A fuel injection system comprising a fuel rail assembly for mounting on an internal combustion engine comprising electrically operated fuel injectors and fuel pressure regulator means for regulating the pressure of fuel supplied to said fuel injectors, a fuel tank containing a pump for pumping pressurized fuel to said fuel rail assembly, said fuel pressure regulator means comprising a fuel chamber and a control chamber divided by a movable wall, said fuel rail assembly comprising first passage means supplying to said fuel chamber fuel that has been pumped from said pump and second passage means supplying fuel from said fuel chamber to said fuel injectors, normally closed check valve means having a first port that is exposed to fuel in said fuel chamber and a second port that is adapted to be exposed to pressure applied to it from said fuel pump, said check valve means comprising means biased to allow flow in a favored direction of flow from said first port to said second port and to disallow flow in a disfavored direction from said second port to said first port, said biased means of said check valve means being disposed for operation that allows flow from said fuel chamber through said check valve means in the favored direction toward said fuel pump in response to the fuel pressure in said fuel chamber exceeding that applied to said second port by a predetermined difference, and means operated by said movable wall to force said biased means of said check valve means to open said check valve means to allow flow from said fuel pump through said check valve means in the disfavored direction and into said fuel chamber in response to the fuel pressure in said fuel chamber falling below a desired fuel regulation pressure for said fuel injectors.

5,413,078

# ENGINE CONTROL SYSTEM

Seisuke Mitsunaga, Hiroshima; Naoya Matsuo, Higashihiroshima; Akihito Nagao, and Yasunori Sasaki, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 8, 1993, Ser. No. 15,169

Claims priority, application Japan, Feb. 6, 1992, 4-021347

Int. Cl.<sup>6</sup> F02D 43/00

U.S. Cl. 123—492

7 Claims

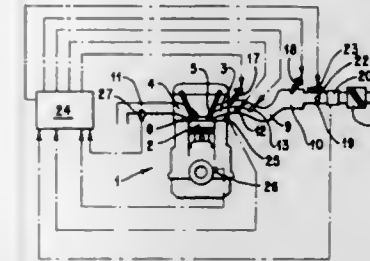
1. A control system having an air-to-fuel ratio control means

for controlling an air-to-fuel ratio of a fuel mixture delivered into an internal combustion engine in accordance with engine operating conditions, said control system comprising:

monitoring means for monitoring engine operating conditions which are divided into a plurality of preselected ranges and for detecting a specified preselected range of engine operating conditions;

lean control means for controlling said air-to-fuel ratio control means to provide an air-to-fuel ratio which is leaner than an ideally combustible air-to-fuel ratio in response to detection of said specified preselected range of engine operating conditions by said monitoring means;

enriching control means for increasing an air flow rate at which air is introduced into said engine in response to detection of an engine operating condition transitional to



said specified preselected range of engine operating conditions by said monitoring means;

transitional pattern detecting means for detecting transitional patterns of engine operating conditions to said specified preselected range of engine operating conditions, said transitional patterns including an acceleration pattern, in which a transition of an engine operating condition to said specified preselected range of engine operating conditions is occurring as a result of acceleration of the engine, and a deceleration pattern, in which a transition of an engine operating condition to said specified preselected range of engine operating conditions is occurring as a result of deceleration of the engine; and control managing means for conducting controls by said lean control means and said enriching control means sequentially.

5,413,079

# FUEL INJECTION PUMP

Helmut Laufer, Gerlingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

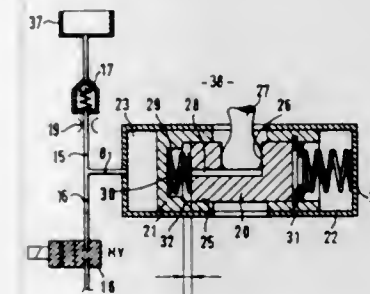
Filed Feb. 25, 1994, Ser. No. 201,956

Claims priority, application Germany, May 12, 1993, 43 15 776.9

Int. Cl.<sup>6</sup> F02M 37/04

U.S. Cl. 123—502

9 Claims



1. A fuel injection pump for internal combustion engines, having at least one pump piston driven by a cam drive, which piston defines a pump work chamber in a pump work cylinder, from said pump work chamber fuel is pumped at high pressure to a fuel injection valve in the pumping stroke of the pump piston, wherein the cam drive has a substantially stationary

part and one moving part driven by a drive shaft of the injection pump, of which parts one is provided by a cam race and of which the moving part exerts a repelling force via the cam race upon the essentially stationary part, and an adjusting piston (20, 21), which in a cylinder (22) encloses a work chamber (23), which is supplied with pressure fluid from a pressure fluid source (37) and by the pressure fluid, counter to a restoring force (24), is adjustably coupled to the substantially stationary part of the cam drive, wherein the repelling force is in the same direction as the restoring force and with its adjustment adjusts the onset of the high-pressure pumping stroke of the pump piston with respect to a rotary position of the drive shaft, and the pressure fluid pressure in the work chamber (23) is controlled in order to vary the pumping stroke onset as a function of engine operating parameters, the adjusting piston is embodied in two parts, with a first piston (20) coupled to the moving part and displaceably guided in a blind bore (25) of a second piston (21), wherein the second piston (21), with one end face, defines the work chamber (23) in the cylinder (22), said work chamber (23) is supplied fluid whose pressure is controlled by a pressure control device, said second piston delimited by its other end forms a relieved space with the cylinder, a compression spring (24) acting upon said other end of said second piston being arranged in said relieved space and supported in stationary fashion, and the first piston (20) with its one face end, oriented toward the closed end of the blind bore (25), encloses a second work chamber (29), in which a compression spring (30) is disposed that acts upon the face end of the piston (20), by said second spring, this piston can be made to contact a stop (31) on the second piston (21), and said work chamber (29) is permanently connected to a chamber (38) which is permanently connected to a chamber (38) under a low pressure, which pressure is higher than the pressure in said relieved space.

5,413,080

# FUEL INJECTION PUMP

Helmut Laufer, Gerlingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

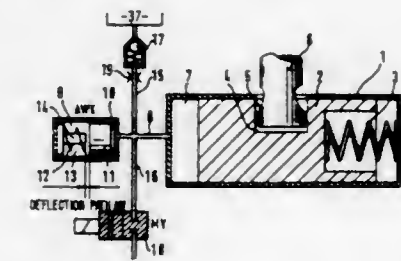
Filed Apr. 8, 1994, Ser. No. 225,113

Claims priority, application Germany, Apr. 8, 1993, 43 11 672.8

Int. Cl.<sup>6</sup> F02D 1/18; F02M 41/12

U.S. Cl. 123—502

20 Claims



1. An improved fuel injection pump for internal combustion engines, having a pump piston in a pump cylinder driven by a cam drive and the pump cylinder encloses a pump work chamber, from which upon the pumping stroke of the pump piston, fuel is pumped at high pressure to a fuel injection valve, said cam drive has a substantially stationary part and a mixing part driven by a drive shaft of the injection pump, one part of which is provided with a cam race and whose moving part, following the cam race, simultaneously moves the pump piston, by means of which a repelling force is exerted upon the substantially stationary part via the cam race, and an adjusting piston that encloses an adjusting work chamber in a cylinder, said adjusting work chamber is supplied with pressure fluid from a pressure fluid source, and by means of the pressure fluid is coupled adjustably to the substantially stationary part of the cam drive counter to a restoring force (3), wherein the repelling force is in the same direction as the restoring force and by adjustment



of said adjusting piston adjusts the high-pressure supply stroke onset of the pump piston with respect to a rotary position of the drive shaft, and the pressure fluid pressure in the work chamber is controlled as a function of engine operating parameters in order to vary the supply stroke onset, and having a withdrawal device for the controlled withdrawal of quantities of pressure fluid from the work chamber during the high-pressure pumping stroke of the pump piston, said withdrawal device includes the adjusting work chamber (7) connected with a pressure fluid inflow line (15) containing a flow control device (17, 34) leading from the pressure fluid source and a pressure fluid outflow line (16), having an electrically controlled relief valve (18), to a relief chamber, by means of said flow control device, the pressure in the adjusting work chamber (7) is controlled, in order to vary the applicable supply stroke onset, in such a way that this pressure is established in each case prior to the onset of each pump piston supply stroke, and that the withdrawal of pressure fluid is controlled by the withdrawal device as a function of the pressure in the adjusting work chamber, or the pressure in the pump work chamber that influences the supply pressure during the high-pressure pumping stroke.

#### 5,413,081 FUEL PUMPS

Peter A. G. Collingborn, Kent, United Kingdom, assignor to Lucas Industries Public Limited Company, Solihull, United Kingdom

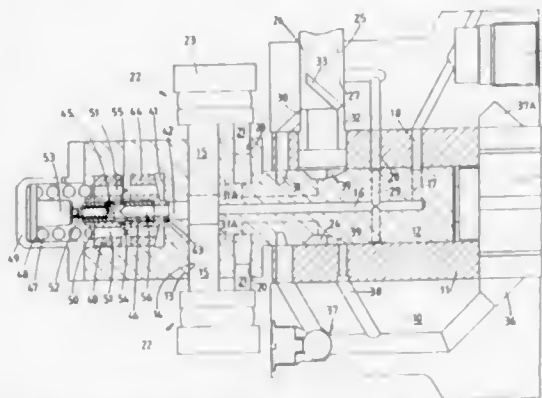
Filed Aug. 29, 1994, Ser. No. 297,095

Claims priority, application United Kingdom, Sep. 18, 1993, 9319363

Int. Cl.<sup>6</sup> F02M 37/04

U.S. Cl. 123—506

10 Claims



1. A fuel pumping apparatus for supplying fuel to a compression ignition engine comprising a pumping plunger slidable within a bore, a cam for imparting inward movement to the plunger in timed relationship with the associated engine, means for distributing fuel displaced from the bore during successive inward movements of the plunger to a plurality of outlets in turn, said outlets in use being connected to the injection nozzles respectively of the associated engine, a spill valve operable to spill fuel from the bore during inward movement of the plunger, an actuating piston slidable within a cylinder, the actuating piston being biased by first resilient means towards an end wall of the cylinder, said spill valve comprising a valve member which is carried by the actuating piston and a seating which is formed in said end wall of the cylinder about a passage communicating with said bore, control valve means for admitting fluid under pressure into the cylinder to effect an initial movement of the actuating piston away from said end wall thereby lifting the valve member from the seating to allow fuel to spill from the bore into the cylinder and effect further movement of the actuating piston, a drilling formed in the actuating piston, the diameter of said drilling being slightly greater than the effective seat diameter of the valve member and seating, a balance piston slidable in said drilling, second

resilient means biasing the balance piston in the direction towards said one end wall of the cylinder, a stop to limit the movement of the balance piston in the direction away from said end wall of the cylinder, and a passage in the valve member and actuating piston whereby the balance piston is subjected to the fuel pressure in the bore, said actuating piston and balance piston defining further valve means for connecting said bore to a source of fuel under pressure thereby to replenish the fuel lost through leakage and the fuel displaced through the outlet, said balance piston when the bore is full of fuel moving against the action of its spring loading relative to the actuator piston to interrupt communication between the bore and said source of fuel, the balance piston being moved into engagement with the stop during the initial inward movement of the plunger.

#### 5,413,082 CANISTER PURGE SYSTEM HAVING IMPROVED PURGE VALVE

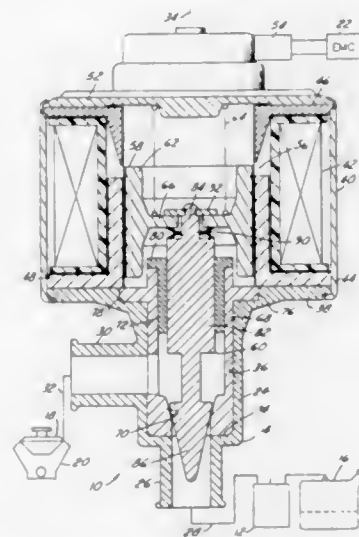
John E. Cook, and Gary M. Everingham, both of Chatham, Canada, assignors to Siemens Electric Limited, Chatham, Canada

Filed Jan. 19, 1994, Ser. No. 184,094

Int. Cl.<sup>6</sup> F02M 37/04

U.S. Cl. 123—520

7 Claims

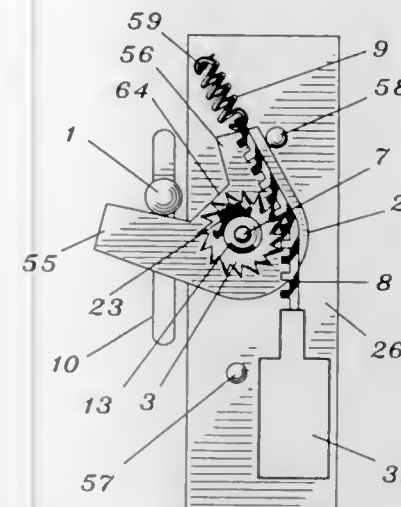


1. In a vapor collection system for an internal combustion engine fuel system wherein an electrically-operated canister purge valve disposed between an intake manifold of an engine and a fuel vapor collection canister that collects vapor generated by volatile fuel in a fuel tank controls the purging of said canister to said intake manifold in accordance with a purge control signal that sets the extent to which said canister purge valve allows purge flow, the improvement in which said canister purge valve comprises a one-piece valve member and a one-piece seat and guide member that share a common axis, said valve member comprising a valve head and a valve stem that is coaxial with and extends from said valve head, said seat and guide member comprising a valve seat and a guide that is coaxial with and extends from said valve seat, a bushing disposed on said seat and guide member as a liner for said guide, said valve head being guided for axial motion for seating on and unseating from said seat by the fit of said valve stem with said bushing, valve body means within which said valve seat and said guide are disposed, and means for causing said valve member to be positioned axially relative to said seat and guide member by said purge control signal.

#### 5,413,083 ATTACHMENT FOR A PAINT PELLET GUN Barry P. Jones, 5908 Lundy Dr., Lanham, Md. 20706 Filed Nov. 2, 1993, Ser. No. 144,562 Int. Cl.<sup>6</sup> F41B 11/00

U.S. Cl. 124—32

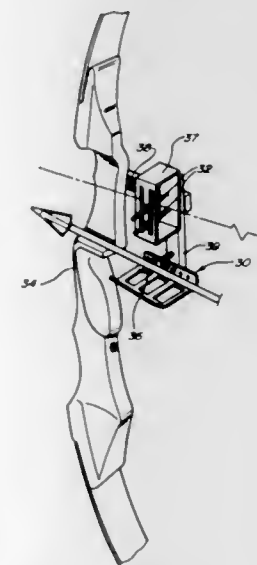
16 Claims



1. An attachment to a gun having a bolt handle wherein at least part of said bolt handle protrudes out of said gun, wherein said bolt handle moves when said gun is fired, comprising: an electromechanical means for releasing the part of said bolt handle protruding from said gun, allowing said gun to fire and for catching said bolt handle after said bolt handle has at least partly recoiled, preventing said gun from firing, wherein said electromechanical means releases said bolt handle in response to electrical pulses, and a means for generating a predetermined pattern of pulses, wherein said means for generating has a means for producing evenly spaced pulses for said pattern of pulses.

#### 5,413,084 COMBINED ARCHERY SIGHT AND ARROW REST Alan Haggard, 3950 Clyde Rd., Holly, Mich. 48442 Filed Dec. 1, 1993, Ser. No. 159,844 Int. Cl.<sup>6</sup> F41B 5/22; F41G 1/467 U.S. Cl. 124—44.5

20 Claims



1. An archery bow comprising:

a bow handle at a first axial position forward of the archer's body in use;  
an archery sight positioned rearwardly of the rearwardmost portion of said handle and towards the archer;  
an arrow rest the supporting an arrow at a contact point positioned rearwardly of the rearwardmost portion of said bow handle and towards the archer; and  
said sight and said rest being generally spaced from said bow handle by a distance selected such that a vertical axis passing through the sight is at generally the same position as a vertical axis passing through said rest.

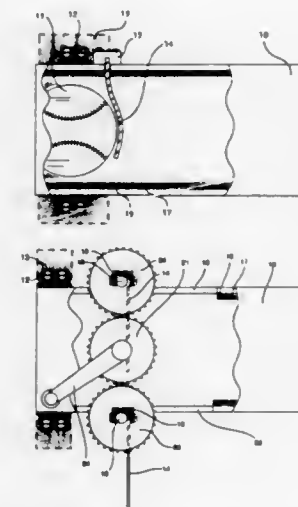
#### 5,413,085 APPARATUS AND METHOD FOR DIRECTING AND CONTROLLING PROPELLED BALLS Robert W. Kraeft, 10581 E. Dorado Ave., Englewood, Colo. 80111

Filed Jul. 7, 1994, Ser. No. 271,766

Int. Cl.<sup>6</sup> A63B 69/40

U.S. Cl. 124—81

17 Claims



1. An apparatus for directing and controlling propelled balls comprising:  
(a) a guide chute means for directing said propelled balls and,  
(b) a cantilevered resilient strap means for inserting into said guide chute in any of a plurality of desired locations circumferentially around said chute on desire for contacting said propelled balls and conforming to said balls' surface curvature that results in producing a spin on said propelled balls in a direction related to said strap location in said guide chute.  
7. A method for directing and controlling propelled balls comprising the steps of:  
(a) providing a guide chute means for directing said propelled balls and,  
(b) a cantilevered resilient strap means for inserting into said guide chute in any of a plurality of desired locations circumferentially around said chute on desire for contacting said propelled balls and conforming to said balls' surface curvature that results in producing a spin on said propelled balls in a direction related to said strap location in said guide chute.

# 5,413,086 CONCRETE PILE CUTTER

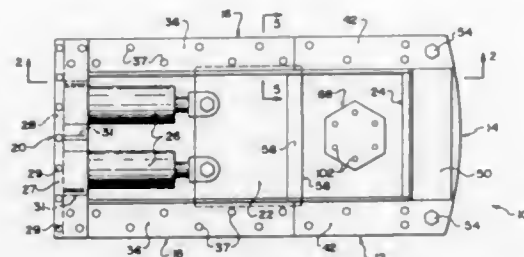
Leon B. Trudeau, 138 Tufnell Drive, Winnipeg, Canada R2N 1J8

PCT No. PCT/CA91/00250, § 371 Date May 7, 1993, § 102(e) Date May 7, 1993, PCT Pub. No. WO92/01841, PCT Pub. Date Feb. 6, 1992

PCT Filed Jul. 17, 1991, Ser. No. 934,661  
Int. Cl.<sup>6</sup> B28D 1/32

U.S. Cl. 125—23.01

24 Claims



24. Apparatus for preparing an end of a pile comprising a concrete matrix and longitudinal reinforcement embedded therein, said apparatus comprising:

a frame with an open centre adapted to receive the pile therethrough;

cutoff means comprising:

an anvil,

means for mounting the anvil on the frame at one side of the open centre,

a shear blade,

means for mounting the shear blade on the frame for movement across the open centre of the frame towards the anvil, and

means for driving the shear blade through the pile to sever the pile,

breaking means comprising:

a plurality of fracturing blades having respective cutting edges;

means for mounting the blades around the pile and at a selected position along the pile with the cutting edges confronting the pile;

means for driving the cutting edges of the blades into the surface of the concrete matrix around the periphery of the pile;

concrete breaker means;

means for mounting the breaker means adjacent the pile and between the end of the pile and the selected position;

means for driving the breaker means into engagement with the concrete matrix.

5,413,087

# CONVERTIBLE PORTABLE COOKER

Kuan-May Jean, Taoyuan, Taiwan, Prov. of China, assignor to Khan's Enterprise Co., Ltd., Taoyuan, Taiwan, Prov. of China

Filed Jan. 3, 1994, Ser. No. 177,107

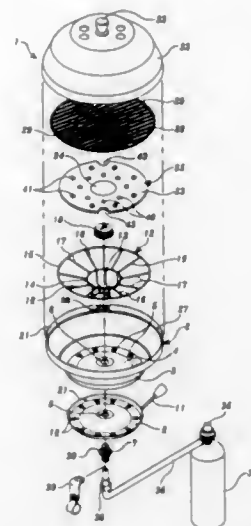
Int. Cl.<sup>6</sup> F24C 3/00

U.S. Cl. 126—41 R

13 Claims

1. A cooker convertible between operation as a barbecue for grilling food and a stove for heating a cooking utensil, said cooker comprising a bowl having a substantially closed base and an open top, a burner mounted on said base, an open wire stand mounted on said base and extending upward therefrom to a location above said burner for supporting the cooking utensil thereon during use of the cooker as a stove, a grill rack removably mounted in the upper portion of said bowl, above said stand, for supporting food thereon during operation of the cooker as a barbecue, and a metal plate supportable directly on said stand, above said burner but below said grill rack, for

distributing heat from said burner to said grill rack during use of the cooker as a barbecue, said stand having a base portion



5,413,088

# WOOD BURNING HEATING UNIT

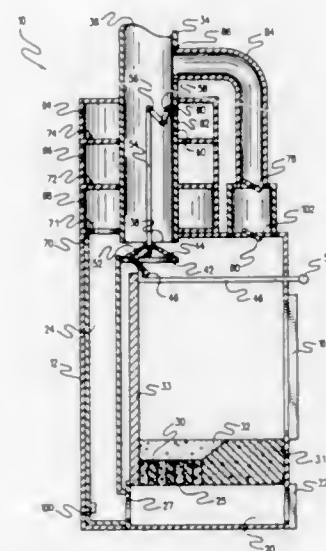
William T. Oviatt, 1375 Highway 71-B North, Springdale, Ark. 72764

Filed Jan. 13, 1993, Ser. No. 3,727

Int. Cl.<sup>6</sup> F24C 1/14

U.S. Cl. 126—77

22 Claims



1. An improved heating unit, comprising:

a housing;

a firebox portion in said housing;

an exhaust conduit for directing exhaust gasses from said firebox;

a chimney operably connected with said exhaust conduit for directing exhaust gasses to ambient;

an air inlet for communicating combustion air to said firebox, said air inlet including a first conduit connected to an external air supply, a second conduit connected to said firebox, and a third conduit connected to said chimney;

a first air pressure regulated valve disposed for opening and

closing said second conduit dependent upon air pressure conditions in said firebox; and  
a second air pressure regulated valve disposed for opening and closing said third conduit dependent upon air pressure conditions in said chimney;  
a damper in said chimney; and  
a trip mechanism connected to said first air pressure regulated valve and said damper for opening said damper in the substantial absence of air flow through said second conduit.

5,413,090

# HEAT DISTRIBUTING APPARATUS FOR GAS BARBECUES

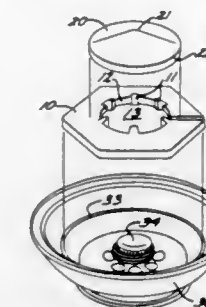
James S. Masburn, and Jerry P. Masburn, both of 213 Rivo Alto Canal, Long Beach, Calif. 90803

Filed Mar. 8, 1993, Ser. No. 27,673

Int. Cl.<sup>6</sup> F24C 15/18

U.S. Cl. 126—246

14 Claims



5,413,089

# WOOD AND COAL BURNING STOVE

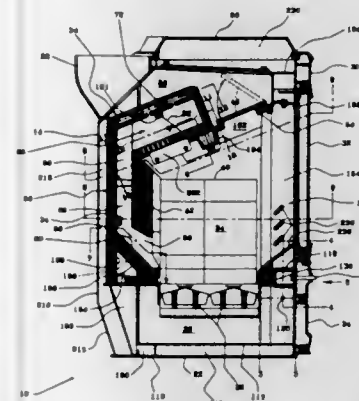
Derik K. Andors, Randolph; Robert W. Ferguson, South Royalton, both of Vt., and Dane P. Harman, Halifax, Pa., assignors to Harman Stove and Welding, Inc., Halifax, Pa.

Filed Mar. 4, 1993, Ser. No. 26,434

Int. Cl.<sup>6</sup> F24C 1/14

U.S. Cl. 126—77

56 Claims



1. A heating stove for burning solid fuel cleanly, the stove comprising:

A) a firebox having a back, side walls, a front wall, a top and a floor, a refractory lining on said back and side walls, the front wall including an access door having a transparent panel for viewing the interior of the firebox;

B) a secondary combustion unit mounted on the top and back wall of the firebox, said unit being formed from high temperature refractory material and including a lower portion and an upper portion, the lower portion defining a combustion passage extending along the back wall of the firebox and having a mouth at the lower end of the combustion passage opening into the firebox at the level of fuel placed on the floor for burning and an upper end located adjacent the top of the back wall, the upper portion including walls defining a mixing and secondary combustion chamber, a combustion gas inlet opening communicating the mixing and secondary combustion chamber with the top of the firebox, a first mixing and secondary combustion chamber outlet opening located a distance from the combustion gas inlet opening, and a first combustion path in said mixing and secondary combustion chamber extending from the inlet opening to the first outlet opening, the upper end of the combustion passage opening into said chamber adjacent the back wall of the firebox;

C) a primary combustion air flow system for the firebox; and  
D) a secondary combustion air flow system for the mixing and secondary combustion chamber.

5,413,091

# SOLAR COLLECTOR WITH FREEZE DAMAGE PROTECTION

Brendan V. Bourke, Stanmore, Australia, assignor to Rheem Australia Limited, Rydalmere, Australia

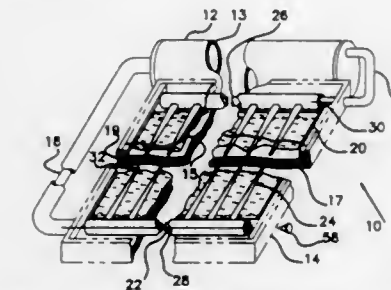
PCT No. PCT/AU92/00384, § 371 Date Jan. 4, 1994, § 102(e) Date Jan. 4, 1994, PCT Pub. No. WO93/02327, PCT Pub. Date Feb. 4, 1993

PCT Filed Jul. 24, 1992, Ser. No. 170,343

Claims priority, application Australia, Jul. 24, 1991, PK7384  
Int. Cl.<sup>6</sup> F24J 2/40

U.S. Cl. 126—598

17 Claims



1. A solar collector having liquid conduits comprising at least one tapered riser having a minimum cross-sectional area and communicating at its opposite ends with headers, each of said headers being enclosed within insulation, the taper of said riser being effective to prevent bursting of said riser caused by freezing of liquid therein by promoting initial freezing of such liquid in a localized region of such riser at its minimum cross-sectional area followed by progressive travel of the freezing of the liquid in a direction away from the localized region, said insulation being effective to delay total freezing of liquid in said headers.



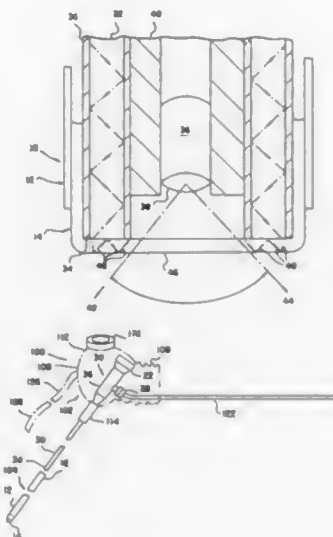
5,413,092

## SHEATH FOR ENDOSCOPE

William B. Williams, III, Ripley, Tenn.; Dennis J. Reisdorf, and William T. Donofrio, both of Jacksonville, Fla., assignors to Xomed-Treace, Inc., Jacksonville, Fla.  
Continuation of Ser. No. 720,096, Jun. 24, 1991, Pat. No. 5,237,984. This application Jun. 29, 1993, Ser. No. 98,968  
Int. Cl.<sup>6</sup> A61B 1/00

U.S. Cl. 128—4

17 Claims



1. A disposable sheath for an endoscope having an elongated barrel comprising,

a) a preformed elongated disposable sleeve of generally circular cross-section having a predetermined length and diameter for detachably fitting onto and accompanying an endoscope barrel, said sleeve including means for preventing slippage of said sleeve relative to said barrel once said sleeve is disposed on said barrel comprising a reduced diameter section of said sleeve,

b) a preformed transparent lens cover secured at one end of said disposable sleeve to permit a field of view from the endoscope through said lens cover, said lens cover being without any apertures, and

c) said lens cover having a substantially planar section with a predetermined central portion through which said field of view is taken and a predetermined peripheral portion surrounding said predetermined central portion, said planar section being non-collapsible and of a predetermined thickness such that light reflected through the predetermined peripheral portion of the planar section from the endoscope does not reflect through the predetermined central portion so as to interfere with the field of view through said planar section.

5,413,093

Patent Not Issued For This Number

5,413,094

## APPARATUS FOR REDUCING THE NOISE OF COUGHS AND SNEEZES

Edward McBrearty, 395 Ranch Rd., Indian River, Mich. 49749  
Filed May 10, 1993, Ser. No. 59,100  
Int. Cl.<sup>6</sup> G10K 11/12

U.S. Cl. 128—200.24

10 Claims



1. An apparatus for reducing the noise of coughs and sneezes comprising:

a core, said core being made of a noise-reducing material and having an outer perimeter which surrounds the nose and mouth of a user and a center, said center being recessed from said outer perimeter;

a cover surrounding said core wherein at least one surface of said cover is made of a moisture-absorbent material.

5,413,095

## MOUTHPIECE WITH OXYGEN RECEIVING AND DIRECTING STRUCTURE

George W. Weaver, East Earl, Pa., assignor to Arrow Precision Products, Inc., Reading, Pa.  
Filed Apr. 15, 1994, Ser. No. 228,123  
Int. Cl.<sup>6</sup> A61M 16/00; A62B 9/06

U.S. Cl. 128—200.26

4 Claims

1. A mouthpiece comprising:

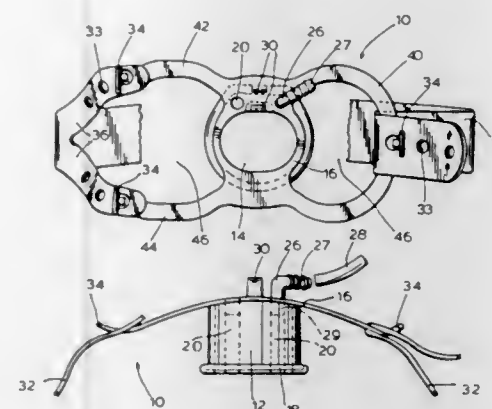
(a) an annular bite portion for placement within the mouth of a patient so as to keep the mouth of the patient open and provide an opening into the mouth of the patient;

(b) an outer portion extending radially outwardly at one end of said annular bite portion for placement outside the mouth of the patient;

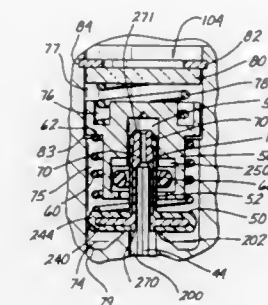
(c) two parallel channels formed in said mouthpiece and extending through said outer portion and said annular bite portion and exiting exclusively into the mouth of the patient, said channels being formed to receive one of (i) a pair of nasal cannulae which extend from a common oxygen supply tube and (ii) a single adapter extending from an oxygen supply tube, so that all of the oxygen from said oxygen supply tube is supplied directly and exclusively into the mouth of the patient;

(d) a tube holder for securing said oxygen supply tube to said mouthpiece and retaining the nasal cannulae in said channels; and

a crown surrounding said orifice having an edge region which engages said plastic overlying said valve body such that the crown edges extend against said plastic at a point



(e) a headstrap attachable to said mouthpiece to secure said annular bite portion of said mouthpiece within the mouth of the patient.



sufficiently removed to allow for the plastic interface between the plastic and the valve body to be across the intermediate pressure zone of said orifice.

5,413,097

FAN-SUPPORTED GAS MASK AND BREATHING EQUIPMENT WITH ADJUSTABLE FAN OUTPUT  
Torsten Birenbeide, Krummesse; Torsten Lönneker-Lammers, Pogeez, and Eckhard Riggert, Ovendorf, all of Germany, assignors to Drägerwerk AG, Lübeck, Germany

Filed Jan. 22, 1993, Ser. No. 7,483

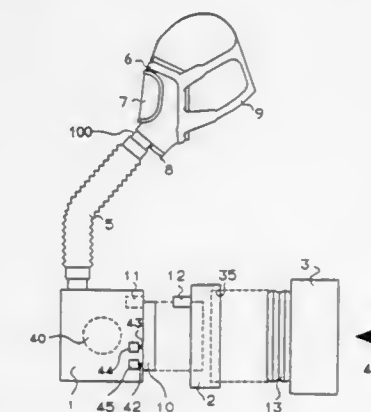
Claims priority, application Germany, Jan. 25, 1992, 42 02 025.5

The portion of the term of this patent subsequent to Apr. 19, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A62B 18/08, 19/00, 23/02

U.S. Cl. 128—206.17

10 Claims



1. Breathing equipment, comprising:

a protective mask including a filtered air connection; an electrically driven fan with adjustable driving power, said fan being positioned in a fan housing, said fan being connected to said protective mask via said filtered air connection;

a filter connection associated with said fan housing for attaching a filter insert with different filter properties, said fan housing including a connection identification means, positioned adjacent said filter connection for receiving filter property information;

a filter insert including filter identification means for provid-

5,413,096

## REGULATOR WITH IMPROVED HIGH PRESSURE SEAT DUE TO A PLASTIC-COVERED VALVE BODY

Dennis L. Hart, Newport Beach, Calif., assignor to U. S. Divers Co., Inc., Santa Ana, Calif.

Continuation of Ser. No. 724,371, Jun. 28, 1991. This application Mar. 23, 1993, Ser. No. 76,814

Int. Cl.<sup>6</sup> A62B 9/02, 18/02; F16L 7/00; F16K 31/12

U.S. Cl. 128—205.24

13 Claims

8. A regulator for self-contained breathing apparatus comprising:

a regulator body; means for connecting said regulator body to a source of high pressure gas;

an opening in said regulator body for receipt of high pressure gas;

a diaphragm in said regulator body which is exposed to ambient pressure on one side and gas pressure which has been regulated by said regulator on the other side;

spring biasing means for biasing said diaphragm;

a valve body made of metal;

an orifice in said regulator body for connection to said source of high pressure gas for regulating said high pressure gas to an intermediate pressure zone on the other side of said orifice;

means for spring biasing said valve body against said orifice so that it extends over said orifice;

an elongated rod interconnecting said diaphragm to said valve body;

a plastic overlying said valve body extending at least in part across said intermediate pressure zone; and,

ing filter property information, said filter identification means being forced into engagement with said connection identification means upon attaching said filter insert to said filter connection;

at least one electric contact being actuated by said connection identification means upon engagement with said filter identification means to adjust delivery output of said electrically driven fan to the filter property assigned to the attached filter insert;

sensor identification means including an information source element on said filter insert and an information receiving element on said fan housing adjacent said filter connection, said sensor identification means receiving information as to harmful material to be sensed for activating a detection sensor, which is sensitive to the harmful material retained by the filter for the filter insert introduced.

5,413,098

# PATH CONSTRAINED SPECTROPHOTOMETER AND METHOD FOR DETERMINATION OF SPATIAL DISTRIBUTION OF LIGHT OR OTHER RADIATION SCATTERING AND ABSORBING SUBSTANCES IN A RADIATION SCATTERING MEDIUM

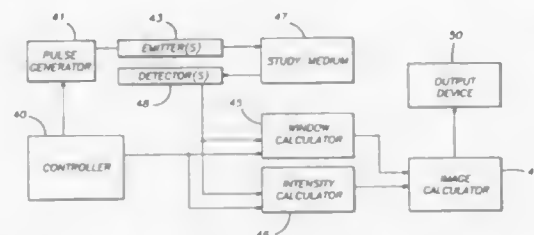
David A. Benaron, San Mateo County, Calif., assignor to Sextant Medical Corporation, Berkeley, Calif.

Continuation-in-part of Ser. No. 813,958, Dec. 24, 1991. This application Dec. 22, 1992, Ser. No. 994,947

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—633

38 Claims



1. A spectrophotometer for providing an image of a radiation scattering medium having one or more radiation attenuating constituents, comprising:

light source means for illuminating said medium from a source location at a time  $t_0$  with electromagnetic radiation of at least one wavelength, said electromagnetic radiation propagating through said medium over a plurality of paths;

means for detecting, during a set of detection windows commencing at selected times relative to time  $t_0$ , portions of said electromagnetic radiation emerging from said medium at a first detection location after having propagated through said medium from said source location to said first detection location over a corresponding set of paths of selected length;

intensity measuring means for measuring intensity of each of said detected portions of electromagnetic radiation during said detection windows wherein said measured intensities are a function of attenuation of said region; and

means for generating said image based upon said intensities measured during each of said detection windows and upon corresponding ones of said paths of selected length.

5,413,099

## MEDICAL SENSOR

Michael Schmidt, Herrenberg, and Malte Schleuter, Boeblingen, both of Germany, assignors to Hewlett-Packard Company, Palo Alto, Calif.

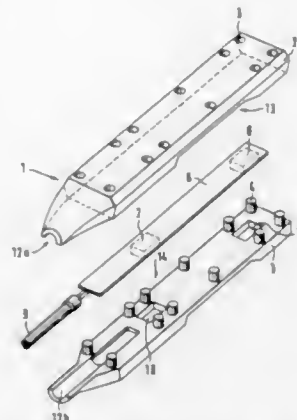
Filed May 11, 1993, Ser. No. 60,364

Claims priority, application European Pat. Off., May 15, 1992, 92108261

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—633

16 Claims



1. A medical sensor for monitoring vital signs of a human being by means of electromagnetic waves transmitted through or reflected by human tissue, said medical sensor comprising:

flexible carrier means carrying at least one transmitter element and one receiver element, said flexible carrier means including a flexible layer to which said transmitter element and said receiver element is attached, and a flexible carrier body for carrying said flexible layer, said body including a lower body portion, and an upper body portion, said lower body portion and said upper body portion being provided with body connection means for interconnection of said lower body portion and said upper body portion, and at least one of said lower body portion and said upper body portion is manufactured from transparent plastic material;

a separate housing element specifically adapted for application to a part of the human body; and  
releasable connection means for releasably connecting together said flexible carrier means and said housing element, said housing element shaping said flexible carrier means into a configuration for effective monitoring of vital signs at said human body part.

5,413,100

## NON-INVASIVE METHOD FOR THE IN VIVO DETERMINATION OF THE OXYGEN SATURATION RATE OF ARTERIAL BLOOD, AND DEVICE FOR CARRYING OUT THE METHOD

Jean-Claude Barthelemy, 12 rue Barra, 42000 Saint-Etienne, and André Geyssant, 24 rue Paillard, 42100 Saint-Etienne, both of France

Continuation-in-part of Ser. No. 914,322, Jul. 17, 1992, abandoned. This application Jan. 21, 1994, Ser. No. 184,031

Claims priority, application France, Jul. 17, 1991, 91 09020

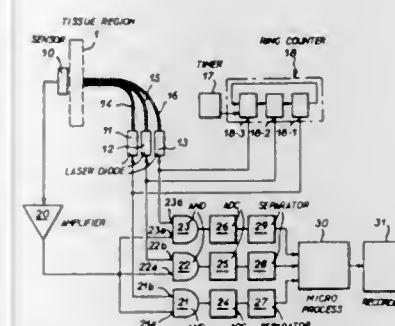
Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—633

19 Claims

1. Method for determining the oxygen saturation rate of the arterial blood of a subject, in which the concentration of oxy-hemoglobin or HbO<sub>2</sub> is compared with the total concentration of hemoglobin, comprising the steps of providing first, second and third light sources emitting in respective wavelength bands including a near infrared wavelength band, a deep red wavelength band and a wavelength band therebetween, selectively directing light emitted from the respective light sources

through an appropriate tissue region of the subject, acquiring representative signals of optical absorption through the tissue region, cyclically exciting the light sources in succession and



determining the frequency of the cyclic succession so as to be large as compared with the arterial pulsation frequency of the subject, and calculating concentrations of HbO<sub>2</sub>, Hb and HbCO to determine the oxygen saturation rate.

5,413,101

## PULSE OXIMETER PROBE

Keiichi Sugiura, Tokyo, Japan, assignor to Nihon Kohden Corporation, Tokyo, Japan

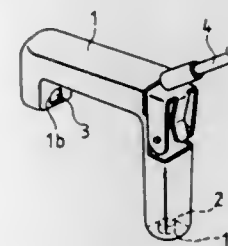
Filed Mar. 15, 1994, Ser. No. 212,924

Claims priority, application Japan, Mar. 15, 1993, 5-011119 to U

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—633

6 Claims



1. A pulse oximeter probe comprising:  
a flexible covering member formed of a flexible material;  
a light-emitting element, for emitting a light to a living tissue, provided in one of an opening in an end face at one end of said covering member and an opening in a lateral face at the other end of said covering member;  
a light-receiving element for receiving the emitted light having passed through the living tissue to detect a pulsation of blood in a blood vessel, the light-receiving element being provided in the other opening;  
a holding member for holding the covering member in a predetermined portion of the living tissue, said holding member being inserted into and covered by said covering member; and  
an urging means for urging the holding member in a predetermined direction.

5,413,102

## MEDICAL SENSOR

Michael Schmidt, Herrenberg, and Malte Schleuter, Boeblingen, both of Germany, assignors to Hewlett-Packard Company, Palo Alto, Calif.

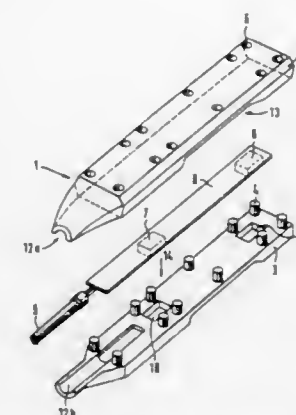
Continuation of Ser. No. 60,364, May 11, 1993. This application May 18, 1994, Ser. No. 245,665

Claims priority, application European Pat. Off., May 15, 1992, 92108261

Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—633

20 Claims



1. A medical sensor for monitoring vital signs of a human being by means of electromagnetic waves transmitted through or reflected by human tissue, said medical sensor comprising:

flexible carrier means carrying at least one transmitter element and one receiver element;  
a separate housing element specifically adapted for application to a part of the human body; and  
releasable connection means for releasably connecting together said flexible carrier means and said housing element, said housing element shaping said flexible carrier means into a configuration for effective monitoring of vital signs at said human body part.

5,413,103

## MICROPROBE AND PROBE APPARATUS

Reinhard Eckhorn, Kirchhain, Germany, assignor to Uwe Thomas Recording, Marburg, Germany

Filed Jan. 3, 1994, Ser. No. 176,221

Claims priority, application Germany, Jan. 19, 1993, 9300676 U

Int. Cl.<sup>6</sup> A61B 5/04

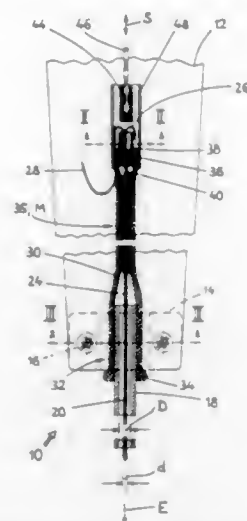
U.S. Cl. 128—639

16 Claims

1. A microprobe for electrophysiological applications, comprising a base fixture, a probe selected from the group consisting of one of a microtube, a fiber and a wire supported on said fixture within a tubular support body which closely surrounds said probe so as to provide radial support for said probe, said probe and said support body having one of their ends mounted together in a clamping structure which is movably disposed on said fixture, a capillary guide tube mounted on said fixture, another end of said probe extending through said capillary guide tube mounted on said fixture and having an inner end received in said tubular support body and an outer end projecting from said fixture for guiding and slidably supporting said probe, said probe having a tip projecting from said capillary



guide tube, and a microdrive mounted on said base fixture and operatively connected to said clamping structure for axially



moving said clamping structure together with said one end of said tubular support body and said probe on said base fixture.

5,413,104

## INVASIVE MRI TRANSDUCERS

Arnold Buijs, Eindhoven, and Wlm Abrahams, Hilvarenbeek, both of Netherlands, assignors to Drager Medical Electronics B.V., Netherlands

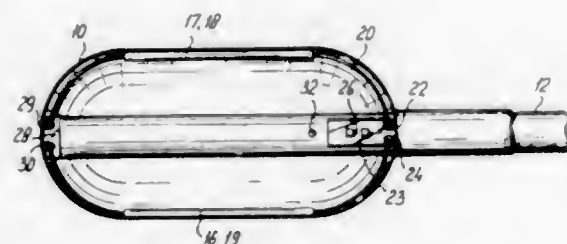
Filed Nov. 9, 1993, Ser. No. 149,072

Claims priority, application Netherlands, Nov. 10, 1992, 9201965

Int. Cl.<sup>6</sup> A61B 5/055

U.S. Cl. 128—653.5

4 Claims



1. A probe for insertion into a body cavity of a patient, comprising:

- (a) an elongated shaft having a proximal end and a distal end, comprising at least one lumen, extending from the proximal end of the shaft to near the distal end of the shaft, wherein the lumen leads to an opening in the shaft;
- (b) an inflatable balloon having a proximal section and a distal section, constructed of flexible material, positioned around the distal end of the shaft, such that the distal and proximal sections of the balloon are connected to the elongated shaft thereby sealing the balloon, and such that the opening in the shaft communicates with the inner space of the balloon and may be used to inflate or deflate the balloon by introducing or removing respectively as through the lumen;
- (c) a coil comprising a loop-shaped flexible wire attached to the balloon, the ends of said wire being connected to a communication cable running through a lumen in the shaft, wherein the communication cable comprises means for connecting the coil to a magnetic resonance system for making images within the body cavity of the patient; and
- (d) two elongated tubular stiff coil conductors which are attached to the balloon such that when the balloon is

inflated both coil conductors extend parallel to the shaft and part of the coil extends through the coil conductors.

5,413,105

## MEDIAN TEMPORAL FILTERING OF ULTRASONIC DATA

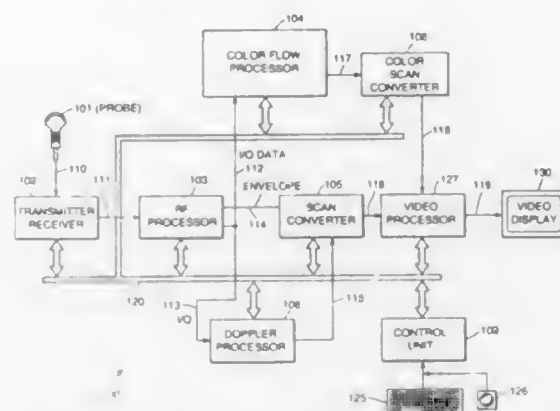
Steven F. Forestieri, Santa Clara, Calif., assignor to Diasonics Ultrasound, Inc., Milpitas, Calif.

Filed May 9, 1994, Ser. No. 239,993

Int. Cl.<sup>6</sup> A61B 8/00

U.S. Cl. 128—660.05

9 Claims



1. A method of processing signals in an ultrasonic imaging system for imaging a living subject, said ultrasonic imaging system including an ultrasonic emitter, receptor and display, comprising the following steps:

- a. obtaining N temporally-spaced signals from ultrasound produced by a plurality of temporally-spaced referenced pulses;
- b. determining an amplitude of each of said N temporally-spaced signals and generating N amplitude signals, wherein each amplitude signal of said N amplitude signals reflects the amplitude of a corresponding temporally-spaced signal of said N temporally-spaced signals;
- c. determining a median temporal signal of said N amplitude signals;
- d. temporally filtering said median temporal signal with a previous signal to produce a filtered signal, wherein the previous signal corresponds to a portion of an image displayed on said display of said ultrasonic imaging system, wherein said step of temporal filtering is performed based upon a filtering coefficient having a magnitude approximating a cardiac cycle of said living subject; and
- e. updating said portion of said image based on said filtered signal.

5,413,106

## MULTI-DIMENSIONAL VISUALIZATION APPARATUS FOR OBSERVING TISSUE

Tatsumori Fujita, and Seiji Kondo, both of Tokyo, Japan, assignors to S.S.B. Co., Ltd., Tsukuba, Japan

Filed Feb. 23, 1994, Ser. No. 200,444

Claims priority, application Japan, Feb. 25, 1993, 5-059391

Int. Cl.<sup>6</sup> A61B 8/00

U.S. Cl. 128—660.07

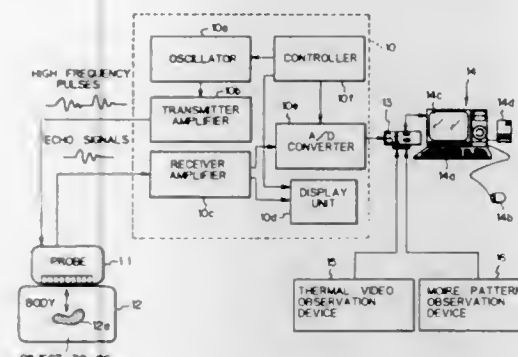
26 Claims

1. A multi-dimensional visualization apparatus for observing tissue, comprising:

- means for producing ultrasonic tomographic image data with respect to respective parallel cross sections of tissue to be observed;
- memory means for temporarily storing the tomographic image data of the respective cross sections, the tomographic image data being received from said producing means;
- means for detecting layer surface positions in the respective

cross sections of the tissue based upon the tomographic image data stored in the memory means and for producing layer surface coordinate data indicative of the detected layer surface positions;

coordinate transformation means for converting the layer surface coordinate data of the respective cross sections from said detecting means into three-dimensional coordinate data; and



means for displaying, on the same screen, both a three-dimensional image of the layer surface positions in the respective cross sections of the tissue based upon the converted three-dimensional coordinate data and the tomographic image of a desired cross section based upon the tomographic image data stored in the memory means.

5,413,107

## ULTRASONIC PROBE HAVING ARTICULATED STRUCTURE AND ROTATABLE TRANSDUCER HEAD

Clyde G. Oakley; Joseph V. Ranalletta, both of Englewood; Stephen J. Douglas, Parker, and Wing K. Law, Denver, all of Colo., assignors to Tetrad Corporation, Englewood, Colo.

Filed Feb. 16, 1994, Ser. No. 197,327

Int. Cl.<sup>6</sup> A61B 8/12

U.S. Cl. 128—662.06

20 Claims



1. An ultrasonic probe assembly, comprising:

- a generally cylindrical elongated transducer head, adapted to be placed in a stationary position against a body part to be ultrasonically examined, and comprising a transducer array comprising a plurality of transducer elements individually excitable to emit ultrasonic energy in a predetermined pattern;
- an elongated probe, said probe including a controllably-articulable section disposed near the distal end of said probe, the axes of elongation of said transducer head and of said probe being substantially coaxial when said articulable section is straight;

first control means at a proximal end of said probe for controlling articulation of said articulable section of said probe in at least one plane of articulation;

said transducer head being mounted to a distal end of said articulable section of said probe by means permitting rotation of said transducer head about its axis of elongation;

second control means at a proximal end of said probe for controlling rotation of said transducer head about its axis of elongation, such that the relative circumferential position of said transducer array with respect to said plane of articulation may be controlled; and

electrical conductor means extending along the length of said probe for carrying excitation signals and detected

signals between said proximal end of said probe and said transducer head.

5,413,108

## METHOD AND APPARATUS FOR MAPPING A TISSUE SAMPLE FOR AND DISTINGUISHING DIFFERENT REGIONS THEREOF BASED ON LUMINESCENCE MEASUREMENTS OF CANCER-INDICATIVE NATIVE FLUOROPHOR

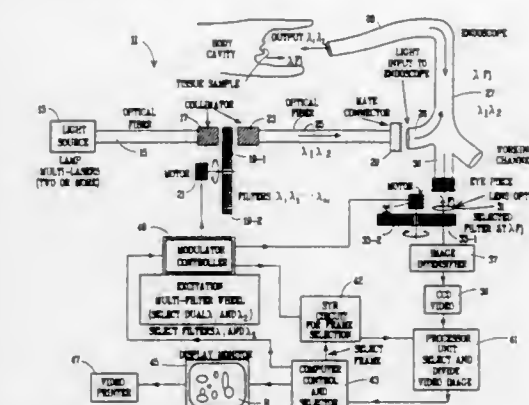
Robert R. Alfano, Bronx, N.Y., assignor to The Research Foundation of City College of New York, New York, N.Y.

Filed Apr. 21, 1993, Ser. No. 51,014

Int. Cl.<sup>6</sup> A61B 6/00

U.S. Cl. 128—665

8 Claims



1. A method of examining a two-dimensional tissue sample comprising the steps of:

- a) exciting the two-dimensional tissue sample with light at a first wavelength, whereby native fluorescence is emitted therefrom;
- b) measuring the intensity of the native fluorescence emitted from the two-dimensional region at a second wavelength as a function of location within the two-dimensional tissue sample;
- c) exciting the two-dimensional tissue sample with light at a third wavelength, whereby native fluorescence is emitted therefrom;
- d) measuring the intensity of the native fluorescence emitted from the two-dimensional tissue sample at said second wavelength as a function of location within the two-dimensional tissue sample;
- e) said first and said third wavelengths being such that the difference of intensities of the resultant native fluorescence measured at said second wavelength is indicative of the carcinomatous condition of the tissue sample;
- f) determining the difference of intensities measured at said second wavelength to obtain a value for each location within the two-dimensional tissue sample; and
- g) generating a map using said values.

5,413,109

## ELECTROCARDIOGRAPHIC APPARATUS FOR ANALYZING THE FUNCTION OF A HEART AND FOR PACING THE HEART DEPENDENT ON THE ANALYSIS

Christer Ekwall, Spanga, Sweden, assignor to Siemens Elema AB, Solna, Sweden

Filed Apr. 23, 1993, Ser. No. 51,249

Claims priority, application Sweden, Dec. 18, 1992, 9203821

Int. Cl.<sup>6</sup> A61B 5/04

U.S. Cl. 128—696

12 Claims

1. An electrocardiographic apparatus comprising: measurement means for measuring a heart variable of a heart and for generating a real-time measurement signal characterizing said heart variable;

parameter signal generator means for generating a real-time parameter signal from said measurement signal, said mea-

surement signal and said parameter signal having simultaneously changing values; and evaluation means for identifying said simultaneously changing values in real-time and for determining whether said simultaneously changing values satisfy predetermined conditions for generating an evaluation result indicative of the functioning of said heart.



ing values in real-time and for determining whether said simultaneously changing values satisfy predetermined conditions for generating an evaluation result indicative of the functioning of said heart.

#### 5,413,110 COMPUTER GATED POSITIVE EXPIRATORY PRESSURE METHOD

Charles C. Cummings, Towson, Md., and Robert I. Prince, Gainesville, Fla., assignors to Puritan-Bennett Corporation, Kans.

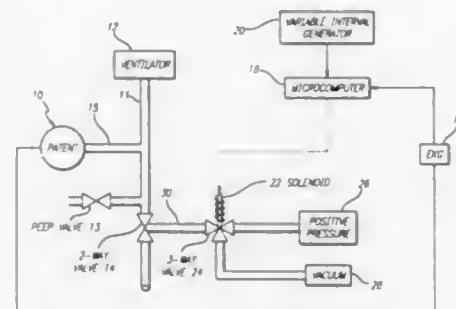
Continuation of Ser. No. 593,324, Oct. 1, 1990, Pat. No. 5,150,291, which is a continuation of Ser. No. 512,577, Apr. 20, 1990, abandoned, which is a continuation of Ser. No. 845,942, Mar. 31, 1986, abandoned. This application Sep. 21, 1992, Ser. No. 947,441

The portion of the term of this patent subsequent to Sep. 22, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> A61M 16/00

U.S. Cl. 128—696

6 Claims



1. A method for altering pressure in a patient breathing pathway in a respiratory ventilation apparatus during specified periods of a patient heart cycle, the respiratory ventilation apparatus having a ventilator and means for providing said patient breathing pathway with a positive ventilation pressure during a patient breath cycle, the steps of the method comprising:

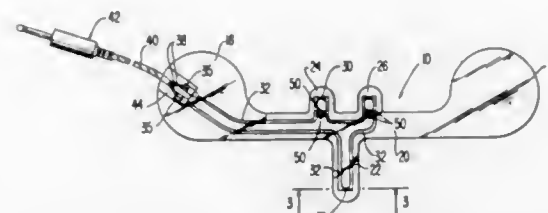
- detecting heart beats in a plurality of patient cardiac cycles; generating an electrical heart beat signal in response to said heart beats, and amplifying said electrical heart beat signal;
- determining a variable moment following a detected heart-beat; and
- altering said positive ventilation pressure in said patient breathing pathway commencing at said variable moment following a detected heart beat for a variable time interval during selected cardiac cycles.

#### 5,413,111 BEAD THERMISTOR AIRFLOW SENSOR ASSEMBLY

Mark A. Wilkinson, Marietta, Ga., assignor to Healthdyne Technologies, Inc., Marietta, Ga.  
Filed Aug. 24, 1993, Ser. No. 111,043  
Int. Cl.<sup>6</sup> A61B 5/087

U.S. Cl. 128—724

9 Claims



1. A thermistor airflow sensor assembly adapted to be mounted adjacent the mouth and nose of a patient for monitoring the breathing of such patient, comprising:

- (a) upper and lower layers of thin, flexible, resilient plastic film readily conformable to the facial curvatures of the patient, said layers being essentially identical in shape and configured to include an elongated main body strip, longitudinal end portions serving as primary mounting pads for the assembly, a first leg extending laterally from said main body strip and having an outer end adapted to be aligned generally with the mouth of the patient when the assembly is mounted, and a pair of longitudinally spaced second legs having outer ends and extending laterally from said main body strip in a direction opposed to said first leg, the outer end of each of said second legs being aligned with the nostrils of the patient when the assembly is mounted;
- (b) an electrical circuit comprising circuit conductors applied to said lower layer, said conductors extending to said outer ends of each of said legs and to a periphery of one of said end portions, and being adapted to be connected electrically to a monitor;
- (c) a bead thermistor for sensing air temperature mounted on said lower film layer adjacent the outer end of each of said first and second legs and electrically connected to said circuit conductors, said bead thermistors being located on said legs so that expired air from the patient's mouth and nose passes thereover;
- (d) said upper film layer fully enclosing and encapsulating said circuit conductors and said bead thermistors thereby electrically isolating said electrical circuit; and
- (e) adhesive bonding means for laminating said upper film layer to said lower film layer and encapsulating said bead thermistors and conductors, whereby said thermistor means detects the temperature change of ambient and expired air and transmits signals through said circuit indicative of such temperatures.

#### 5,413,112 EXPIRATORY FLOW MEASURING DEVICE

Murray L. Jansen, Porirua; Donald E. Killick, Plimmerton; Alexander Lang, Eastbourne; Royce T. Pullman, Lower Hutt; Christopher M. Sutton, Ngaio, and Cornelis H. Zwaaneveld, Fairfield, all of New Zealand, assignors to Asthma International Research Limited, Wellington, New Zealand  
PCT No. PCT/GB91/00793, § 371 Date Jan. 15, 1993, § 102(e) Date Jan. 15, 1993, PCT Pub. No. WO91/17707, PCT Pub. Date Nov. 28, 1991  
PCT Filed May 21, 1991, Ser. No. 952,864  
Claims priority, application New Zealand, May 21, 1990, 233745

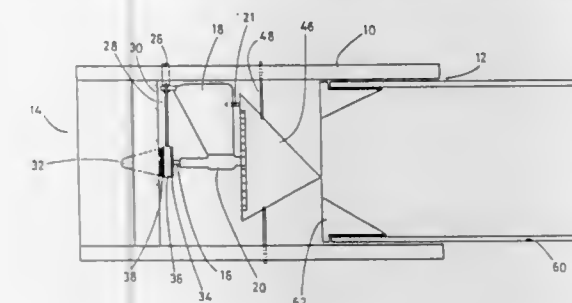
Int. Cl.<sup>6</sup> A61B 5/09

U.S. Cl. 128—726

19 Claims

1. An expiratory flow measuring device for measuring a maximum flow rate of a single forced expiration, comprising:

an elongated hollow body having an inlet end and an outlet end;  
a shaft mounted within the body between the inlet and outlet ends;  
a vane mounted to said shaft and rotatable within said body away from a rest position, said vane being shaped such that airflow through the body from the inlet end past the



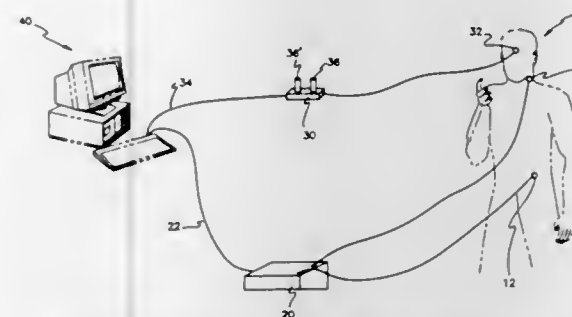
vane causes the vane to be rotatably displaced from said rest position; and  
indicator means co-operable with the vane to indicate a maximum displacement of the vane from the rest position, said indicator means comprising a radial pointer carried by said shaft and an associated graduated scale provided on an internal surface of said body and against which a relative position of said pointer can be read.

#### 5,413,113 ELECTRONIC ALLEGRO-SENSITIVITY TEST DEVICE

Robert D. Milne, 2432 Greens Ave., Henderson, Nev. 89014  
Filed Mar. 21, 1994, Ser. No. 215,358  
Int. Cl.<sup>6</sup> A61M 37/00

U.S. Cl. 128—734

4 Claims



1. A testing apparatus to test a patient's sensitivity to a plurality of potential allergens comprising:  
electrode means for measuring directly the galvanometric response of the patient, said electrode means comprising a pair of electrodes attached at different points to said patient and said electrodes being each connected to a signal amplification means;  
computer interface means included in said signal amplification means for the display and storage of said amplified signals over time in a graphic format for indicating directly the galvanometric response of said patient to each allergen in sequence; and  
allergen storage tray means containing different allergens located at different storage sites therein;  
means comprising a third electrode to introduce allergen samples transcutaneously in sequence from said allergen storage tray means by computer controlled signals into contact with said patient; whereby  
as each allergen is introduced into contact with the patient, the galvanometric response of the patient is monitored through said electrode means such that the severity of the reaction of the patient to each allergen can be determined.

#### 5,413,114 SYSTEM FOR TESTING ADEQUACY OF HUMAN HEARING

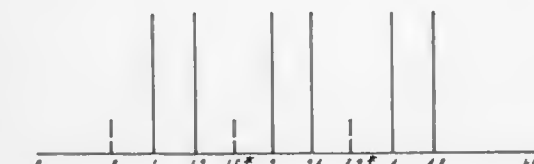
Patrick M. Zurek, Arlington, and William M. Rabinowitz, Bedford, both of Mass., assignors to Sensimetrics Corporation, Cambridge, Mass.

Division of Ser. No. 865,127, Apr. 8, 1992, Pat. No. 5,267,571. This application Nov. 29, 1993, Ser. No. 158,642

The portion of the term of this patent subsequent to Dec. 7, 2010, has been disclaimed.  
Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—746

7 Claims



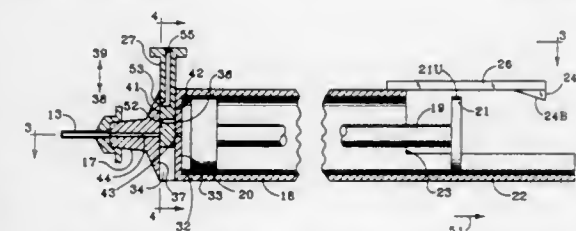
1. Apparatus for testing hearing over a range of audible frequencies comprising:  
means for simultaneously presenting a plurality of primary tones to an ear of a subject being tested through a first transducer, said primary tones being single-frequency sinusoidal tones and said plurality of primary tones including tones with different frequencies;  
means for simultaneously presenting a plurality of primary tones in said ear through a second transducer, said plurality of primary tones including tones with different frequencies;  
means for measuring auditory distortion tones generated by pairs of said primary tones, each of said pairs of primary tones including one primary tone presented by said first transducer and one primary tone presented by said second transducer, said frequencies of said primary tones being selected to prevent the production of unwanted intermodulation distortion products.

#### 5,413,115 BIOPSY SYRINGE WITH SLIDE VALVE

James R. Baldwin, 2200 W. Petty Rd., Muncie, Ind. 47304  
Filed Dec. 29, 1993, Ser. No. 175,152  
Int. Cl.<sup>6</sup> A61B 5/00

U.S. Cl. 128—763

10 Claims



1. A fine needle aspiration biopsy device comprising:  
a barrel;  
a needle mounting hub at the front end of the barrel;  
a needle mounted to the hub;  
a vacuum-establishing control member at the other end of the barrel;  
a valve in the barrel between the hub and the control member; and  
a latch on the barrel engageable with the control member to hold the control member in vacuum maintaining position; there being a first fluid passageway from the hub to the valve, and a second fluid passageway from the valve to a vacuum chamber in the barrel;  
the valve including a slideway between the hub and the control member, and the valve having a slide that is slid.



ably received in the slideway, and the valve slide having third and fourth passageways therein, the valve slide having three positions, one of them placing the slide in a position occluding one of the first and second passageways thereby preventing communication from the first passageway to the second, another position placing the third passageway in registry with the first and second passageways thereby providing communication between the first passageway and the second passageway, and a third position placing the fourth passageway in registry with the first passageway and opening outside the body thereby providing communication between the first passageway and the environment around the device.

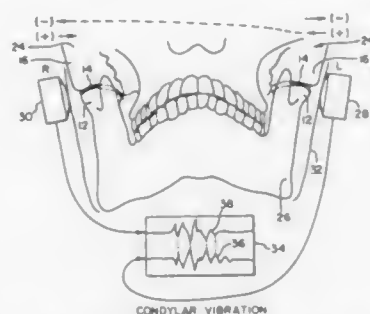
**5,413,116**  
**METHOD AND APPARATUS FOR DIAGNOSING JOINTS**

John C. Radke, Whitefish Bay; Gregory J. Ryan, Milwaukee, both of Wis., and Troy W. Hershberger, Warsaw, Ind., assignors to BioResearch, Milwaukee, Wis.

Filed Jun. 24, 1993, Ser. No. 83,219  
Int. Cl.<sup>6</sup> A61B 5/103

U.S. Cl. 128—777

28 Claims



1. A system for classifying degenerative joint disease conditions, the system comprising:
  - a) sensor means for detecting a vibration pattern from the joint;
  - b) preprocessor means for providing a predetermined set of data parameters descriptive of the vibration pattern; and
  - c) trainable adaptive interpreter means for receiving said data parameters as input and producing an output which indicates at least one classification of the degenerative disease condition of said joint.

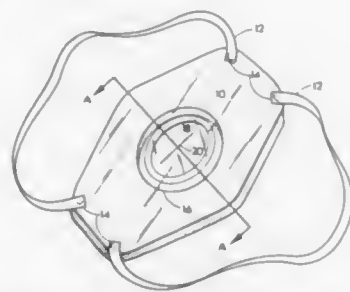
**5,413,117**  
**PROPHYLACTIC DEVICE**

Marquita Wills, 724 Leavenworth St., Apt. K, San Francisco, Calif. 94109

Filed Aug. 5, 1994, Ser. No. 286,642  
Int. Cl.<sup>6</sup> A61F 6/06, 6/02

U.S. Cl. 128—830

16 Claims



1. A prophylactic device for humans which will allow penetration of body cavities or orifices by a probing item, especially during sexual activity, but will reduce communication of body

or other fluids from a user to a partner, said prophylactic device comprising:

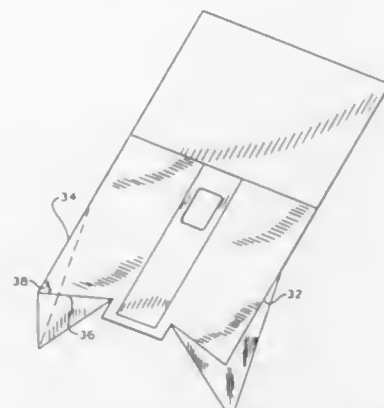
- a) a shield member constructed out of a first fluid impervious material and having an upper side and a lower side, said shield member having a predetermined size and shape suitable for covering pubic and other regions surrounding body cavities and orifices;
- a) a fluid absorbing element having an attachment face and a fluid absorbing face, said attachment face attached to said lower side of said shield member by a first attachment means, both said shield member and said fluid absorbing element having a central opening extending therethrough, said central openings having a predetermined size and shape, said central openings having a peripheral region; and
- a) a slotted elastic member being constructed of a second fluid impervious material, said second fluid impervious material being somewhat rigid, said slotted elastic member being somewhat larger in size than said central openings, said slotted elastic member being attached to said shield at said peripheral region of said central openings by a second attachment means such that communication of body or other fluids are prevented from passing through said central openings to said upper side of said shield member, said slotted elastic member having a slot with a predetermined length extending therethrough, said slot defining two opposing edges, said slotted elastic member being rigid enough so as to maintain said opposing edges adjacent to and otherwise in contact with each other, whereby when said prophylactic device is placed over said pubic or other regions surrounding cavities or orifices to be penetrated and said penetration accompanying said sexual activity by said probing item occurs, said opposing edges of said slotted elastic member produce a squeegee-like wiping action to remove said body or other fluids from said probing item thereby reducing said communication of said body or other fluids therethrough.

**5,413,118**  
**SURGICAL DRAPE FOR COVERING APPENDAGES**  
Joseph F. Thompson, Lindenhurst, Ill., assignor to Baxter International Inc., Deerfield, Ill.

Filed Aug. 20, 1990, Ser. No. 570,090  
Int. Cl.<sup>6</sup> A61F 13/00

U.S. Cl. 128—853

18 Claims



1. A drape for covering an appendage of a patient, comprising: a top sheet having a top sheet edge, an upper surface and an under surface, said surfaces of said sheet forming a first plane which is generally horizontal when said under surface of said sheet is in proximity with the appendage of the patient; and
- an apron means extending vertically downwardly from said top sheet and attached to at least a portion of said top sheet edge, said apron means forming second and third planes

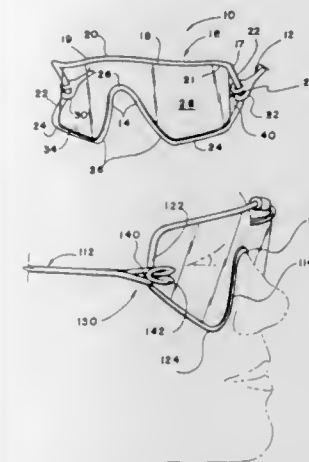
when said drape is positioned over the patient, said second and third planes being generally perpendicular to said first plane.

**5,413,119**  
**PROTECTIVE EYE SHIELD FOR DENTAL PATIENTS**  
George H. Guerrant, 2901-A Loring Dr., Loring AFB, Me. 04751

Filed Feb. 17, 1994, Ser. No. 197,757  
Int. Cl.<sup>6</sup> A61F 9/00

U.S. Cl. 128—858

10 Claims



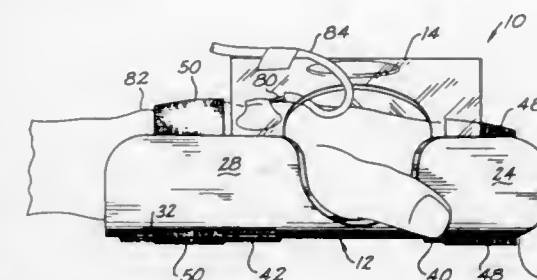
1. An eye protection device, comprising: a frame having a rim including:
  - a) a superior rim (18) having a superior apex (20), a medial majority (19), lateral extents (21), and lateral ends (17), said lateral extents (21) extending bilaterally from said medial majority (19) and terminating at said lateral ends (17);
  - oppositely disposed lateral rims (22) contiguous with said lateral ends (17) of said superior rim (18);
  - oppositely disposed bottom rims (24) contiguous with respective ones of said lateral rims (22); and
  - a) an inferior rim complex contiguous with and adjoining said oppositely disposed bottom rims, said inferior rim complex including oppositely disposed inferior rims (14) and an inferior apex (26) adjoining said inferior rims (14), said inferior rim complex being generally parabolic in shape and diverging downwardly from said inferior apex at a predetermined angle, said inferior rims (14) being located in a plane passing behind said superior apex (20) and said medial majority (19) of said superior rim (18), and said inferior rims (14) being anterior to said lateral ends (17) of said superior rim (18);
- a) a shield (28) supported by said frame, said shield having lateral edges (29), said lateral edges being spaced from said lateral rims (22), and said lateral edges defining an opening (40) in cooperation with said lateral rims; and
- a) a strap (12) for retaining said frame on a wearer, said strap having means for attaching said strap to said lateral rims, said strap being attached to said lateral rims, and said means for attaching said strap to said lateral rims being free to slide along said lateral rims defining said opening in cooperation with said lateral edges of said shield.

**5,413,120**  
**INTRAVENOUS INJECTION SHIELD ASSEMBLY**  
Michael L. Grant, 6009 Greenview Dr., Oklahoma City, Okla. 73135

Filed May 16, 1994, Ser. No. 243,354  
Int. Cl.<sup>6</sup> A61F 5/37

U.S. Cl. 128—877

3 Claims



1. A shield for protecting the position of an intravenous needle inserted into a body part of a patient and having one end of intravenous tubing connected thereto, comprising:
  - a) a generally rectangular planar base having top and bottom surfaces and having forward and rearward longitudinally spaced-apart pairs of upright side walls defining a thumb receiving space at respective sides of the base, said base having a longitudinally extending slot adjacent its juncture with the respective side wall of said pairs of side walls;
  - a) a layer of self adhesive fabric material bonded to the bottom surface of said base and inner surface of each side wall of said pairs of side walls, respectively;
  - a) a plurality of flexible strap means respectively extending through the slots transversely of the base for securing a patient's limb to the base;
  - an elongated inverted substantially U-shaped transparent shield having forward and rearward pairs of legs depending from its respective end portions and laterally spaced-apart a distance at least equal to the transverse outside dimension between said pairs of side walls, said pairs of legs capable of being manually flexed inwardly toward each other and respectively disposed between said pairs of side walls and returning toward a position of repose against the inner surface of said pairs of base side walls,
  - said shield having an arcuate bight portion longitudinally overlying said base in vertically spaced relation with respect to the surface of a patient's limb when disposed thereon and an intravenous needle location,
  - said bight portion having a top opening whereby a caretaker may finger touch inspect a patient's intravenous needle site; and,
  - a pad of self adhesive fabric material bonded to the outer depending end portion surface of each shield leg of said pairs of legs for removably securing said pairs of legs with said pairs of side walls, respectively.

**5,413,121**  
**CIGARETTE MAKING MACHINE**  
John Dawson, Coventry; Derek H. Dyett; Norman L. Sharp, both of High Wycombe, and James R. Stemberge, Coventry, all of England, assignors to Molins PLC, England

Filed Aug. 25, 1993, Ser. No. 111,411  
Claims priority, application United Kingdom, Aug. 26, 1992, 9218176; Nov. 11, 1992, 9223611

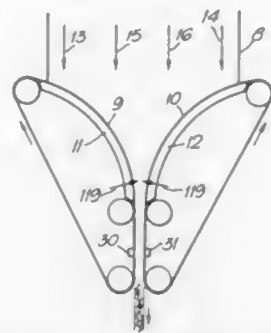
U.S. Cl. 131—84.1

Int. Cl.<sup>6</sup> A24C 5/18

19 Claims

12. A cigarette making machine comprising means for showering tobacco towards and onto tobacco shower receiving surfaces of two moving suction bands to form tobacco sub-streams on the respective bands which are then merged to form a single cigarette filler, and including means for enclosing at

least a portion of the filler streams in a wrapper web to form a continuous cigarette rod, at least one portion of the tobacco shower receiving surface of at least one of the suction bands having little or no forward component of movement with



respect to the direction of movement of the showered tobacco arriving on it, and at least one portion of the tobacco shower receiving surface of at least one band having a significant forward component of movement with respect to the direction of movement of the showered tobacco arriving on it.

5,413,122

# METHOD OF PROVIDING FLAVORFUL AND AROMATIC COMPOUNDS

Chi-Kuen Shu, Pfafftown, and Brian M. Lawrence, Winston-Salem, both of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Feb. 18, 1992, Ser. No. 837,844

Int. Cl.<sup>6</sup> A24B 15/00

U.S. Cl. 131-274

5 Claims

1. A method for providing flavorful and aromatic composition for use in a smoking article, the method comprising:

- (a) subjecting an amino acid from the group consisting of serine, threonine and analogs thereof in the presence of water to heat treatment at a pressure of about 10 psig to about 1000 psig and at a temperature of at least about 100° C. to provide a flavorful and aromatic composition; and
- (b) collecting the flavorful and aromatic composition for use in a smoking article.

5,413,123

# ARTIFICIAL NAIL TIP

David H. Aylott, deceased, late of Avon, and by Zena M. Aylott, beneficiary, The Old Hundred Barn, Tormarton, Badminton, Avon, GL9 1JA, both of United Kingdom

PCT No. PCT/GB92/00023, § 371 Date Aug. 3, 1993, § 102(e) Date Aug. 3, 1993, PCT Pub. No. WO92/11784, PCT Pub. Date Jul. 23, 1992

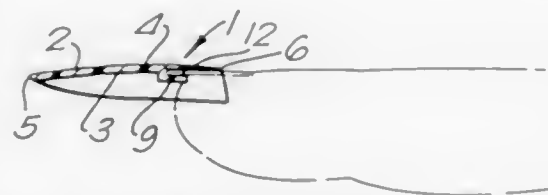
PCT Filed Jan. 6, 1992, Ser. No. 87,726

Claims priority, application United Kingdom, Jan. 5, 1991, 9100197

Int. Cl.<sup>6</sup> A61M 1/06

U.S. Cl. 132-73

3 Claims



1. An artificial nail tip for attaching to a natural fingertip of a user comprising:

- a body having underside and outer surfaces extending between a leading end and a trailing end, the body having a

lateral extension which is arched to conform to the curvature of the natural fingernail,

- a shoulder on the body defining a thinner body portion adjacent the trailing end of the body, the shoulder being provided on the underside surface of the body, and
- a security projection positioned substantially at the center of the shoulder on the underside surface of the body, said security projection comprising a first portion extending away from the underside surface substantially at a right angle and a second portion extending rearwardly to the trailing end and from a free end of the first portion to define a slot open towards the trailing end, the security projection extending laterally a distance substantially less than the lateral extension of the body of the nail tip, whereby the security projection in use is engaged underneath the tip of the user's natural fingernail which is located within the slot with the natural fingernail butted up against the shoulder and the back of the slot and the thinner portion of the artificial nail tip overlying the natural fingernail.

5,413,124

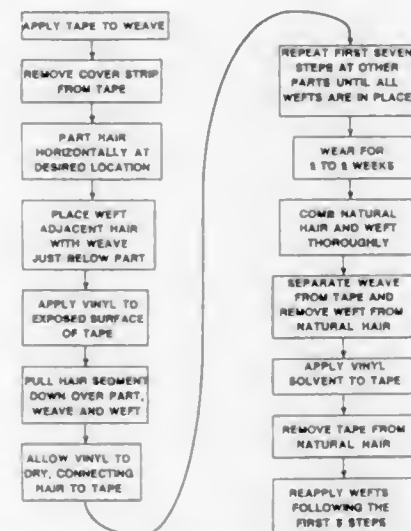
HAIR WEFT AND EXTENSION METHOD AND ARTICLE  
Peter A. Incando, P.O. Box 292685, Sacramento, Calif. 95829-2685

Filed Aug. 13, 1993, Ser. No. 106,914

Int. Cl.<sup>6</sup> A41G 5/00

U.S. Cl. 132-201

8 Claims



1. A method for manufacturing a hair weft having a plurality of individual hairs attached to a weave extending perpendicular to the individual hairs, the method including the steps of: interweaving the individual hairs with fibers of the weave, applying a bonding composition to the weave, and bonding attached ends of the individual hairs to the fibers of the weave with the bonding composition, wherein said interweaving step includes the step of orienting the individual hairs perpendicular to a length of the weave, wherein said applying step includes the step of including a polyvinyl chloride compound within the bonding composition, the bonding composition bonding the fibers of the weave to the attached ends of the hair, including the further step of drying the bonding composition, including the further step of applying an additional layer of bonding composition to the weave, including the further step of pressing the vinyl composition between two platens, each platen having a planar surface addressing the weave and pressing the weave and included vinyl composition into a thin flexible weave,

wherein said pressing step includes steps of clamping the platens together and waiting for a time not less than a time necessary to fix the weave at a new lesser thickness, wherein said bonding step includes bonding the attached ends of the hairs to the fibers of the weave in a manner preserving flexibility of the weave, including the further steps of:

- applying a bead of bonding composition to a vinyl substrate, placing the hair weft over the bead with the hairs of the hair weft addressing the bead between the attached end and a free end,
- pressing the hair into the bead with a polyethylene strip, and cutting the hair within the hair weft between the bead and the weave;
- whereby the hair weft is attached to a vinyl substrate for placing upon the head of a person without the weave included thereto.

5,413,125

# METHOD OF APPLYING AN INTRACELLULAR HAIR RECONSTRUCTION SYSTEM TO A PERSON'S HEAD

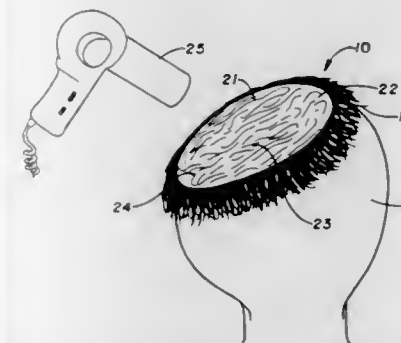
Jonathan S. Waranch, Owings Mills, and Michael E. Baylin, Baltimore, both of Md., assignors to Waye Laboratories, Inc., Timonium, Md.

Filed Oct. 6, 1993, Ser. No. 132,714

Int. Cl.<sup>6</sup> A41G 5/00

U.S. Cl. 132-201

13 Claims



1. A method for applying an intracellular hair reconstruction system to a person's head to cover a bald portion of the person's head, the intracellular hair reconstruction system having a plastic membrane base, the membrane base having a front edge, a first side and a second side, hair being attached to the membrane base and extending from the second side of the membrane base, the hair being customized to match the person's natural hair in color and texture, the method comprising the steps of:

- preparing a template of the bald portion specific to the person,
- adapting the membrane base to the template to replicate the template, and be no larger than the template,
- preliminarily placing the intracellular hair reconstruction system on the person's head and adjusting the intracellular hair reconstruction system for desired fit and styling,
- marking the person's head for placement of the intracellular hair reconstruction system,
- removing the intracellular hair reconstruction system from the person's head,
- applying a uniform coating of adhesive on the first side of the membrane base,
- applying heat to the intracellular hair reconstruction system thereby curing the adhesive on the membrane base,
- after heating, placing the membrane base on the bald portion to conform with the marking on the person's head,
- pressing the membrane firmly against the bald portion whereby the intracellular hair reconstruction system is adhered to the person's head,
- wherein the membrane has a front section, a middle section

and a back section, the adhesive being applied to the front section and dried with a hand-held drier, the adhesive being applied to the middle section and dried with the hand-held drier and the adhesive being applied to the back section and dried with the hand-held drier, wherein the drying with the hand-held drier is performed in two steps, the first step using high heat and low air flow for approximately one and one-half to two minutes and the second step using high heat and high air flow for approximately one and one-half minutes.

5,413,126

# DECORATIVE FASHION ACCESSORY

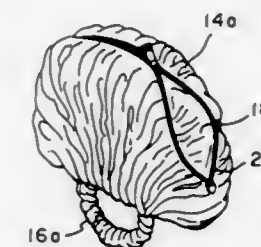
Romy H. Revson, 225 E. 57th St., New York, N.Y. 10022

Filed Aug. 25, 1992, Ser. No. 935,029

Int. Cl.<sup>6</sup> A45D 8/12; A45C 3/14

U.S. Cl. 132-275

3 Claims



1. A decorative fashion accessory having an elastic band surrounded partially along its circumference by bunched fabric of relatively large width and a tubular length of fabric of appreciably less width surrounding the remaining portions of said band to enable the accessory to encircle a length of hair with said tubular length in close proximity to the head of the wearer, including an opening extending circumferentially along said bunched fabric of relatively large width, and a closure for said opening.

5,413,127

# DENTAL FLOSS OR TAPE

David M. Hill, Big Mill Leek, United Kingdom, assignor to Jordan A/S, Norway

PCT No. PCT/GB91/00213, § 371 Date Aug. 12, 1992, § 102(e) Date Aug. 12, 1992, PCT Pub. No. WO91/11970, PCT Pub. Date Aug. 22, 1991

Continuation of Ser. No. 920,552, Aug. 12, 1992, abandoned.

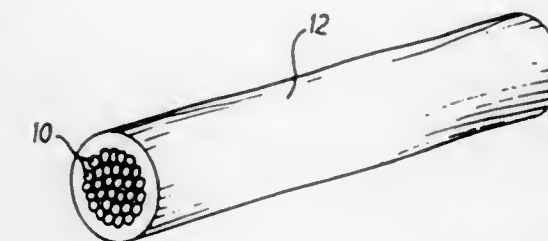
This PCT application Feb. 13, 1991, Ser. No. 242,709

Claims priority, application United Kingdom, Feb. 14, 1990, 9003292

Int. Cl.<sup>6</sup> A61D 5/00

U.S. Cl. 132-321

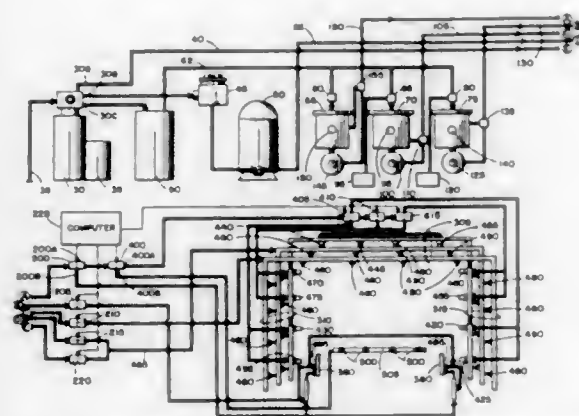
9 Claims



1. A method of producing a fluorocarbon-coated dental floss or tape comprising the step of coating a multi-filament core with a pure, substantially continuous outer layer of coalesced fluorocarbon particles bound to each other on the core for permanently adhering to the core during use of said dental floss or tape.



5,413,128  
**AUTOMATIC PERSONAL CAR WASHING METHOD  
 AND APPARATUS**  
 James N. Butts, 2819 Marks St., Orlando, Fla. 32803  
 Filed Apr. 6, 1994, Ser. No. 223,771  
 Int. Cl.<sup>6</sup> B08B 3/02  
 U.S. Cl. 134—56 R 13 Claims



2. A car wash for washing a car which includes side surfaces, front and rear surfaces, and a top surface, the car wash comprising:

- an enclosure including a back and a front, the front having an opening through which a car can enter and exit, the enclosure further including opposed side surfaces, a floor and a ceiling;
- water softening means for softening untreated water to provide soft water;
- heating means, coupled to the water softening means, for heating the soft water to provide hot soft water;
- pressurizing and mixing means, coupled to the heating means, for pressurizing and mixing the hot soft water with soap to provide a low pressure heated soap/water mix;
- hot water pressurizing means, coupled to the heating means, for pressurizing the hot soft water to provide high pressure heated rinse water;
- spot free water generating means, coupled to the water softener, for generating spot free water from the soft water;
- first spraying means, situated in the enclosure and coupled to the pressurizing and mixing means, for spraying the car with the low pressure heated soap/water mix;
- second spraying means, situated in the enclosure and coupled to the hot water pressurizing means, for spraying the car with high pressure heated rinse water to rinse the car; and
- third spraying means, situated in the enclosure and coupled to the spot free water generating means, for spraying the car with spot free water.

5,413,129  
**APPARATUS AND METHOD FOR REMOVING  
 HYDROCARBONS FROM SOILS AND GRAVEL**  
 Noel A. Shenoi, Houston, Tex., assignor to Worldwide Remediation, Inc., Houston, Tex.  
 Filed Mar. 16, 1993, Ser. No. 32,796  
 Int. Cl.<sup>6</sup> B08B 3/10 2 Claims

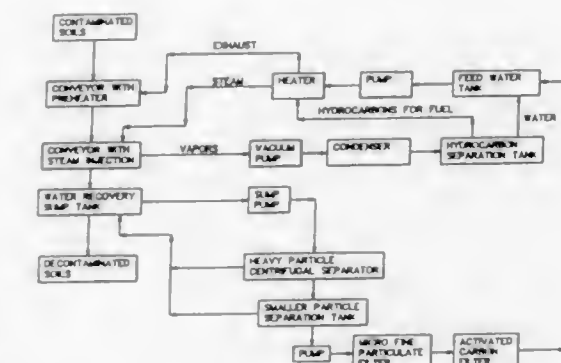
U.S. Cl. 134—65  
 1. Apparatus for removal of hydrocarbons from soil and gravel comprising:

- a conveyor onto which the contaminated soil and gravel is placed and onto which steam is injected; a water separation sump which separates the cleaned soil and gravel output from said conveyor from the water resultant from the condensation of said steam;
- one or more particle separators which remove particulate matter from said water removed from said water separation sump; one or more particle filters which remove fine particulate matter from said water removed from said particle separators;

a feed water tank into which said water removed from said particle filters is placed;

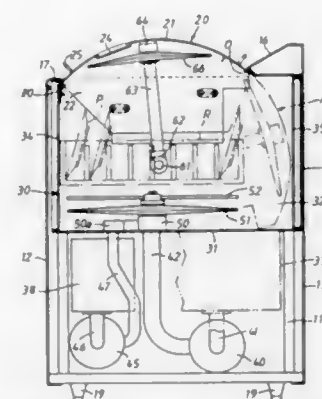
a heater which utilizes hydrocarbons as fuel and which converts said water removed from said feed water tank into said steam;

an evacuator which removes from said conveyor the water and hydrocarbon vapor which results from injection of said steam onto said conveyor;



- a condenser which condenses said water and hydrocarbon vapor output from said evacuator;
- a separation tank in which the output of said condenser is permitted to sit and separate into its constituent components, condensed water and liquid hydrocarbons;
- a connection from the output of said separation tank through which said liquid hydrocarbons are fed to the fuel input of said heater; and
- a connection from the output of said separation tank through which said condensed water is fed to said feed water tank.

5,413,130  
**DISHWASHING MACHINE**  
 Fumio Maruyama, Nagoya, and Tomio Suyama, Shimane, both of Japan, assignors to Hoshizaki Denki Kabushiki Kaisha, Aichi, Japan  
 Filed Sep. 29, 1993, Ser. No. 128,040  
 Int. Cl.<sup>6</sup> A47L 15/16 5 Claims



1. A dishwashing machine having a washing tub, said tub having a bottom portion, at least a pair of opposed side walls, and a top which is opened for entry of tableware and removal of said tableware after washing, and said dishwashing machine being provided at said bottom portion with a lower nozzle arm for spraying jet streams of hot wash water or rinse water upwardly; said dishwashing machine comprising:

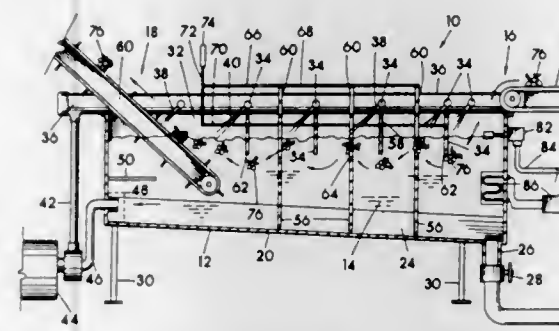
- an unsegmented door comprising a top plate of semi-circular cross-section arranged to be rotatable in its semi-circular

direction along said pair of opposed side walls of said washing tub, said top plate being movable between a closed position where said top plate is placed to close an upper opening of said washing tub and an open position where said top plate is housed in a rear portion of wash washing tub;

an upper nozzle arm provided inside of said top plate to be movable with said top plate, said upper nozzle arm being arranged at a central portion of said top plate to spray said jet streams of hot wash water or rinse water downwardly into said washing tub; and

a water supply passage provided along an internal surface of said top plate for supplying a portion of said hot wash water or rinse water supplied to said lower nozzle arm to said upper nozzle arm.

5,413,131  
**PRODUCE WASHER**  
 Harold G. Medlock, Box 7514, U.S. Hwy. 85, Fort Luften, Colo. 80621-8824  
 Filed May 6, 1994, Ser. No. 239,379  
 Int. Cl.<sup>6</sup> B08B 3/04 2 Claims

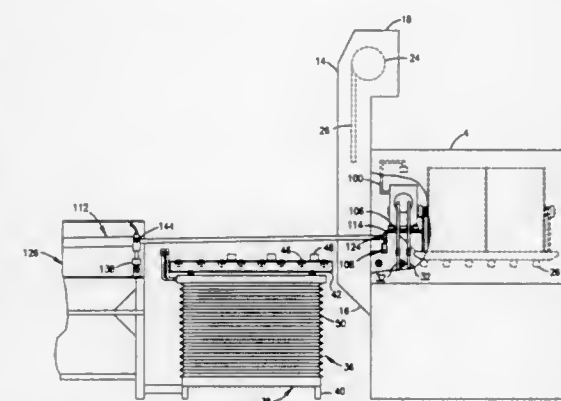


1. A produce washer comprising an elongated open top tank containing water, a first end of said tank being a loading end whereat produce is first introduced into said produce washer for cleaning, and an oppositely disposed second end of said tank being an exit end whereat cleaned produce is removed from the tank;

- a water circulation pump connected to draw water from within said tank from said exit end, said pump further connected to return the drawn water to said tank through a plurality of water output nozzles positioned along said open top of said tank, said output nozzles aiming downward into the water within said tank so that the water from said nozzles will strike produce floating in the water within said tank and push the produce underwater, the drawing of said water and re-applying of the water via said pump and nozzles arranged for creating a current within the water within said tank with said current moving from said loading end toward said exit end of said tank, said current being sufficiently strong to move produce within the water in said tank from said loading end toward said exit end;
- a plurality of upper baffles positioned transversely within said tank and in spaced relationship to one another, said upper baffles extending downward within said water contained within said tank and terminating prior to reaching a bottom of said tank so as to provide space between a bottom edge of each upper baffle and the bottom of said tank for said current and the produce to pass thereunder;
- a plurality of lower baffles positioned transversely within said tank and in spaced relationship to one another, said lower baffles extending upward from said bottom of said tank within said water contained within said tank and terminating prior to reaching a top surface of said water within said tank so as to provide space between a top edge of each lower baffle and the top surface of said water for said current and the produce to pass thereover, said lower

baffles positioned in between and in spaced relationship to said upper baffles so as to define a serpentine channel through which said current travels and carries produce in the process of washing the produce.

5,413,132  
**PARTS CLEANER WITH ROTATING CARRIAGE**  
 Todd Cronan, Kingsville, Mo., assignor to Aichelin-Stahl, Inc., Kingsville, Mo.  
 Filed Nov. 15, 1993, Ser. No. 152,980  
 Int. Cl.<sup>6</sup> B08B 3/04 15 Claims

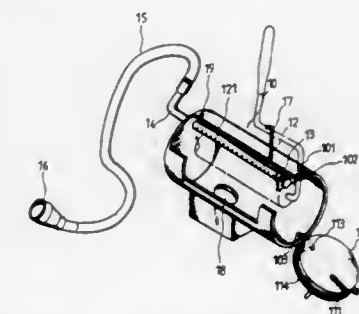


1. A cleaning apparatus for cleaning workpieces, said apparatus comprising:

- a washer drum for washing said workpieces, said drum being formed along a longitudinal axis and having an open end arranged along said axis, said drum including a door to seal shut said open end during a washing cycle and to expose said opening during a reloading cycle;
- carriage means for rotating said workpieces during said washing cycle and during said reloading cycle, said carriage means holding said workpieces within said drum during said washing cycle and releasably receiving said workpieces outside said drum during said reloading cycle;
- driving means, fixedly mounted to said carriage means, for rotating said carriage means during said washing cycle and during said reloading cycle.

5,413,133  
**PAINT ROLLER CLEANING DEVICE**  
 Frank A. Russell, 2784W 1600N, Clinton, Utah 84015, assignor to Unitera International Corp., Taipei, Taiwan, Prov. of China and Frank A. Russell, Clinton, Utah, a part interest  
 Filed Mar. 8, 1994, Ser. No. 207,177  
 Int. Cl.<sup>6</sup> B08B 3/02 4 Claims

U.S. Cl. 134—138



1. A paint roller cleaning device comprising:  
 a housing for receiving a cylindrical brush of the paint roller,

said housing having an opening for inserting the brush and a cover for said opening; and  
a spray tube disposed inside said housing and having a longitudinal axis, said spray tube having a series of jet nozzles spaced along its length; and said spray tube being rotatably mounted about said axis in a wall of the housing and having a handle portion extending outwardly from said wall to rotate the spray tube whereby said spray tube can be turned to let water from said jet nozzles be perpendicularly ejected onto the cylindrical brush of the paint roller causing it to be cleaned, or let water from said jet nozzles touch the cylindrical brush of the paint roller causing the brush to rotate and to shake off water wherein said housing comprises an elongated groove on an inside wall of said cover, through which the handle of the paint roller passes, a notch on said housing at one end, through which the handle of the paint roller passes, a retainer rod raised from said housing on the outside for holding down the handle of the paint roller.

5,413,134

# WINTERIZING SYSTEM FOR AN UNDERGROUND SPRINKLER SYSTEM

Robert K. Burgess, 27 Taxi Dr., and Thomas A. Redle, 115 Red Fox Dr., both of Sheridan, Wyo. 82801

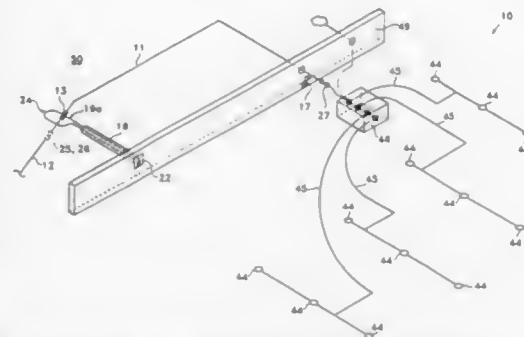
Filed May 4, 1993, Ser. No. 57,333

The portion of the term of this patent subsequent to Oct. 18, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> F16L 5/00; F16K 31/46

U.S. Cl. 137-1

21 Claims



15. A method for retrofitting an existing underground sprinkler system with a winterizing system, wherein said existing sprinkler system is attached to a water source line of a building structure via a primary feedline, and wherein said existing system also has a first shut-off valve and a first hose bib located within said building structure, and a second shut-off valve and a second hose bib located outside of said building structure, said method comprising the steps of:

- closing said first shut-off valve;
- connecting a single valve means into an area of said primary feedline within said building structure;
- coupling valve control means to said single valve means;
- positioning a means for manipulating said valve control means such that said means for manipulating is accessible from outside said building structure;
- connecting drain means to said single valve means, wherein said drain means is responsive to said valve means;
- terminating use of said first hose bib and said second shut-off valve;
- opening said first shut-off valve.

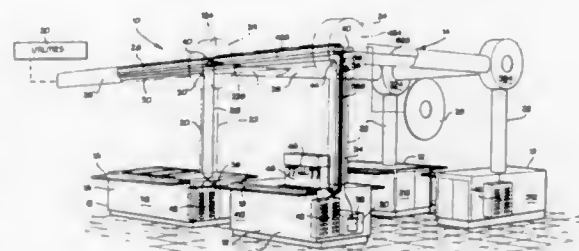
## 5,413,135 APPARATUS FOR SERVING COMESTIBLES AND METHOD OF ERECTING SAME

Barry S. Poole, 19114 Spring Blossom, Huntersville, N.C. 28078  
Filed Oct. 8, 1993, Ser. No. 133,712

Int. Cl.<sup>6</sup> F16L 55/18

U.S. Cl. 137-15

16 Claims



1. A method of erecting a comestible serving apparatus within a pre-existing building structure having fixed structural walls, a fixed structural floor and a fixed structural ceiling collectively defining a comestible service area, and having at least one pre-existing utility supply source accessible through one of the walls, ceiling and floor, the method being characterized in that essentially no structural modification of building floors, ceilings walls and utility supply sources is required, the method comprising the steps of prefabricating a plurality of distinct serving stations, arranging the serving stations on the floor within the service area of the building structure in a predetermined spaced apart arrangement forming separate respective serving locations without structural modification of the floor, prefabricating a common superstructure for the plural serving stations, arranging the superstructure within the service area above the floor and below the ceiling and connecting the superstructure to each serving station and to the one of the walls, ceiling, and floor substantially without structural modification of any thereof for connecting the serving stations with the pre-existing utility supply source of the building structure, and routing utility supply means through the superstructure between the utility supply source and the serving stations to contain and enclose the utility supply means from view within the superstructure.

5,413,136

## INFLATABLE ELASTOMERIC VALVE HAVING A SPHERICAL CONFIGURATION

Kevin B. Prescott, 767 Salem St., Groveland, Mass. 01834

Filed Apr. 4, 1994, Ser. No. 222,449

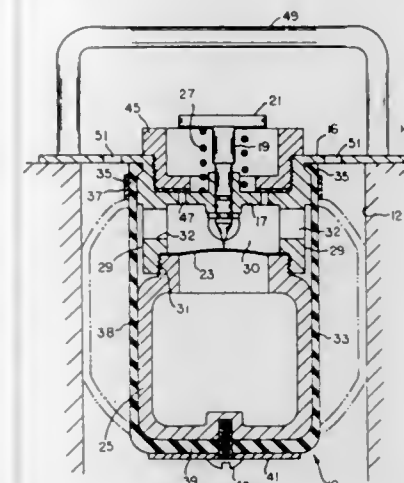
Int. Cl.<sup>6</sup> F16L 55/128; F16K 7/10

U.S. Cl. 137-68.1

10 Claims

1. A portable elastomeric valve for a floor drain hole, comprising a rigid support structure adapted to be positioned on a floor over an associated drain hole;  
a gas cylinder located below said support structure for disposition within the drain hole;  
a tubular spacer means depending from said rigid support structure for spacing the gas cylinder downwardly from said support structure;  
said gas cylinder having a puncturable closure located within said tubular spacer means;  
an upright manually-operable plunger slidably mounted on said rigid support structure for downward motion through the tubular spacer means, whereby said plunger is enabled to puncture said closure to release pressurized gas from said cylinder into a space circumscribed by said tubular spacer means;  
an elastomeric sock having a lower closed end wall underlying said gas cylinder, and an upper mouth affixed to said rigid support structure; and  
said elastomeric sock encircling said spacer means and said

cylinder, whereby pressurized gas is enabled to flow from the spacer means outwardly into said sock so as to inflate



the sock into sealing engagement with a surface of the associated drain hole.

5,413,137

## FUEL VAPOR VENT ASSEMBLY WITH LIQUID TRAP

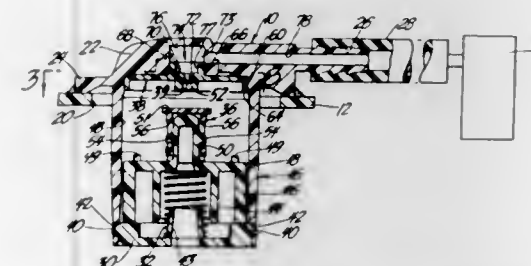
David R. Gimby, Livonia, Mich., assignor to Borg-Warner Automotive, Inc., Sterling Heights, Mich.

Filed Feb. 14, 1994, Ser. No. 195,229

Int. Cl.<sup>6</sup> F16K 17/36

U.S. Cl. 137-200

9 Claims



1. A fuel vapor vent assembly adapted to be mounted in the top of a motor vehicle fuel tank, said assembly comprising a body having an entry passage adapted to be open to liquid fuel and fuel vapor and a vapor exit passage adapted to be connected to a fuel vapor storage device, an insert mounted in said body having a normally generally vertically oriented orifice, said orifice having an entrance and an exit elevated above said entrance, said insert further having a basin extending about said exit of said orifice, and said body having a cavity co-operating with said basin to define an expansive chamber above said exit and connected to said vapor exit passage and adapted to trap liquid fuel from fuel vapor passing under pressure through said orifice before said liquid fuel can reach said vapor exit passage.

5,413,138

## DEVICE FOR TAPPING OFF OR FILLING FLUID INTO A CONTAINER

Halvard Aström, Kärrvägen 26, S-135 55 Tyresö, Sweden  
PCT No. PCT/SE92/00168, § 371 Date Sep. 17, 1993, § 102(e)

Date Sep. 17, 1993, PCT Pub. No. WO92/16449, PCT Pub. Date Oct. 1, 1992

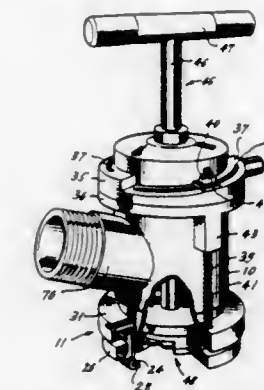
PCT Filed Mar. 18, 1992, Ser. No. 119,112

Claims priority, application Sweden, Mar. 18, 1991, 9100810; Dec. 20, 1991, 9103802

Int. Cl.<sup>6</sup> F16L 55/10

U.S. Cl. 137-320

20 Claims



1. A filling and emptying device for a fluid in a container, the container including an emptying or filling hole having a pipe stem and a flange thereon, the emptying or filling hole being closable by a bung, the bung including an outwardly open substantially cylindrical cavity and two mutually spaced projections disposed within the cavity, the device comprising:

- a housing having opposed ends, one of the ends being an open end adapted to be removably mounted over the pipe stem of the emptying or filling hole of the container;
- a tool for manually operating the bung for filling and emptying the container from a position outside the housing, the tool including a spindle, having opposed ends, which extends slidably and rotatably within the housing through the other end of the housing, and a handle located on one of the opposed ends of the spindle;
- fastening means located on the open end of said housing for sealingly engaging said housing with the flange of the pipe stem, said fastening means including a plurality of jaws projecting from the open end of the housing for gripping the flange and maneuvering means for actuating the plurality of jaws to grip the flange;
- bung holder means disposed on the other end of the spindle for releasably retaining the bung, said bung holder means including gripping means for releasably engaging the projections of the bung; and
- operating means rotatably mounted on the other end of said housing for operating the maneuvering means.

5,413,139

## THROTTLE VALVE

Satoru Kusumoto, and Ryoichi Oka, both of Yokohama, Japan, assignors to Tylan General, K.K., Yokohama, Japan

Filed Jun. 16, 1993, Ser. No. 78,365

Claims priority, application Japan, Dec. 2, 1992, 4-350321

Int. Cl.<sup>6</sup> F16K 49/00

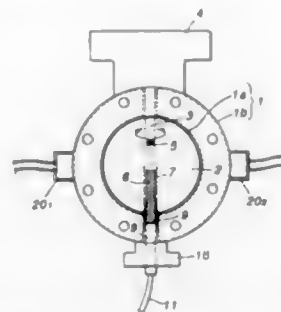
U.S. Cl. 137-341

19 Claims

1. A throttle valve comprising:  
a main body having a flange portion enclosing a fluid passage extending in a first direction, said flange portion having an annular groove for removably mounting therein a plate-shaped heater, said annular groove being open along an outer surface of said flange portion;  
a valve disc having a diameter substantially equal to that of



the fluid passage and a rotation axis perpendicular to the first direction of the fluid passage, said valve disc being rotatably mounted in the flange portion; and



driving means for rotating the valve disc about said rotation axis.

5,413,140

## SPRING-ASSISTED SPLIT SEAT GATE VALVE

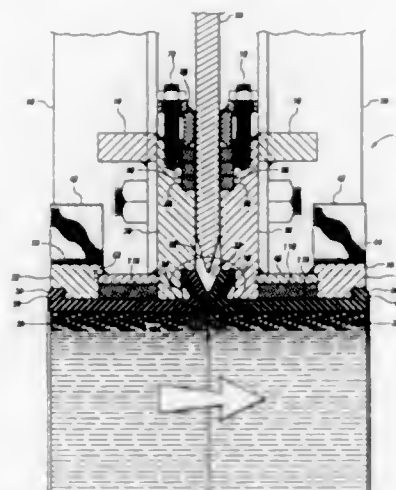
Alvin A. Klmpel, Edgerton, Wis., and Milton E. Jennings, Sparks, Nev., assignors to Warman International Ltd., Artarmon, Australia

Filed Jun. 29, 1994, Ser. No. 267,966

Int. Cl.<sup>6</sup> F16L 7/00

U.S. Cl. 137—375

15 Claims



- tions which extend within said valve liner inner flange; and
- c) a gate mounted to the housing members for selected interposition between the valve liners, wherein the gate is moveable between a raised position in which flow through the valve assembly is permitted and a lowered position in which the gate extends into the split seat portions and flow is blocked, and wherein the valve liner flanges are engaged with one another when the gate is raised, and wherein the spring members bias portions of the valve liners into engagement with the gate when the gate is interposed between the valve liners.

5,413,141

## TWO-STAGE GAS VALVE WITH NATURAL/LP GAS CONVERSION CAPABILITY

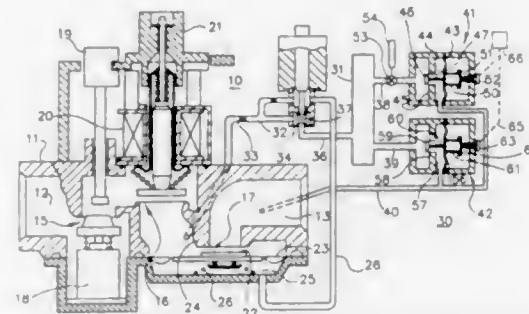
Paul Dietiker, Redondo Beach, Calif., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 179,027, Jan. 7, 1994, abandoned. This application Sep. 1, 1994, Ser. No. 299,775

Int. Cl.<sup>6</sup> G05D 16/06

U.S. Cl. 137—489

7 Claims



1. A pressure regulator having first and second electrically determinable states for each of a plurality of pressure ranges, the pressure range being changeable without parts replacement, the pressure regulator comprising:

- housing means defining fluid inlet and fluid outlet passageways and a main valve seat providing for flow between the fluid inlet and fluid outlet passageways;
- a main valve closure member mounted in said housing means for movement relative to the main valve seat for varying the flow between the fluid inlet and outlet passageways;
- a main valve actuator operable to vary the position of said main valve closure member relative to the valve seat in response to variations in a control pressure;
- first and second regulator valve assemblies arranged in parallel for producing the control pressure in response to the pressure in the fluid outlet passageway, the control pressure further being dependent on biasing provided by first and second variable biasing means in the first and second regulator valve assemblies respectively, the first variable biasing means applying a smaller force than the second variable biasing means;
- selection means operable in response to a selection input to coordinately vary the forces applied by the first and second variable biasing means; and
- electrically operable means for disabling said second regulator valve assembly

1. A gate valve assembly comprising:

- a) two body housing members, wherein each housing member has portions defining a through passage, and wherein the housing members are connected together to define an axial passage therethrough, and wherein the connected housing members define a clearance for the passage of a gate between the housing members, and wherein each housing member has portions defining an abutment spaced axially outwardly from said clearance and radially outwardly of said through passage;
- b) two resilient valve liners engaged with the body housing members, wherein the valve liners have portions defining a coaxial flow passage through the housing members, and wherein each valve liner has an inner flange with radially extending portions, said radially extending portions of each inner flange extending axially to engage one of said housing member abutments;
- c) two resilient split seat portions positioned between the housing members and beneath the valve liner coaxial passages;
- d) two frustoconical spring members, one formed within each valve liner, wherein each spring member has por-

5,413,142

## AUTOMATIC FLUID CIRCULATING SYSTEM AND METHOD

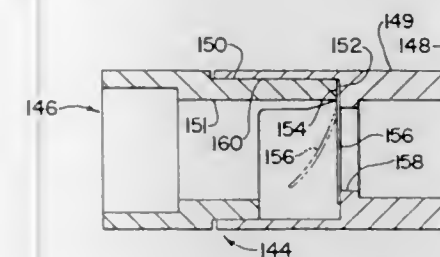
Glenn W. Johnson, Summit; Henry J. McVicker, Chatham, both of N.J., and E. P. Erez Pick, Bayside, N.Y., assignors to Aircast, Inc., Summit, N.J.

Division of Ser. No. 180,706, Jan. 13, 1994, which is a continuation of Ser. No. 968,287, Oct. 29, 1992, abandoned. This application Mar. 30, 1994, Ser. No. 219,988

Int. Cl.<sup>6</sup> F16K 15/16

U.S. Cl. 137—515.5

13 Claims



1. A fluid flow control device comprising

- a first sleeve;
- a second sleeve in fluid-tight engagement with said first sleeve; and
- a membrane disposed across an interior cross-section of said engaged sleeves and secured along less than its full circumference, said membrane being flexible in a first direction so that the portion of the membrane circumference which is not so secured can flex in said first direction to allow fluid flow in said first direction through said sleeves, said membrane resisting fluid flow in the opposite direction through said sleeves.

5,413,143

## ROTARY VALVE ASSEMBLY

Guy d'Agostino, Vitry Sur Seine; Jean-Marie Brocard, Rubelles; Pierre G. J. Hebert, Libourne; Franck Liotte, Melun; Eric C. Lorne, Vaux Le Penil; Claude Maillard, Vulaines Sur Seine, and Alain Tiepel, Chailly En Biere, all of France, assignors to Societe Nationale D'Etude et de Construction de Moteurs D'Aviation S.N.E.C.M.A., Paris, France

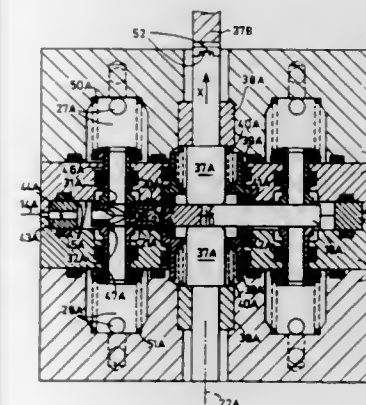
Division of Ser. No. 1,744, Jan. 2, 1993, Pat. No. 5,307,838. This application Feb. 2, 1994, Ser. No. 190,554

Claims priority, application France, Jan. 8, 1992, 92 00104

Int. Cl.<sup>6</sup> F16K 11/074

U.S. Cl. 137—625.11

7 Claims



1. A rotary valve assembly comprising:

- a) a casing defining an interior chamber, the casing comprising:
- i) two separate opposite portions; and

- ii) a middle portion joining the two separate opposite portions together;

- b) a rotary valve member operatively associated with the casing such that the valve member may rotate within the interior chamber, the rotary valve member having opposite sides and defining at least one fluid conduit, and at least two fluid orifices, one fluid orifice opening on each opposite side of the rotary valve member such that the at least two fluid orifices are in fluid communication with the at least one fluid conduit;

- c) a shaft extending from each opposite side of the rotary valve member, each shaft being rotatably supported by a bearing in the casing;

- d) a sealing sleeve extending around a portion of each shaft and in sealing contact with the rotary valve member;

- e) inlet means defining a fluid inlet in fluid communication with the at least one fluid conduit, wherein the inlet means comprises:

- i) a first fluid inlet passage; and,
- ii) a second fluid inlet passage in fluid communication with the first fluid inlet passage and the at least one fluid conduit wherein the second fluid inlet passage is generally perpendicular to an axis of rotation of the rotary valve member;

- f) outlet means defining at least two fluid outlet passages, one passage located on each opposite side of the rotary valve member and located such that the at least two fluid outlet passages are in fluid communication with the at least two fluid orifices during at least a portion of rotation of the rotary valve member wherein the outlet means comprises:

- i) at least two first fluid outlet passages defined by the housing, one outlet passage located on each of the opposite sides of the rotary valve member; and,
- ii) at least two outlet sleeve members, each defining a second fluid outlet passage and located on opposite sides of the rotary valve member such that each second fluid outlet passage is in fluid communication with a first fluid outlet passage, whereby the at least two first fluid outlet passages are grouped in pairs, the fluid outlet passages of each pair are connected to each other.

5,413,144

## SINGLE-LEVER MIXER VALVE PROVIDED WITH A DEVICE FOR PREVENTING PRESSURE SHOCK AT THE CLOSING MOVEMENT OF THE LEVER

Voldemar Riis, Vargårda, Sweden, assignor to Gustavsberg Vargårda Armatur AB, Sweden

PCT No. PCT/SE92/00445, § 371 Date Dec. 16, 1993, § 102(e) Date Dec. 16, 1993, PCT Pub. No. WO92/22767, PCT Pub. Date Dec. 23, 1992

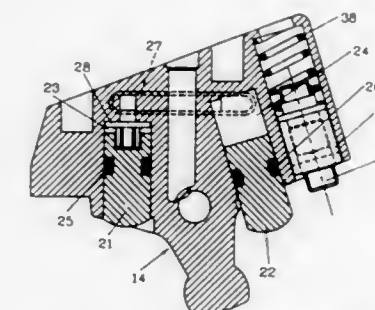
PCT Filed Jun. 17, 1992, Ser. No. 162,199

Claims priority, application Sweden, Jun. 17, 1991, 9101852

Int. Cl.<sup>6</sup> F16K 11/078, 31/72

U.S. Cl. 137—625.17

4 Claims



1. A single-lever mixer valve for liquids of different temperatures, comprising a housing which is provided with an inlet for each of said liquids and a common outlet, and a lever for controlling the amount and the temperature of the liquid flowing out through said outlet, an actuator, connected to said

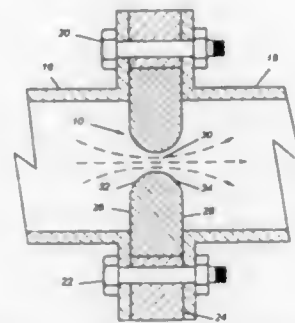
lever, provided in the housing and a valve member in the housing cooperating with said actuator, said actuator having a built-in closing damper for reducing hydraulic shock resulting from rapid closing of the mixer valve, said closing damper including at least one sealed chamber containing a fluid, a piston movable in said chamber, and a throttling member defining flow passages for said fluid, said piston adapted to force the fluid from the sealed chamber via said throttling member when the lever closes the mixer valve, said throttling member adapted to be deformed elastically when the fluid pressure in said chamber exceeds a predetermined value to cause a progressive reduction of the flow passages of the throttling member so that resistance to flow of the fluid increases at a fast-closing movement of the lever, while the resistance to flow of the fluid remains low at a slow-closing movement of the lever.

5,413,145

**LOW-PRESSURE-DROP CRITICAL FLOW VENTURI**  
Lee D. Rhyne, Rosenberg, and James R. Stoy, Missouri City, both of Tex., assignors to Texaco Inc., White Plains, N.Y.  
Continuation-in-part of Ser. No. 47,525, Apr. 19, 1993, abandoned. This application Feb. 22, 1994, Ser. No. 200,087  
Int. Cl.<sup>6</sup> F15D 1/06

U.S. Cl. 138—44

7 Claims



1. A shaped obstruction placed in a compressible fluid flow line to restrict flow therethrough, comprising:  
a venturi having a relatively low pressure drop across an axial flow opening at critical fluid flow rate where the mass flow rate of the fluid does not increase with an increase in upstream pressure in the fluid, said venturi having an upstream inlet section and a downstream diffuser section, said inlet section and said diffuser section being symmetrical to each other in any plane perpendicular to the direction of fluid flow and said inlet section and said diffuser section also being radially symmetrical to each other about the central axis of said flow opening in all directions, said inlet section being the mirror image of said diffuser section and each section being continuously curvilinear in shape with no straight line portion, the juncture of said inlet section and said diffuser section at the center plane of said venturi perpendicular to the direction of fluid flow defining the interior of a torodially shaped axially oriented flow opening.

# 5,413,146 HOSE WITH RELEASABLE FLOAT FOR LEAK DETECTION

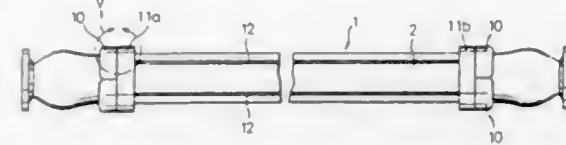
Masuo Kuroda, Tokyo; Fumihiko Yazaki, Hiratsuka; Masashi Wakabayashi, Hiratsuka, and Naoyuki Oboka, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

PCT No. PCT/JP93/01628, § 371 Date Jul. 8, 1994, § 102(e) Date Jul. 8, 1994, PCT Pub. No. WO94/11665, PCT Pub. Date May 26, 1994

PCT Filed Nov. 9, 1993, Ser. No. 256,152  
Claims priority, application Japan, Nov. 9, 1992, 4-298633  
Int. Cl.<sup>6</sup> F16L 55/00

U.S. Cl. 138—104

9 Claims



1. A hose comprising: a main pressure cord layer for retaining a circulating fluid; an auxiliary pressure cord layer sheathing said main pressure cord layer; and a chamber for retaining the fluid leaking from said main pressure cord layer, said chamber being formed between said main pressure cord layer and said auxiliary pressure cord layer, wherein said auxiliary pressure cord layer is capable of being deformed by the pressure of the fluid retained in said chamber, said hose further comprising a float moored at said hose, said float being connected to said hose through a connection member, wherein said connection member is fractured and said float is released from said hose when an amount of deformation of said auxiliary pressure cord layer has increased to a predetermined value.

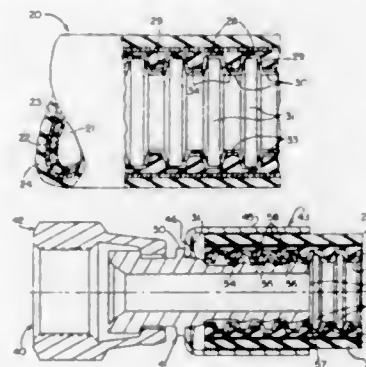
5,413,147

**FLEXIBLE HOSE AND FITTING ASSEMBLY**  
Luis Moreiras, Willoughby, Ohio; Frederick J. Davis, Rog Spak, Iowa, and Isaac Shlad, Mentor, Ohio, assignors to Parker Hannifin Corporation, Cleveland, Ohio

Filed Apr. 29, 1993, Ser. No. 55,007  
Int. Cl.<sup>6</sup> F16L 47/00

U.S. Cl. 138—109

16 Claims



1. A flexible hose comprising  
an inner corrugated tube of polymeric material impervious to the fluid to be conveyed through the hose, said tube having alternating radially outer ridges and radially outwardly opening grooves axially staggered in relation to alternating radially inner ridges and radially inwardly opening grooves;  
an intermediate layer of elastomeric rubber material surrounding said inner corrugated tube and supported on said radially outer ridges;  
a braided layer of fiber reinforcement material on said intermediate layer; and

an outer layer of elastomeric rubber material surrounding said braided layer of fiber reinforcement; and wherein said intermediate layer penetrates partway into said radially outwardly opening grooves with a void being left at a lower region of said radially outwardly opening grooves.

5,413,148

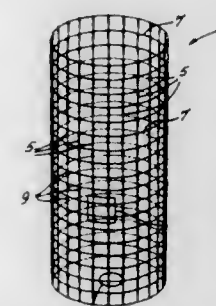
# CASING STRUCTURE FOR ENCASING MEAT PRODUCTS

Marcus Mintz, 5040 Hampton Ave., Montreal, Quebec, Canada H3X 3P7, and Neil Mintz, 3101 Del Rey Ave., Carlsbad, Calif. 92009

Continuation of Ser. No. 886,280, May 20, 1992, abandoned, which is a continuation-in-part of Ser. No. 838,355, Feb. 19, 1992, abandoned. This application Jan. 6, 1994, Ser. No. 177,800  
Int. Cl.<sup>6</sup> F16L 11/00; A22C 13/00

U.S. Cl. 138—118.1

8 Claims



1. An elongated tubular casing structure for encasing meat products, said elongated structure having a longitudinal direction and a transverse lateral direction, said casing structure comprising:  
a stockinette member comprising a closely knit tubular member formed of closely knit threads and having a first stretch capacity;  
a knitted netting arrangement having a second stretch capacity and comprising a first plurality of spaced strands extending in said longitudinal direction and a second plurality of spaced strands extending in said lateral direction; the longitudinal and lateral strands of said netting arrangement each intersecting in locking engagement with one another to form a grid-like pattern comprising a plurality of four-sided shapes;  
said strands of said netting arrangement being knit into the threads of said stockinette member, whereby said netting arrangement and said stockinette member are integrally formed so that said casing structure comprises an integrally formed structure;  
said first stretch capacity being greater than said second stretch capacity;  
whereby, when a meat product is stuffed into said casing structure under pressure, said meat product forms a bulge within each of said four-sided shapes to thereby define a checker-board pattern on the surface thereof, said stockinette member forming a shield to prevent the adherence of adjacent meat product bulges over said strands of said netting arrangement.

5,413,149

# SHAPED FABRIC PRODUCTS AND METHODS OF MAKING SAME

Michael A. Ford, West Chester; Richard A. Barlow, and Martin I. Jacobs, both of Newtown Square, all of Pa., assignors to The Bentley-Harris Manufacturing Company, Exton, Pa.

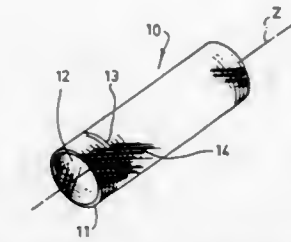
Filed Nov. 5, 1991, Ser. No. 787,900  
Int. Cl.<sup>6</sup> F16L 11/00

U.S. Cl. 138—123

8 Claims

1. A flexible abrasion and kink-resistant sleeve for protection of elongated articles, such as wires, cables, hoses, and conduits,

said sleeve comprised of warp and fill ends having an open weave construction characterized by the absence of supporting material for said warp and fill ends, said sleeve having a substantially circular cross-sectional configuration and an ARP abrasion resistance of at least about 25,000 cycles, said sleeve comprising:



at least one resilient filamentary fill end having a resilient set in a hoop configuration disposed in a plane extending substantially perpendicularly to the sleeve central axis; and  
at least one resilient filamentary warp end interwoven with said fill end, said warp end having a resilient set in a spiral configuration and having a pitch of from about 0.2 to about 0.3 turns per longitudinal sleeve inch.

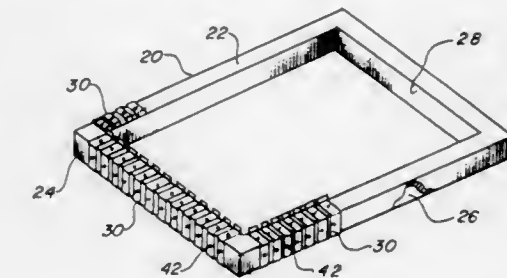
5,413,150

**FRAME WITH CLIP TYPE YARN HOLDER**  
Irving Townsend, 11910 Mayfield #303, Los Angeles, Calif. 90049

Filed Jan. 31, 1994, Ser. No. 188,804  
Int. Cl.<sup>6</sup> D03D 29/00

U.S. Cl. 139—34

20 Claims



1. A frame device with yarn holders for retaining yarn during a weaving and crocheting process to make a textile fabric, the frame and holders comprising:  
a) a multi-sided rigid structural frame, each side having a top, an outside edge, a bottom and an inside edge, and  
b) a plurality of yarn holding clips attached to the frame, each clip having an upper leg contiguous with the frame top, an outside leg contiguous with the frame outside edge, a lower leg contiguous with the frame bottom and a freely upstanding leg parallel with the frame inside edge, said clips disposed on each of the sides of the frame in opposed relationship such that a strand of yarn may be looped over each upstanding leg and wound in a first direction around each adjacent parallel clip to form a warp and a second direction 90-degrees from the first around each of the remaining adjacent parallel clips to form a woof-like layer on top of the warp.



5,413,151

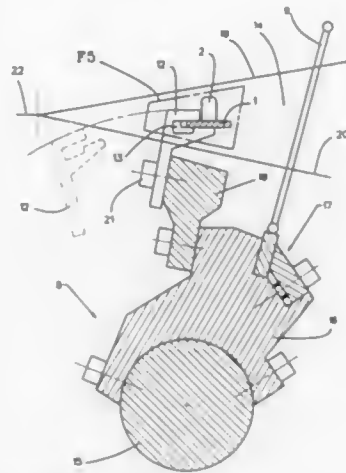
**GRIPPER LOOM RAPIER GUIDE ARRANGEMENT**  
 Denis Moeneclaeys, Oostnieuwkerke-Staden, Belgium, assignor to Picanol N.V., Belgium

Filed Apr. 7, 1994, Ser. No. 224,512

Claims priority, application Belgium, Apr. 15, 1993, 09300369  
 Int. Cl.<sup>6</sup> D03D 47/27

U.S. Cl. 139—449

14 Claims



1. A gripper loom, comprising:  
 at least one gripper;  
 a rapier having a plurality of guide surfaces;  
 means for mounting the gripper on the rapier such that the gripper is insertable into and retractable from a shed;  
 at least one fixed guide mounted outside the shed so as to engage and exclusively guide a first set of said guide surfaces;  
 and  
 at least one displaceable guide mounted for displacement into and out of the shed so as to engage and exclusively guide a second set of said guide surfaces,  
 wherein guide surfaces of said first and second sets are located at different sites on the rapier.

5,413,152

**BOTTLE CAP AND VALVE ASSEMBLY FOR A BOTTLED WATER STATION**

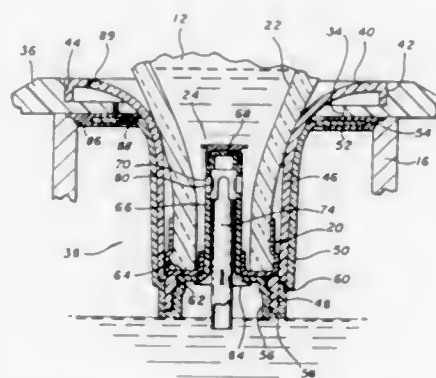
Bruce D. Burrows, Valencia, Calif., assignor to Ebtch, Inc., Columbus, Ohio

Filed Oct. 7, 1991, Ser. No. 773,024

Int. Cl.<sup>6</sup> B65B 1/04, 3/04

U.S. Cl. 141—18

17 Claims



1. A bottle cap and valve assembly for a bottled water station, comprising:  
 a bottle cap for mounting onto a water bottle, said bottle cap including a valve member;

a vented water reservoir; and  
 a receiver assembly on said reservoir and including means for receiving and supporting a water bottle in an inverted orientation with said bottle cap thereon;  
 said receiver assembly including an actuator probe for engaging said bottle cap to displace said valve member to an open position when the bottle with said cap thereon is received by said receiver assembly;  
 said actuator probe defining a first flow path for water flow passage from the bottle to said reservoir, and a second flow path for substantially simultaneous air flow passage from said reservoir into the bottle;  
 said second flow path having a lowermost end disposed within an upper region of said reservoir in a position to be covered and closed by water within said reservoir when the reservoir water level rises to a substantially filled condition, and to be uncovered and exposed when the reservoir water level falls below the substantially filled condition, whereby air flow passage from said reservoir and through said second flow path into the bottle is interrupted by the water within said reservoir when the reservoir water level rises to the substantially filled condition to correspondingly halt downward flow of water from the bottle and through said first flow path to said reservoir, and further whereby air flow passage from said reservoir and through said second flow path into the bottle is resumed when the reservoir water level falls below the substantially filled condition to correspondingly permit resumed downward water flow from the bottle and through said first flow path to said reservoir.

5,413,153

**CONTAINER FILLING MACHINE FOR FILLING OPEN-TOP CONTAINERS, AND A FILLER VALVE THEREFOR**

Heinz-Michael Zwilling, Hamm; Siegmund Sindermann, Kamen, and Axel Thelne, Wöllstein, all of Germany, assignors to KHS Maschinen- und Anlagenbau AG, Dortmund, Germany

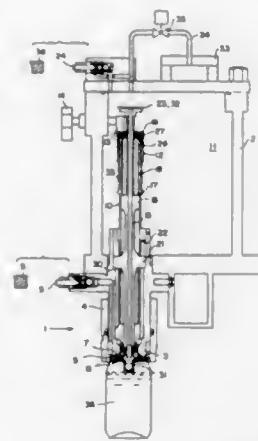
Filed Feb. 7, 1994, Ser. No. 192,688

Claims priority, application Germany, Feb. 6, 1993, 43 03 524.8

Int. Cl.<sup>6</sup> B67C 3/26; B65B 55/10

U.S. Cl. 141—39

18 Claims



10. A filling valve for a container filling machine for filling liquid into containers, the containers having an interior space, the container filling machine comprising a reservoir to contain liquid therein with a gas headspace above the liquid, means for supporting containers to be filled relative to the reservoir, and means for providing a gas to purge a container to be filled, said filling valve comprising:  
 fill conduit means configured for interconnecting the reservoir with a container to be filled;

a valve body for opening and closing said conduit means to respectively permit and stop liquid flow into a container;  
 said valve body comprising a gas exchange tube for conducting gas into and out of a container;  
 said gas exchange tube having a first end disposed adjacent a container to be filled, and a second end disposed within the reservoir;  
 said gas exchange tube being configured to be movable relative to, and independently of said valve body, between a first position and a second position;  
 said gas exchange tube in said first position comprising said second end thereof in communication with said means for providing a purging gas to purge the container to be filled; and  
 said gas exchange tube in said second position comprising said second end in communication with the gas headspace for venting gas out of a container being filled into the headspace of the reservoir during liquid flow into the container being filled.

5,413,154

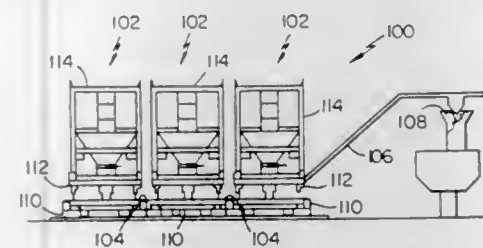
**PROGRAMMABLE MODULAR SYSTEM PROVIDING CONTROLLED FLOWS OF GRANULAR MATERIALS**  
 Billy J. Hurst, Jr., Mandeville, La., and Kenneth M. Waters, Jr., Carriere, Miss., assignors to Bulk Tank, Inc., Covington, La.

Filed Oct. 14, 1993, Ser. No. 135,643

Int. Cl.<sup>6</sup> B28C 7/04

U.S. Cl. 141—83

26 Claims



1. A system for delivering a controlled flow of a granular material, comprising:  
 container means, having an inlet opening and an outlet opening, for containing a quantity of the granular material;  
 sealing support means located beneath said container means for sealing to and supporting said container means and granular material contained therein;  
 weighing means cooperating with said sealing support means only for continually weighing a total weight of said support means with said container means and contents thereof being supported thereon;  
 material delivery means, cooperating with the container means, the support means and the weighing means, for delivering a predetermined weight of said granular material from said container means to a selected delivery location; and  
 programmable control means for receiving, storing and processing data and instructions from a user relating to said predetermined weight and for controlling said flow of the granular material from the container means to said selected delivery location, whereby the container means is supported solely by resting on the sealing support means.

5,413,155

**AGRICULTURAL FEED BAGGER**

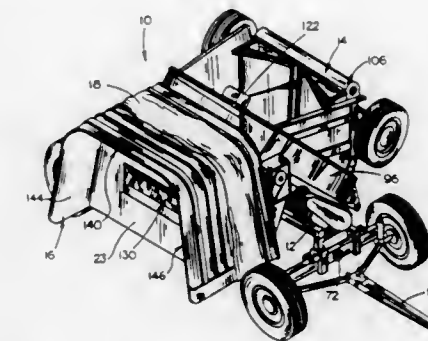
Kelly P. Ryan, P.O. Box 488, Blair, Nebr. 68008

Continuation of Ser. No. 993,963, Dec. 17, 1992, abandoned, which is a continuation of Ser. No. 861,316, Mar. 31, 1992, abandoned, which is a continuation-in-part of Ser. No. 202,107, Jun. 3, 1988, abandoned, which is a continuation-in-part of Ser. No. 155,108, Feb. 11, 1988, abandoned. This application Oct. 6, 1993, Ser. No. 132,483

Int. Cl.<sup>6</sup> B65B 1/00

U.S. Cl. 141—114

4 Claims



1. An improved agricultural feed stock loading apparatus, comprising:  
 a feed tunnel having forward and rearward ends, said tunnel further having at least a top wall extending between opposite side walls defining a bag opening having a bottom portion extending between the opposite side walls, whereby an expandable agricultural bag with an open end may be secured to said tunnel with the bag open end substantially coinciding with said defined bag opening;  
 a hopper disposed adjacent the tunnel forward end and communicating with said tunnel through a transversely elongated rectangular feed opening oriented substantially vertically in a wall defining the forward end of the tunnel at a level that is approximately midway between the top wall and bottom portion of said tunnel, said forward end defining walls extending from said feed opening to said top wall, said bottom portion, and said opposite side walls;  
 a rotor element for propelling feed stock from said hopper into said tunnel and a secured bag, the rotor element consisting essentially of a single rotor rotatable about a horizontal axis at a height that is approximately midway between the top wall and bottom portion of said tunnel; and  
 means for rotating said rotor about said horizontal axis.

5,413,156

**PROCESS AND APPARATUS FOR FILLING INSULATING GLASS PANES WITH A GAS OTHER THAN AIR**

Peter Lisec, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria

Filed Nov. 4, 1993, Ser. No. 145,504

Claims priority, application Austria, Dec. 18, 1992, 2519/92; Germany, Feb. 25, 1993, 9302744 U

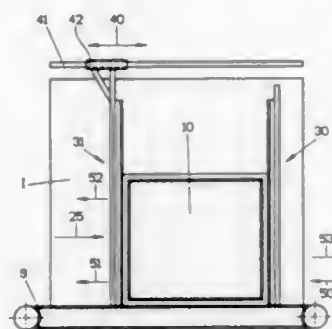
Int. Cl.<sup>6</sup> B65B 43/42; B67C 3/00

U.S. Cl. 141—165

36 Claims

1. Apparatus for filling insulating glass pane (10) with filler gas, the pane (10) comprising two glass sheets with a sealing spacer therebetween, comprising two upright parallel plates (1, 2) arranged on both sides of the insulating glass pane (10) to be filled, at least one (2) of said plates being displaceable toward and away from the other plate (1) respectively to press-bond the glass sheets to the spacer and to release the press-bonded pane, conveying means (9) for sealingly contacting lower edges of an insulating glass pane, first and second sealing de-

vices (30, 31) adapted to contact with opposite upright edges of the insulating glass pane (10), one of the sealing devices (30, 31)



having a connection (50) for the feeding of filler gas into the interior of the insulating glass pane (10).

5,413,157

### BAG FILLING APPARATUS HAVING DUST-TIGHT SPOUT

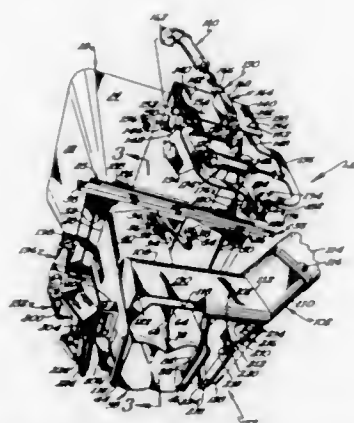
Harold R. McGregor, 645 Riverwood Dr., Owatonna, Minn. 55060

Division of Ser. No. 919,934, Jul. 27, 1992, Pat. No. 5,349,996. This application Jan. 10, 1994, Ser. No. 179,248

Int. Cl.<sup>6</sup> B65D 1/04

U.S. Cl. 141—314

4 Claims



1. In a bag filling machine for filling a product into a bag having an interior region and a generally open top and a top edge, said bag filling machine being of a type having a hopper, a spout suspended beneath said hopper onto which said bag is mounted, and a bag gripping assembly for maintaining said bag on said spout, said bag gripping assembly having a pair of bag gripping arms including a pair of bag gripping members for gripping said top edge of said bag, at least one of said pair of bag gripping arms being mounted for pivotal movement on a support member between an extended position and a retracted position such that said pair of bag gripping members move outwardly to an extended position and inwardly to a retracted position to grip said top edge of said bag, the improvement comprising:

at least one stop mounted on a pin, said at least one stop being connected to the support member said pin being slidably and engagingly mounted within a slot in said support plate for movement relative to the slot such that the at least one stop is positioned in a selectively adjusted predetermined position in the slot, and such that at least one of the pair of bag gripping arms contacts said at least one stop when said at least one of the pair of bag gripping arms moves to the extended position; whereby the contact between the at least one of the pair of bag gripping arms and the at least one stop controls and limits a maximum extent of the movement of the at least

one of the pair of bag gripping arms toward the extended position.

5,413,158

### RADIAL ARM SAW MORTISING ADAPTER

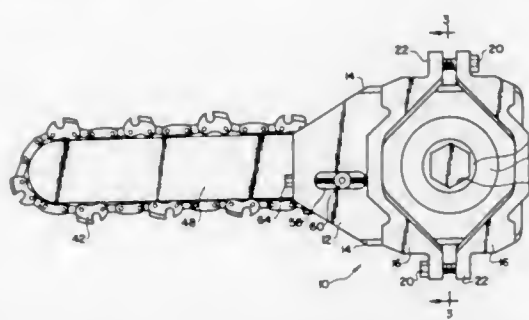
John Wirth, Jr., Dubois; Norris Shippen, and Jay L. Sanger, both of Casper, Wyo., assignors to Woodworker's Supply, Inc., Casper, Wyo.

Filed Apr. 21, 1994, Ser. No. 230,831

Int. Cl.<sup>6</sup> B27F 5/00

U.S. Cl. 144—72

19 Claims



1. A device for operatively coupling a chain saw blade to a power tool so that a chain saw on the blade is driven by a motor of the power tool, said device comprising:

a base plate, said base plate including a flanged raceway which runs generally parallel to a longitudinal axis of the base plate;

a drive spindle rotatably mounted to the base plate for rotation about a fixed axis generally perpendicular to a side face of the base plate, the drive spindle including a mechanism for directly and detachably coupling the drive spindle to an arbor of the power tool so that the power tool rotatably drives the drive spindle;

a clamp mechanism for detachably securing the base plate to a component of the power tool, said clamp mechanism comprising a clamp bracket assembly for providing a clamping force on the component of the power tool, said clamp bracket assembly comprising two clamp brackets and permitting centering of said drive spindle on said arbor, at least one of the clamp brackets including a flanged portion for slideably engaging the flanged raceway of the base plate;

a mechanism for adjustably and detachably mounting a chain saw blade and chain saw to the base plate such that 1) the chain saw engages and is driven by the drive spindle to move in a plane generally parallel to the side face of the base plate, 2) the chain saw blade is mounted such that a longitudinal axis of the chain saw blade intersects the axis of rotation of the drive spindle and is generally parallel to the longitudinal axis of the base plate and 3) the chain saw blade can be selectively adjusted in a direction generally parallel to the longitudinal axis of the chain saw blade to remove slack and vary tension on the chain saw engaged between the chain saw blade and the drive spindle.

5,413,159

### SELF-REGULATING TIRE PRESSURE SYSTEM AND METHOD

Ross D. Olney, West Hills, and John W. Reeds, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 793,762, Nov. 18, 1991, Pat. No. 5,293,919.

This application Nov. 9, 1993, Ser. No. 149,269

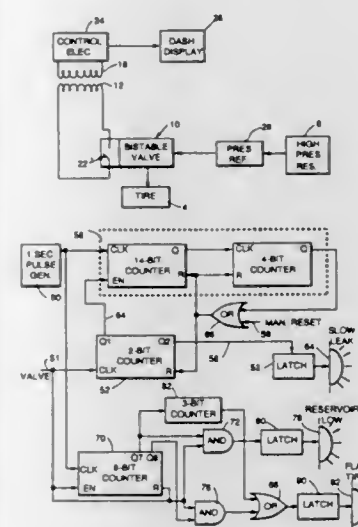
Int. Cl.<sup>6</sup> B60C 23/16, 23/04

U.S. Cl. 152—418

14 Claims

1. A self-regulating tire pressure system, comprising:

a wheel for seating a tire, said wheel including a reservoir for providing a high pressure air source, a valve for establishing an air flow communication between said reservoir and a tire seated on said wheel in response to a low air pressure condition in the tire that is caused by either a slow leak or a fast leak,



sensing means responsive to operations of said valve for generating a signal indicative of low pressure condition, and

indicator means responsive to said signal for generating mutually distinct indications of a slow leak or a fast leak.

5,413,160

### SELF-SUPPORTING TIRE FOR MOTOR-VEHICLE WHEELS INCORPORATING ELASTIC SUPPORT INSERTS IN THE SIDEWALLS

Ghillardi Giuliano, Milan, Italy, assignor to Pirelli Coordinamento Pneumatici S.p.A., Milan, Italy

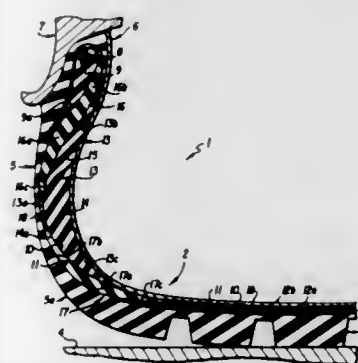
Filed Nov. 16, 1992, Ser. No. 975,327

Claims priority, application Italy, Nov. 15, 1991, MI9-1A03045; Jul. 31, 1992, MI92A01886

Int. Cl.<sup>6</sup> B60C 17/04, 17/06

U.S. Cl. 152—458

9 Claims



1. A self-supporting tire for motor vehicle wheels, incorporating elastic support inserts in sidewalls thereof, comprising a carcass, a tread band disposed on a radially outer surface of said carcass, a circumferentially-inextensible annular belt structure, positioned on said carcass and radially inward of said tread band, said carcass further including:

a pair of circumferentially inextensible bead cores, each positioned within a bead defined along an inner circumferential edge of the tire;

a pair of elastomeric fillers each of which extends along an

outer circumferential edge of one of the bead cores and tapers radially outwardly from its respective bead core; at least one carcass ply having radially inner edges each folded back around a respective one of said bead cores and a respective one of said elastomeric fillers;

at least one pair of annular elastic support inserts of lenticular cross-sectional form, made of elastomeric material, each of which is secured to an axially inner surface of one of the tire sidewalls and extends in a radial direction between one of the beads and a corresponding side edge of the belt structure, each of said annular elastic support inserts comprising:

(i) a counter core of substantially lenticular cross-sectional form defining the radially outer end portion of the annular elastic support insert, positioned partly in an area of maximum thickness of said annular elastic support insert, said counter core substantially extending from the maximum width region of said tire to the corresponding side edge of said belt structure and having an axially outwardly facing abutment side of convex profile facing the radially innermost ply of said at least one carcass ply and partly in contact therewith;

(ii) an elastically deformable cover defining the inner end portion of the annular elastic support insert, contacting the counter core at least partly on said convex abutment side thereof, said cover extending between the corresponding bead and at most the maximum width region of said tire, said cover having a dynamic modulus which is lower than that of said counter core.

5,413,161

### SOLAR POWERED WINDOW SHADE

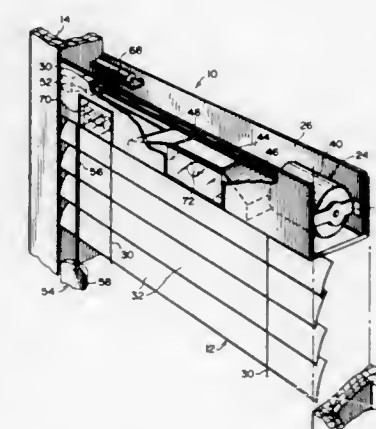
Warren Corazzini, 1375 McCann La., Greenport, N.Y. 11944

Filed Sep. 9, 1993, Ser. No. 118,517

Int. Cl.<sup>6</sup> E05F 15/20

U.S. Cl. 160—7

4 Claims



1. A solar powered window shade which comprises:

a) a head channel affixed horizontally to an underside of a head jamb of the frame of a window in a wall of a building, a venetian blind having slats mounted within an interior of said frame below said head channel

b) means comprising a solar panel mounted on said head channel facing the window to receive the solar radiation and a plurality of interconnected solar cells within said solar panel, each solar panel converting the solar radiation into electrical energy;

c) means comprising a reversible electric motor mounted within said head channel and electrically connected to said solar cells within said solar panel, so as to be operated by the electrical energy for opening and closing said slats in said venetian blind, so that at sunrise and all through the day, said venetian blind will remain opened to allow sunlight to enter through the window to held heat up the building and at sunset and all through the night said vene-



tian blind will remain closed, to produce a thermal barrier to held retain the heat within the building;

d) control unit means electrically connected to said motor, so that said motor can be operated both manually and automatically, said control unit means comprising an elongate electrical cord suspended to hang down from said head channel, a housing on the bottom end of said electrical cord, said housing containing first switch means which upon being manually pressed will cause said motor to rotate in the direction of opening said slats, second switch means which when manually pressed will cause said motor to rotate in the direction of closing said slats, automatic timed set switch means when activated will cause said motor to rotate in the directions of open and close said slats at predetermined time intervals, and a clock for setting said automatic timed set switch means; and

e) battery means carried in said head channel electrically connected to said motor as a back up to supply electrical energy when there is insufficient sunlight.

5,413,162

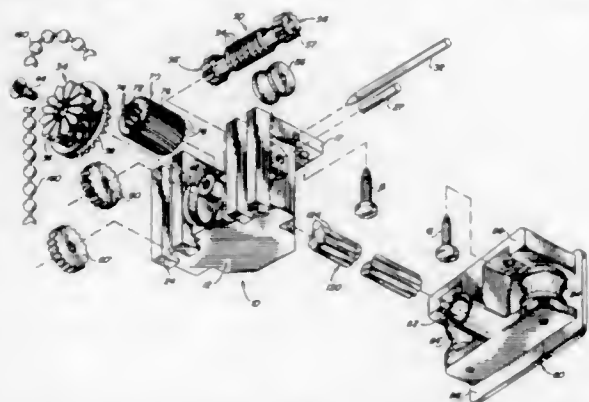
**CONTROL UNIT FOR VERTICAL BLIND ASSEMBLY**  
Piergiorgio Ciriaci, Hollywood, Fla., assignor to Micro Molds Corp., Hialeah, Fla.

Filed Aug. 16, 1993, Ser. No. 106,708

Int. Cl.<sup>6</sup> E06B 9/38

U.S. Cl. 160—177

15 Claims



1. For use in combination with a vertical blind assembly of the type including a horizontally disposed track assembly with an elongate pinion rod rotatably mounted therein and extending along a length thereof, a control unit structured and disposed for rotating said pinion rod;

said control unit comprising:

a control housing structured for mounting on said track assembly and including means to rotatably secure a first end of said pinion rod;

an end housing structured for mounting on said track assembly and including means to rotatably secure a second opposite end of said pinion rod, said control housing and end housing structured and disposed for support and rotatable interconnection of said pinion rod within said track assembly;

a drive gear assembly within said control housing structured for controlled, driven rotation of said pinion rod, said drive gear assembly comprising:

a sprocket gear movably driven by a pull chain selectively in either of two opposite directions and having opposite gear faces including an outer gear face adapted for driven engagement with said pull chain and an opposite inner gear face;

a worm gear rotatably mounted within said control housing and including a spiral gear ridge about an outer surface thereof;

a helical gear fixedly attached to said first end of said pinion rod and rotatable therewith, said helical gear being drivingly intermeshed with said worm gear and structured and disposed to be driven by said worm gear,

said helical gear including a plurality of elongate gear teeth extending in substantially parallel relation to one another and structured for intermeshing driven engagement within a groove defined between said spiral gear ridge of said worm gear such that rotation of said worm gear by forced rotation of said helical gear is prevented, and

intermediate gear means drivingly engaged between said worm gear and said inner gear face of said sprocket gear such that driven rotation of said sprocket gear by said pull chain serves to rotate said worm gear, said helical gear and the attached pinion rod.

5,413,163

Patent Not Issued For This Number

5,413,164

**HEATING FURNACE IN COMBINATION WITH ELECTRONIC CIRCUIT MODULES**

Yasuhiro Teshima, Oyama; Mamoru Nishiro, Yuki, and Michinori Matsubayashi, Utsunomiya, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

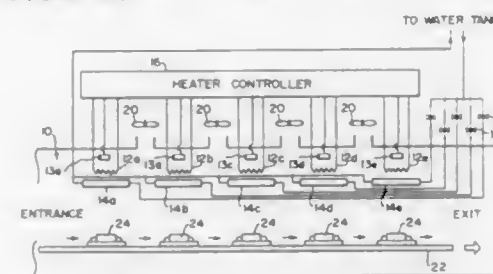
Filed Aug. 29, 1991, Ser. No. 751,944

Claims priority, application Japan, Aug. 30, 1990, 2-229355

Int. Cl.<sup>6</sup> F25B 29/00; B23K 37/04, 31/02; F27B 9/24

U.S. Cl. 165—11.1

3 Claims



1. A heating furnace in combination with a plurality of circuit devices, all of said plurality of circuit devices requiring heat treatments of different temperatures, said furnace for use in the fabrication of electronic circuit modules each having said plurality of circuit devices mounted on a substrate, said circuit devices requiring a heat treatment of a first temperature within a portion of said furnace and requiring a heat treatment of a second temperature within another portion of said furnace, said furnace comprising:

a plurality of heater means, spaced apart from each other, for providing a plurality of heating zones necessary to fabricate, in said furnace, said electronic circuit modules each having said plurality of circuit devices mounted on said substrate, wherein said heating zones include a first heating zone for heat treating the circuit devices and a second heating zone for heat treating the circuit devices;

a heater controller means for controlling the respective heater means independently of each other;

a plurality of cooling means, provided in said heating zones of the respective heater means, for cooling respective heating zones;

a plurality of exhaust fans for discharging exhaust air from the furnace;

a transfer means for transferring a substrate with the circuit devices mounted thereon through said heating zones of the respective heater means;

a temperature profile memory means for storing predetermined furnace temperature profiles for various types of substrates;

an ID code reading means for reading in an ID code on the substrate to be treated in the furnace;

a controller means, operably connected to each of the heater means, cooling means and exhaust fans, for selecting a temperature profile for the substrate type corresponding to the ID code read in by the ID reading means and for

independently controlling the heater means, cooling means and exhaust fans to establish the selected temperature profile in said furnace; and

a plurality of temperature sensors for detecting the furnace temperatures in said heating zones of the respective heater means.

5,413,165

**TEMPERATURE CONTROL SYSTEM FOR MULTI-STORY BUILDING**

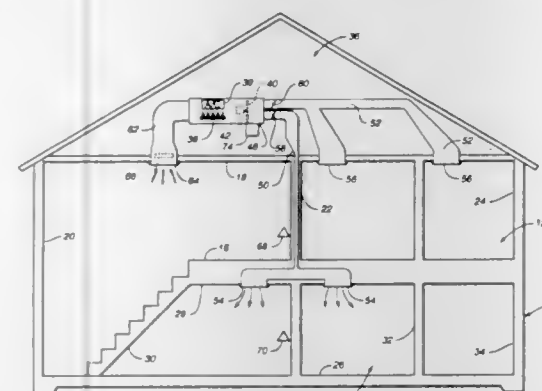
Calvin R. Wylie, Fair Oaks, Calif., assignor to Beutler Heating and Air Conditioning, Inc., Sacramento, Calif.

Filed Oct. 4, 1993, Ser. No. 130,883

Int. Cl.<sup>6</sup> F24F 13/04

U.S. Cl. 165—22

9 Claims



7. Apparatus for use in a building having upper and lower levels, each level including a floor, a ceiling, and walls between the floor and ceiling defining an interior, said apparatus adapted to modify the temperature of said interiors and comprising in combination:

air delivery means;

heat generating means;

first duct means providing air flow communication between said air delivery means and said upper and lower levels;

second duct means providing air flow communication between said upper level interior and said air delivery means;

first thermostat means at said lower level interior;

second thermostat means at said upper level interior; and

control means operatively associated with said air delivery means and said heat generating means for activating said heat generating means and said air delivery means to deliver heated air from said heat generating means to said lower level interior through said first duct means for a first period of time not exceeding a predetermined duration in response to the first thermostat means and for deactivating said heat generating means and delivering heated air from said upper level interior to said lower level interior through said second duct means after deactivation of said heat generating means.

5,413,166

**THERMOELECTRIC POWER MODULE**

James M. Kerner, 779 Hillgrove Ct., Chico, Calif. 95926; Patrick A. McCauley, 24660 Tehema-Vina Rd. #1, Los Molinos, Calif. 96055; Larry E. McCulloch, 16 Glenshire Ln., Chico, Calif. 95926, and Michael R. Tanner, 2114 Durham-Dayton Hwy., Durham, Calif. 95938

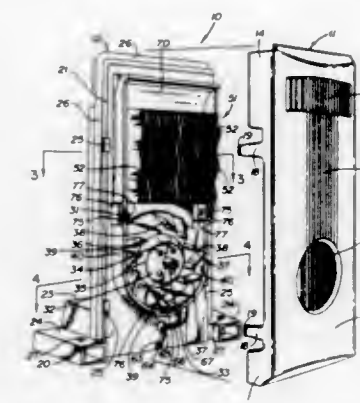
Filed May 7, 1993, Ser. No. 60,205

Int. Cl.<sup>6</sup> F25B 29/00

U.S. Cl. 165—30

43 Claims

1. Apparatus for selectively heating or cooling the inside of a container comprising a first heat exchanger having spaced and generally parallel undulating fins, a first fan adjacent to said first heat exchanger and adapted to move air from the outside of the container through the spaces between said fins of



said fins of said second heat exchanger, and power means between said first and second heat exchangers to selectively heat one of said first and second heat exchangers while cooling the other of said first and second heat exchangers.

5,413,167

**WAFER COOLING DEVICE**

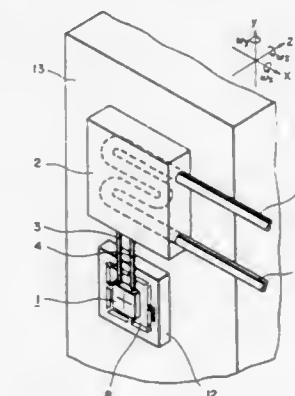
Shinichi Hara, Yokohama, and Ryuichi Ebinuma, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 733,838, Jul. 22, 1991, abandoned. This application Apr. 28, 1994, Ser. No. 235,146

Claims priority, application Japan, Jul. 30, 1990, 2-199103

Int. Cl.<sup>6</sup> F28F 5/00

U.S. Cl. 165—86

5 Claims



1. A wafer cooling device for use in an exposure apparatus, said device comprising:

a wafer chuck for chucking a wafer;

a fine-motion stage on which said wafer chuck is mounted;

a heat exchanger having an internal structure for circulation of cooling water therethrough, wherein said heat exchanger is mounted at a location other than on said fine-motion stage;

a rough-motion stage on which said fine-motion stage and said heat exchanger are separately mounted, wherein said rough-motion stage has a higher rigidity than that of said fine-motion stage; and

a flexible heat pipe system for providing heat communication between said wafer chuck and said heat exchanger.

5,413,168

## CLEANING METHOD FOR HEAT EXCHANGERS

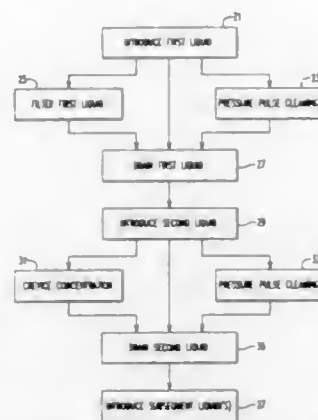
Allen J. Baum, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 13, 1993, Ser. No. 105,571

Int. Cl.<sup>6</sup> F28G 9/00; B08B 9/02; F22B 37/48

U.S. Cl. 165—95

19 Claims



1. A method for cleaning the interior of a vessel having interior surfaces and crevice regions therein, comprising the steps of:

- introducing a first liquid containing a cleaning agent into said vessel, said first liquid being operative to remove substantially all of the sludge and deposits accumulated on said interior surfaces;
- removing said first liquid from said vessel;
- introducing a second liquid containing a cleaning agent into said vessel, wherein essentially all of the cleaning agent in said second liquid is available for cleaning of deposits in said crevice regions; and
- removing said second liquid from said vessel.

5,413,169

## AUTOMOTIVE EVAPORATOR MANIFOLD

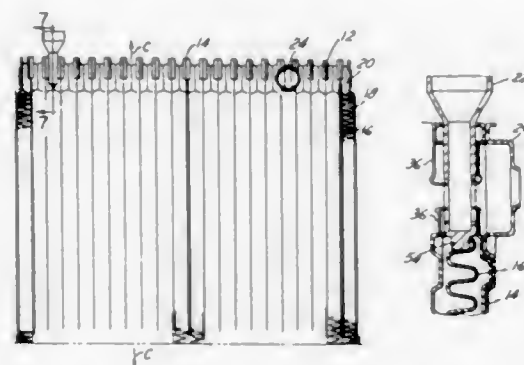
Kathleen L. Frazier, Farmington Hills, Mich.; Kevin B. Wise, Connersville, Ind., and Michael A. Breda, Livonia, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 17, 1993, Ser. No. 168,307

Int. Cl.<sup>6</sup> F28D 1/03

U.S. Cl. 165—153

11 Claims



1. A heat exchanger for an automotive vehicle, comprising:
- a plurality of flat pipes arranged parallel to and in fluid communication with one another for allowing the flow of a heat exchange fluid therethrough, each of said flat pipes comprising a pair of generally planar plates joined together in abutting face-to-face relationship, each plate including an end portion having a cup member with an aperture therein and wherein said cup members are configured to be joined together to form a tank having a longitudinal axis generally perpendicular to the longitudi-

nal axis of said plates, said tank allowing fluid to flow therethrough;

- a plurality of fin members interleaved between the plurality of flat pipes;
- a pair of endsheet members attached to the outermost ones of said flat pipes;
- a pair of fluid manifolds for the inlet and outlet of heat exchange fluid to and from said heat exchanger, respectively, each of said manifolds comprising a unitary member having a fluid opening end, a closed end and at least one aperture through which fluid flows into said tank, said pair of manifolds being configured to engage said tank such that the fluid opening end can be arranged generally parallel to either of the two axes perpendicular to the longitudinal axis of said tank;
- and wherein said flat pipes, said fin members, said endsheet members and said pair of manifolds are brazed together to form an integral body.

5,413,170

## SPOOLABLE COILED TUBING COMPLETION SYSTEM

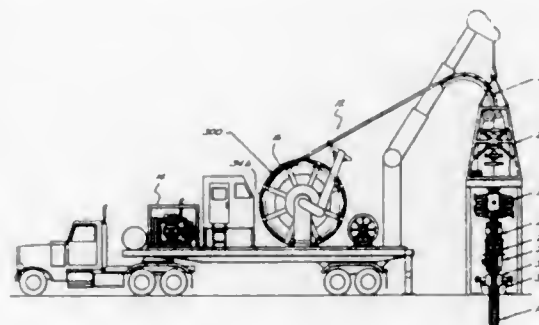
Brian K. Moore, Humble, Tex., assignor to Camco International Inc., Houston, Tex.

Division of Ser. No. 146,344, Nov. 1, 1993. This application Sep. 9, 1994, Ser. No. 278,285

Int. Cl.<sup>6</sup> E21B 19/22, 31/20

U.S. Cl. 166—85

7 Claims



1. A retrieval system for retrieving a coiled tubing system having a continuously sized outside diameter from a well comprising,

- a coiled tubing hanger supporting and sealing the outside of the upper end of the coiled tubing,
- a wellhead, and blowout preventer and injector head successive positioned above the coiled tubing hanger,
- a second coiled tubing positioned on a reel and having a first end having a longitudinally actuated internal gripping connector attached thereto for insertion through the injector, blowout preventer, and wellhead and into the upper end of the first coiled tubing for gripping and removal from the well.

5,413,171

## LATCHING AND SEALING ASSEMBLY

Robert E. Womack, Humble, Tex., assignor to Downhole Systems, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 877,312, May 1, 1992,

abandoned. This application Dec. 9, 1993, Ser. No. 164,158

Int. Cl.<sup>6</sup> E21B 31/18

U.S. Cl. 166—98

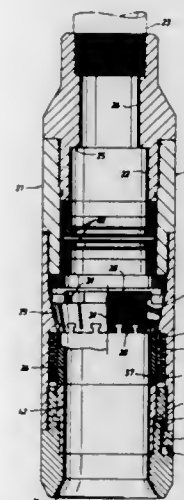
22 Claims

1. An assembly for latching over and sealing about a tubular member having an enlarged diameter upper end, comprising
- a housing having a bore therein to receive the upper end of the member as it is lowered thereover and a recess thereabout having a downwardly and inwardly extending conical surface,

latch means mounted in the recess for sliding along the

conical surface between an upper expanded position to pass the upper end of the member and a lower contracted position to fit closely about the member beneath said upper end,

said latch means being normally disposed in its lower position in which it may be engaged and raised into its upper position by the upper end of the member, as the housing is lowered over the member, whereby said upper end is free to move upwardly through the latch means and then



- permit the latch means to return to its lower position beneath said upper end,
- means mounted within the recess of the housing above the latch means for sealing between the recess and the member beneath its upper end when it has moved upwardly through the latch means, and
- means for raising the latch means from its lower to its upper position in response to the supply of pressure fluid thereto from a source external to the housing.

5,413,172

## SUB-SURFACE RELEASE PLUG ASSEMBLY WITH NON-METALLIC COMPONENTS

David F. Laurel, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 976,110, Nov. 16, 1992. This

application Nov. 24, 1993, Ser. No. 158,593

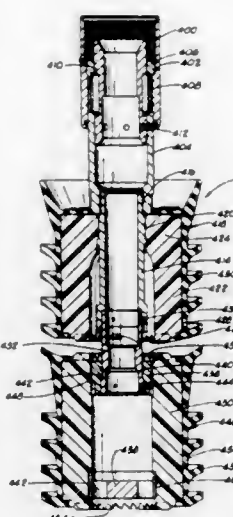
Int. Cl.<sup>6</sup> E21B 33/16

U.S. Cl. 166—153

10 Claims

1. A sub-surface release plug apparatus comprising:
- an upper plug releasably attachable to a drill string positionable in a well casing, said plug comprising a body made of a non-metallic material having a compressive strength of at least about 35,000 psi;
  - a lower plug releasably connected to said upper plug and comprising a body made of said non-metallic material;
  - a collet interconnecting said upper plug with said drill string;
  - a releasing sleeve slidably disposed with respect to said collet and adapted for holding said collet in engagement with said drill string when in a first position and adapted for releasing said collet when in a second position; and

a releasing plug adapted for engaging said releasing sleeve and moving said releasing sleeve from said first position to



said second position in response to a differential pressure across said releasing plug.

5,413,173

## WELL APPARATUS INCLUDING A TOOL FOR USE IN SHIFTING A SLEEVE WITHIN A WELL CONDUIT

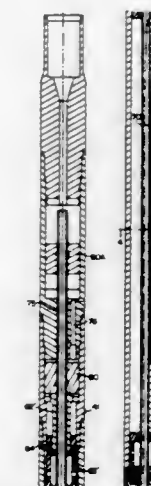
Aubrey C. Mills; Billy R. Newman, both of Houston; John A. Barton, Arlington, and Neil H. Akkerman, Houston, all of Tex., assignors to AVA International Corporation, Houston, Tex.

Filed Dec. 8, 1993, Ser. No. 163,824

Int. Cl.<sup>6</sup> E21B 23/04

U.S. Cl. 166—212

15 Claims



1. A tool for use in shifting a sleeve between upper and lower positions within a well conduit, wherein the sleeve has a groove about its inner surface having oppositely facing ends, said tool comprising:

- a tubular body adapted for connection to a pipe string for lowering into the well conduit and having windows spaced about its circumference,
- a beam received in each window for guided radial movement with respect to the body and having inner and outer sides and opposite ends with a dog on its outer sides intermediate its ends,
- a sleeve extending longitudinally within the body to form annular spaces between them at the ends of the win-



dows and in which the ends of the beams are received, each beam having an inner end facing the end of the other beam and an outer end,

a piston longitudinally slidable within each annular space, means for admitting fluid within the body to the outer end of each piston, so that, when its pressure is raised to a predetermined level, the inner ends of the pistons are urged against the outer ends of the beams to force the beam to bend outwardly away from the sleeve to a position in which, upon movement of the body with the pipe string vertically within the well conduit, the dog will be forced into the groove in the sleeve when the dog is opposite the groove,

said dog having a shoulder which faces one end of the groove, when disposed therein, to permit the sleeve to be shifted from one position to another upon vertical movement of the tool body with the pipe string, and

a bow spring retained on the inner sides of the beams and arranged to retract the beams and thereby remove the dogs from the groove, following shifting of the sleeve and a predetermined reduction in such pressure, whereby the tool may be moved vertically within the well conduit.

5,413,174

# **SIGNAL TRANSMISSION THROUGH DEFLECTED WELL TUBING**

Joseph H. Schmidt, Anchorage, Ak., assignor to Atlantic Richfield Company, Plano, Tex.

Filed May 18, 1994, Ser. No. 245,283  
Int. Cl.<sup>6</sup> E21B 47/00; G01V 3/26

U.S. Cl. 166—250

8 Claims



1. A method for transmitting signals with respect to an earth formation having a well penetrating said formation, comprising the steps of:

placing a signal transmitting device within a tubing string extending within said well;

deflecting said tubing string into firm engagement with a wellbore wall of said well; and

transmitting signals between said device and said earth formation through a wall of said tubing string.

5,413,175

# **STABILIZATION AND CONTROL OF HOT TWO PHASE FLOW IN A WELL**

Neil Edmunds, Calgary, Canada, assignor to Alberta Oil Sands Technology and Research Authority, Edmonton, Canada

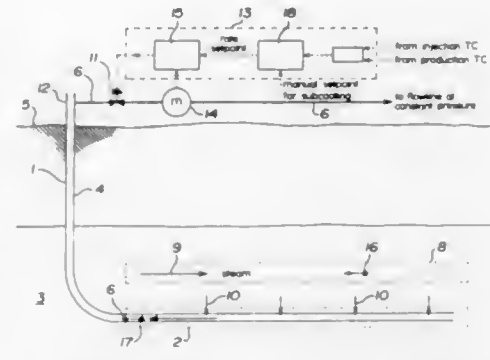
Filed Apr. 13, 1994, Ser. No. 227,116

Claims priority, application Canada, May 26, 1993, 2096999

Int. Cl.<sup>6</sup> E21B 43/24, 43/12, 47/06

U.S. Cl. 166—252

3 Claims



1. A method for stabilizing and controlling the upwards flow of hot fluid containing water in an upwardly rising conduit, to prevent unstable cyclic generation and collapse of two-phase flow, said conduit having a top fluid discharge, and said fluid entering the bottom of the conduit at a temperature greater than the saturation temperature of water at the conditions present at the top of the conduit, the method comprising:

providing a fluid production choke means located at the top of the conduit for adjusting the mass flow rate of the hot fluid issuing therefrom;

providing a mass flow detection means downstream of the production choke means to repetitively produce signals indicative of the mass flow rate of hot fluid flowing there-through;

providing a first mass rate control means for receiving the mass flow detecting means signals and producing an output signal for adjusting the production choke means, thereby controlling the mass rate of fluid therethrough;

providing measurement means for repetitively producing process signals related to optimal production of the fluid;

providing a second controlling means for receiving the process signals and being cascaded to the first controlling means for modifying the output of the first controlling means when process signals indicate that the mass rate requires adjustment to achieve optimal production of fluid;

producing the hot fluid at a substantially constant mass rate over a short time interval using the first mass rate controller and production choke means, whereby two-phase flow is stabilized;

adjusting the mass rate of flow of the hot fluid, responsive to the process signals, over a time interval which is large relative to the short time interval of the first mass rate controller whereby the mass rate of fluid flow may be controlled at an optimal level.

5,413,176

# **SAND SCREEN REPAIR**

Henry L. Restarick, Houston, Tex., assignor to Halliburton Company, Houston, Tex.

Division of Ser. No. 921,922, Jul. 29, 1992, Pat. No. 5,295,538.

This application Jan. 18, 1994, Ser. No. 183,081

Int. Cl.<sup>6</sup> E21B 43/10, 43/12

U.S. Cl. 166—277

8 Claims

1. A method for selectively isolating a sand screen comprising the steps:

suspending the sand screen within the production bore of a circulation sub of the type having a longitudinal production bore and a radial circulation port for selectively admitting formation fluid into the production bore; and,



opening and closing the circulation port for selectively admitting formation fluid into the production bore of the circulation sub and for isolating the sand screen, respectively.

5,413,177

# **METHOD OF DECREASING GAS/OIL RATIO DURING CYCLIC HUFF-N-PUFF PRACTICE**

Robert L. Horton, The Woodlands, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Sep. 22, 1993, Ser. No. 125,368

Int. Cl.<sup>6</sup> E21B 33/138, 43/22

U.S. Cl. 166—294

13 Claims

1. A method of recovering hydrocarbons from an underground reservoir with a cyclic injection/production process which comprises:

injecting a first recovery fluid into the formation through a well, said recovery fluid selected from the group consisting of carbon dioxide, nitrogen, sulfur dioxide, methane, ethane, propane, butane, pentane, and mixtures thereof; ceasing injection of the first fluid and allowing the first fluid to soak in the formation for a period of about 1 to about 30 days;

producing hydrocarbons and other fluids through said well; injecting a second recovery fluid into the formation through said well, said second fluid comprising a cosolvent, a solute and a fluid selected from the group of first recovery fluids, said second fluid composition designed for solute to drop out of solution in the formation;

ceasing injection of the second fluid and allowing the second fluid to soak in the formation for a period of about 1 to about 30 days; and

producing hydrocarbons and other fluids through said well, leaving solute in the formation to reduce permeability.

5,413,178

# **METHOD FOR BREAKING STABILIZED VISCOSIFIED FLUIDS**

Michael L. Walker, and Chris E. Shuchart, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 12, 1994, Ser. No. 226,793

Int. Cl.<sup>6</sup> E21B 43/26

U.S. Cl. 166—300

14 Claims

1. A method of treating a subterranean formation penetrated by a wellbore wherein the static temperature of a zone of the

formation adjacent the wellbore is above about 175° F. comprising:

injecting into the wellbore and into contact with said formation an aqueous fluid comprising (i) an aqueous liquid, (ii) a viscosity increasing amount of a gelling agent comprising at least one member selected from the group consisting of galactomanans, modified or derivatized galactomanans and cellulose derivatives, (iii) a crosslinker for said gelling agent, (iv) a gel stabilizing effective amount of a stabilizer comprising at least one member selected from the group of alkali metal thiosulfates and (v) a breaker comprising at least one member selected from the group of alkali metal chlorites and hypochlorites and calcium hypochlorite present in an amount sufficient to effect a controlled reduction in the viscosity of the aqueous fluid after a period of time within the zone of the formation.

5,413,179

# **SYSTEM AND METHOD FOR MONITORING FRACTURE GROWTH DURING HYDRAULIC FRACTURE TREATMENT**

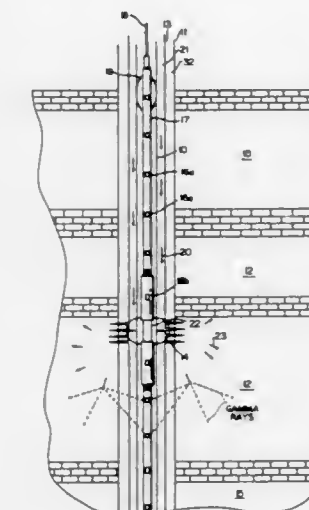
George L. Scott, III, Roswell, N. Mex., assignor to The Energex Company, Roswell, N. Mex.

Continuation-in-part of Ser. No. 48,838, Apr. 16, 1993, Pat. No. 5,322,126. This application Jun. 20, 1994, Ser. No. 262,770

Int. Cl.<sup>6</sup> E21B 43/00

U.S. Cl. 166—308

20 Claims



1. A method for monitoring the hydraulic fracturing of a geologic formation traversed by a well borehole, comprising:

(a) fracturing the formation by pumping a mixture of particles and fluid into the borehole to create hydraulic pressure on the formation at a predetermined depth;

(b) adding radioactivity as the mixture enters the fracturing formation; and

(c) while the mixture is being pumped, detecting spectral emissions from the radioactive mixture with a plurality of detectors vertically spaced in the borehole over a selected depth interval.

5,413,180

## ONE TRIP BACKWASH/SAND CONTROL SYSTEM WITH EXTENDABLE WASHPIPE ISOLATION

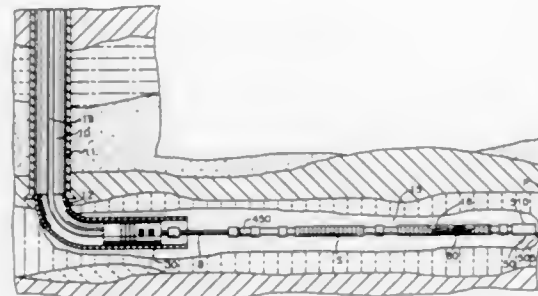
Colby M. Ross, Carrollton; Henry L. Restarick, Plano; Ralph H. Echols, III, Carrollton; Phillip T. Thomas, Lewisville, and Dhirajlal C. Patel, Carrollton, all of Tex., assignors to Halliburton Company, Houston, Tex.

Continuation-in-part of Ser. No. 1,020, Jan. 6, 1993, Pat. No. 5,332,045, which is a continuation of Ser. No. 743,792, Aug. 12, 1991, Pat. No. 5,180,016. This application Jul. 30, 1993, Ser. No. 99,857

Int. Cl.<sup>6</sup> E21B 23/04

U.S. Cl. 166—387

23 Claims



1. Setting apparatus for selectively applying hydraulic pressure to a hydraulically operated well completion apparatus comprising, in combination:

- a tubular mandrel having a flow bore;
- a guide tube received within the flow bore of tubular mandrel, said guide tube having an internal bore which is radially inset with respect to the flow bore, and said guide tube being radially intersected by a setting port;
- an outwardly biased split C-ring having a bore passage therethrough and having an annular seat for engaging a drop ball, said C-ring being disposed for longitudinal movement within the bore of the guide tube;
- a shear sleeve disposed in slidable engagement against the internal bore of the guide tube;
- means coupled to the shear sleeve and to the guide tube for sealing the setting port when the shear sleeve is in a closed port, run-in position; and
- a shearable member coupled to said shear sleeve and guide tube for restricting longitudinal movement of the shear sleeve relative to the guide tube.

5,413,181

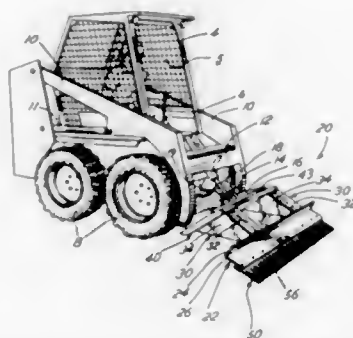
## RAKE ATTACHMENT FOR A SKID STEER

Kevin V. Keigley, 11510 Jefferson Rd., Osceola, Ind. 46561  
Filed Aug. 5, 1993, Ser. No. 102,207

Int. Cl.<sup>6</sup> E02F 3/76

U.S. Cl. 172—253

8 Claims



1. A tool, said tool being adapted for use with a skid steer for working soil, said skid steer including a frame chassis defining an operator compartment, a pair of lift arms, first pivot means pivotally connecting said lift arms to said chassis, a mounting

plate, second pivot means pivotally connecting said mounting plate to said arms, and power means for pivoting said mounting plate about said second pivot means,

said tool comprising a support member, mounting means connecting one end of said support member to said mounting plate, and a tined member connected to the other end of said support member and having teeth for contacting soil, said mounting plate being pivotable into a position disposing said teeth at an acute angle with respect to ground, said acute angle being adjustable by pivoting said mounting plate about said second pivot means, to permit soil to be graded and dragged as the skid steer is moved in both forward and reverse directions.

5,413,182

## IMPROVEMENTS IN FRAME OF WINGED AGRICULTURAL IMPLEMENT

Gaylen Kromminga, Morton; William J. Dietrich, Sr., and Dean Knobloch, both of Congerville, all of Ill., assignors to DMI, Inc., Goodfield, Ill.

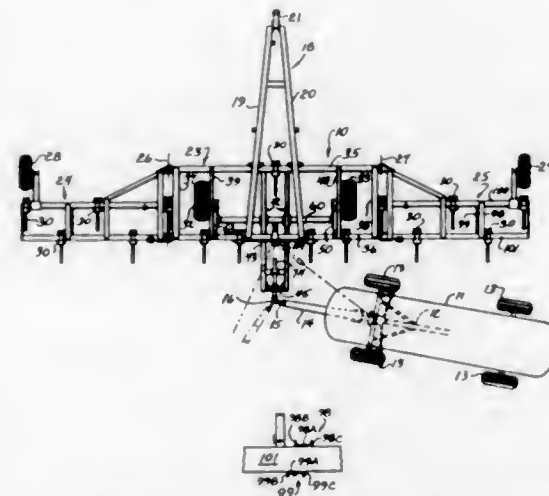
Division of Ser. No. 907,836, Jul. 2, 1992, Pat. No. 5,343,958.

This application Apr. 28, 1994, Ser. No. 234,176

Int. Cl.<sup>6</sup> A01B 15/14, 23/04

U.S. Cl. 172—776

1 Claim



1. In an agricultural implement having a frame including a center frame section and first and second side frame sections pivotally mounted respectively to right and left sides of said center frame section for rotation between use and transport positions, support wheels for supporting said center frame section and side frame sections in use, an improved frame for said side frame sections comprising: first and second elongated transverse frame members located in front and rear positions respectively; and first and second U-shaped channels mounted between said first and second transverse frame members with one U-shaped channel located above and one below said first and second transverse frame members, each channel having a back portion and upstanding side stiffener flanges, said channels partially overlapping but being laterally displaced such that the distance between outermost flanges of said respective U-shaped channels is greater than the width of either of said back portions.

5,413,183

## SPHERICAL REAMING BIT

J. Richard England, 1021 Dublin Street, Sudbury, Ontario, Canada P3A 1R5

Filed May 17, 1993, Ser. No. 62,174

Int. Cl.<sup>6</sup> E21B 10/22

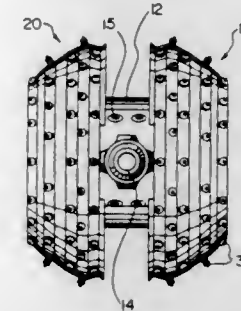
U.S. Cl. 175—53

10 Claims

1. A reamer bit for reaming an opening in an earth forma-

tion, said bit including a stem and at least one shaft for connection with drive means comprising:

- a pair of semi-circular reaming bodies rotatably mounted to said stem, each body of said pair having a plurality of exterior openings for receiving cutting bit means;



cutting bit means for cutting into an earth formation; and holder means for said cutting bit means releasably engageable within said openings.

5,413,184

## METHOD OF AND APPARATUS FOR HORIZONTAL WELL DRILLING

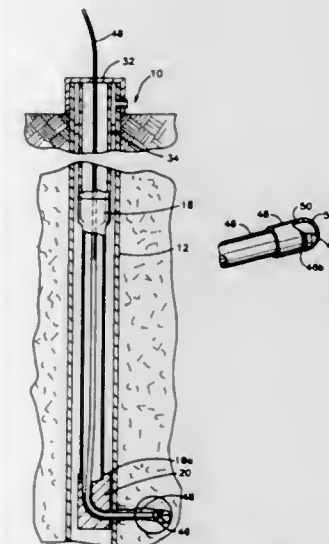
Carl Landers, 141 S. Union St., Madisonville, Ky. 42431

Filed Oct. 1, 1993, Ser. No. 131,526

Int. Cl.<sup>6</sup> E21B 7/08

U.S. Cl. 175—62

9 Claims



1. A method for penetrating a well casing and surrounding earth strata comprising the steps of:

- (a) inserting an upset tubing having an elbow on an end thereof a preselected distance into a well casing;
- (b) inserting a flexible shaft having cutting means on an end thereof into said upset tubing, said cutting means extending through said elbow;
- (c) rotating said flexible shaft and said cutting means cutting a hole in said well casing;
- (d) cutting a channel a preselected length in the earth's strata surrounding said well casing;
- (e) removing said flexible shaft and said cutting means from said upset tubing;
- (f) inserting a flexible tube having a nozzle on an end thereof into the upset tubing and said channel;
- (g) pumping a fluid into the flexible tube and nozzle; and,
- (h) cutting an extension of said channel in said earth's strata.

5,413,185

## SOIL DISPLACEMENT HAMMER WITH MOVABLE HEAD

Allan G. Kayes, Sittingbourne, United Kingdom, assignor to Powermole International Ltd., Churt, England  
PCT No. PCT/GB92/00848, § 371 Date Feb. 14, 1994, § 102(e)  
Date Feb. 14, 1994, PCT Pub. No. WO92/20896, PCT Pub. Date Nov. 26, 1992

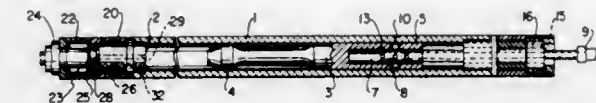
PCT Filed May 12, 1992, Ser. No. 142,281

Claims priority, application United Kingdom, May 13, 1991, 9110294

Int. Cl.<sup>6</sup> F21B 4/14

U.S. Cl. 175—296

3 Claims



1. A pneumatically operated impact-action self-propelled mechanism for driving holes in the earth, comprising a cylindrical housing assembly (1) with an anvil member (2) located at a forward end thereof; a pneumatically-operated impact piston (3) reciprocal in the housing to deliver successive impacts to the anvil member (2) and forming with the housing a forward chamber (6) of variable volume; characterised by a head chamber (22) forward of the anvil member (2), a head piston (23) reciprocal in the head chamber (22) and connected at its forward end to the head (24) of the mechanism, and compressed air supply means (29,30) communicating between the forward chamber (6) and the head chamber (22) to the rear of the head piston (23) so as to cause the head piston to travel forwards.

5,413,186

## REVERSE PERCUSSION DEVICE

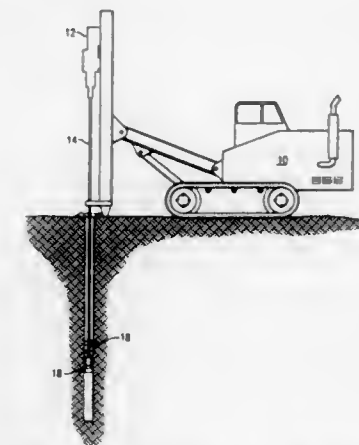
Paul Campbell, Roanoke, Va., assignor to Reedrill, Inc., Denison, Tex.

Filed May 13, 1994, Ser. No. 242,195

Int. Cl.<sup>6</sup> E21B 4/14

U.S. Cl. 175—296

7 Claims



1. A reverse percussive device for use with a hydraulic percussive drill having an elongated shank adapter extending through the drill along a longitudinal axis, the reverse percussive device comprising:

- a housing having first and second chambers along the longitudinal axis of the drill, the first chamber having a pair of opposed facing edges;
- a piston having a bore therethrough for receiving the elongated shank adapter, the piston disposed in the second



chamber of the housing and positioned to reciprocate along the longitudinal axis;  
 a valve positioned to move between first and second control positions and adapted to control movement of the piston within the housing;  
 an anvil disposed within the first chamber of the housing and positioned to move between first and second control positions along the longitudinal axis between the pair of opposed facing edges; and  
 fluid pressure control means cooperating with the valve (a) for maintaining the piston in a stalled position during a first mode of operation corresponding to the anvil being located in the first control position within the first chamber, (b) for cyclically-reciprocating the piston within the second chamber during a second mode of operation corresponding to movement of the anvil from the first control position to the second control position within the first chamber, and (c) for returning the piston back to its stalled position following the second mode of operation corresponding to movement of the anvil from the second control position back to the first control position.

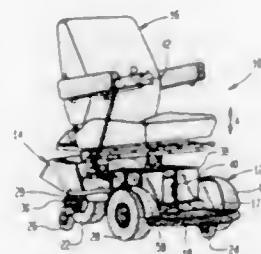
5,413,187

## PERSONAL MOBILITY VEHICLE

Thomas E. Kruse, and John C. Traxler, both of Sarasota, Fla., assignors to Sunstate Mobility Corp., Sarasota, Fla.  
 Filed Nov. 10, 1993, Ser. No. 150,409  
 Int. Cl.<sup>6</sup> B60K 17/30

U.S. Cl. 180—65.1

6 Claims



1. A self-propelled personal mobility vehicle for transporting a person comprising:  
 a generally flat frame supported generally horizontally above the ground by a rear wheel steerable about a generally upright axis and two spaced front wheels;  
 said rear wheel positioned along a central longitudinal axis of and rearwardly of said frame;  
 first drive means operably connected to said rear wheel for propelling said vehicle;  
 second drive means operably connected between said frame and said rear wheel for controlled rotationally positioning said rear wheel about said upright axis;  
 a seat connected to and upwardly extending from said frame;  
 control means including a hand-actuated lever supported on said seat for selectively controlling the rotational speed of said first drive means and the rotational steering positioning of said rear wheel by selective activation of said second drive means;  
 a stored source of electronic power mounted on said frame and operably connected between said control means and said first and second drive means;  
 said frame having a cushioning ring connected around and radially extending from a perimeter of said frame;  
 said front wheels being spaced apart along a common transverse axis and positioned in close proximity to the perimeter of said frame;  
 an anti-tip wheel connected on each side of said frame between each said front wheel and said rear wheel and extending outwardly from the perimeter of said frame;  
 each said anti-tip wheel positioned vertically just above a support surface of said vehicle whereby one said anti-tip wheel will contact the support surface when said frame is

tilted laterally from an at-rest generally horizontal position above the support surface.

5,413,188

## OPERATOR CABIN OF BULLDOZER

Kunio Ui, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan  
 PCT No. PCT/JP92/01357, § 371 Date May 26, 1994, § 102(e)  
 Date May 26, 1994, PCT Pub. No. WO93/08338, PCT Pub. Date Apr. 29, 1993

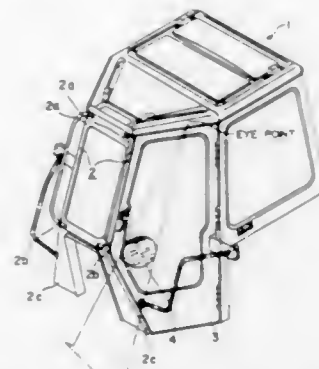
PCT Filed Oct. 19, 1992, Ser. No. 211,848

Claims priority, application Japan, Oct. 18, 1991, 3-297640;  
 Feb. 7, 1992, 4-013206; Feb. 7, 1992, 4-056979

Int. Cl.<sup>6</sup> B62D 33/06; E02F 9/16

U.S. Cl. 180—89.12

15 Claims



1. An operator cabin, suitable for use on a bulldozer, said operator cabin being formed in the shape of a truncated hexagonal pyramid having a hexagonal roof panel, a front panel, two front side panels, two rear side panels and a rear panel, wherein said front panel is secured between right and left utmost front supporting pillars and each of said front side panels extends rearwardly from a respective one of said utmost front supporting pillars, wherein said right and left utmost front supporting pillars slant forwardly from an upper part of the operator cabin to an intermediate part of the operator cabin and then slant rearwardly from said intermediate part to a bottom part of the operator cabin with a progressively increasing width between said supporting pillars so as to expand a forward field of view through said front side panels from an eye point of an operator in the operator cabin in comparison to a forward field of view through said front side panels from said eye point if said utmost front supporting pillars were to extend straight from said upper part of the operator cabin to said bottom part of the operator cabin.

5,413,189

## SOUND ATTENUATING DEVICE AND INSERT

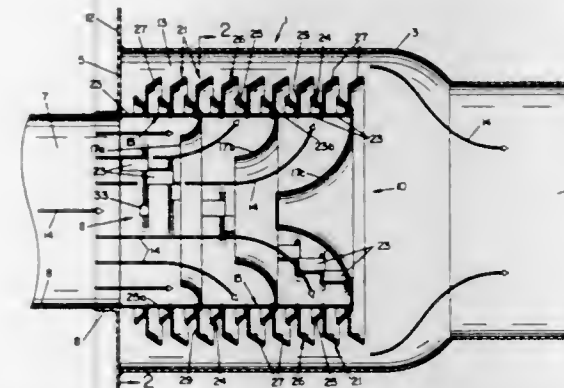
James R. Browning, Berea, and Gerald A. Carek, Vermillion, both of Ohio, assignors to J. B. Design, Inc., Berea, Ohio  
 Filed Sep. 1, 1993, Ser. No. 114,156  
 Int. Cl.<sup>6</sup> F01N 1/08

U.S. Cl. 181—268

13 Claims

1. In a muffler useful for attenuating the sounds of an internal combustion engine including an axially extending housing having an inlet adapted to be connected to an exhaust pipe in communication with the engine, and an outlet, the improvement comprising: an inner chamber adapted to receive exhaust gases moving in an axial direction, said inner chamber including means for redirecting the flow of gases from the axial direction into a radially outward direction, and a plurality of annular acoustical reflectors axially spaced from one another to form open passageways for the radial flow of exhaust gases from the inner chamber into an outer chamber defined by said housing and said inner chamber, each reflector including at least one sound reflection surface radially outwardly of said inner chamber and extending into each open passageway

whereby sound waves are reflected from each of said surfaces to cause attenuation of the sound, each of said sound reflection



surfaces forming an angle of 45° or less with respect to the axis of the muffler.

5,413,190

## ENGINE MOUNT FOR BLIND INSTALLATION

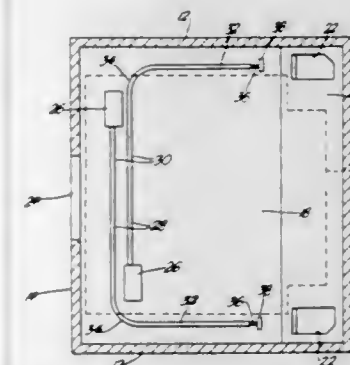
Balbir S. Tuteja, Rochester Hills, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 5, 1994, Ser. No. 273,439

Int. Cl.<sup>6</sup> B60K 8/00

U.S. Cl. 180—291

8 Claims



1. A mechanism to blindly mount an engine, comprising:  
 an adapter connected to the engine;  
 a ridge on the adapter;  
 a ridge bore through the ridge;  
 an adapter flat on the adapter;  
 a mounting block in the compartment having a channel shaped to closely receive the ridge, the block defining block bores communicated to the channel and aligned along a common axis;  
 a mounting flat on the block faced toward the adapter flat;  
 a plunger translatable in one of the block bores, at least a portion of the plunger receivable in the ridge bore and another of the block bores;  
 means for biasing the plunger toward the other block bore;  
 a cable connected to the plunger;  
 means for translating the plunger by manipulating the cable, the translating means having means to lock the cable in a selected position.

5,413,191

## DUAL TRACK LADDER

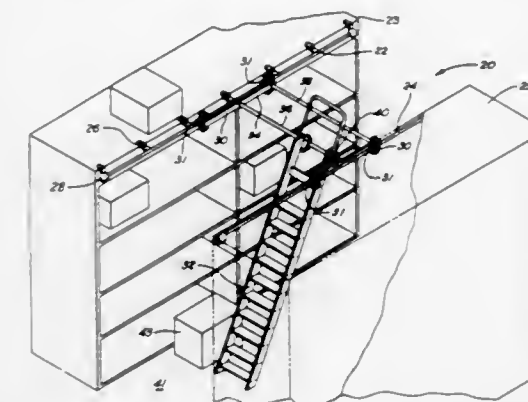
James F. Kerr, Crosswell, Mich., assignor to Material Control, Inc., Crosswell, Mich.

Continuation of Ser. No. 204,105, Mar. 1, 1994, abandoned, which is a continuation of Ser. No. 63,409, May 18, 1993, abandoned. This application Aug. 29, 1994, Ser. No. 298,531

Int. Cl.<sup>6</sup> E06C 1/397

U.S. Cl. 182—39

5 Claims



1. A ladder system for positioning a ladder between two spaced storage areas which are positioned on a floor, a longitudinal direction being defined as extending parallel to the spaced storage areas, a lateral direction being defined as extending between said spaced storage areas, the ladder system comprising:

a ladder adapted to contact the floor;  
 a track system adapted to be attached to at least one storage area, said ladder being mounted on said track system for selective movement along said longitudinal direction only, along said lateral direction only, and along both said longitudinal direction and said lateral direction simultaneously, said track system including a first guide track and a second guide track, said guide tracks each extending along a longitudinal axis, said track system further including a first rod extending along a lateral axis between said guide tracks, said first rod being coupled to said first and second guide tracks for longitudinal movement along said guide tracks;  
 a pair of spaced rollers attached to said ladder for coupling said ladder to said first rod, said rollers being spaced apart at a distance that is generally the diameter of said first rod, said first rod being interposed between said pair of rollers, said rollers cooperatively gripping said first rod and guiding said ladder for lateral and pivoting movement relative to said first rod, said ladder being movable laterally between said first and second guide tracks, and said ladder being adapted to pivot about said lateral axis of said first rod; a pair of laterally spaced sidewalls, one of said guide tracks being associated with one of said sidewalls, said first rod being rigidly secured to said sidewalls and extending between said sidewalls; and  
 a second rod rigidly secured to said sidewalls and extending between said sidewalls for providing increased stability.

5,413,192

## TREE STAND WITH CONFORMING SEAT

Ronald R. Woller, 2305 Stratford Rd. SE, and John A. Woller, 2311 College St. SE, both of Decatur, Ala. 35601

Filed Jul. 14, 1993, Ser. No. 91,024

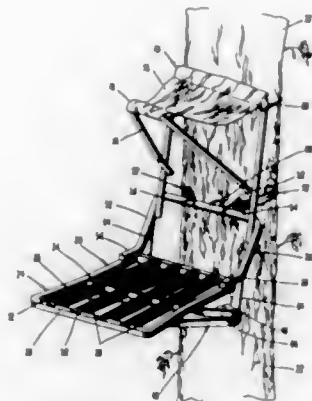
Int. Cl.<sup>6</sup> E04G 3/00

U.S. Cl. 182—187

12 Claims

1. An observation platform adapted for detachable connection with a vertical support, comprising:

platform means for supporting an observer, having a generally rectangular shape, and  
defining an observation plane and including  
platform support means for compressively engaging a vertical support at a position below the observation plane, connected to the platform means with a first portion located under the observation plane, and a second portion located above the observation plane; and



attachment means for releasably securing the platform means to the vertical support, including a flexible tensile connector; and  
seat means positioned above the observation plane, connected to the platform means, and having two supports, a flexible seat member having front and rear portions, suspended between the two supports, the seat member being non-planar, substantially continuous fabric, the front portion being narrower than the rear portion, and having a doubly curved contour capable of anatomical conformation to a seated observer.

5,413,193

## ADJUSTABLE EYE BOLT FOR BICYCLE CANTILEVER BRAKES

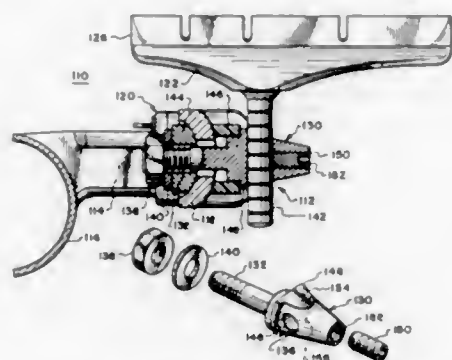
Steven Miller, 2209 Gorman St., Camarillo, Calif. 93010

Filed Mar. 31, 1994, Ser. No. 221,697

Int. Cl.<sup>6</sup> B62L 1/08

U.S. Cl. 188—24.19

3 Claims



1. In a cantilever brake system for a bicycle wheel that includes a brake mount terminating in a brake mounting screw, a brake arm having one end pivotally mounted on said brake mount and its other end adapted to receive a brake cable for causing the longitudinal center of the brake arm to move and thereby accomplish a braking action, a brake pad having a stud adapted for adjustably mounting the brake pad to the longitudinal center of the brake arm, and the brake arm having an opening at its longitudinal center for mounting the brake pad

thereto, the subcombination for adjustably securing the brake pad stud to the brake arm, comprising:

- an elongated eye bolt having a threaded end adapted to be received in the opening of the brake arm, and to be secured therein with a nut;
  - a contoured adjustment washer adapted to surround said elongated eye bolt and engage the brake arm when said bolt is received in the opening of the brake arm;
  - said elongated eye bolt having on its other end a shoulder adapted to fit within said contoured adjustment washer, said shoulder also being enlarged to form a circumferential lip adapted to engage an end face of said contoured adjustment washer, so as to compress said adjustment washer against the brake arm;
  - said enlarged end of said eye bolt further having, exterior to said shoulder, a transverse opening therein for receiving the brake shoe stud;
  - said enlarged end of said eye bolt further having a threaded opening aligned generally perpendicular to said transverse opening; and
  - a set screw engageable with said threaded opening for adjustably securing the brake shoe stud therein;
- whereby the brake shoe may be replaced or adjusted without undoing the nut which retains the eye bolt, thereby allowing the firm retention of said contour adjustment washer and the maintenance of its positional adjustment during the operation.

5,413,194

## BRAKE FRICTION PAD ASSEMBLY

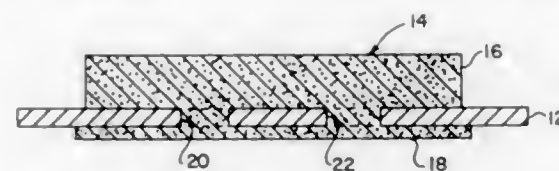
Stanley F. Kulis, Jr., White Post, and Richard L. Carpenter, Winchester, both of Va., assignors to Pneumo Abex Corporation, Hampton, N.H.

Filed Jul. 25, 1994, Ser. No. 279,555

Int. Cl.<sup>6</sup> F16D 69/00, 65/00

U.S. Cl. 188—251 A

25 Claims



1. A brake friction pad assembly comprising:  
a backing plate means having opposed faces and at least one extrusion opening extending between said opposed faces;  
a molded friction-generating pad element in contact with one of said backing plate means opposed faces; and  
a molded noise-damping pad element which overlies and contacts a substantial portion of the other of said backing plate means opposed faces, said noise-damping pad element being joined to said friction-generating pad element by molded material contained within said extrusion opening.

5,413,195

## SHOCK ABSORBER

Tomoharu Murakami, Gifu, Japan, assignor to Kayaba Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 966,719, Oct. 26, 1992, abandoned, which is a division of Ser. No. 857,710, Mar. 25, 1992, Pat. No. 5,332,069, which is a continuation of Ser. No. 575,291, Aug. 30, 1990, abandoned. This application Mar. 31, 1994, Ser. No. 221,556

Claims priority, application Japan, Aug. 31, 1989, 1-102277; Nov. 28, 1989, 1-136789

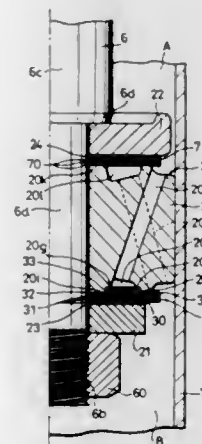
Int. Cl.<sup>6</sup> F16F 9/348

U.S. Cl. 188—282

10 Claims

1. A hydraulic shock absorber, comprising:  
a cylinder;

a wall member defining a first hydraulic fluid chamber and a second hydraulic fluid chamber;  
a hydraulic fluid port defined by said wall member providing communication between said first hydraulic fluid chamber and said second hydraulic fluid chamber;  
a valve stopper positioned on an end of said port, said valve stopper extending partially across said end of said port;  
high speed valve means for restricting fluid flow from said first hydraulic fluid chamber to said second hydraulic fluid chamber below a force corresponding to a medium or high speed hydraulic fluid flow range and attenuating fluid flow in said medium or high speed range, including plural leaf springs fixedly attached at one end to said wall and cooperating with a valve seat to define a gap and to control high speed fluid flow between said first hydraulic fluid chamber and said second hydraulic fluid chamber;



low speed valve means including a low speed leaf valve positioned in said gap and acting against said valve seat to prevent fluid communication between said first hydraulic fluid chamber and said second hydraulic fluid chamber through said port and for moving in said gap, away from said valve seat under force corresponding to hydraulic fluid flow in a low speed range, said low speed leaf valve having a downstream inner peripheral surface abutting an upper surface of said valve stopper, and said downstream inner peripheral surface being partially moveable away from said valve stopper in response to fluid flow between said first and second chambers, said valve stopper being supported between said high speed valve means and said wall member, a thickness of said valve stopper spacing said low speed leaf valve from said plurality of leaf valves of said high speed leaf means to adjust damping characteristics of the shock absorber.

5,413,196

## OSCILLATION DAMPER

Andreas Förster, Schweinfurt, Germany, assignor to Fichtel &amp; Sachs AG, Schweinfurt, Germany

Filed Mar. 17, 1993, Ser. No. 32,139

Claims priority, application Germany, Mar. 19, 1992, 42 08 886.0

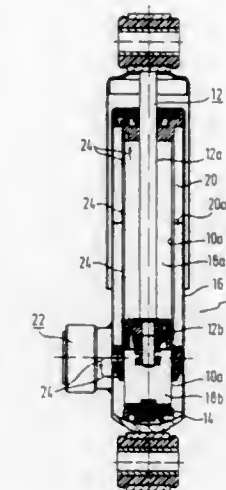
Int. Cl.<sup>6</sup> F16F 9/46

U.S. Cl. 188—299

26 Claims

1. An oscillation damper comprising a cylinder unit having an axis and a piston-piston rod unit axially movable with respect to said cylinder unit, fluid chambers being confined by said cylinder unit and said piston-piston rod unit within cavity means of said cylinder unit, said fluid chambers containing a damping fluid, fluid passage means for permitting a throttled fluid flow between at least some of said fluid chambers in response to axial movement of said piston-piston rod unit with respect to said cylinder unit, said throttled fluid flow providing a damping effect resisting said axial movement, said fluid passage means comprising cross-sectional area variation means

within at least one fluid path, said cross-sectional area variation means being controlled by at least one EM-valve unit (electromagnetically operated valve unit), said EM-valve unit having biasing means for biasing said EM-valve unit toward an emergency condition and EM-transferring means (electromagnetic transferring means) for transferring said EM-valve unit from said emergency condition to a plurality of operational conditions against the action of said biasing means, said biasing means exerting a weaker resistance to a change of said E-M



valve unit from said emergency condition to a first operational condition and a stronger resistance to a change of said E-M valve unit from said first operational condition to least one further operational condition and the rate of change of the increase in said resistance during the change from said emergency condition to said first operational condition being less than the rate of change of the increase of said resistance during the change from said first operational condition to said at least one further operational condition.

5,413,197

## PARKING BRAKE VALVE

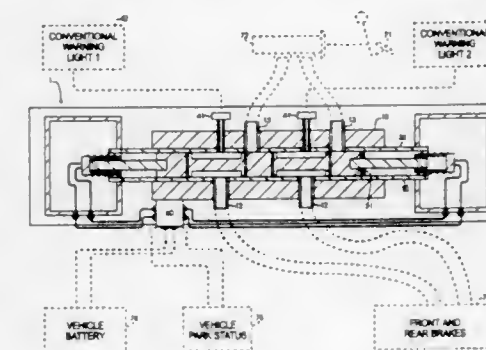
Larry G. Baer, 3713 Fairfield Dr., and Walt Pyndus, 404 Coulter Rd., both of Maryville, Tenn. 37804

Filed Mar. 14, 1994, Ser. No. 212,213

Int. Cl.<sup>6</sup> B60T 11/00; B60R 25/00

U.S. Cl. 188—353

8 Claims



1. A parking brake valve comprising:  
a tubular track having an inner surface, an outer surface, a locking end and an unlocking end, said inner surface and outer surface defining an outer casing, said outer casing defining a plurality of inlet holes and an equivalent number of outlet holes, each extending from said outer surface to said inner surface of said track;  
a sled having an outer surface, a stopping end and an unstopping end, said sled also having a plurality of stoppers and



fluid passers, said sled being of such size and shape that it abuts and can slide along said inner surface of said track, said stoppers being of such size and shape that when said sled is in a locking position within said track such that the stopping end of said sled is proximate to the locking end of said track, said stoppers prevent fluid from passing between inlet holes and outlet holes, said fluid passers being of such size and shape that when said sled is an unlocking position within said track such that the unstopping end of said sled is proximate to the unlocking end of said track, said fluid passers permit fluid to flow between inlet holes and outlet holes, said sled also having a plurality of conventional brake seals for preventing fluid leakage and affixing said stoppers and fluid passers together as a sled; sled-moving means for moving said sled within said track longitudinally between its locking position and unlocking position;

actuator means for initiating operation of said sled-moving means and thereby determine the sled position longitudinally within said track;

a braking system interface having an outer surface, an inner surface, a plurality of conventional hydraulic motor vehicle braking system inlet hose connectors and a plurality of conventional hydraulic motor vehicle braking system outlet hose connectors, each inlet hose connector extending from said inner surface of said track, sealingly through an inlet hole and protruding beyond said outer surface of said braking system interface, each outlet hose connector extending from said inner surface of said track, sealingly through an outlet hole and protruding beyond said outer surface of said braking system interface, whereby a conventional hydraulic motor vehicle braking system can be actuated and then moving said sled to its locking position acts to prevent the flow of brake fluid, thereby locking the vehicle braking system in a braking state, and moving said sled to its unlocking position acts to allow the flow of brake fluid, thereby allowing the vehicle braking system to return to a non-interrupted braking state;

a plurality of conventional pressure switches, each pressure switch extending from said inner surface of said track, sealingly through pressure holes defined by the casing of said track, sealingly through pressure holes defined by said outer surface of said braking system interface and protruding outward from said outer surface of said braking system interface, thereby allowing fluid pressure within said fluid passers of said sled to be monitored;

wherein said actuator means comprises a conventional remote transmitter, a conventional frequency matched receiver and a switch, thereby allowing said sled-moving means to be remotely actuated and thus allowing said sled to be remotely moved longitudinally within said track between its locking position and unlocking position;

wherein said remote transmitter and said receiver further comprise conventional security means whereby the parking brake valve is secure from actuation utilizing other than a matched transmitter;

conventional tamper-protection circuitry and means for connecting this circuitry to a conventional vehicle alarm system;

wherein said sled moving means is comprised of two solenoids, a locking solenoid being positioned proximate to the locking end of said track and an unlocking solenoid being positioned proximate to the unlocking end of said track, thereby actuation of the locking solenoid causing said sled to be magnetically attracted to its locking position and actuation of the unlocking solenoid causing said sled to be magnetically attracted to its unlocking position; and

wherein said solenoids are of a hollow-core type and said sled further comprises a magnetically attractable fluid interrupting rod affixed longitudinally to its stopping end and a magnetically attractable fluid uninterrupted rod affixed longitudinally to its unstopping end, for allowing

other sled components to be composed of materials that are not magnetically attractable.

5,413,198

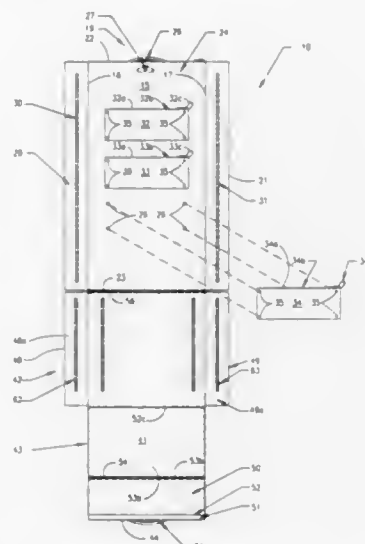
# **FLEXIBLE GARMENT AND ACCESSORY CASE HAVING A DETACHABLE BRIEFCASE**

Jack E. Ferris, 301 SE. Complex (CCX), Wahpeton, N. Dak. 58075

Filed Sep. 13, 1993, Ser. No. 119,626  
Int. Cl.<sup>6</sup> A45C 3/02, 7/00, 13/10

U.S. Cl. 190—1

3 Claims



1. A flexible garment and accessory case having a detachable briefcase comprising:

a main panel member having a top edge, bottom edge, and two side edges and having a front side and a back side, said main panel member further having a plurality of snap fastener members fixedly attached and disposed upon said front side thereof and having a pair of flap members integrally attached to said side edges thereof;

a second panel member having a top edge, bottom edge, and two side edges and having an inner side and an outer side, said second panel member further having an upper portion and a lower portion; means for detachably attaching said top and said bottom edges of said second panel member to said top and said bottom edges of said main panel member for forming said garment and accessory case, said second panel member further being detachable from said main panel member and including means for forming said second panel member into said briefcase, said brief case forming means including elongate fastener means fixedly attached upon said outer side near said side edges of said second panel member, said flap members of said main panel member being foldable upon said outer side of said second panel member and each having a strip-like fastener means fixedly attached to one side thereof said strip-like fastener means being detachably fastened to said elongate fastener means on said second panel member to form said garment and accessory case for storing and carrying clothes as such; and

a plurality of pouch members each having at least one compartment and means for closing said compartment for storing personal belongings of a user, said pouch members further having a plurality of snap fastener means fixedly attached thereto, said snap fastener means being detachably fastened to said snap fastener members on said main panel member, said pouch members each capable of being detached and used separately from said main panel member.

5,413,199

# **EQUIPMENT BAG HAVING A REMOVABLE INNER MESH SACK**

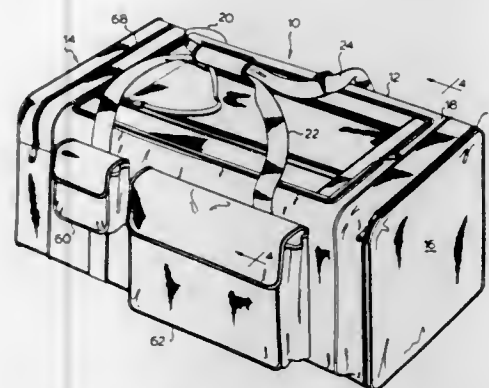
Leonard W. Clement, Bolton, Canada, assignor to Irwin Toy Limited, Toronto, Canada

Filed Oct. 7, 1993, Ser. No. 132,935

Int. Cl.<sup>6</sup> A45C 3/00, 5/02, 13/02

U.S. Cl. 190—108

10 Claims



6. An equipment bag comprising an outer bag having a first closable opening comprising an open top and a fastening means extending thereabout and said outer bag having a strap presenting handles for carrying said equipment bag,

an inner mesh sack releasably securable within said outer bag, said inner mesh sack comprises a top panel having a second closable opening and means for closing said second closable opening and a plurality of side panels and a bottom panel, said plurality of side panels and bottom panels made of a mesh material, said top panel having complementary fastening means extending thereabout for joining with said fastening means for closing said open top when said inner mesh sack is within said outer bag,

whereby equipment is storable within the inner mesh sack and the inner mesh sack is removable from the outer bag for facilitating air to pass therethrough for drying said equipment and said inner mesh sack is securable within said outer bag for transportation.

5,413,200

# **POWER ASSIST SYSTEM FOR VEHICLE**

Chiaki Hirata, Shizuoka, Japan, assignor to Suzuki Kabushiki Kaisha, Japan

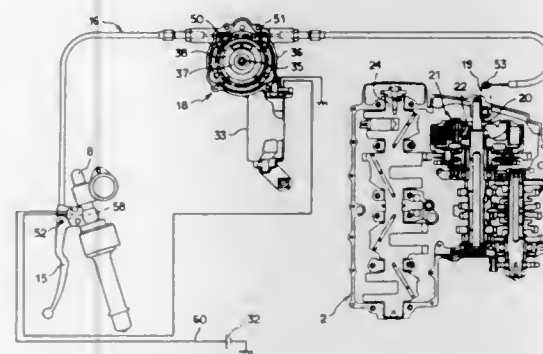
Filed Jun. 7, 1993, Ser. No. 72,556

Claims priority, application Japan, Sep. 30, 1992, 4-262446

Int. Cl.<sup>6</sup> F16D 23/12

U.S. Cl. 192—40

30 Claims



1. In a motor vehicle having an engine, a transmission and a clutch mechanism interposed between the engine and transmission, the clutch mechanism having an operation cable having a

cable drive portion connected to a clutch operation member and a cable driven portion connected to actuate a clutch release member, a power assist system for imparting an additional driving force to the operation cable, the power assist system comprising: a drive unit connected to both the cable drive and driven portions and operative when activated to impart a driving force to the cable driven portion to actuate the clutch release member to effect a clutching operation; and activating means connected to the clutch operating member for activating the drive unit to effect a clutching operation such that when an operation force is applied to the operation cable through an operation stroke of the clutch operation member, the activating means activates the drive unit to impart a driving force to the cable driven portion to actuate the clutch release member to effect a clutching operation.

5,413,201

# **DEVICE FOR ENGAGING AND RELEASING OF WHEELS, BY FLUID MEANS**

Hugo J. Vidal, Sao Paulo, Brazil, assignor to AVM Auto Equipamentos LTDA., Sao Paulo, Brazil

Continuation-in-part of Ser. No. 62,398, May 14, 1993,

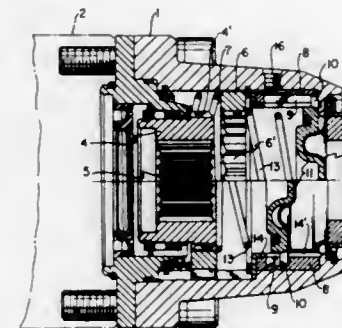
abandoned. This application Sep. 14, 1993, Ser. No. 121,595

Claims priority, application Brazil, May 14, 1992, 9201821

Int. Cl.<sup>6</sup> F16D 11/00, 25/04

U.S. Cl. 192—67 R

13 Claims



1. A device for engaging and releasing of wheels by fluid means, applied in a vehicle equipped with more than one drive shaft and with any one of a hydraulic, pneumatic and vacuum system responsible for operation, said device being mounted within a housing attachable to a wheel hub of the vehicle, said device comprising a cylindrical engaging hub that has internal grooves for engagement with a notched end of one of said drive shafts of the vehicle; engaging means for determining engaged and released positions between the one drive shaft and the wheel hub, said engaging means including an engaging element having inner teeth, said cylindrical engaging hub having a serrated outer portion that is arranged complementing said inner teeth of said engaging element; biasing spring means for biasing said engaging element out of an engaged position with said wheel hub and into a released position away from said wheel hub; means for determining locking positions for maintaining said engaging element in one of said engaged and released positions after interruption of the operation of the any one of the hydraulic, pneumatic and vacuum system, said determining means including a cam and including a cam following part having an outer edge, said engaging element being between said cam and said cylindrical engaging hub, the cam having an inner face with a channel; means for forcing one of said cam and said cam following part to turn for determining the locking positions, said forcing means including studs movable in said channel, said studs being equidistantly spaced in the outer edge of said cam following part; a driving element; and engaging spring means for biasing said cam following part in contact with said driving element, said driving element being responsive to operation of the any one the hydraulic, pneumatic and vacuum system for driving said cam following part

inwardly to push said engaged spring means toward said engaging hub and overcoming bias of said biasing spring means so as to thereby push said engaging element into engagement with said engaging hub, said cam being fixed directly to any one of the housing and around a guiding ring provided with grooves which number the same as the number of studs of the cam following part.

5,413,202

# **FRICTION GENERATING TORQUE TRANSMITTING DEVICE**

Paul Maucher, Sasbach, Germany, assignor to LuK Lamellen und Kupplungsbau GmbH, Buhl, Germany

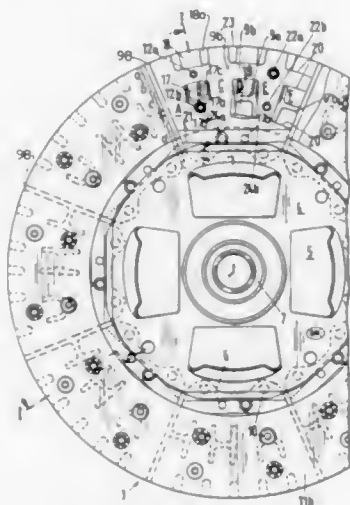
Filed Feb. 24, 1993, Ser. No. 21,873

Claims priority, application Germany, Mar. 5, 1992, 42 06 880

Int. Cl.<sup>6</sup> F16D 13/64

U.S. Cl. 192—107 C

43 Claims



1. A friction-operated torque transmitting device comprising:

- a rotary hub;
- a disc coaxial with and affixed to said hub and having an outer diameter;
- two annular friction linings coaxial with said hub and having inner diameters greater than said outer diameter;
- an annulus of pairs of confronting substantially sector-shaped resilient discrete carriers disposed axially between said linings and secured to said disc, said carriers having substantially flat portions and each of said carriers having a plurality of substantially radially extending tongues partly cutout and projecting from the flat portions, at least one tongue of at least one carrier of each pair being located opposite a flat portion of the other carrier of the respective pair; and
- means for fastening said carriers to said linings, including means for fixing the carriers of said pairs to each other in axially stressed condition.

5,413,203

# **METHODS AND APPARATUS FOR TRANSPORTING AND POSITIONING MICRO-MECHANICAL PARTS**

Marcel Sonderegger, Schaffhausen, Switzerland, assignor to United States Surgical Corporation, Norwalk, Conn.

Filed Oct. 20, 1993, Ser. No. 140,355

Claims priority, application Germany, Mar. 11, 1993, 43 07 730.7

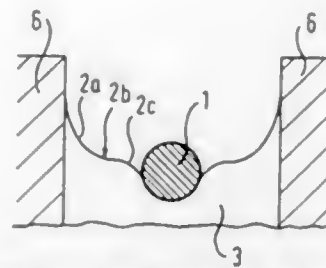
Int. Cl.<sup>6</sup> B65G 19/00

U.S. Cl. 198—345.1

32 Claims

1. A method of transporting small micro-mechanical parts comprising the steps of placing a small micro-mechanical part on the surface of a still liquid and holding said part on the

liquid surface on account of the surface tension of the liquid, such that a predetermined path is formed, subjecting the small micro-mechanical part to at least one external force, and trans-



5,413,204

# **GLASS PLATE POSITIONING AND SUPPLYING MACHINE**

Takeshi Mori; Masato Nakamura, and Eiji Nakayama, all of Matsusaka, Japan, assignors to Central Glass Co., Ltd., Japan

Filed Jun. 21, 1994, Ser. No. 262,903

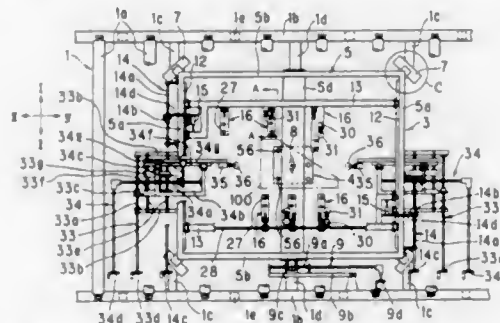
Claims priority, application Japan, Jun. 25, 1993, 5-155636;

Oct. 22, 1993, 5-265123

Int. Cl.<sup>6</sup> B65G 47/24

U.S. Cl. 198—345.1

8 Claims



1. A glass plate positioning and supplying machine, which comprises:

- (a) a glass plate positioning machine disposed above a roller conveyor, including:
  - a horizontal rectangular main frame which has a pair of first beams extending in a first direction which coincides with the running direction of the roller conveyor and a pair of second beams extending in a second direction at right angles to the first direction;
  - a pair of traveling beams which extend in the first direction and are supported by the second beams of the rectangular main frame at opposite ends thereof to be movable in the second direction;
  - first adjusting means for adjusting the positions of the traveling beams in the second direction;
  - first driving means for advancing and retracting the traveling beams in the second direction;
  - a plurality of support units which engage the traveling beams to be movable in the first direction and the second direction;
  - a plurality of first rollers mounted on the support units to be movable in the second direction;
  - second driving means for advancing and retracting the first rollers in the second direction;
  - a pair of second rollers disposed between the traveling beams;
  - second adjusting means for adjusting the positions of the second rollers in the first and second directions; and

- third driving means for advancing and retracting the second rollers in the first direction; and
- (b) a glass plate supplying machine disposed below the glass plate positioning machine, including:
  - a pair of vertical legs;
  - an elevator plate which engages the vertical legs to be movable in the vertical direction;
  - fourth driving means for advancing and retracting the elevator plate in the vertical direction;
  - a pair of side vertical rods which engage the opposite side portions of the elevator plate to be movable in the vertical direction;
  - a horizontal beam which is fixed to the upper ends of the vertical rods at opposite ends thereof;
  - supporting rods mounted on the horizontal beam;
  - a center vertical rod fixed to the center of the horizontal beam at the upper end thereof and extending downward;
  - a pair of springs which are disposed one at either side of the vertical rod and fixed to the horizontal beam at the upper end thereof and the elevator plate at the lower end thereof;
  - a trigger mounted on the elevator plate;
  - fifth driving means for driving the trigger into and out of engagement with the lower end of the vertical rod; and
  - a pair of stoppers mounted on the legs for engaging the lower ends of side vertical rods.

5,413,206

# **PEAR PROCESSING METHOD AND APPARATUS**

Douglas F. Paterson, Colorado Springs, Colo.; Konrad Meissner, Lafayette, Calif.; William V. Redd, Broomfield, Colo.; Anthony D. Oliver, Rye, Colo.; Michael S. Lipford, Pueblo, Colo.; Don A. Perry, Manitou Springs, Colo., and C. Richard Schoner, Palm Desert, Calif., assignors to Atlas Pacific Engineering Company, Pueblo, Colo.

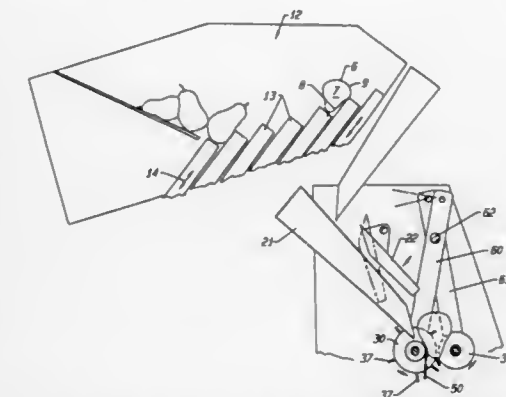
Division of Ser. No. 35,667, Mar. 23, 1993. This application

Mar. 28, 1994, Ser. No. 218,254

Int. Cl.<sup>6</sup> B65G 47/24

U.S. Cl. 198—383

6 Claims



1. In a pear orienting apparatus having a set of orienting rolls including at least a pair of rolls mounted for rotation upon spaced horizontal axes, each of said rolls having two sides, drive means for rotating said pair of rolls, and means feeding singulated pears to the top of the rolls intermediate said spaced axes, the improvement comprising:

- a plurality of whiskers carried by at least one of said pair of rolls, said whiskers extending in a direction radially outward from the axis of rotation of said roll, and said whiskers being located at each end of said roll so that said whiskers urge the stems of pears extending beyond either side of said roll toward the center of said roll.

5,413,205

# **EARLY BAG STORAGE SYSTEM**

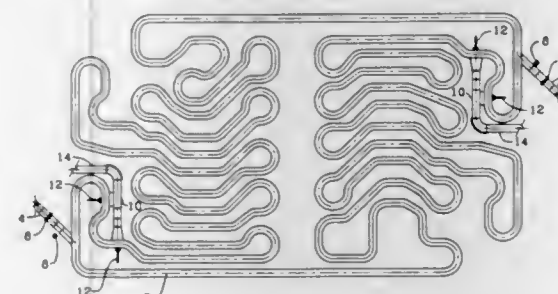
Ronald K. Taylor, Milton Keynes, United Kingdom, and Donald L. Anderson, Brighton, Mich., assignors to Jervis B. Webb Company, Farmington Hills, Mich.

Filed Oct. 13, 1993, Ser. No. 135,464

Int. Cl.<sup>6</sup> B65G 37/00

U.S. Cl. 198—358

9 Claims



1. Apparatus for storing early bags arriving at an airport and discharging such stored early bags to a make-up operation for a desired departure flight, comprising:

- an endless storage conveyor having a plurality of baggage carriers, each having a tray adapted to receive one of said early bags, said tray being arranged in end-to-end endless fashion and supported for continuous recirculating movement on a path of travel defined by a conveyor track;
- induction conveyor means for loading each of said early bags onto a separate one of said baggage carriers;
- means for identifying each of said early bags and the said baggage carrier onto which it is loaded, and
- discharge means adjacent to a portion of said conveyor track for selectively removing early bags from baggage carriers passing said discharge means.

5,413,207

# **METHOD AND APPARATUS FOR DELIVERING ROLLED ROD TO A COOLING BED**

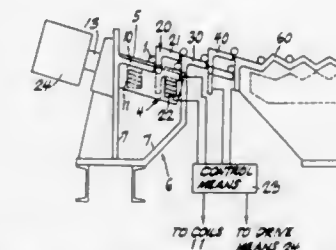
David T. Pong, Shiu Wing Steel Limited, 1209 Jardine House, 1 Connaught Place, Hong Kong, Hong Kong

Filed Jun. 8, 1993, Ser. No. 73,736

Int. Cl.<sup>6</sup> B65G 47/26

U.S. Cl. 198—457

11 Claims

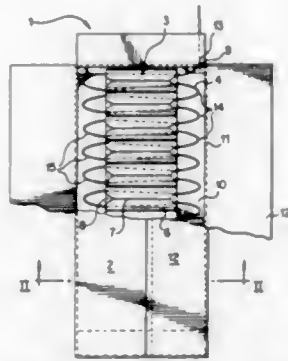


1. In rolling mill apparatus for high speed production of rolled rod in which rolled rod is longitudinally advanced to an entry end of a run-in table and after supply of the rolled rod onto the run-in table, a lifting apron laterally displaces the rod from the run-in table towards a cooling bed, said apparatus comprising first magnetic means operatively associated with the lifting apron for applying braking force to a tail end of the rolled rod to reduce speed of advance of the rolled rod and second magnetic means operatively associated with the run-in table in spaced downstream location from the first magnetic





each of said first and said second open ends of said hollow tubular members for supporting reversed portions of said strands such that said strands can be stored compactly and removed individually so as to avoid entanglement,



wherein the position of said end wall means remain generally unchanged relative to said reversed portions of the strands remaining in said holder during removal of individual strands.

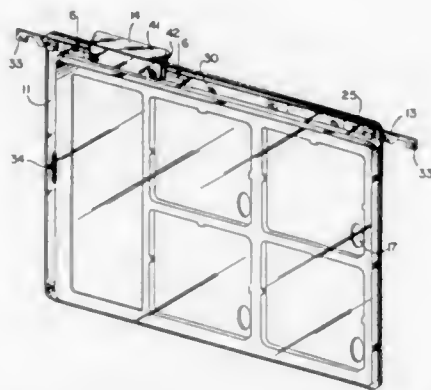
5,413,215

**HOUSING SYSTEM FOR STORING DISK CONTAINERS**  
Charles A. Hardinger, Jr., 1260 N. Prospect #306, Milwaukee, Wis. 53202, assignor to Charles A. Hardinger, Jr., Milwaukee, Wis.

Filed May 18, 1994, Ser. No. 245,344  
Int. Cl.<sup>6</sup> B65D 85/57

U.S. Cl. 206—308.1

10 Claims



1. A housing system for storing a disk container, the system comprising:
  - a first panel having a recess formed in a top surface thereof for retaining the disk container;
  - a hinge web running along and linked to a first lateral end of the first panel, the first panel also having a second lateral end opposite the first lateral end;
  - a second panel linked to the hinge web so that the hinge web runs along a first lateral end of the second panel, the second panel also having a second lateral end opposite the first lateral end of the second panel;
  - a hook extending from the first or the second panel adjacent the second lateral end of the panel from which the hook extends; and
  - connector means on the first and second panels such that when top surfaces of both panels are folded against each other at the hinge web, the panels can removably be linked together via the connector means to be retained in a folded and closed position such that the second panel top surface and the first panel recess will then form a storage area suitable to retain the disk container.

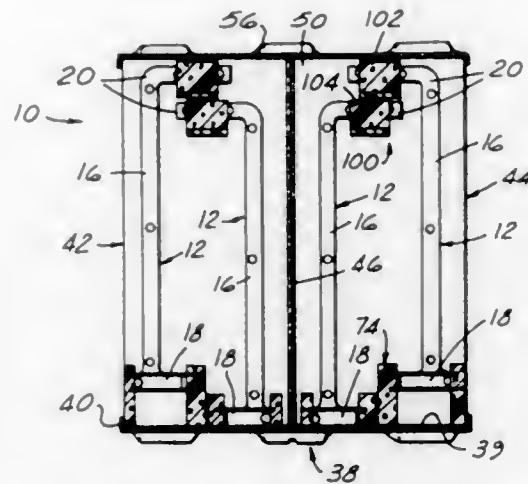
5,413,216  
**SHIPPING RACK FOR VEHICLE SLIDING DOOR UPPER TRIM FRAMES**

Lawrence J. Timmins, 18645 Matthews, Riverview, Mich. 48192  
Filed Sep. 23, 1991, Ser. No. 763,857

Int. Cl.<sup>5</sup> B65D 85/68, 81/10

U.S. Cl. 206—335

5 Claims



1. A shipping rack for vehicle sliding door upper trim frames, the frames being of the type fabricated of plastic material and comprising an elongated central portion for positioning along the upper edge of a vehicle sliding door opening, an end portion extending from each end of the central portion and being substantially perpendicular with respect thereto, one of the end portions being shorter than the other end portion which is longer, the end portions adapted to extend downwardly from the upper edge of the vehicle sliding door opening, the shipping rack including: a base, a pair of oppositely disposed end walls secured to the base, the base having a generally horizontal loading surface, at least one elongated lower frame end portion receiver structure on the horizontal loading surface of the base extending between the end walls, each said lower frame end portion receiver structure including a first and a second elongated receiver element located in horizontal side-by-side relationship with respect to each other, each receiver element having a plurality of spaced apart upwardly facing recesses therein, each of said recesses being adapted to receive one of the shorter end portions of a frame, the first receiver element being positioned higher than the second receiver element, at least one elongated upper frame end portion holder structure extending between said end walls and secured thereto, each said elongated upper frame end portion holder structure being positioned above a said lower frame end portion receiver structure and including a first and a second elongated holder element each having a plurality of spaced apart upwardly facing slots therein, the longer end portions of a said frame each having a wall section, each of said slots being adapted to receive a wall section of one of said longer end portions of a frame, the first holder element being positioned higher than the second holder element, the first and second receiver elements and the first and second holder elements being positioned with respect to each other in a manner such that frames may be loaded into the shipping rack in oppositely facing relationship with the longer end portions of frames loaded in the first holder element being in horizontal overlapping relationship with respect to longer end portions of frames mounted in the second holder element, the first holder element being removably mounted to the side walls of the shipping rack to facilitate loading and unloading of frames from the second holder element.

5,413,217  
**FLANGE SUPPORT AND DISPLAY PACKAGE FOR SURGICAL INSTRUMENTS**

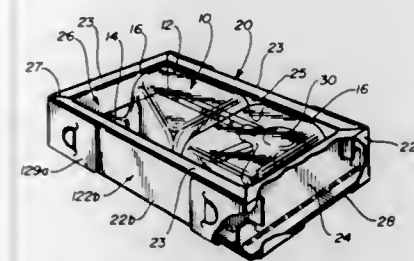
Erik Sauer, Mason, Ohio, assignor to Ethicon Endo-Surgery, Cincinnati, Ohio

Filed Apr. 28, 1994, Ser. No. 234,751

Int. Cl.<sup>6</sup> B65D 5/38, 6/06

U.S. Cl. 206—363

3 Claims



1. In combination:
  - a first package for holding surgical instruments, said package containing a blister having a cavity with a flange surrounding said cavity, and an adhesive sealed lid attached to said flange; and
  - a second package containing a lower surface; a pair of side walls integrally joined to and extending perpendicularly from said lower surface; a pair of parallel back walls integrally joined to and extending perpendicularly from said lower surface, said back walls also being perpendicular to said side walls; four inner walls each of which is parallel to an associated one of said side walls and said back walls, and a top surface connecting each said inner wall to its associated one of said side walls and back walls; each said inner wall abutting two other said inner walls to form a well through which said blister can be displayed; and
 wherein said flange fits between each of said inner walls and said lower surface.

5,413,218

**CASSETTE FOR ACCOMMODATING A RECORDING MEDIUM**

Kenji Shimokuni, and Kenji Ogisu, both of Miyagi, Japan, assignors to Sony Corporation, Japan

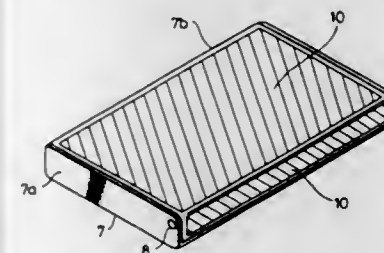
Division of Ser. No. 102,888, Aug. 6, 1993. This application Feb. 7, 1994, Ser. No. 192,822

Claims priority, application Japan, Aug. 14, 1992, 4-217010; Jul. 28, 1993, 5-186153

Int. Cl.<sup>6</sup> B65D 85/672

U.S. Cl. 206—387.1

3 Claims



1. A plastic cassette storage case having a cassette-accommodating portion in which a recording medium cassette is accommodated, comprising:
  - a writable area printed at a predetermined position on an outer surface of said cassette storage case using a printing ink containing a predetermined amount of protein powder having a natural collagen as its main component;
 wherein said writable area comprises a single writable layer printed on the outer surface of said case at the predetermined position, and wherein said natural collagen contains a hydrophilic group and has a particle size of about 5  $\mu$ m,

said natural collagen being dispersed in said single layer such that the spacing between the particles of the collagen and the hydrophilic group of said collagen allow water based ink to permeate into said single layer.

5,413,219

**EASY OPENING CASE**

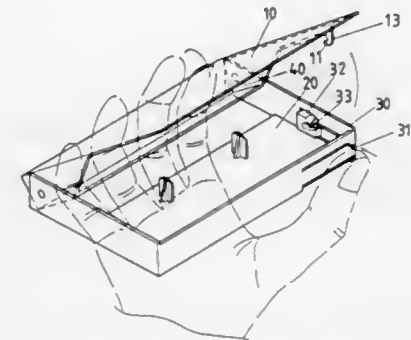
Chiao-Mei Yu, No. 145, Sec. 2, Chung Shan Rd., Ta Tsuen Hsiang, Chang-Hua Hsien, Taiwan, Prov. of China

Filed May 18, 1994, Ser. No. 245,531

Int. Cl.<sup>6</sup> B65D 85/672

U.S. Cl. 206—387.1

4 Claims



1. An easy opening case configured to store an audio reproducing medium such as a cassette tape or a compact disc, the case comprising:

- a case base having at least two adjacent sidewalls;
- a cover pivotally attached to the base so as to be movable between closed and open positions, the cover having a hook thereon, the hook having an arcuate surface thereon;
- a resiliently moving lug on one of the at least two adjacent sidewalls so as to move relative to the one sidewall; and,
- a hook shaped positioning block on the moving lug so as to move therewith, the hook shaped positioning block having a pushing surface and located such that it engages the hook to hold the cover in its closed position wherein movement of the moving lug relative to the one sidewall disengages the hook shaped positioning block from the hook and causes the pushing surface to engage the arcuate surface of the hook to urge the cover toward its open position.

5,413,220

**ENERGY ATTENUATING SUPPORT PLATES FOR PROTECTING OBJECTS THEREON**

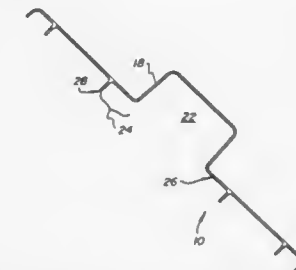
John F. Sirianni, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 31, 1994, Ser. No. 251,454

Int. Cl.<sup>6</sup> B65D 85/671

U.S. Cl. 206—395

14 Claims



1. Energy attenuating support plate for protecting an object having a core from shock, said plate comprising:
  - a first side and a second side opposite said first side, said first side comprising a first substantially smooth surface and a



hub member projecting essentially normally from said first substantially smooth surface for engageably supporting said core thereon, said hub member and said first substantially smooth surface being adjoined by a grooved portion, and wherein said hub member includes a cavity portion projecting outwardly of said second side;

said second side having a first energy attenuation region surrounding said cavity portion, said first attenuation region being provided with means to flex in response to shock, said flex means comprising said grooved portion, a second substantially smooth surface adjoining said grooved portion, and a first annular rib surrounding said second substantially smooth surface;

said second side further comprising a second energy attenuation region surrounding said first energy attenuation region, and a third energy attenuation region surrounding said second energy attenuation region;

whereby said first, second and third energy attenuation regions are successively arranged generally concentric to the hub member so that substantially all shock incurred initially by the third energy attenuation region is virtually absorbed by said second and first attenuation regions thereby protecting said object supported on the hub from shock.

13. An article of manufacture comprising:

a container having a closed end portion and openable end portion;

a roll of photosensitive web having a core, said roll being supported on an energy attenuating support plate positionable inside said container, said support plate comprising: a first side and a second side opposite said first side, said first side comprising a first substantially smooth surface and a hub member projecting essentially normally from said first substantially smooth surface for engageably supporting said core thereon, said hub member and said first substantially smooth surface being adjoined by a grooved portion, and wherein said hub member includes a cavity portion projecting outwardly of said second side;

said second side having a first energy attenuation region surrounding said cavity portion, said first attenuation region being provided with means to flex in response to shock, said flex means comprising said grooved portion, a second substantially smooth surface adjoining said grooved portion, and a first annular rib surrounding said second substantially smooth surface;

said second side further comprising a second energy attenuation region surrounding said first energy attenuation region, and a third energy attenuation region surrounding said second energy attenuation region;

whereby said first, second and third energy attenuation regions are successively arranged generally concentric to the hub member so that substantially all shock incurred initially by the third energy attenuation region is virtually absorbed by said second and first attenuation regions thereby protecting said object supported on the hub from shock.

14. An article of manufacture comprising a container having an interior compartment, and first and second opposite side-walls, each said sidewall having a first side facing inwardly of said interior compartment and a second side opposite said first side facing outwardly of said interior compartment, said first side being provided with a hub member projecting essentially normally therefrom for supporting said core thereon, said hub member having a cavity portion projecting outwardly of said second side, and wherein at least one of said sidewalls is further characterized by:

said second side having a first energy attenuation region surrounding said cavity portion, said first attenuation region being provided with means to flex in response to shock, said flex means comprising said grooved portion, a second substantially smooth surface adjoining said grooved portion, and a first annular rib surrounding said second substantially smooth surface;

said second side further comprising a second energy attenua-

tion region surrounding said first energy attenuation region, and a third energy attenuation region surrounding said second energy attenuation region;

whereby said first, second and third energy attenuation regions are successively arranged generally concentric to the hub member so that substantially all shock incurred initially by the third energy attenuation region is virtually absorbed by said second and first attenuation regions thereby protecting said object supported on the hub from shock.

5,413,221

# PACKAGING FOR A PHOTOGRAPHIC FILM CASSETTE

Kazunori Mizuno, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 883,573, May 15, 1992, abandoned.

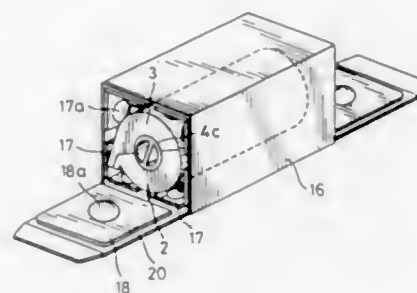
This application Dec. 6, 1993, Ser. No. 161,450

Claims priority, application Japan, May 17, 1991, 3-141298

Int. Cl.<sup>6</sup> B65D 85/67

U.S. Cl. 206—397

3 Claims



1. A packing unit comprising:

a photographic film cassette comprising a spool with photographic film wound thereon and a cassette shell for rotatably containing said spool, rotation of said spool causes a leader of said photographic film to advance outward through a passage mouth defined between port portions formed in said cassette shell;

packaging means for packaging said photographic film cassette, said packaging means being disposed around said photographic film cassette, said packaging means includes a carton having an openable flap;

stopper means being provided inside said packaging means for preventing said leader from exiting from said passage mouth while said cassette is contained in said packaging means, said stopper means including a bubbled sheet attached to an inside of said openable flap and provided with an air cell which presses on one end of said spool to prevent rotation of said spool relative to said cassette shell.

5,413,222

# METHOD FOR SEPARATING A PARTICULAR METAL FRACTION FROM A STREAM OF MATERIALS CONTAINING VARIOUS METALS

Morris E. Holder, P.O. Box 9283, Chattanooga, Tenn. 37412-9283

Filed Jan. 21, 1994, Ser. No. 184,651

Int. Cl.<sup>6</sup> B07C 5/344

U.S. Cl. 209—567

20 Claims

1. A method for separating a preselected metal fraction which is not strongly ferromagnetic from a stream of discrete particles containing a plurality of metals, which method comprises:

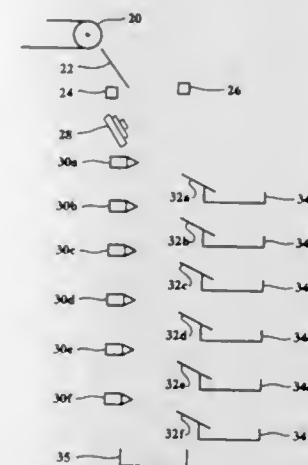
(a) establishing a detection zone within the stream of particles;

(b) establishing within the detection zone a static magnetic field which is of insufficient strength to induce in the

particles of metal in the stream an opposing magnetic field of such strength as to cause the particles in the stream to move;

(c) detecting the presence of a particle within the detection zone;

(d) measuring changes in the magnetic flux density of the field as the particle passes through the detection zone;



(e) comparing the changes measured in the magnetic flux density of the field as the particle passed through the detection zone with a predetermined change pattern for the preselected metal fraction; and

(f) separating from the stream any particle whose passage through the detection zone changed the magnetic flux density of the field according to the predetermined change pattern.

5,413,223

# HOLDER FOR EMERGENCY FLASHLIGHT

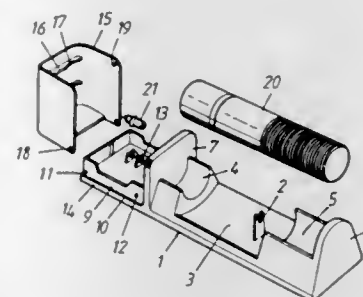
Woo J. Kang, 170-145, Younhee-Dong, Seodaemoon-ku, Rep. of Korea

Filed Mar. 18, 1994, Ser. No. 210,345

Int. Cl.<sup>6</sup> B65D 69/00; F21L 7/00

U.S. Cl. 206—573

2 Claims



1. A holder for an emergency flashlight comprising:

an emergency flashlight;

a holder body having a pair of end members respectively with flashlight holding grooves for holding said emergency flashlight therein;

a flashlight grip opening defined between said end members; a battery spacer protruded from said holder body in said flashlight grip opening;

an extension extending from a selected one of said end members;

an inner rim provided on said extension, said inner rim having opposite ends with a pair of hinges respectively protruded from opposite sides of one rim end thereof and a pair of locking notches respectively formed at said other rim end thereof;

a bulb holding member protruded from an inner surface of said extension;

a lid hingeably coupled to said extension allowing movement between an opened position and a closed position, said lid having a pair of hinge holes respectively engaged with said hinges and a pair of locking lugs respectively protruded from inner surfaces of opposite side walls of said lid and engaged in said locking notches at said closed position of the lid; and

at least one reinforcing member protruded from an inner upper surface of said lid, said reinforcing member having a battery supporting groove.

5,413,224

# STACKABLE PALLET PACKAGING

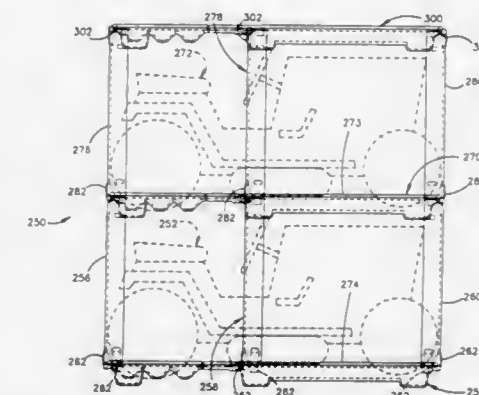
John V. Marron, Lakewood, and Gerhard Plamper, Valley City, both of Ohio, assignors to Ply Mar Inc., Cleveland, Ohio

Filed Jul. 23, 1993, Ser. No. 96,776

Int. Cl.<sup>6</sup> B65D 19/00, 85/68

U.S. Cl. 206—600

9 Claims



1. A returnable package for an article, comprising:

a horizontally extending lower pallet which serves as the bottom of said package, said lower pallet having an upper major side surface and having a lower major side surface, said upper major side surface of said lower pallet having surface means for receiving thereon a said article;

an upper pallet which serves as the top of said package, said upper pallet being substantially identical to said lower pallet, said upper pallet having an upper major side surface which is substantially identical to said upper major side surface of said lower pallet, said upper pallet having a lower major side surface which is substantially identical to said lower major side surface of said lower pallet;

said upper major side surface of said lower pallet facing upward in a first direction, said lower major side surface of said upper pallet facing downward in a second direction opposite to said first direction, said lower major side surface of said upper pallet being presented toward said upper major side surface of said lower pallet;

a plurality of elongate load-bearing support posts extending between said lower pallet and said upper pallet in a direction generally perpendicular to said upper major side surface of said lower pallet, each one of said plurality of support posts having a lower end portion engaging said lower pallet and an upper end portion engaging said upper pallet, said plurality of support posts supporting said upper pallet on said lower pallet at a location spaced upward from said lower pallet to at least partially define an article-receiving chamber between said upper pallet and said lower pallet; and

a plurality of connector members releasably interconnecting said support posts with said upper pallet and with said lower pallet;

wherein said upper pallet is movable from said location spaced upward from said lower pallet to a nested position

disposed in closely spaced relation to and nested with said lower pallet, a portion of said upper major side surface of said lower pallet engaging a portion of said lower major side surface of said upper pallet when said pallets are nested, said lower pallet including surface means configured the same as said support posts for defining a plurality of storage spaces for receiving said support posts in a storage orientation extending generally parallel to said upper major side surface of said lower pallet, each one of said support posts having an elongate central portion with side surfaces extending between said end portions of said one support post, said side surfaces of said elongate central portions of said support posts engaging said lower major side surface of said upper pallet and engaging said upper major side surface of said lower pallet when said support posts are in said storage orientation.

#### 6. A package comprising:

a lower pallet having an upper major side surface for receiving an article and a lower major side surface;  
an upper pallet identical to said lower pallet and similarly oriented to said upper pallet, said upper pallet having an upper major side surface and a lower major side surface;  
a plurality of load-bearing support posts supporting said upper pallet on said lower pallet at a location spaced upward from said lower pallet to at least partially define between said upper pallet and said lower pallet an article-receiving chamber; and

a plurality of connector members releasably interconnecting said support posts with said upper and lower pallets;  
said package being disassemblable into a disassembled condition including no components which require separation prior to recycling;

wherein each one of said lower pallet and said upper pallet and said plurality of support posts and said plurality of connector members is recyclable and is free of a fixed attachment to each other one of said lower pallet and said upper pallet and said plurality of support posts and said plurality of connector members;

said upper and lower pallets being nestable, the combined vertical height of said upper and lower pallets when nested being less than the total of their individual heights and said upper and lower pallets when thus nested having respective portions which are separated from each other and which define between them space for receiving the forks of a fork lift;

said support posts being clampable between said upper and lower pallets when said upper and lower pallets are nested;

said lower pallet including surface means for defining a plurality of storage spaces for receiving said support posts in an orientation generally parallel to said upper major side surface of said lower pallet when said pallets are nested, said upper pallet being disposed in closely spaced relation to said lower pallet when said pallets are nested, said support posts being disposed intermediate said upper pallet and said lower pallet and being clamped therebetween when said pallets are nested.

5,413,225

#### MAGNETIC SWEEPER

Charles W. Shields, Santa Barbara, Calif., assignor to Shields Company, Ventura, Calif.

Filed Apr. 20, 1994, Ser. No. 230,495

Int. Cl.<sup>6</sup> B07C 7/04

U.S. Cl. 209—614

7 Claims

1. A magnetic sweeper for gathering magnetically attachable debris comprising in combination:

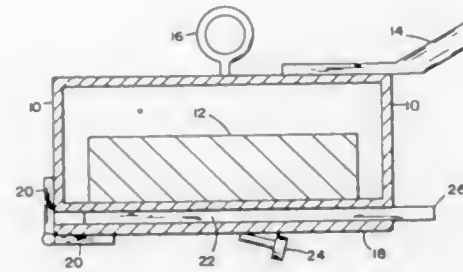
a housing;

magnet means in the housing;

a collecting plate hinged on the bottom of said housing with hinging means, said collecting plate swingable on said hinge means from a location within the influence of said

magnet means to a location outside the influence of the magnet means; and

latch plate means fastened to said collecting plate on the side of the collecting plate nearest to said magnet means, said latch plate means being of material attracted to said mag-



net means so as to hold said collecting plate close to said magnet means, said latch plate means having at least a portion extending beyond the side of said housing so as to provide a convenient projection for pushing said collecting plate downwards away from said magnet means.

5,413,226

#### APPARATUS FOR SORTING OBJECTS ACCORDING TO SIZE

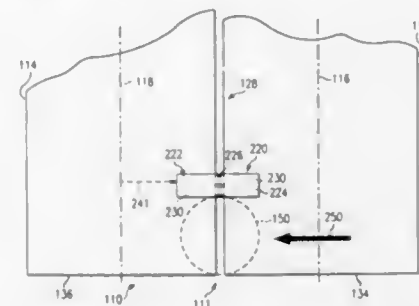
Mark Matthews, Richardson, and Michael R. Weidman, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 30, 1993, Ser. No. 159,637

Int. Cl.<sup>6</sup> B07B 13/05

U.S. Cl. 209—668

20 Claims



1. Improved apparatus for sorting particulate material by size, the apparatus being of the type which includes (i) a pair of adjacent rollers having generally circular cross-sections, the facing surfaces of the rollers being separated by a gap which is coplanar with a plane defined by the major axes of the rollers, a sorting region being generally defined and bounded by the plane and the facing surfaces of the rollers above the plane; (ii) facilities for counter-rotating the roller surfaces away from the sorting region above the plane and toward the sorting region below the plane; and (iii) facilities for feeding the material into the sorting region at an input zone; wherein the improvement comprises:

stationary and non-rotatable means for metering the material fed into the input zone to limit the number of particles entering the sorting region during a selected time.

5,413,227

#### IMPROVED VORTEX REACTOR SYSTEM

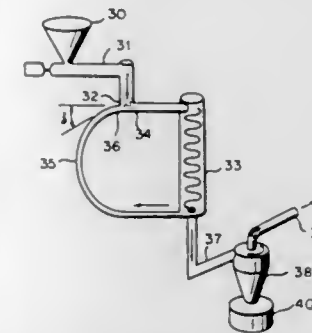
James P. Diebold, Lakewood, and John W. Seahill, Evergreen, both of Colo., assignors to Midwest Research Institute, Kansas City, Mo.

Filed Oct. 5, 1992, Ser. No. 956,667

Int. Cl.<sup>6</sup> B04C 7/00; B01D 45/12

U.S. Cl. 209—722

11 Claims



1. An improved vortex reactor system for affecting fast pyrolysis of biomass and Refuse Derived Fuel (RDF) feed materials comprising:

a vortex reactor having its axis vertically disposed in relation to a jet of a horizontally disposed stream ejector that impels feed material from a feeder and solids from a recycle loop along with a motive gas into a top part of said reactor;

wherein said top part of said vertically disposed vortex reactor has a wear plate assembly comprising: a removable pipe flange which has been replaced by said wear plate assembly, said wear plate assembly comprising a wear plate of a sectional circular piece of pipe that fits into a curved dovetail slot that positions said wear plate opposite a feed tangential entry position of the top part of said vortex reactor, a wear ring spacer that positions said wear plate and a wear ring longitudinally, and a removable wear ring; said dovetail slot being made by removal of an approximately 90° section of a reactor wall of said vortex reactor and converting said approximately 90° section with a larger telescoping pipe.

5,413,228

#### COMBINATION DISPLAY DEVICE/STORAGE RACK

Joe Le Clerc, Downsview, Canada, assignor to The Kids Own Co. Ltd., Downsview, Canada

Filed Dec. 21, 1992, Ser. No. 994,345

Claims priority, application Canada, Dec. 10, 1992, 2085065-5

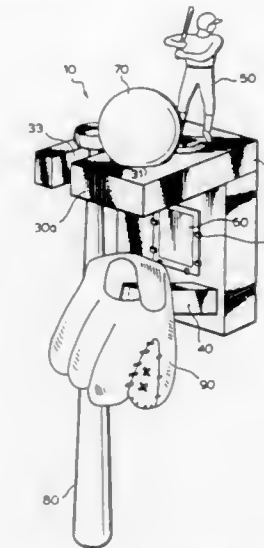
Int. Cl.<sup>6</sup> A47F 7/00

U.S. Cl. 211—13

8 Claims

1. A combination utility rack/display device comprising a first member having two sides and a top surface, said first member having extending from proximate one side thereof means for storing hand held sports equipment, and also providing means for retaining and storing the object to be effected by the hand held sports equipment, the first member having disposed proximate the side thereof remote said means for storing said hand held sports equipment, means for storing equipment worn on at least one hand of a participant, the improvement comprising display means for displaying a flat planar member, the display means further comprising, portions raised from the top surface of the first member which portions are laterally raised away from the top of the first member so as to provide therebetween a hollow within which the edge of a card may be inserted so as to display the flat planar member yet retain it on the sides of the flat planar member, at least the fourth side being left open to allow the easy insertion or removal of the flat planar member, said rack/display device further comprising

means for mounting a statue therewith said display device carrying a message coinciding with the type of statue being



5,413,229

#### SHELF ALLOCATION AND MANAGEMENT SYSTEM

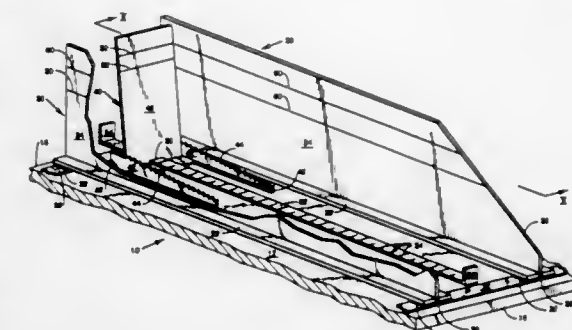
H. Richard Zuberbuhler, 401 Fourth Ave., Beaver Falls, Pa. 15010; James R. Burchell, 318 New York Ave., Clairton, Pa. 15025, and David F. Sorosky, 491 Front St., Box 182, Glenwillard, Pa. 15046

Filed Feb. 3, 1993, Ser. No. 12,908

Int. Cl.<sup>6</sup> A47F 5/00

U.S. Cl. 211—59.3

21 Claims



1. A shelf allocation and management system for allocating shelf space among rows of products and for moving the rows of products toward the front of the shelf, said shelf allocation and management system comprising:

at least two adjacent side rails positioned on the shelf extending from the front of the shelf to the back of the shelf, each said side rail including a generally flat rail base and a rigid divider attached to and extending upwardly from said rail base, wherein each said rail base includes a groove extending across a top surface thereof in which said divider is received and wherein at least one row of products may be positioned between said dividers of said adjacent side rails; an unbiased backstop positioned between said dividers of said adjacent side rails, said backstop movable between the front and the back of the shelf and adapted to engage and advance at least one row of products which may be positioned between said dividers of said adjacent side rails toward the front of the shelf; and a rigid puller member positioned between said dividers of



said adjacent side rails and associated with said backstop, said puller member adapted to be manually moved toward the front and the back of the shelf to move said backstop at least toward the front of the shelf.

5,413,230

## REFILLABLE COMPRESSED GAS CAPSULE

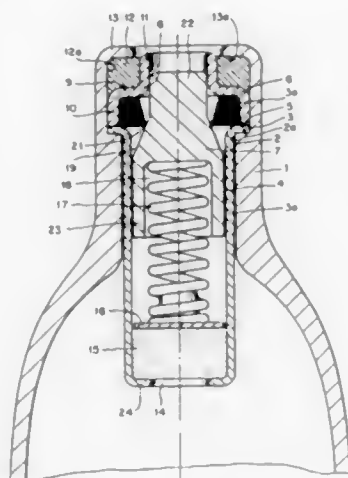
Christian Folter, and Franz Gröbl, both of Vienna, Austria, assignors to ISI Metallwarenfabrik Ges. m.b.H., Vienna, Austria

Filed Jul. 19, 1993, Ser. No. 94,479

Int. Cl.<sup>6</sup> B65D 23/00

U.S. Cl. 215—5

8 Claims



1. Refillable compressed-gas capsule having spaced opposite face sides and an inwardly bent neck portion therein, said capsule comprising:

- a valve seat;
- a holding means within said capsule;
- a holding element;
- said inwardly bent neck portion indirectly holding the holding means and the valve seat forming an inwardly flanged edge via the holding element;
- a spring;
- a valve body pretensioned by the spring and slidably guided within said holding means, said valve body being held against the valve seat by the pressure of compressed-gas held within the capsule and the force of the spring, the valve body having an opening path;
- an opening provided in one of the face sides of the capsule;
- said holding means having at least one opening into the interior of the capsule, said holding means limiting said opening path of said valve body;
- said holding means being inserted in said opening in one of the face sides of said capsule, and said valve body being held in said holding means;
- said holding element having an axial passage way for the gas and at least two portions of different outer diameter;
- a ring shoulder connecting the two parts of different outer diameters of said holding element and being overlapped by said inwardly bent neck portion of the capsule;
- a seal held by the ring shoulder; and
- said valve body having two portions of different outer diameter, the portion of said valve body having the greater outer diameter being adjacent an interior of said capsule, said greater outer diameter being greater than the portion of said holding element having the smaller inner diameter to prevent said valve body from escaping from said capsule in case of damage of the valve seat.

5,413,231

## BOTTLE HANDLE

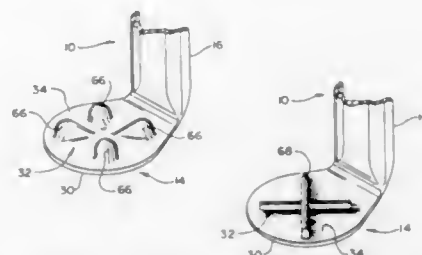
David W. Carroll, 1306 Mayflower Dr., Northfield, Minn. 55057; Wendell L. Carroll, 4134 40th Ave. S., Minneapolis, Minn. 55406, and Jimmy W. Davidson, 6660 Upper Afton Rd., Woodbury, Minn. 55125

Filed Apr. 15, 1993, Ser. No. 48,727

Int. Cl.<sup>6</sup> B65D 23/10

U.S. Cl. 215—396

12 Claims



1. An apparatus for releasable, lifting attachment to a bottle, the bottle including a spout, a body presenting a bottle longitudinal axis and a base presenting a bottle bottom surface oriented generally orthogonal to said bottle longitudinal axis, the body presenting a first end and an opposed second end, the spout extending upward from the body first end and the base oriented at said body second end, comprising:

- a spout collar adapted for detachable engagement of said bottle spout;
- a base engagement portion adapted for operable abutable supporting engagement of the bottle base, said base engagement portion including a base plate presenting a base plate margin and a plurality of rounded half conical dimple elements projecting upward from said base plate toward said spout collar, said dimple elements spaced radially inwardly from said bottle base margin; and
- a flexible, handle member integral with and extending between the spout collar and the base engagement portion, said handle member including a hand graspable portion oriented generally parallel to said bottle longitudinal axis and a self-biasing portion oriented generally transversely to said bottle longitudinal axis and said bottle bottom surface whereby said spout collar and said base engagement portion are biased towards each other and said boss is urged into operable, abutable engagement with said bottle bottom surface by the weight of said bottle when said apparatus is attached to said bottle and said bottle is lifted by grasping said hand graspable portion of said handle member.

5,413,232

## PACK FOR POURABLE PRODUCTS

Rainer Bergner, Duesseldorf; Hubert Droessler, Erkrath; Siegfried Konkel, Duesseldorf; Volker Weiss, Langenfeld, and Paul-Otto Weltgen, Hilden, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Germany

PCT No. PCT/EP92/01179, § 371 Date Dec. 6, 1993, § 102(e) Date Dec. 6, 1993, PCT Pub. No. WO92/21577, PCT Pub. Date Dec. 10, 1992

PCT Filed May 26, 1992, Ser. No. 157,137

Claims priority, application Germany, Jun. 4, 1991, 41 18 253.7

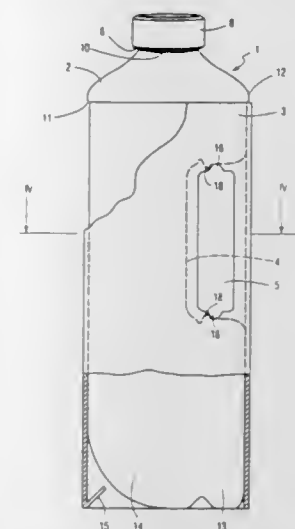
Int. Cl.<sup>6</sup> B65D 23/12

U.S. Cl. 215—398

2 Claims

1. A pack for pourable products, such as liquids or free-flowing fine granules, comprising an inner thin-walled blown plastic container intended to hold the product, and a base- and cover-free supporting jacket with an upper supporting edge surrounding the blown plastic container and bearing against it in the in-use position of the pack, the blown plastic container being provided with an upper bearing shoulder for resting on

the supporting edge of the supporting jacket, and including a recess, the supporting jacket being provided with flaps configured to fold at least locally into the recess and to serve as fixing elements for the supporting jacket, and for forming a carrying handle, latching means being provided for the folded flaps, said



latching means being in the form of cams which are integrally formed on at least one end of said flaps of the supporting jacket, and with which a ramp-like projection formed on the plastic container is associated in the pivoting range for said flaps within the recess.

5,413,233

## CHILD RESISTANT BOTTLE CLOSURE

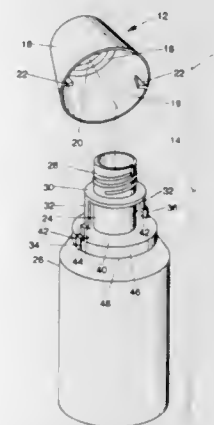
Thomas J. Hall, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 30, 1994, Ser. No. 298,008

Int. Cl.<sup>6</sup> B65D 50/08

U.S. Cl. 215—209

18 Claims



1. A package suitable for storing and dispensing potentially dangerous material, said package being resistant to opening by children yet readily openable by adults, said package comprising:

- a) a bottle for containing said potentially dangerous material, said bottle having a body and a finish portion, said finish portion having a threaded outer end and a support ring located between said threaded outer end and said body of said bottle;
- b) a resiliently deformable cantilevered beam connected to said support ring, said cantilevered beam being positioned outward and downward from said support ring to form an angle to said finish portion, said cantilevered beam having a length, a substantially vertical locking surface, and a

pushtab spaced along said length, said angle to said finish portion being small enough that said pushtab may be depressed substantially radially toward said finish portion; and

- c) a closure having an outermost surface, an upper inner surface, and a lower inner surface, said upper inner surface having threads for rotatably securing said closure to said threaded outer end of said finish portion, said closure also having a tooth projecting radially inward from said lower inner surface, said tooth being so shaped and positioned that it engages said locking surface of said cantilevered beam whenever there is an attempt to unscrew said closure, thereby preventing removal of said closure until said pushtab is manually depressed to disengage said tooth of said closure from said locking surface of said cantilevered beam.

5,413,234

## TAMPER EVIDENT CLOSURE

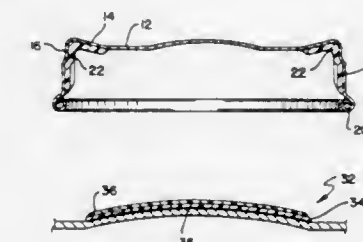
Ihab Hekal, Stanford, Conn.; Howard D. Iler, Wheaton, Ill.; Bradley C. Kiss, Lombard, Ill., and Daniel P. Bialka, Lockport, Ill., assignors to Continental White Cap, Inc., Downers Grove, Ill.

Filed Feb. 12, 1992, Ser. No. 835,137

Int. Cl.<sup>6</sup> B65D 41/02

U.S. Cl. 215—230

19 Claims



1. A container including a container body and a removable closure sealably applied to said container body, said closure including a flexible end panel portion having formed therein a sealing state indicating area which can flex from a seal indicating position to a non-seal indicating position due to the release of energy stored within said end panel, said sealing state indicating area carrying an irreversible tamper indicating color change system comprising an effectively dark colored background base layer, a translucent light colored indicator layer, and a degradable bonding-release layer interposed between said base layer and said indicator layer, said degradable bonding-release layer maintaining said base layer and said indicator layer in effective intimate contact with each other when said flexible end panel is in a seal indicating position so that when viewed through said indicator layer said color change system has an effective first color, and when said flexible end panel flexes to its non-seal indicating position, said degradable bonding-release layer allowing said indicator layer to separate from said base layer so that when viewed through said indicator layer said color change system has a second color different from said first color.

5,413,235

## TAMPER-EVIDENT CLOSURE

Gilles Decelles, P.O. Box 1197, Waterloo, Québec, Canada J0E 2N0

Filed Sep. 28, 1994, Ser. No. 314,010

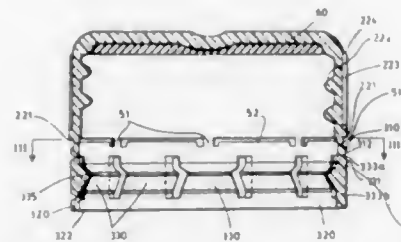
Int. Cl.<sup>6</sup> B65D 41/34

U.S. Cl. 215—252

9 Claims

1. A tamper-evident closure for sealing a container, said container having an opening, a threaded neck portion and an outwardly extending annular flange adjacent to and beneath the threaded neck portion, said tamper-evident closure comprising:

- (a) a cap portion sized to fit and be screwed onto the threaded neck portion of the container, said cap portion having a top wall and an annular skirt of given internal diameter that is coaxial with and integrally projects from said top wall, said skirt having a lower edge and being provided with an internal thread sized and shaped to engage the threaded neck portion of the container; and
- (b) a ring portion that is coaxial with the top wall and skirt of the cap portion comprising:
- an upper ring having the same internal diameter as the skirt, said upper ring having an upper edge connected to the lower edge of the skirt by breakable connecting means, and a lower edge;
  - a lower ring of the same internal diameter as the skirt, said lower ring also having an upper edge and a lower edge; and
  - a plurality of inwardly oriented wedges circumferentially distributed and spaced apart from each other in between



said upper ring and said lower ring, each wedge having an upper edge connected along a thin folding line to the lower edge of the upper ring, a lower edge connected along another thin folding line to the upper edge of the lower ring, and an inwardly and upwardly projecting apex positioned and sized to fit under the outwardly extending flange of the threaded neck portion of the container when the cap portion of the closure is fully screwed onto the threaded neck portion.

whereby, in use, when the closure is screwed onto the container to close the same, the wedges are allowed to move radially outwardly due to the thin folding lines joining said wedges to said upper ring and said lower ring, and thus pass over the flange of the neck before returning to their original position where the apexes of the wedges extend under the flange; and, thereafter, during removal of the closure, the apexes of the wedges engage under the flange of the neck, the connecting means break and the ring portion separates from said skirt.

5,413,236

## MODULAR SHIPPING CONTAINER

Timothy P. Kenevan, 3650 Ridgewood Dr., Willits, Calif. 95490  
Filed Jul. 2, 1993, Ser. No. 86,726

Int. Cl.<sup>6</sup> B65D 6/24

U.S. Cl. 220—4.28

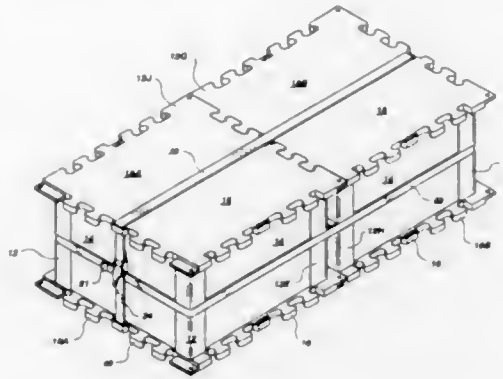
10 Claims

1. A container for use in transporting cargo, said container comprising:

- a plurality of floor elements, each said floor element having a plurality of sides, each said side having at least one first extension tab extending outwardly therefrom and at least one first recess opening; each said floor element defining a plurality of first slots therein; said plurality of floor elements being interconnected one to another by an inter-cooperation of said first extension tabs and said first recess openings to form a floor;
- a plurality of frame elements, each frame element having a first extension on its first end and a second extension on its second end; said frame elements being positioned upright on said floor with each said first extension being inserted into a respective first slot; each frame member defining at least one vertical oriented channel therein;
- a plurality of wall panels, each wall panel having two opposing sides, each said side being inserted into a respective

said channel of a said frame element, said wall panels being oriented upright on said floor;

a plurality of cover elements, each cover element having a plurality of sides, each said cover element side having at least one second extension tab extending outwardly therefrom and at least one second recess opening, each said cover element defining a plurality of second slots therein; said plurality of cover elements being interconnected one to another by said second extension tabs and said second recess openings to form a cover, said cover being positioned atop said frame elements wherein each said second extension is received within a respective said second slot,



- a lateral-extending strap positioned about a perimeter of said container defined by said upright wall panels and said frame elements to add structural integrity to said container;
- wherein each said frame element defines a channel therein for receiving and retaining said lateral extending strap; and
- wherein each said first extension tab and each said second extension tab are configured to interlock with a respective recess opening in a respective said floor element and a respective said cover of an adjacently positioned container.

5,413,237

## NONFRAGMENTING RUPTURE DISK ASSEMBLIES AND METHODS

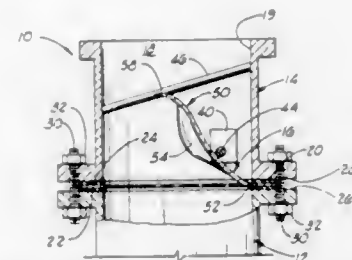
Stephen P. Farwell, Owasso, Okla., assignor to BS&B Safety Systems, Inc., Tulsa, Okla.

Filed Jun. 20, 1994, Ser. No. 263,374

Int. Cl.<sup>6</sup> B65D 25/00

U.S. Cl. 220—89.2

30 Claims



1. A nonfragmenting rupture disk assembly comprising:
- an inlet rupture disk supporting member for communicating fluid pressure to said rupture disk;
  - an outlet rupture disk supporting member including a pressure relieving fluid flow passageway therethrough;
  - a rupture disk sealingly clamped between said inlet and outlet supporting members which forms a hinged blow-out portion that is folded into said outlet supporting member upon pressure relieving rupture and fluid flow through the ruptured disk; and

catching means disposed in said outlet supporting member for catching the leading edge of said blow-out portion as it is folded into said outlet supporting member thereby preventing the subsequent movement and tearing of said blow-out portion as a result of said pressure relieving fluid flow through said ruptured disk and outlet supporting member.

5,413,238

## CLOSURE UNIT ON A CONTAINER FOR FLOWABLE PRODUCTS

Elmar Mock, Biel/Bienne, Switzerland, assignor to Tetra Alfa Holdings S.A., Pully, Switzerland

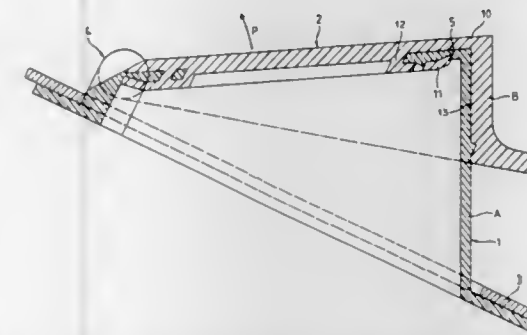
Filed Dec. 8, 1992, Ser. No. 986,914

Claims priority, application Switzerland, Dec. 12, 1991, 03684/91; Dec. 12, 1991, 03685/91; Dec. 12, 1991, 03689/91

Int. Cl.<sup>6</sup> B65D 17/32

U.S. Cl. 220—268

6 Claims



1. A closure unit made for thermoplastic material for mounting on a container for handling and storing flowable products, the closure unit comprising:

- a substantially tubular pouring part (1) having a pouring opening therein;
- a closure part (2) closing the pouring opening of said pouring part;
- said closure unit being made from at least first and second single materials (A and B), said first and second single materials differing from each other in at least one characteristic;
- at least one area of said closure unit being made only from said first single material (A) and extending both in said pouring part (1) and in said closure part (2) and forming a predetermined linear thin area breaking point (5) at least partly extending around a circumference of said pouring opening of said pouring part;
- another area of said closure unit being made only from said second single material (B) and having a protection and support zone (10, 11) which closely covers and closely contacts said at least one area which forms said predetermined breaking point (5) and at least an immediately surrounding area on one of an inside and outside of said closure unit;
- wherein, on a closure part side of said predetermined breaking point (5), said another area of said closure unit including said protection and support zone (10, 11), is firmly connected to at least a portion of said at least one area having said predetermined breaking point;
- wherein, on a pouring part side of said predetermined breaking point (5), said another area of said closure unit being one of adhering only slightly and not adhering at all, to said at least one area having said predetermined breaking point and forming a pair of mutually contacting sealing surfaces (13) together with said at least one area having said predetermined breaking point; and
- said protection and support zone (10, 11) comprising: an outer support zone (10) which is located on the outside of said closure unit and which firmly contacts a closure part portion in the vicinity of said predetermined break-

ing point (5); and on the closure part side of said predetermined breaking point;

an inner support zone (11) provided on the inside of said closure unit, said inner support zone (11) being made of the same second material (B) as said outer support zone (10), and said inner support zone (11) firmly contacting a closure part portion on the closure part side of said predetermined breaking point in the vicinity of said predetermined breaking point (5);

said another area of said closure unit comprising said outer support zone (10), said inner support zone (11) and one of the sealing surfaces of said pair of sealing surfaces (13).

5,413,239

## UNITARY HINGE FOR A CONTAINER

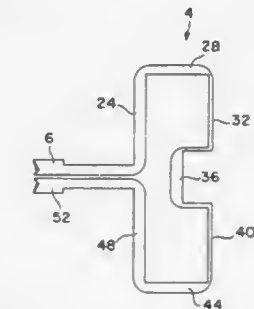
Edward W. Rider, Jr., Slate Hill, N.Y., assignor to Genpak Corporation, Middletown, N.Y.

Filed Jan. 27, 1994, Ser. No. 186,980

Int. Cl.<sup>6</sup> B65D 43/16

U.S. Cl. 220—339

14 Claims



1. A unitary structure for forming into a hinge, when folded comprising:

- a) a base element having an upper surface and a lower surface, wherein said upper surface has a first elevation and a second elevation;
- b) a first projecting element of the structure projecting from said base element proximate said second elevation;
- c) a first extension of the structure extending from said first projecting element thereby forming a third elevation;
- d) a first depending element of the structure depending from said first extension;
- e) a second extension of the structure extending from said first depending element thereby forming a fourth elevation;
- f) a second projecting element of the structure projecting from said second extension of the structure wherein said second projecting element is substantially the same thickness as said first depending element and thinner than said second extension;
- g) a third extension of the structure extending from said second projecting element thereby forming a fifth elevation;
- h) a second depending element of the structure depending from said third extension of the structure;
- i) a fourth extension of the structure extending from said second depending element, wherein said fourth extension has an upper surface and a lower surface, wherein said upper surface of said fourth extension forms a sixth elevation at the same elevation as said second elevation and a seventh elevation at the same elevation as said first elevation, so that when the hinge is folded, said lower surfaces are brought proximate each other.



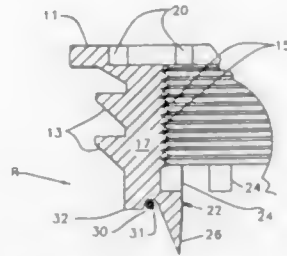
# 5,413,240 REPLACEABLE CLOSURE SYSTEM

John Hunter, Placerville; Charles Hudson, Rowland Hts., and Michael McGrath, Colton, all of Calif., assignors to Russell-Stanley Corporation, Red Bank, N.J.

Filed Sep. 17, 1993, Ser. No. 123,426  
Int. Cl.<sup>6</sup> B65D 51/18

U.S. Cl. 220—254

4 Claims



1. A closure system for a container comprising
  - (a) a container having an integral cylindrical neck with internal threads for threadably receiving a closure member with external threads;
  - (b) a closure plug having external threads;
  - (c) a replaceable closure member having an upper cylindrical skirt with external and internal threads and a lower unthreaded cylindrical skirt, said internal threads for threadably receiving said closure plug with external threads; and
  - (d) a means for tightening the replaceable closure member to a torque measurement of greater than 65 ft lbs comprising a specialized tool;

wherein said replaceable closure member comprises an annular upper flange extending radially outwardly from the top of said upper cylindrical skirt, the inner circumference of the annular flange having distributed within said inner circumference a series of evenly-spaced semicircular notches, and an annular lower flange extending radially inwardly from said upper cylindrical skirt, the inner circumference of the annular lower flange having distributed within said inner circumference a series of evenly spaced semicircular notches.

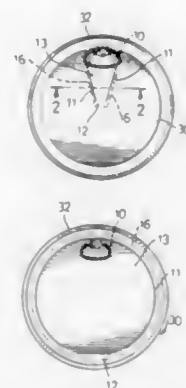
# 5,413,241 EASY-OPEN CAN END

Hsi-Shou Yeh, No. 996, Chungshan Rd., Taichia Chen, Taichung Hsien, Taiwan, Prov. of China

Filed Apr. 15, 1994, Ser. No. 228,593  
Int. Cl.<sup>6</sup> B65D 17/32

U.S. Cl. 220—269

2 Claims



1. A can end having a tab device thereon comprising an upper panel (30) having a rim portion (32) and a central portion, a pressing seam portion (11) being formed on said upper panel (30) and defining an open-ended loop, thereby defining a cap sheet (13) which has an open end (12) integrally formed on

the central portion of said upper panel (30) and a closed end integrally formed on the rim portion (32) of said upper panel (30), a tab (10) being mounted on the closed end of said cap sheet (13) by a rivet means, whereby, when said tab (10) is pulled upwardly, said cap sheet (13) is synchronously pulled upwardly with the open end (12) thereof still fixed to said upper panel (30), and means for enclosing a peripheral portion of said cap sheet (13) when said cap sheet (13) is pulled out of said upper panel (30) to avoid injuring human bodies by any sharp edge of said cap sheet (13) comprising a flexible material (16) attached on an underside of said cap sheet (13), protruding on the peripheral portion thereof and exceeding the reach of said pressing seam portion (11), with said flexible material (16) being synchronously pulled out with said cap sheet (13) when said cap sheet (13) is pulled out of said upper panel (30).

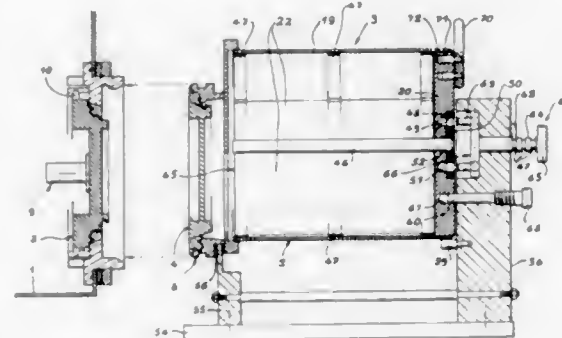
# 5,413,242 TIGHT CONTAINER AND ASSEMBLY OF SAID CONTAINER AND AN APPROPRIATE SUPPORT

Christian Orange, La Luzerne De Haut, 50260 - Bricquebec, France

Filed Jul. 11, 1994, Ser. No. 273,493  
Int. Cl.<sup>6</sup> B65D 55/00

U.S. Cl. 220—592

6 Claims



1. Tight container (3) constituted by a cover (4), an envelope (5) on an opening of which is mounted the cover (4), the opening being offset with respect to a median axis of the envelope, and a drum (45) rotating in the envelope about the median axis, the drum being subdivided into offset compartments (21) and able to come successively in front of the opening when the drum rotates, characterized in that the envelope (5) carries a fastening part (6) equipped with means (14) for locking to an enclosure wall, the drum (45) being terminated by a disk (48) outside the envelope (5), centred on the median axis and positioned, along said median axis, on a side (20) opposite to the opening, the disk (48) being provided with cutouts (49) for receiving pins (69) of the key (63) and covering an envelope portion provided with other cutouts (51) for receiving pins of the key (69) able to extend the cutouts (49).

# 5,413,243 SHARPS DISPOSAL CONTAINER

Richard A. Bemis, Sheboygan, and Kenneth V. Pepper, Plymouth, both of Wis., assignors to Bemis Manufacturing Company, Sheboygan Falls, Wis.

Continuation of Ser. No. 651,294, Feb. 5, 1991, abandoned, which is a continuation of Ser. No. 309,208, Dec. 20, 1988, abandoned, which is a continuation-in-part of Ser. No. 40,430, Apr. 30, 1987, Pat. No. 4,736,860. This application Apr. 9, 1993, Ser. No. 45,830

Int. Cl.<sup>6</sup> B65D 25/00

U.S. Cl. 220—481

30 Claims

1. A medical sharps disposal container apparatus comprising a container including a base and a cover permanently secured to said base, said base and said cover being molded of plastic,

said cover defining an elongated access slot sized to receive medical sharps, said slot having forward and rearward edges, a door supported by said cover for pivotal movement about an axis extending in the direction of said slot, said forward edge of said slot having a length in the direction of said axis, and said door having a length in the direction of said axis substantially equal to said length of said forward edge of said slot, said door being pivotable through a range of positions between an open position and a closed position, said container being completely closed when said door is in said closed position, and said door being prevented by said container from moving beyond said closed position in the direction away from said open position, said door and said cover including an integral mechanism for selectively permanently locking said door in said closed position, said door having opposite ends spaced along said axis, and said door including an outer surface which extends between said ends of said door, a portion of said outer surface defining



a part of a cylinder centered on said axis and being in closely spaced relation to said rearward edge of said slot throughout said range of positions, said outer surface closing said slot when said door is in said closed position, said door also including an inner surface that extends between said ends of said door, that is spaced from said axis, and that has a portion which, when said door is in said open position, extends below and blocks passage into said base through said slot and receives the medical sharps received through said slot, said inner surface also having opposite first and second edges extending in the direction of said axis, said first and second edges being arranged so that, when said door is in said open position, said first edge is adjacent said rearward edge of said slot, and when said door moves from said open position to said closed position, said first edge moves forward and downward to adjacent said forward edge of said slot and said second edge moves rearward, said door closes said slot and the medical sharps on said inner surface fall into said base.

# 5,413,244 OPEN-TOPPED CAN BODY WITH PANELLED SIDE WALLS

Christopher P. Ramsey, Uffington, United Kingdom, assignor to Carnaudmetalbox plc, United Kingdom

Continuation of Ser. No. 51,658, Apr. 26, 1993, abandoned. This application May 4, 1994, Ser. No. 237,724

Claims priority, application United Kingdom, Apr. 25, 1992, 9208984

Int. Cl.<sup>6</sup> B65D 8/12

U.S. Cl. 220—671

25 Claims

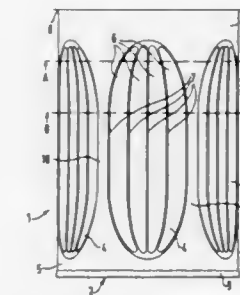
1. An open-topped sheet metal can body comprising an end wall and a tubular side wall upstanding from a periphery of the end wall, the side wall being formed from a plain cylinder defining a cylindrical envelope of the side wall;

said side wall terminating in an open top remote from said end wall;

said tubular side wall includes a plurality of flexible panels recessed within the cylindrical envelope of the side wall,

all said panels being substantially equally spaced from each other in all circumferential directions around said side wall, each of said panels having a central longitudinal axis which extends in a direction generally parallel to an axis central to the cylindrical envelope of the side wall, each panel being connected at each of panel ends thereof to a cylindrical portion of the side wall;

each panel is formed of a plurality of elongated, outwardly concave, side-by-side flutes extending generally parallel to the central axis of the side wall, each flute being defined laterally on each side by an elongated outwardly convex rib;



outermost convex ribs of each panel lie on the cylindrical envelope of the side wall of the can body and, at least in the longitudinal middle region of the panels, the remaining convex ribs of each panel lie inside the cylindrical envelope of the side wall;

each panel curves progressively along an inner peripheral portion in a radially inward direction from opposite outermost convex ribs thereof toward the cylindrical envelope central axis;

and the perimeter dimension of said side wall and the circumference of said cylindrical envelope of the side wall are substantially constant at any position along substantially an entire axial length of the side wall.

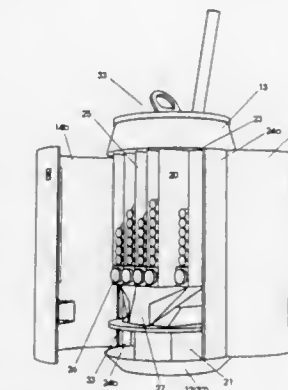
# 5,413,245 VENDING SYSTEM HAVING IMPROVED VENDING ACCESS AND IDENTIFICATION

Christopher B. Wright, San Francisco, Calif., assignor to Wright Food Systems, Inc., San Francisco, Calif.

Continuation-in-part of Ser. No. 823,563, Jan. 22, 1992, Pat. No. Des. 350,987. This application Jul. 22, 1992, Ser. No. 918,573  
Int. Cl.<sup>6</sup> A24F 15/04

U.S. Cl. 221—24

16 Claims



1. A vending system comprising: a main body portion having an external surface in a cylindrical shape and an interior frame, including two opposing side panels spaced apart along a diameter chord of the cylindrical shape, for housing a plurality of stacks and respective dispensing control mechanisms therein for

stacking and dispensing of product units to be vended from said vending system, said cylindrically-shaped main body portion having a body height and diameter defining an interior space for housing said plurality of stacks and dispensing control mechanisms therein;

at least one door hinged to a respective one of the side panels and having an arc-curvature shape defining an arcuate external surface that is flush with the external cylindrical surface of the main body portion and a hollow space on an internal side of the arc-curvature of the door, wherein said door has a door height corresponding to the body height of the main body portion and a door arc-width which is less than said body diameter but sufficiently wide to expose substantially the entire interior space housing said plurality of stacks and dispensing mechanisms; and vending and dispensing means including a payment mechanism, selection buttons, and a dispenser slot mounted on said at least one door for allowing payment, selection, and dispensing of a selected product unit from said vending system, wherein said vending and dispensing means are all arranged along a single, vertical centerline of said at least one door in a deepest part of the curvature of the door so as to be positioned in a space of maximum depth within the arc-width of said arcuate door and thereby allow a greater density of stacks of product units and respective dispensing mechanisms to be housed within the interior space of said main body portion.

5,413,246

#### APPARATUS AND METHOD FOR ALIQUOTTING PHASES OF BLOOD

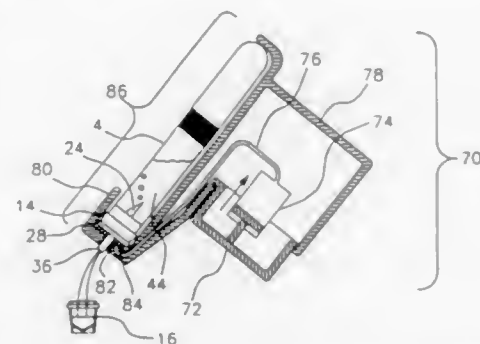
William J. Godolphin, Vancouver; Wilona C. Specht; David P. Pires, both of North Vancouver, and Geoffrey T. Killam, Burnaby, all of Canada, assignors to Automated Corporation, Richmond, Canada

Continuation of Ser. No. 693,653, Apr. 30, 1991, Pat. No. 5,211,310. This application May 5, 1993, Ser. No. 57,306 The portion of the term of this patent subsequent to May 18, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> B65G 59/00

U.S. Cl. 222—1

13 Claims



1. Apparatus for dispensing a liquid such as blood, blood sera or blood plasma from a closed blood collection tube, comprising:

- closure piercing means having an end shaped for piercing a stopper of a blood collection tube and for extending into the tube;
- liquid path means located within said closure piercing means for defining an opening through the stopper when the closure piercing means is inserted through the stopper of the blood collection tube;
- gas passage means to allow gas to be introduced into the interior of the blood collection tube for the purpose of dispensing liquid from the tube;
- gas connection means for making a substantially leak-proof connection between the gas passage means and a gas source;

- input means to produce a first signal indicative of a specified quantity of liquid to be dispensed; and
- controlling means responsive to the first signal to regulate the introduction of gas into the blood collection tube so that the specified quantity of liquid is dispensed.

5,413,247

#### RELEASE ADAPTER FOR PRESSURE GAS CARTRIDGE

Stefan Glasa, Hamburg, Germany, assignor to Bernhardt Apparatebau GmbH u. Co., Germany

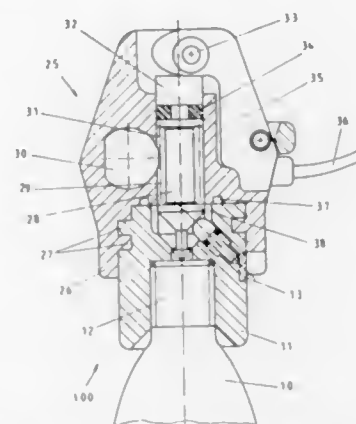
Filed Mar. 29, 1994, Ser. No. 219,202

Claims priority, application Germany, Feb. 5, 1994, 9401917 U

Int. Cl.<sup>6</sup> B67D 5/00

U.S. Cl. 222—5

10 Claims



1. An inflating device comprising a cartridge filled with a pressure gas and which possesses a neck sealed with a diaphragm, a cutter which, in the event of a release, pierces with a sharp bottom portion the diaphragm on the cartridge, and a releasing means which, in the event of a release, acts upon the cutter with a force for piercing the diaphragm, characterized in that:

the cutter is movably accommodated in a disposable part separated from the releasing means, said disposable part being rigidly connected with the cartridge and which can, together with the cartridge, be detachably inserted into the releasing means; and in the disposable part an optical indicating means is additionally accommodated which indicates whether the cutter has been actuated for opening the cartridge.

5,413,248

#### MAPLE SYRUP DISPENSER

David N. Scott, 130 Coleman Rd., Walden, N.Y. 12586

Filed Nov. 9, 1993, Ser. No. 149,513

Int. Cl.<sup>6</sup> B67D 5/22

U.S. Cl. 222—51

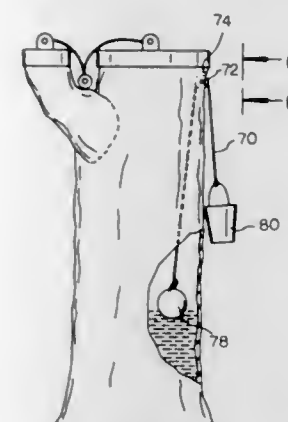
1 Claim

1. A bottle for storing and dispensing maple syrup and like fluids comprising, in combination:

- a one piece container having a generally circular horizontal bottom wall and upstanding side walls of an uneven undulating contour horizontally, vertically, axially and circumferentially, the upper end of the container having a large major opening entirely overlying the bottom wall in an annular configuration and a small minor opening with an annular configuration partially overlying the base portion with an angled tubular extent coupling the minor opening with the main portion of the container, the major opening and the minor opening lying in an essentially common horizontal plane;
- a large cap with a circular top and downwardly extending side walls positionable over the major opening;
- a small cap with a circular cover and downwardly extending side walls positionable over the minor opening;

a cord of a flexible material coupling the major cap and the minor cap;

a level indicator formed of a pulley mounted for rotation in an aperture located in an upper region of the side wall



having a cord with a float at one end within the container and a weight at the other end outside of the container; and a supplemental tube coupled with respect to the minor opening and defining an opening there around to constitute a no-drip spout.

5,413,249

#### AUTOMATIC VENDING MACHINE

Noboru Chigira, Shimoshoshi, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

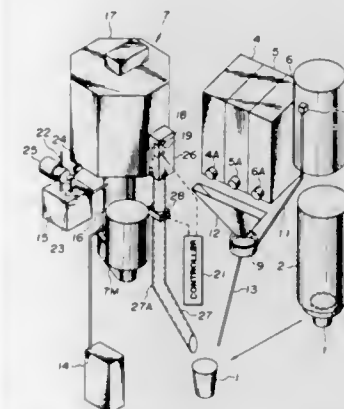
Filed Feb. 18, 1994, Ser. No. 198,903

Claims priority, application Japan, Feb. 26, 1993, 5-038565

Int. Cl.<sup>6</sup> B67D 5/62

U.S. Cl. 222—55

9 Claims



1. An automatic vending machine for supplying a drink in a cup comprising:

- ice making means for making ice;
- an ice chute into which ice is discharged from said ice making means and through which the ice passes for feeding into the cup;
- a sensor for detecting the ice passing through said ice chute and creating an ice passage signal in response thereto; and
- a controller operatively connected to said sensor for determining the amount of ice fed to the cup and controlling the feeding of ice to the cup on the basis of said ice passage signal.

5,413,250

#### UNIT FOR DISPENSING AT LEAST ONE FLUID PRODUCT, IN PARTICULAR A COSMETIC OR PHARMACEUTICAL PRODUCT

Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

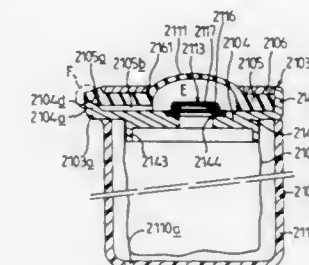
Division of Ser. No. 916,256, Jul. 21, 1992, Pat. No. 5,301,850, which is a division of Ser. No. 556,546, Jul. 24, 1990, Pat. No. 5,154,328. This application Dec. 28, 1993, Ser. No. 174,062

Claims priority, application France, Jul. 25, 1989, 89 10000; Feb. 1, 1990, 90 400269.8

Int. Cl.<sup>6</sup> B65D 35/56

U.S. Cl. 222—105

7 Claims



1. In a unit for dispensing at least one fluid product, said unit comprising:

- a container;
  - a dispensing head;
  - said dispensing head including means defining at least one dispensing duct for said at least one fluid product to be dispensed, said dispensing duct having a first and a second end;
  - closing means situated at said second end of the said at least one dispensing duct;
  - said dispensing duct means comprising an obturator which forms part of a first component of the dispensing head made of an elastically deformable material and at least one seat which forms part of a second component of the dispensing head;
  - said obturator being adapted to be in contact with said seat when no dispensing is taking place, but to move away from said seat by elastic deformation under pressure of the product being dispensed and to reenter into contact with said seat by elasticity when dispensing stops;
- the improvement comprising:
- said at least one dispensing duct comprising a first duct portion having one end in communication with a flexible enclosure for the product and a second end in communication with a one way valve means; said dispensing head including operating means for opening said one way valve means to cause the product to move through said one way valve means toward said obturator, said one way valve including a first member having a plurality of apertures surrounded by a shoulder and a second member including a peripheral portion overlying said shoulder with said peripheral portion including a plurality of apertures movable into and out of engagement with said shoulder to define a flow path through said one way valve means.

5,413,251

#### LIQUID DISPENSING WITH DUAL RESERVOIR DELIVERY SYSTEM

David J. Adamson, 770 N. Main St., Alpine, Utah 84004

Filed Oct. 12, 1993, Ser. No. 134,543

Int. Cl.<sup>6</sup> B67D 5/56

U.S. Cl. 222—129

8 Claims

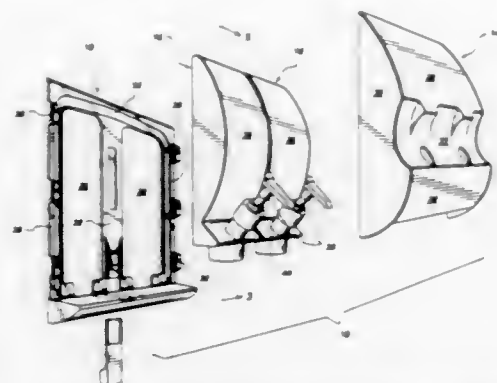
1. A liquid dispensing device for wall mounting, comprising:

- a substantially rectangular back plate for mounting on a wall;
- a cover adapted for quick attachment to and removal from said back plate; and
- a refillable, bottle adapted to conform to the interior



contours of said back plate and said cover, and mountable in functional position within said cover, said bottle being sealed at all times except when dispensing liquid therefrom, said bottle comprising:

- (1) a first reservoir for holding a supply of liquid therein; and
- (2) a second reservoir positioned vertically below and in communication with said first reservoir for vacuum-



pressure-controlled gravity-feed of liquid from said first reservoir to said second reservoir, said second reservoir including a pump for withdrawing liquid from said second reservoir, said second reservoir including a dispensing nozzle area for receiving successive volumes of air introduced thereto by said pump, and metering these volumes of air into said first reservoir to replace like volumes of liquid migrating from said first reservoir to said second reservoir for subsequent dispensing.

5,413,252

## FRUIT JUICE DISPENSER

Eberhard Magnus, Kemscheid, Germany, assignor to Mastermark Corporation, Louisville, Ky.

PCT No. PCT/EP92/00761, § 371 Date Oct. 27, 1993, § 102(e) Date Oct. 27, 1993, PCT Pub. No. WO92/19529, PCT Pub. Date Nov. 12, 1992

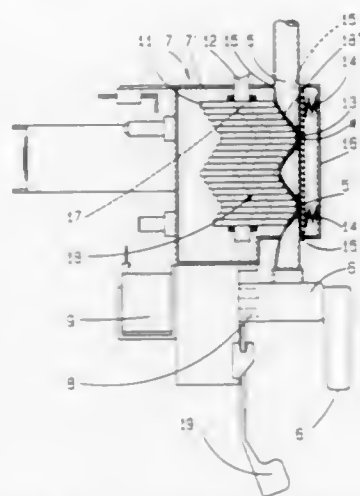
PCT Filed Apr. 4, 1992, Ser. No. 140,159

Claims priority, application Germany, May 2, 1991, 9105439 U

Int. Cl.<sup>6</sup> B65D 35/00

U.S. Cl. 222-129.1

7 Claims



1. A fruit juice dispenser having a receiving device for receiving a concentrate container which is equipped with a spigot hose, said dispenser having a hose pump with a pump housing enclosing said hose pump, said dispenser including a

housing wall which is driven by an electric motor and includes a squeezing means which extends into a hose receiving chamber portion of said pump housing, said squeezing means being displaceable in the direction of conveyance of the juice through the spigot hose;

said dispenser having an electromagnetically controlled water feed device arranged between the hose pump and a spigot opening, said hose pump comprising a plate-block having a squeezing contour which operates as the hose pump and against which the spigot hose is pressed by means of a spring biased rear wall of a flap of the pump housing which can be opened in a forward direction for the insertion of the spigot hose within the hose receiving chamber;

said apparatus further comprising openings in the hose receiving chamber side of the pump housing wall which form bearings for an associated plate block eccentric shaft for the removal of said plate block thereon, including the eccentric shaft, from the pump housing.

5,413,253

## STATIC MIXER

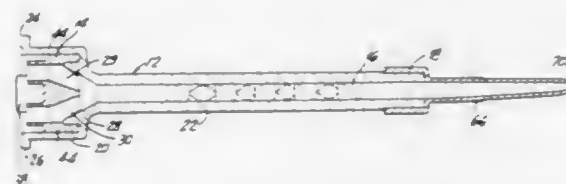
Christian Simmen, Mahwah, N.J., assignor to Coltene/Whaledent, Inc., Mahwah, N.J.

Filed Dec. 6, 1993, Ser. No. 162,859

Int. Cl.<sup>6</sup> B67D 5/52

U.S. Cl. 222-137

17 Claims



1. A static mixer for mixing together at least two materials from a cartridge, comprising:

- an elongated hollow sleeve having an enlarged collar at one end thereof and a mixer tube at a second end thereof;
- coupling means positioned with respect to the collar;
- a center plug, rotatably mounted within the collar of the sleeve, having hollow male prongs extending at a connecting end of the center plug and passageways extending through the prongs and the plug, each passageway having an exit at the mixer tube, and each prong being adapted to engage a respective outlet on a discharge end of the cartridge;
- a mixing element positioned within the mixer tube portion;
- and
- means for rotatably positioning the sleeve into locking engagement with the cartridge.

5,413,254

## VIBRATORY FEEDER

Edward B. Decker, Lake Wylie, S.C., and Edward G. Decker, Charlotte, N.C., assignors to The Pullman Company, Lebanon, N.J.

Filed Jan. 18, 1994, Ser. No. 183,996

Int. Cl.<sup>6</sup> B65G 65/44

U.S. Cl. 222-199

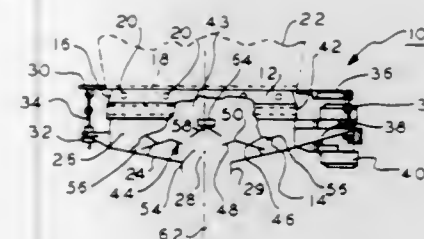
26 Claims

1. Apparatus for flowing material stored in a bin having a lowermost opening through which the material flows to the apparatus, said apparatus comprising:

- a material receiving member having a central material discharge port in a bottom wall thereof and including means for coupling the member to the bin for receiving said material from said bin through said lowermost opening, said member having an inlet opening corresponding to the lowermost opening for receiving said material in an axial

direction, said member including an annular peripheral side wall upstanding from the bottom wall defining a material receiving cavity with said bottom wall;

baffle means secured to the member in the cavity for selectively providing different flow paths for said material to said discharge port;



means for suspending the material receiving member from the bin; and

means for vibrating the suspended material receiving member and baffle means to flow the material to said discharge port from between said baffle means and said member.

5,413,255

## IMPROVEMENTS IN GAS POWERED APPLICATORS

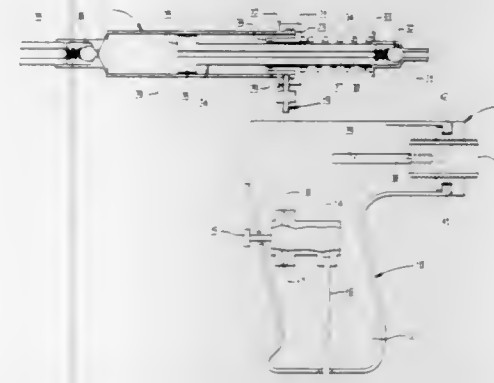
Hugh Dent, Bradford on Avon, United Kingdom, assignor to Mark Anderson, Spring Valley, Wis.

Filed Oct. 4, 1993, Ser. No. 130,871

Int. Cl.<sup>6</sup> B67D 5/00

U.S. Cl. 222-309

3 Claims



1. A gas powered applicator for dispensing measured doses of a liquid and comprising:

- a handle;
- a dispensing unit mounted detachably on said handle;
- a source of gas under pressure;
- an exhaust;
- a manually operable gas control valve adapted to place said dispensing unit selectively in communication with said source of gas under pressure or with said exhaust, said dispensing unit comprising:
- a cylinder;
- piston slidable within said cylinder;
- connecting means connecting one end of said cylinder on a first side of said piston to said manually operable gas control valve;
- spring means biasing said piston toward said one end of said cylinder;
- a source of liquid medicament to be dispensed;
- an inlet non-return valve;
- inlet means through said piston for communicating said source of liquid medicament to the cylinder on a second side of said piston, the flow of medicament through the inlet means being controlled by said inlet non-return valve;

an outlet non-return valve at an other end of said cylinder; and

outlet means leading from said other end of said cylinder, the flow of medicament therethrough being controlled by said outlet non-return valve;

said inlet non-return valve disposed in an inlet passage;

said connecting means connecting said one end of the cylinder to said gas control valve and comprising a detachable coupling;

an adjustable abutment means mounted on said handle for limiting the extent of withdrawal of said piston from said cylinder thereby controlling volume of dose of the medicament drawn into said cylinder on the second side of said piston and subsequently dispensed.

5,413,256

## VALVE ROTOR

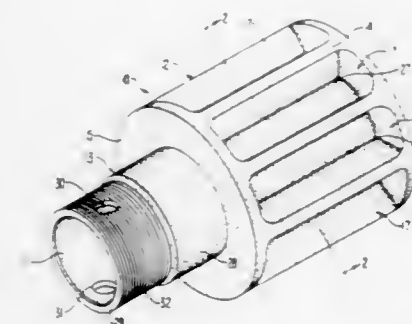
Andrew Mitchell, Montoursville, and Galen Ingram, Muncy, both of Pa., assignors to The Young Industries, Inc., Muncy, Pa.

Division of Ser. No. 693,715, Apr. 30, 1991, Pat. No. 5,246,655. This application Dec. 21, 1992, Ser. No. 995,669

Int. Cl.<sup>6</sup> G01F 11/10

U.S. Cl. 222-368

9 Claims



1. In a rotary valve including a housing having a rotor chamber and a drive shaft journaled in said housing and having an end portion thereof projecting into said rotor chamber, a rotor mountable on said drive shaft within said rotor chamber comprising:

- a solitary body of plastic material having a cylindrical wall provided with a plurality of circumferentially spaced pockets machined-out therein;
- means for detachably mounting said body on said drive shaft;
- and
- means for securing said body to said drive shaft when mounted thereon.

5,413,257

## LID WITH SELECTABLE TYPE OF SPOUT CLOSURE

Nancy D. Amberger, Grand Haven, and John T. Dedoes, Brighton, both of Mich., assignors to Dedoes Industries, Inc., Walled Lake, Mich.

Filed Sep. 20, 1993, Ser. No. 123,799

Int. Cl.<sup>6</sup> A47G 19/12

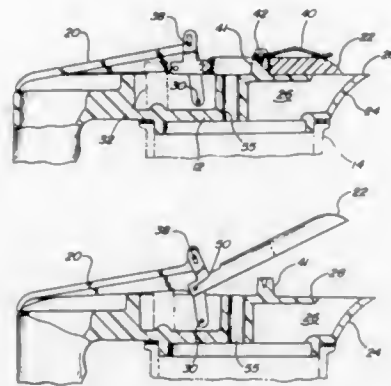
U.S. Cl. 222-472

8 Claims

1. A lid for a can comprising:

- a body dimensioned to cover an open top of the can,
- means for removably securing said body to the can,
- a pouring spout formed in said body for dispensing material from the can, said spout having a generally flat upper surface and an opening formed through said surface,
- a closure,
- means for selectively moving said closure between a first and second position, or between a first and third position, wherein in said first position said closure covers said opening through said spout surface and closes said pouring spout, wherein in said second position said closure pivots obliquely

from an inner end of the closure with respect to said upper surface of said pouring spout to thereby open said spout for dispensing material from the can,



wherein in said third position said closure is retracted inwardly with respect to said body to thereby open said spout for dispensing material from the can.

5,413,258

## WIPING DEVICE FOR CAULKING

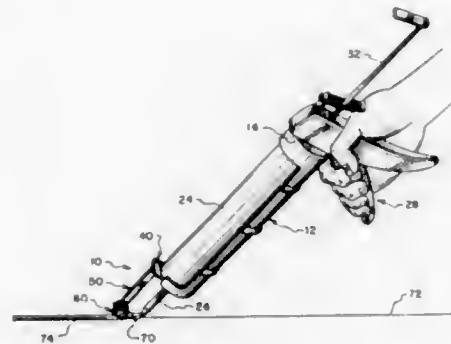
David Kartler, Las Vegas, Nev., assignor to Thomas P. Mahoney and J. Mark Holland, both of Newport Beach, Calif.

Filed Sep. 8, 1993, Ser. No. 118,134

Int. Cl.<sup>6</sup> B28B 3/00

U.S. Cl. 222—575

16 Claims



1. In a wiping device for use with a caulking applicator having a caulking outlet, the combination of: mounting means for positioning said device on said caulking applicator adjacent said outlet but spaced therefrom; an arm secured to said mounting means at a location spaced from said outlet; and wiping means located on the outer extremity of said arm, said arm and said wiping means being configured to permit the application and smoothing of caulk in a corner joint of an adjacent surface, in which said wiping means is hygroscopic.

5,413,259

## DEVICE FOR REPEATED, AUTOMATIC METERING OF DOSES OF A POWDERED DETERGENT IN WATER-CONDUCTING CLEANING MACHINES

Daniele Cerruti, Caresana-VC, Italy, and Egon Galler-Benker, Offingen, Germany, assignors to Bosch-Siemens Hausgeraete GmbH, Munich, Germany

Filed Nov. 23, 1993, Ser. No. 156,884

Claims priority, application Italy, Mar. 26, 1992, TO92A0265

Int. Cl.<sup>6</sup> B67D 5/00

U.S. Cl. 222—636

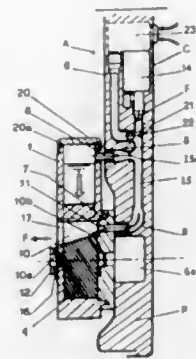
12 Claims

1. In a water-conducting cleaning machine having a processing vessel, a device for repeated, automatic metering of doses of a powdered detergent, comprising:

- a detergent holder having an interior and an outlet opening;
- a metering and dispensing device disposed below said outlet

opening and having at least one indentation with an interior for receiving individual doses of a powdered detergent from said outlet opening and for feeding the individual doses to the processing vessel in a dispensing position thereof;

- a duct communicating with said metering and dispensing device;



- a compressed air generator connected with said duct and communicating with said metering and dispensing device through said duct, said compressed air generator generating a flow of compressed air continuously acting upon the interior of said detergent holder and acting upon the interior of said indentation in the dispensing position thereof for ejecting the detergent from the interior of said indentation with the compressed air.

5,413,260

## CARGO CARRIER FOR A VAN

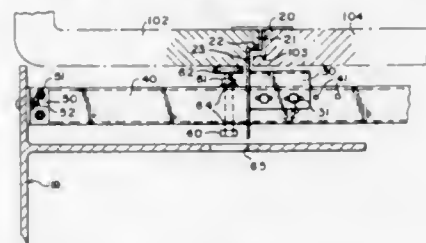
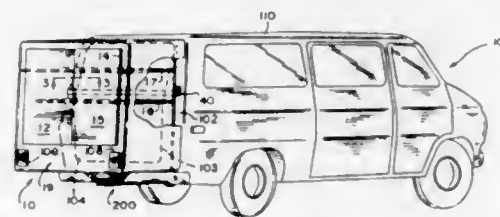
Raymond D. McFarland, 5214 Central College Rd., Westerville, Ohio 43081-9372

Filed Mar. 7, 1994, Ser. No. 206,685

Int. Cl.<sup>6</sup> B60R 9/06

U.S. Cl. 224—42.03 A

7 Claims



1. A cargo carrier for a vehicle comprising:
  - (a) a carrier housing member extending substantially across the width of the vehicle from a rear bumper on the vehicle to the roof line of the vehicle;
  - (b) connecting means for rigidly attaching said carrier housing member to the rear of said vehicle without the necessity of altering the vehicle in any way, wherein said connecting means comprises weight support means for supporting a bottom portion of said housing member from an existing tow hitch bar on the vehicle, lateral support means for preventing rotation of said cargo carrier about the tow hitch bar, said lateral support means including tee

brackets with head portions flush with the interior of the vehicle and with leg portions fitting through the contours of an existing door crack and extending rearwardly of the vehicle, said rearwardly extending part of said leg portion of each of said tee brackets having an aperture extending therethrough, and a horizontal carrier cross bar secured at both ends to said cargo carrier and passing through said apertures in each of said tee brackets; and

- (c) pressure application means connected to said cross bar for generating a force tending to rotate said carrier about said weight support means away from said vehicle body; wherein generation of said force by said pressure application means pulls said head portions of said tee brackets against the interior of the vehicle with sufficient force to prevent any motion of said tee brackets in the door crack, and said cross bar, being surrounded by said apertures, is prevented from motion by said apertures.

5,413,261

## SAFE DETACHABLE BAND FOR A CHILD'S WATER BOTTLE

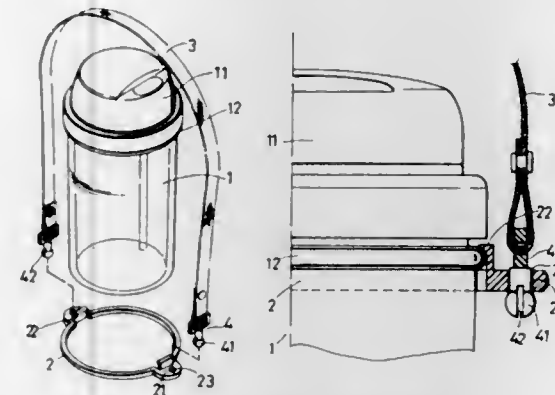
Hua-Te Wu, Tainan, Taiwan, Prov. of China, assignor to Yienn Lib Enterprise Co., Ltd., Tainan, Taiwan, Prov. of China

Filed Dec. 21, 1993, Ser. No. 170,813

Int. Cl.<sup>6</sup> A45F 3/14

U.S. Cl. 224—148

1 Claim



1. A bottle safety band system comprising:
  - (a) a bottle having an annular edge member formed on an upper section of said bottle;
  - (b) a cap member removably secured to said upper section of said bottle, said cap member and said annular edge member forming an annular recess therebetween when said cap member is secured to said bottle;
  - (c) a hitching ring member having an annular contour for displaceable mounting on a sidewall of said bottle, said hitching ring member having a pair of diametrically opposed semi-circularly contoured projections extending therefrom, each of said semi-circularly contoured projections having a projection opening passing therethrough and a hook member extending therefrom for insert into said annular recess between said annular edge member and said cap member;
  - (d) a band member having opposing end sections; and,
  - (e) a pair of fitting pins respectively coupled to said opposing end sections of said band member, each of said fitting pins having a downwardly extending ball member, each of said ball members having a vertically directed slot formed therein forming a pair of ball member half portions whereby said ball member half portions may be inserted through a respective one of said projection openings when said half portions are displaced toward each other and whereby said hook members are released from said annular recess when a predetermined force is applied to said band member.

5,413,262

## LUMBAR SUPPORTING BELT

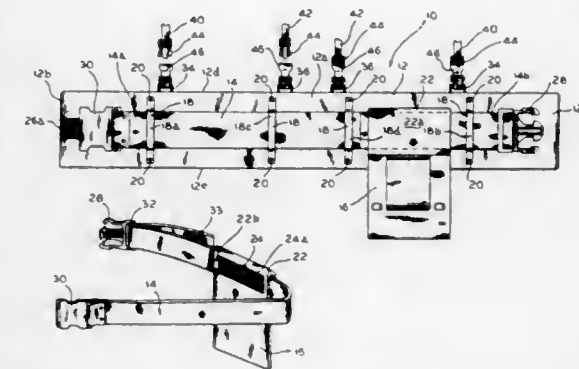
Robert J. Dewire, Naperville, Ill., and John D. Krueger, Fontana, Wis., assignors to Sears Roebuck & Co., Hoffman Estates, Ill.

Filed May 7, 1993, Ser. No. 58,396

Int. Cl.<sup>6</sup> A45F 5/00

U.S. Cl. 224—253

19 Claims



1. A lumbar supporting belt, comprising:
  - a relatively wide inner belt adapted to extend entirely about the waist of a person, said inner belt having a middle region adapted to be positioned in the lumbar region of the back and having opposing ends adapted to be placed in proximity to one another, said inner belt being formed of a soft, flexible material;
  - means for releasably connecting said opposing ends of said inner belt to secure said inner belt about the waist of said person after said inner belt has been pulled tight with said middle region in the lumbar region of the back;
  - a relatively narrow outer belt adapted to extend entirely about the waist of a person, said outer belt overlying said inner belt and having opposing ends corresponding to said opposing ends of said inner belt and adapted to be placed in proximity to one another, said outer belt being formed of a flexible, non-stretchable material;
  - means for releasably connecting said opposing ends of said outer belt and tightening said outer belt to secure said outer belt tightly about the waist of said person after said inner belt has been stretched and said opposing ends of said inner belt have been connected;
  - said outer belt being formed to have a sufficient length to extend entirely about said inner belt in relatively moveable relationship; and
  - releasable support means on said inner belt for cooperation with corresponding releasable support means on a tool pouch when said releasable support means are disposed in generally confronting relationship, wherein the outer belt contributes to maintaining the cooperation of the releasable support means on said inner belt and said tool pouch.

5,413,263

## APPARATUS FOR BREAKING PLATE GLASS

Shigeru Bando, Tokushima, Japan, assignor to Bando Kiko Co., Ltd., Tokushima, Japan

PCT No. PCT/JP91/00893, § 371 Date Feb. 4, 1992, § 102(e) Date Feb. 4, 1992, PCT Pub. No. WO92/00922, PCT Pub. Date Jan. 23, 1992

Continuation of Ser. No. 829,039, Feb. 4, 1992, abandoned. This PCT application Jul. 3, 1991, Ser. No. 139,062

Claims priority, application Japan, Jul. 5, 1990, 2-179139

Int. Cl.<sup>6</sup> C03B 33/033

U.S. Cl. 225—96.5

7 Claims

1. An apparatus for breaking plate glass, comprising:
  - belt conveyor means including a belt for conveying plate glass placed thereon;
  - movable breaking means disposed above the belt for pressing the plate glass and thereby breaking the same along a



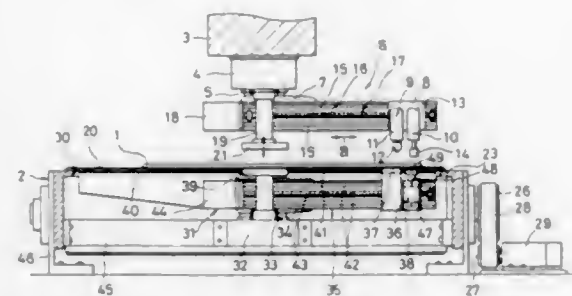
cutting line formed on a surface of the plate glass placed on the belt, said breaking means being movable in a first plane parallel to an upper surface of the belt on which the plate glass is placed;

first moving means for moving the breaking means relative to the belt in the first plane parallel to the upper surface of the belt;

lifting means provided above the belt for lifting the plate glass which is on the belt;

supporting means underneath the belt for supporting the plate glass which is on the belt through the belt, the supporting means including a belt supporting plate which is rotatable in a second plane parallel to the upper surface of the belt and has a cutout;

movable glass support means disposed under the belt for providing additional support for the plate glass through the belt, said glass support means being movable in the second plane parallel to the upper surface of the belt,



movable crack developing means disposed under the belt for developing a crack in the cutting line of the plate glass through the belt, said crack developing means being movable in the second plane parallel to the upper surface of the belt;

second moving means for moving the glass support means and the crack developing means in the second plane parallel to the upper surface of the belt in a polar coordinate system to position the glass support means and the crack developing means in alignment with the breaking means moved by the first moving means, said second moving means being adapted to rotate the belt supporting plate in the second plane to position the cutout, the glass support means and the crack developing means in alignment with the breaking means, whereby the glass support means and the crack developing means support the plate glass and develop the crack to the plate glass, respectively, through the cutout.

5,413,264

# SERIAL ACCUMULATOR SYSTEM FOR FILAMENTARY MATERIAL

Frank W. Kotzur, Carmel; Mark Swanson, Mahopac; Kevin Sutton, Peekskill; Donald J. Hopko, Carmel; Thomas Rosenkranz, Dover Plains; and David Franklin, Carmel, all of N.Y., assignors to Windings, Inc., Patterson, N.Y.

Continuation of Ser. No. 37,682, Mar. 25, 1993, abandoned, which is a continuation of Ser. No. 631,682, Dec. 24, 1990, abandoned. This application Aug. 2, 1994, Ser. No. 284,282

Int. Cl.<sup>6</sup> B65H 20/24; G11B 15/56

U.S. Cl. 226—119

3 Claims

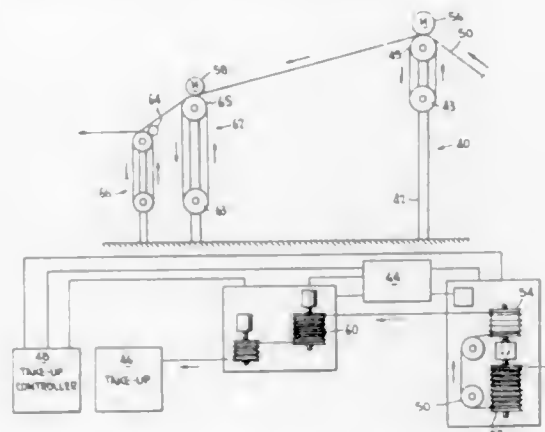
1. A winding accumulator system for controlling the storage of filamentary material between a source of such material and a winding receptacle, comprising:

a plurality of serially interconnected accumulator units, each including means for storing filamentary material with a first accumulator unit receiving filamentary material from said source and storing a given amount of filamentary material, and each succeeding accumulator unit storing additional amounts of filamentary material, each of the accumulator units includes a stationary block and a movable block for storing said filamentary material, whereby

movement of said movable block away from and toward said stationary block respectively increases or decreases the amount of filamentary material stored in the accumulator unit;

a capstan and associated capstan motor positioned between adjacent accumulator units for controlling the movement of filamentary material between the adjacent accumulator units;

means for controlling the rotation of each of the capstan motors to vary the amount of said filamentary material stored in the adjacent accumulator units with changes in the acceleration and deceleration of said filamentary material caused by a change in the input or output of filamentary material in the winding accumulator system; said means for controlling including:



means for sensing a desired reference amount of filamentary material stored in each of said accumulator units;

means for determining the change in the amount of filamentary material stored in each of said accumulator units;

said means for controlling further including means for generating respective compensation signals from the change in the amount of filamentary material in each of the adjacent accumulator units to control each respective capstan motor; and

said means for controlling further including reference clamping circuits for at least one of decreasing and increasing the respective capstan motor control compensating signals from two of said means for generating associated with adjacent accumulator units to control the capstan motor between said two adjacent accumulator units.

5,413,265

# ARRANGEMENT FOR TRANSPORTING WEB-SHAPED MATERIALS TO BE SCANNED OR EXPOSED

Werner Stahl, Heimstetten, and Volkmar Voigtlaender, Eichenau, both of Germany, assignors to AGFA-Gevaert A.G., Leverkusen, Germany

Continuation-in-part of Ser. No. 719,822, Jun. 24, 1991, abandoned. This application Jan. 22, 1993, Ser. No. 7,607

Claims priority, application Germany, Jul. 7, 1990, 40 21 660.8

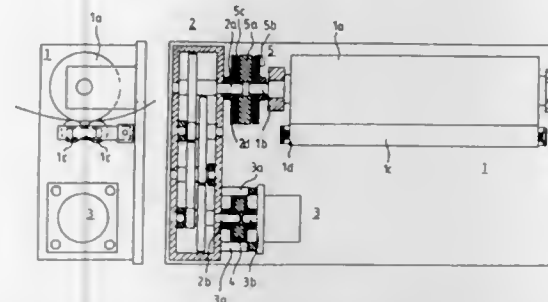
Int. Cl.<sup>6</sup> B65H 20/00; F16H 1/12

U.S. Cl. 226—188

11 Claims

1. An arrangement for driving at least one roller of a roller unit for transporting web-shaped materials, such as X-ray sheet films or stimulatable phosphorous foils with substantially constant speed in a device for exposing or scanning these materials, the arrangement comprising a stepping motor having a motor output shaft; a friction drive having a drive input shaft connected with said motor output shaft of said stepping motor and also having a drive output shaft connected with the at least one roller; means for vibration damping provided between said

motor output shaft and said drive input shaft, said friction drive being formed with a transmission ratio such that a ratio between steps of said stepping motor and a transporting path of the web-shaped material is at least 20 steps per one millimeter, so that said ratio between steps of said stepping motor and a



transporting path of the web-shaped material in combination with said friction drive and said vibration damping means arranged between said stepping motor and said friction drive provide conversion of a stepped motion of the stepping motor into a continuous motion of said roller to provide an accurate and approximately uniform movement of said roller.

5,413,266

# COMPACT GEAR ARM POWERED STAPLER WITH MOVABLE ANVIL

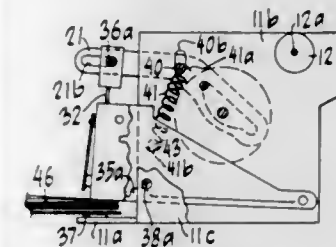
Sarwan A. Jaiaram, Richmond Hill, N.Y., assignor to Acco USA, Inc., Wheeling, Ill.

Continuation-in-part of Ser. No. 80,373, Jun. 18, 1993, abandoned, which is a continuation-in-part of Ser. No. 3,340, Jan. 12, 1993, abandoned, which is a continuation of Ser. No. 940,934, Sep. 3, 1992, abandoned, which is a continuation of Ser. No. 761,102, Sep. 17, 1991, abandoned. This application Apr. 13, 1994, Ser. No. 226,909

Int. Cl.<sup>6</sup> B25C 5/02

U.S. Cl. 227—129

6 Claims



1. In a stapler having a frame, a head, a driver blade and one or more pivotal arms for controlling and driving said drive blade, the improvement comprising:

- said one or more pivotal arms having a first exterior surface and a second exterior surface spaced apart by a selected distance which distance is the pivotal arm thickness;
- an elongated follower cam slot extending between said exterior surfaces in the interior of said one or more pivotal arms, said slot having only one continuous wall having a width equal to said one or more pivotal arms thickness;
- a driven rotatable gear mounted on an axle rotatable in the frame;
- a pin on said driven gear which rotates with the gear, which pin rides within and along such wall of the cam slot to cause said one or more pivotal arms to pivot;
- clutching wings mounted on the frame and pivotable upwardly and downwardly;
- a staple clinching arm unit including a clinching arm and pivot means on the frame for pivotally connecting said clinching arm to the frame, wherein said clinching arm engages said wings to cause said wings to pivot upwardly

and to pivot downwardly; and a pivot arm shaft about which said one or more pivotal arms pivots, said pivot arm shaft passing through frame slots substantially larger than the pivot arm shaft, said pivot arm shaft being resiliently mounted to permit the pivot arm shaft to move upwardly or downwardly within said frame slots depending on the thickness of the work being stapled.

5,413,267

# SURGICAL STAPLER WITH SPENT CARTRIDGE SENSING AND LOCKOUT MEANS

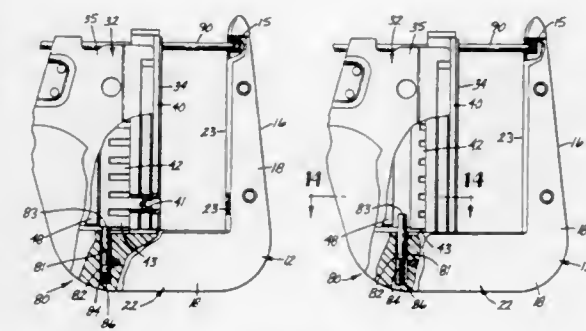
Alan J. Solyntjes, Richfield, and Robert M. Eyerly, Lino Lakes, both of Minn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed May 14, 1991, Ser. No. 699,718

Int. Cl.<sup>6</sup> A61B 17/068

U.S. Cl. 227—176

37 Claims



1. A surgical stapler comprising:

an anvil frame having proximal and distal ends, and a pair of lateral side portions each being elongate in a longitudinal direction and spaced to define a channel therebetween, said anvil frame having a handle portion generally adjacent said proximal end and having first and second ends, and a jaw portion having anvil surfaces generally adjacent said distal end and positioned in a plane generally perpendicular to said longitudinal direction, and an elongate manually movable lever part having first and second ends, said lever part having pivot means at said second end adapted for affording relative pivotal movement of said lever part and said anvil frame between a release position with said first end of said lever part being spaced from said first end of said handle portion and an actuation position with said lever part and said handle portion in closely spaced relationship;

biasing means for biasing said lever part toward said release position;

a cartridge assembly having proximal and distal ends and being mounted in said channel between said lateral side portions for longitudinal movement relative to said anvil frame, said cartridge assembly including, a cartridge transporting member having first and second side portions each being elongate in said longitudinal direction and being spaced to define a ram channel therebetween, said first and second side portions having surfaces defining a cartridge groove generally adjacent said distal end of said cartridge assembly, said cartridge groove surfaces being adapted to releasably receive a cartridge housing containing a plurality of staples disposed in at least one row positioned in opposition to said anvil surfaces, and pusher means for pressing said staples within said cartridge housing against said anvil surfaces to engage and close the staples in tissue between the cartridge housing and the anvil surfaces, said pusher means mounted for movement relative to the cartridge housing between a pre-fired and a fired position;

means mounting said cartridge assembly for longitudinal movement relative to said anvil frame between a closed

position with said cartridge housing and said anvil surfaces in closely spaced relationship, and an open position with said cartridge housing and said anvil surfaces spaced farther from each other than in said closed position;

an elongate ram mounted in said ram channel between said first and second side portions for longitudinal movement relative to said cartridge transporting member and said anvil frame, said ram engaging said pusher means to move said pusher means from said prefired position to said fired position when said cartridge housing and said anvil surfaces are in closely spaced relationship;

actuation means for initially moving said cartridge assembly from said open position to said closed position in response to movement of said lever part from said release position to said actuation position and for subsequently moving said ram distally relative to said cartridge transporting member by again moving said lever part from said release position to said actuation position;

means for biasing said cartridge assembly from said closed position to said open position; and

means for preventing said cartridge assembly from moving from said open position to said closed position when the stapler is loaded with a cartridge housing having the pusher means disposed in a fired position, said preventing means including a safety aperture defining an opening in the surface of the anvil frame and a locking pin mounted in the safety aperture for movement between a first position to afford free movement of the cartridge assembly between said open position and said closed position, and a second blocking position to prevent such movement.

5,413,268

**APPARATUS AND METHOD FOR PLACING STAPLES IN LAPAROSCOPIC OR ENDOSCOPIC PROCEDURES**  
David T. Green, Westport; Henry Bolanos, East Norwalk; Daniel E. Alesi, New Fairfield; Keith Rateliff, Sandy Hook, and Charles R. Sherts, Southport, all of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

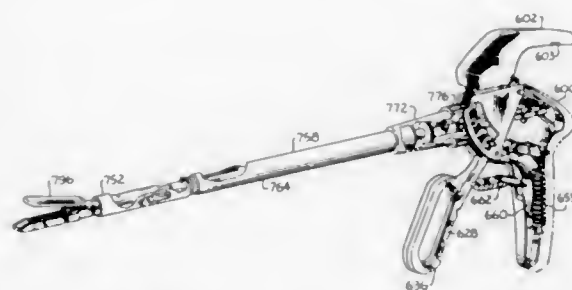
Continuation of Ser. No. 27,566, Mar. 8, 1993, abandoned, which is a continuation of Ser. No. 593,654, Oct. 5, 1990, abandoned, which is a continuation-in-part of Ser. No. 358,646, May 26, 1989, Pat. No. 5,040,715. This application Sep. 30, 1993, Ser. No. 129,862

The portion of the term of this patent subsequent to Aug. 20, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> A61B 17/072

U.S. Cl. 227—176

47 Claims



1. A surgical apparatus for driving surgical fasteners into body tissue comprising:
  - a) a frame;
  - b) an endoscopic portion defining a longitudinal axis and extending distally from said frame, said endoscopic portion including:
    - i) an elongated support for receiving a cartridge assembly, the cartridge assembly having a distal end and a proximal end and including a plurality of surgical fasteners slidably mounted therein, and having a tissue engaging surface;
    - ii) a jaw member having an external ramped camming surface, a distal end and a proximal end, said proximal

- end of said jaw member being pivotally retained in said elongated support such that the jaw member is movable between an open position and a closed position in close cooperative alignment with the tissue engaging surface of the cartridge assembly and said distal end of said jaw member is in juxtaposed alignment with said distal end of said cartridge assembly;
- iii) closure means for moving the jaw member between the open position and the closed position, said closure means including at least a camming surface transverse to said longitudinal axis for contacting said ramped camming surface of said jaw member whereby longitudinal movement of said closure means relative to said jaw member causes said transverse camming surface to contact said ramped camming surface of said jaw member and movement of said jaw member to said closed position;
- iv) pusher elements for ejecting the surgical fasteners from the cartridge assembly, through tissue;
- c) gas seal means for sealing said endoscopic portion to obstruct the passage of gaseous media therethrough; and
- d) means which translates with respect to said endoscopic portion independent of said closure means for actuating said pusher elements.

5,413,269

#### METHOD TO IMPLANT DEFECTS IN A METALLIC COMPONENT

Juan A. D. Aja, San Touch, Spain, assignor to Equipos Nucleares, S.A., Spain

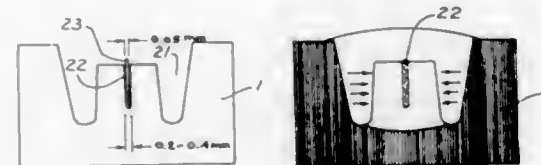
Filed Dec. 18, 1992, Ser. No. 994,217

Claims priority, application Spain, Dec. 18, 1991, 9102811

Int. Cl.<sup>6</sup> B23K 31/12

U.S. Cl. 228—104

9 Claims



1. A method for directly implanting a defect, of a type selected from any fine, thick or volumetric defect, into a model element, the method comprising the steps of:
  - cutting a recess in the model element;
  - placing the defect in the recess;
  - deforming a portion of the recess to substantially cover the defect; and
  - subsequently refilling the recess by a welding process.

5,413,270

#### METHOD FOR REMOVING A PORTION OF A COATING BY LIQUID JETS

Pierre M. S. Lechery, Ste Genevieve des Bois, and Paul L. Silva, Vert Saint Denis, both of France, assignors to Societe Nationale D'Etude et de Construction de Moteurs D'Aviation "SNECMA", Paris, France

Filed Dec. 28, 1993, Ser. No. 174,403

Claims priority, application France, Jan. 6, 1993, 93 00042

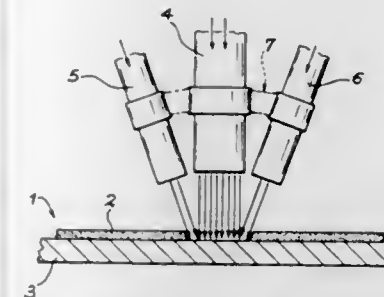
Int. Cl.<sup>6</sup> B23K 20/18; B24C 5/02

U.S. Cl. 228—118

12 Claims

1. A method for removing a portion of a coating which resists a diffusion welding and which covers a surface of a plate comprising:

- cutting at least one main depth cut with a wide liquid jet to remove the coating over almost the entire portion; and



- cutting at least one finishing depth cut with a fine jet to remove the coating from a peripheral contour of the portion.

5,413,271

#### FORMING OF METAL ARTICLES

Martin H. Mansbridge, and David Irwin, both of Bristol, England, assignors to British Aerospace Public Limited Company, Hampshire, United Kingdom

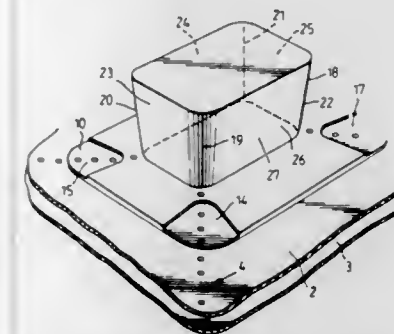
Filed Feb. 25, 1994, Ser. No. 202,115

Claims priority, application United Kingdom, Feb. 27, 1993, 9304041

Int. Cl.<sup>6</sup> B23K 28/02

U.S. Cl. 228—157

9 Claims



1. A method of forming a metal article including the steps of placing sheet material including at least one sheet of superplastically formable material and a sheet of reinforcing material adjacent a said sheet of superplastically formable material within a mold tool having a male former protruding from the tool surface positioned to contact said sheet of reinforcing material during forming and causing the at least one superplastically formable sheet adjacent the reinforcing sheet to be superplastically formed into conformation with the surface of the mold tool and simultaneously to urge the sheet of reinforcing material against the male former, the method being characterized by thinning at least one selected area of the sheet of reinforcing material, said at least one area being adapted to form around at least one region of high curvature of the male former whereby to promote controlled folding of the reinforcing sheet thereabout.

5,413,272

#### SURGICAL FASTENING DEVICE

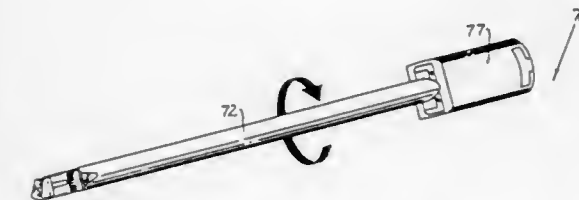
David T. Green, Westport; Henry Bolanos, East Norwalk; Dominick L. Mastri, Bridgeport; Richard A. McGarry, Norwalk, all of Conn., and Wayne P. Young, Brewster, N.Y., assignors to United States Surgical Corporation, Norwalk, Conn.

Continuation of Ser. No. 931,591, Aug. 18, 1992, Pat. No. 5,257,713, which is a continuation-in-part of Ser. No. 696,511, May 7, 1991, Pat. No. 5,217,472. This application Sep. 14, 1993, Ser. No. 121,012

Int. Cl.<sup>6</sup> A61B 17/04

U.S. Cl. 227—175

26 Claims



1. An endoscopic surgical apparatus for applying surgical fasteners to body tissue in a manner to improve access to the surgical site during endoscopic procedures, the apparatus comprising:

- a) an elongated endoscopic portion having a longitudinal axis and a distal end, the elongated endoscopic portion dimensioned for insertion through a cannula;
- b) a surgical fastener positioned in the elongated endoscopic portion along the longitudinal axis, the surgical fastener having a pair of legs oriented in a first direction such that the legs are directed toward the distal end of the elongated endoscopic portion;
- c) a fastener closing member positioned at the distal end portion of the elongated endoscopic portion for closing the fastener;
- d) a fastener pusher operable from a proximal end of the apparatus and dimensioned for engaging and moving the surgical fastener into engagement with the fastener closing member for closing the surgical fastener, the fastener pusher moving the surgical fastener along a non-linear fastener track, wherein the direction of the legs of the surgical fastener are altered such that the legs are oriented in a second direction during application of the surgical fastener to body tissue to thereby improve access to the body tissue during endoscopic procedures, the second direction being different from the first direction;
- e) wherein initial movement of the fastener pusher moves the surgical fastener in a distal direction and alters the direction of the legs of the surgical fastener such that the legs are oriented in the second direction, and subsequent movement of the fastener pusher closes the surgical fastener.

5,413,273

#### MERCHANDISE CONTAINERS

Julian D. Money, Richmond, United Kingdom, assignor to M-Pak Limited, London, England

PCT No. PCT/GB93/01489, § 371 Date Sep. 24, 1993, § 102(e) Date Sep. 24, 1993, PCT Pub. No. WO94/02363, PCT Pub. Date Feb. 3, 1994

PCT Filed Jul. 15, 1993, Ser. No. 122,509

Claims priority, application United Kingdom, Jul. 28, 1992, 9216024; Oct. 28, 1992, 9222754

Int. Cl.<sup>6</sup> B65D 5/08, 5/478, 5/10

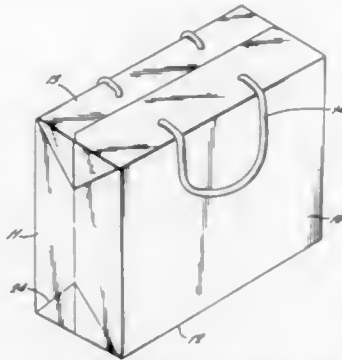
U.S. Cl. 229—128

13 Claims

1. A merchandise container formed from folded flexible sheet material to provide a box form having side walls, end walls and a top closure, the top closure comprising side wall flaps which overlap to close the container and end wall flaps which are integral with the side wall flaps and form triangular



wings on the end wall which can be folded downwardly to lie against the end walls, wherein the improvement comprises forming the end walls of the container with central crease lines extending lengthwise of the end walls from upper edges of said end wall flaps down the end walls to allow the end walls to bow inwardly into a concave formation so that as the wings are



folded downwardly through horizontal towards the end walls, the end walls can bow inwardly to cause the side walls to converge towards one another, thereby causing the wings to be biased downwardly against the end walls of the container, which are inwardly bowed, to hold the side wall flaps over a top opening of the container in closed, overlapping condition.

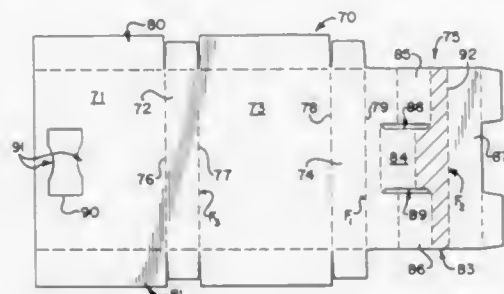
#### 5,413,274 FRONT LOADED DISPLAY CARTON

Hampton E. Forbes, Jr., Edinburg, Va., assignor to Westvaco Corporation, New York, N.Y.  
Division of Ser. No. 1,252, Jan. 6, 1993, Pat. No. 5,328,089. This application Mar. 8, 1994, Ser. No. 207,069

Int. Cl.<sup>6</sup> B65D 25/04

U.S. Cl. 229—162

3 Claims



1. A collapsible display carton prepared from a folded blank of paperboard comprising front and rear panels joined to opposing side wall panels along scored fold lines, end closure flaps foldably attached to the ends of said front, rear and side wall panels, a display opening cut from said front panel and an extension panel foldably attached to one of said side wall panels, said extension panel being cut and scored to provide a U-shaped section the entirety of which is adhered to the interior of said front wall, a T-shaped section the entirety of which is adhered to the interior of said rear wall, a pair of stop panels located adjacent to the vertical leg of said T-shaped section, a header panel beneath the vertical leg of said T-shaped section, and a second header panel located adjacent to the horizontal leg of said T-shaped section, said stop panels and header panels being adapted to form a product pocket beneath the display opening.

#### 5,413,275 METHOD OF POSITIONING AND SOLDERING OF SMD COMPONENTS

Martinus M. F. Verguld, and Hubertus T. Mollen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

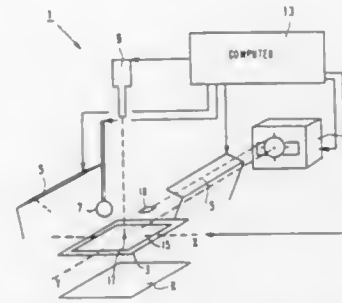
Continuation of Ser. No. 627,121, Dec. 13, 1990, abandoned. This application Oct. 19, 1992, Ser. No. 132,628

Claims priority, application Netherlands, Dec. 20, 1989, 8903109

Int. Cl.<sup>6</sup> B23K 1/005, 31/02

U.S. Cl. 228—180.21

24 Claims



3. A method of surface mounting, by positioning and soldering, electronic components via their connections to the surface of a printed circuit board comprising:  
applying soldering material to the printed circuit board;  
melting the soldering material by heating the soldering material to a temperature such that the soldering material is in the molten state;  
placing an electronic component and its connections in the resultant molten soldering material; and  
cooling the soldering material to thereby harden the soldering material and fasten said electric component to the printed circuit board.

#### 5,413,276 PLURAL-COMPONENT ONE-PIECE SHIPPING AND RETAIL DISPLAY CARTON

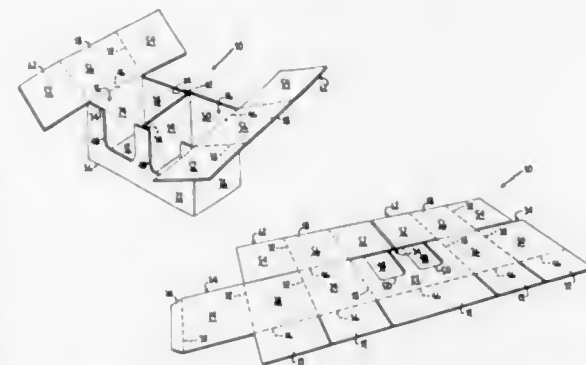
Phil B. Sheffer, Thomasville, Pa., assignor to Triangle Container Corporation, Philadelphia, Pa.

Filed Sep. 14, 1994, Ser. No. 306,178

Int. Cl.<sup>6</sup> B65D 5/486

U.S. Cl. 229—120.11

13 Claims



1. A plural-compartment, one-piece carton comprising:  
a plurality of panels foldably attached to one another and extending between upper and lower edges;  
two removable flaps foldably attached to the upper edges of two of the panels and other flaps foldably attached to the lower edges of at least some of the panels;  
wherein, the carton has a collapsed state in which spaced portions of the panels are overlapped and affixed together,

and in which the flaps extend generally coplanar with the attached panels;  
the carton is foldable from the collapsed state to an erected state in which said other flaps are folded to and fixed in a plane perpendicular to the panels such that the panels define the sidewalls of the carton and at least one partition in the carton; and,  
wherein in the erected state the removable flaps are foldably attached to and permanently detachable from the carton.

#### 5,413,277 LIQUID-FILLED THERMOSTATIC SYSTEM

Wolfgang Rothengass, Limbach-Laudenberg, Germany, assignor to Alfred Buchta, Seeheim, Germany  
PCT No. PCT/DE91/00590, § 371 Date Oct. 12, 1993, § 102(e) Date Oct. 12, 1993, PCT Pub. No. WO92/07314, PCT Pub. Date Apr. 30, 1992

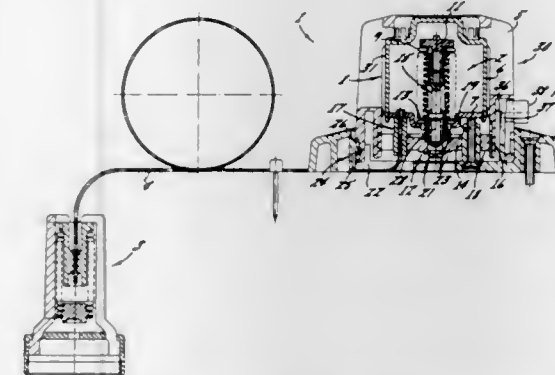
PCT Filed Jul. 18, 1991, Ser. No. 39,167

Claims priority, application Germany, Oct. 11, 1990, 40 32 285.8

Int. Cl.<sup>6</sup> G05D 23/12

U.S. Cl. 236—42

20 Claims



1. An activating device (1) which is adapted for controlling an operating device (3) which is positioned to control a heat valve, and comprising

an annular base plate (10) defining a central region which is bounded by the base plate,  
a housing (8) comprising a pot shaped cover (6) and a bottom wall (7) and so as to define a fluid enclosure therewithin,  
a capillary line (4) connected to said housing so as to communicate with said fluid enclosure,  
means mounting said housing to said base plate with said bottom wall being adjacent or within said central region of said base plate, and with said cover extending outwardly a substantial distance beyond said central region of said base plate,  
an axially extendable bellows-type tube (9) mounted within said housing so as to define a central axis which is generally perpendicular to said base plate, said tube having a bottom end (13), and an opposite free end (11), with said bottom end being mounted to said bottom wall of said housing and with said free end being positioned axially a substantial distance beyond said central region of said base plate,  
a knob (5) rotatably mounted to said base plate and so as to generally surround said housing, and  
means (12) interconnecting said knob and said free end of said bellows-type tube so that rotation of said knob causes said free end to move axially within said housing toward and away from said base plate to thereby change the axial length of said tube and the fluid capacity of said housing.

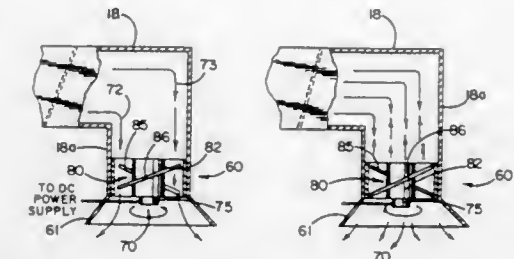
#### 5,413,278 REMOTELY ACTIVATED OPPOSING PRESSURE AIR FLOW CONTROL REGISTER

Evans W. Erikson, 6526 Spring Brook Rd., Rockford, Ill. 61114  
Filed Jun. 30, 1994, Ser. No. 269,103

Int. Cl.<sup>6</sup> F24F 7/00

U.S. Cl. 236—49.3

11 Claims



1. An airflow controllable register system for controlling flow of air through the register from a register air flow supply duct in response to an externally provided control signal that commands differing air flow rates through said register, said air flow controllable register comprising:

a register flow control means that includes a rotary mounted fan positioned within said register air flow supply duct, said fan coupled to a motor to be energized, said fan when driven by said energized motor creates air pressure from the fan to reduce the flow of air from the supply duct, said register flow control means responsive to said externally provided control signal to provide for said energizing of said motor coupled to said fan to provide said air pressure against said flow of air from the supply duct thereby simultaneously diminishing air flow past said fan and controlling air flow through said register.

#### 5,413,279 VEHICLE HEATING

Hans-Reiner Quaas, Gröbenzell, and Helmut Keinert, Nürtingen, both of Germany, assignors to J. Eberspächer, Esslingen, Germany

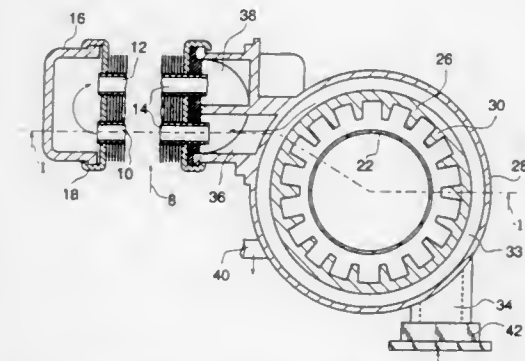
Continuation of Ser. No. 761,348, Nov. 7, 1991, abandoned. This application Jul. 2, 1993, Ser. No. 95,813

Claims priority, application Germany, Mar. 7, 1989, 39 07 222.3; Dec. 29, 1989, 39 43 335.8

Int. Cl.<sup>6</sup> B60H 1/22

U.S. Cl. 237—12.3 C

13 Claims



1. A vehicle heating system comprising:  
a heater operating by burning fuel and generating combustion gas, said heater including a combustion gas/liquid heat exchanger to transfer heat from said combustion gas to a liquid;  
a liquid/air heat exchanger connected with said combustion gas/liquid heat exchanger to receive said liquid from said combustion gas/liquid heat exchanger and to transfer heat from said liquid to air to warm the vehicle, a portion of

said liquid/air heat exchanger being combined with a portion of said combustion gas/liquid heat exchanger to form a signal heating unit, said liquid/air heat exchanger and the heater is connected to the cooling liquid circuit of an internal combustion driving engine of the vehicle, said cooling liquid circuit comprises a by-pass line for providing a short connection of a liquid outlet of the liquid/air heat exchanger to a liquid inlet of the heater, and a control valve for controlling the ratio of the liquid flow to the by-pass line and through the internal combustion engine.

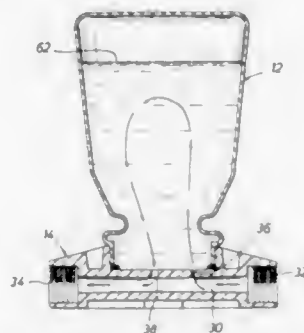
5,413,280

# APPARATUS AND METHOD FOR DISSOLVING AND DISPENSING SOLUBLE COMPOUNDS

William S. Taylor, 16014 Rustic Sands, Houston, Tex. 77084  
Continuation-in-part of Ser. No. 122,219, Sep. 17, 1993, abandoned, which is a continuation-in-part of Ser. No. 13,690, Feb. 4, 1993, abandoned, which is a continuation-in-part of Ser. No. 504, Oct. 16, 1992, Pat. No. Des. 350,383. This application Sep. 20, 1993, Ser. No. 124,350  
Int. Cl.<sup>6</sup> B05B 7/30

U.S. Cl. 239-10

16 Claims



1. A method for dissolving and dispensing a soluble substance into a liquid stream being dispensed downstream through a flow restricting device, the method utilizing a container mounted to a base member having a throughbore and entrance and exit orifices providing fluid communication between the throughbore and the container, the method comprising the steps of:

- placing the soluble substance into the container;
- attaching the container to the base member;
- positioning the base member beneath the container;
- connecting the base member to a liquid source;
- connecting the flow restricting device downstream of the base member;
- providing a liquid stream to the throughbore of the base member; and
- pressurizing the container.

9. A dispensing apparatus for dispensing a soluble compound into a liquid stream, the dispensing apparatus comprising: a base member having a throughbore; a container having an opening adapted to receive a soluble compound, said container connected to said base member; said base member includes a first entrance orifice providing fluid communication between the throughbore and said container and a second exit orifice providing fluid communication between the throughbore and said container; and means for providing substantially equal liquid backpressures to the first entrance and second exit orifices.

5,413,281

# FUEL INJECTION NOZZLE FOR AN INTERNAL COMBUSTION ENGINE

Karl Hofmann, Remseck, and Johann Wurga, Bietigheim-Bissingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

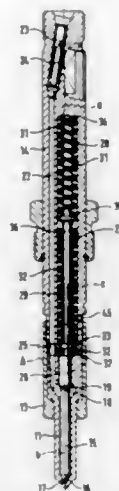
Filed Jun. 23, 1994, Ser. No. 264,269

Claims priority, application Germany, Aug. 3, 1993, 43 25 979.0

Int. Cl.<sup>6</sup> F02M 45/02

U.S. Cl. 239-533.4

20 Claims



1. A fuel injection nozzle for an internal combustion engine, in particular for a direct-injection Diesel engine, having a nozzle body in which a valve needle that cooperates with a valve seat and is acted upon in the closing direction by a helical compression spring and in the opening direction by the fuel pressure is guided displaceably along a longitudinal axis of the nozzle body; having a nozzle holder coaxially joined to the nozzle body and in which a cylindrical spring chamber open toward the nozzle body is formed, axially offset from the longitudinal axis of the nozzle body, said nozzle body having a thicker wall portion because of the eccentricity of the spring chamber, said spring chamber having said closing spring, and said nozzle body having a fuel inlet conduit disposed in the thicker wall portion; and having a shim fastened coaxially and sealingly in place between the nozzle body and the nozzle holder, which shim is struck with a stop face of the valve needle at a maximum stroke and has an aperture for a protrusion having a free end face, said free end face transmitting the closing force of the helical compression spring to the valve needle, the aperture (40, 55, 65) and the protrusion (38, 53, 63) are disposed in the shim (12) axially offset from the longitudinal axis (b) of the nozzle body (11) and of the valve needle (15), and essentially coaxially with the axis (a) of the closing spring (31, 32; 46, 47; 51).

5,413,282

# PRESSURE COMPENSATING EMITTER WITH SHUT DOWN FLUSH

Michael J. Boswell, Lakeside, Calif., assignor to James Hardie Irrigation, Inc., Laguna Niguel, Calif.

Filed Oct. 28, 1993, Ser. No. 144,748

Int. Cl.<sup>6</sup> B05B 15/00

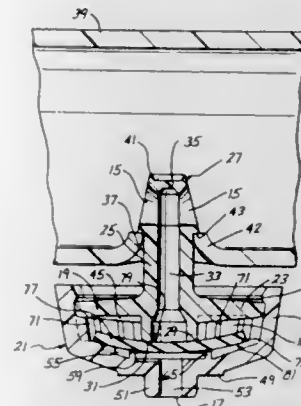
U.S. Cl. 239-542

9 Claims

1. An emitter for use in irrigation comprising: a housing having an inlet couplable to a source of irrigation liquid and an outlet; a valve including a valve seat in said housing and a resilient disc, said inlet leading to said valve seat; said resilient disc having an inlet side facing the valve seat, a first region of said disc lying radially outwardly of the

valve seat, said disc being supported in said housing so as to seat a second region of the disc on the valve seat and to resiliently bias the second region of the disc against the valve seat, said disc being movable away from the valve seat to an open position in response to the irrigation liquid at the inlet being of at least about a first pressure and being biased against the valve seat to a closed position in response to the irrigation liquid at the inlet being at or below about a second pressure which is less than said first pressure;

an open sided flow channel between the disc and the outlet with the open side of the flow channel facing the disc, said



disc being movable away from the valve seat in response to receiving irrigation liquid at about said first pressure from the valve to close the open side of the flow channel to provide a restricted flow channel leading to said outlet and to substantially prevent flush flow of irrigation liquid through the housing upon initiation of the flow of irrigation liquid through the valve, said disc being in a flush position in which the disc allows flush flow to the outlet in response to receiving irrigation liquid from said valve at a third pressure which is between said first and second pressures; and

a flow passage in said housing leading from said inlet side of the disc to the open sided flow channel.

5,413,283

# QUICK DISCONNECT FOR AN AUTOMATIC COATING DEVICE

James J. Gimple, Oregon, Ohio; David L. Hamilton, Belleville, Mich.; Daniel C. Hughey; Chris M. Jamison, both of Indianapolis, Ind., and David M. Seltz, Temperance, Mich., assignors to Ransburg Corporation, Indianapolis, Ind.

Division of Ser. No. 894,089, Jun. 5, 1992, which is a continuation-in-part of Ser. No. 618,053, Nov. 26, 1990, abandoned. This application Dec. 22, 1993, Ser. No. 172,542

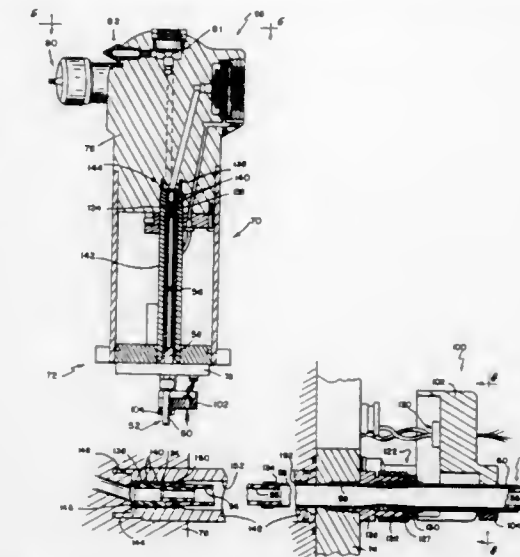
Int. Cl.<sup>6</sup> B05B 5/025; F16L 33/18

U.S. Cl. 239-600

4 Claims

1. In combination, a quick disconnect and a coating material dispensing device, the dispensing device including a passageway through which coating material is supplied from a supply conduit for dispensing, the supply conduit including a first region along its length, the first region provided with a surrounding O-ring adjacent a first end thereof, the passageway including a sidewall providing a second region along its length in which the first region resides when the supply conduit is positioned in a use orientation in the dispensing device, the second region compressing the O-ring into fluid-tight sealing orientation against the passageway sidewall in the second region when the supply conduit is inserted into the passageway into its use orientation, the first region comprising a length of

electrically non-conductive conduit around which is provided a layer of electrically non-insulative shield, the layer of non-



insulative shield being terminated within the second region but remote from the first end of the first region.

5,413,284

# METHOD OF AND APPARATUS FOR TREATING PLASTERBOARD-PRODUCTION SCRAP

Harri Hirz, Haunack, and Horst Sterr, Paderborn, both of Germany, assignors to Babcock BSH Aktiengesellschaft Vormalis Buttner-Schilde-Haas, Krefeld and Gebrüder Lodige Maschinenbaugesellschaft MbH, Paderborn, both of Germany

PCT No. PCT/EP92/01659, § 371 Date Jan. 10, 1994, § 102(e) Date Jan. 10, 1994, PCT Pub. No. WO93/02984, PCT Pub. Date Feb. 18, 1993

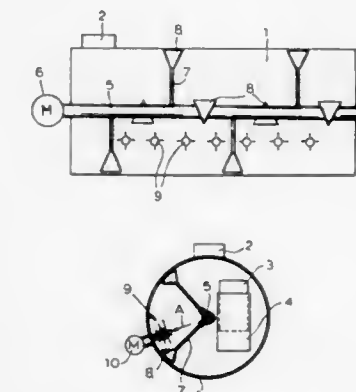
PCT Filed Jul. 21, 1992, Ser. No. 178,314

Claims priority, application Germany, Jul. 27, 1991, 41 24 984.4

Int. Cl.<sup>6</sup> B02C 19/12

U.S. Cl. 241-15

14 Claims



1. A method of treating plasterboard-production scrap, comprising the steps of:

- (a) transforming pieces of plasterboard-production scrap consisting of paper components attached to gypsum components into a homogeneous mixture of fibers of said paper components and granular gypsum, by introducing pieces of said plasterboard-production scrap consisting of paper components attached to gypsum components into a generally horizontal cylindrical



container having a plurality of axially spaced and angularly offset radial arms carried by a central shaft, plow-share-shaped mixing tools on said radial arms sweeping close to an inner surface of the container, and cutting heads on a wall of said container each having a generally radial shaft carrying a multiplicity of cutting blades of increasing radial length inwardly from the wall so that said blades sweep close to envelopes generated by said mixing tools as said central shaft is rotated, and rotating said shafts while maintaining said scrap in said container for a dwell time sufficient to reduce said pieces substantially to a homogeneous mixture of fibers of said paper components and granular gypsum;

- (b) mixing said scrap with granular raw gypsum to produce a calcinable mixture; and  
(c) calcining said calcinable mixture.

5,413,285

# METHOD OF TREATING ADHERENT SEMICONDUCTOR PARTICLES TO BREAK THEM APART

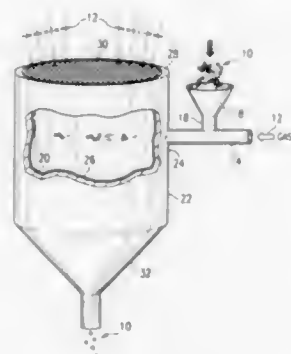
Mark D. Matthews, Richardson, and Johnny Langley, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 12, 1994, Ser. No. 180,583

Int. Cl.<sup>6</sup> B02C 19/06

U.S. Cl. 241—5

15 Claims



1. A method of breaking apart two or more adherent, solid particles, the particles having become adherent by abutting when they were molten and then being solidified, the method comprising:

- entraining the adherent particles in a high velocity stream of gas and directing the gas stream and the entrained particles at, and impacting the particles against, a surface, so that the impact breaks the particles apart

5,413,286

# WASTE PROCESSING MACHINE

Ivor Bateman, Mt. Pleasant, Mich., assignor to Tramor, Inc., Remus, Mich.

Continuation of Ser. No. 874,751, Apr. 27, 1992, abandoned.

This application Oct. 15, 1993, Ser. No. 138,839

Int. Cl.<sup>6</sup> B02C 13/04

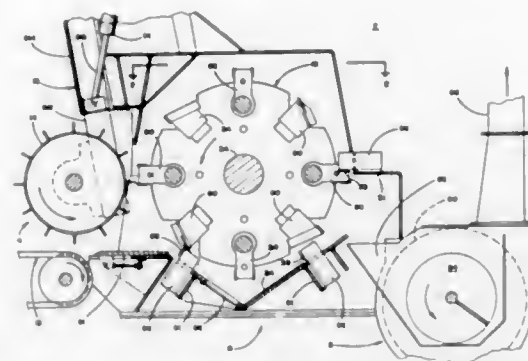
U.S. Cl. 241—190

50 Claims

1. An apparatus for comminuting and chipping waste material comprising:

- a substantially cylindrical housing having an inlet opening on one side thereof and an outlet opening on another side thereof;  
a main shaft mounted axially within the housing, said main shaft being connected to a drive means for rotating the main shaft within the housing,  
at least two discs disposed axially on the main shaft for rotation therewith,  
a bearing shaft extending between said at least two discs,

swinging hammers rotatably mounted to the bearing shaft between the at least two discs,  
retaining means for retaining the swinging hammers within the periphery of the at least two discs,  
mounting means on at least one disc for selectively and



releasably mounting non-swinging hammers and knives to the at least one disc,  
so that any combination of the swinging hammers, non-swinging hammers, and knives can be selected for use in a single apparatus to comminute a variety of waste materials.

5,413,287

# CHOPPING DEVICE, PARTICULARLY FOR HOUSE AND GARDEN WASTES

Adolf Telsnig, Gartenstrasse 9, D-34125 Kassel, Germany

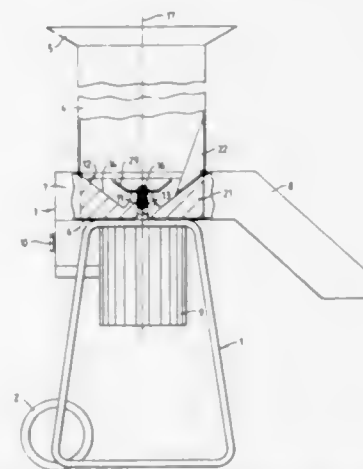
Filed Nov. 16, 1993, Ser. No. 153,175

Claims priority, application Germany, Nov. 18, 1992, 9215679 U

Int. Cl.<sup>6</sup> B02C 18/06, 18/10

U.S. Cl. 241—46,17

16 Claims



1. A chopping device for chopping waste material, in particular household and garden wastes, the device comprising a housing (3) having a filling opening for waste material; a rotor (12, 35) rotatably supported in said housing below said filling opening and having a substantially vertical rotary axis (17); a rotary drive for rotating said rotor about said rotary axis; said rotor (12, 35) being funnel-shaped and having a central bottom part (13, 37) which is connected with said rotary drive and a side wall (14, 38) which projects upwardly and outwardly toward said filling opening so as to expand substantially conically and which side wall is provided with at least one throughgoing gap (18, 48, 49) for comminuted waste material and has at least one cutter provided at an upper side of said wall and at least one driver provided at a lower side of said

wall; at least one holding element for the waste material, said holding element extending into said funnel-shaped rotor; and a chamber (15) located underneath said side wall and open to a discharging opening so that sufficiently comminuted waste material substantially is discharged through said throughgoing gap whereas not sufficiently comminuted waste material is thrown radially outwardly and upwardly and then transported back into said funnel-shaped rotor without substantially penetrating a gap between said side wall and said housing.

5,413,288

# COMPOUND PARTITION DIAPHRAGM FOR USE IN A BALL MILL

Yasuo Inui, and Nobuhito Yagi, both of Osaka, Japan, assignors to Kurimoto, Ltd., Osaka, Japan

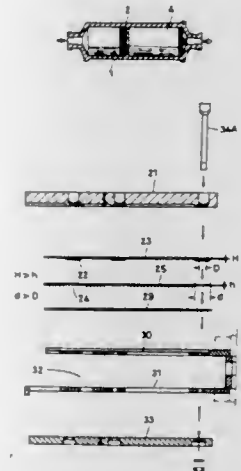
Continuation of Ser. No. 726,960, Jul. 8, 1991, abandoned. This application Jul. 15, 1993, Ser. No. 91,743

Claims priority, application Japan, Mar. 29, 1991, 3-093203

Int. Cl.<sup>6</sup> B02C 17/07

U.S. Cl. 241—72

2 Claims



1. A compound partition diaphragm for use in a ball mill which divides the ball mill into two or more grinding chambers, comprising: a primary screen plate facing a primary grinding chamber; a secondary screen plate mounted adjacent to the primary screen plate; a connecting chamber between the primary screen plate and the secondary screen plate; a common bolt; a setting plate provided with mounting eyes, a wire sieve being provided with circular holes of larger diameter than said mounting eyes and having a thickness smaller than the height of the mounting eye; a sieve supporter which provides the wire sieve with meshes both lengthwise and breadthwise; a supporting plate which supports said wire sieve to be freely movable; and a blind plate, all superposed in order relative to each other from the fan-shaped primary screen plate of each division toward the secondary grinding chamber, and all being secured by said common bolt through a mounting hole which is common to each of said mounting eyes, circular hole, wire sieve, sieve supporter, supporting plate and blind plate, wherein said secondary screen plate comprises a wire sieve provided with a plurality of fine slits each having a trapezoidal shape in section, said wire sieve being disposed loosely so as to be freely movable, and said partition diaphragm being divided circumferentially into several divisions.

5,413,289

# PROGRAMMABLY CONTROLLED ARMATURE WINDING APPARATUS

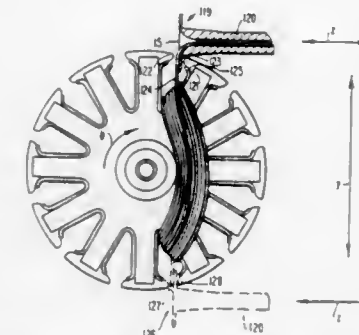
Luciano Santandrea; Massimo Lombardi, and Salvatore Amato, all of Florence, Italy, assignors to Axis USA, Inc., Marlborough, Mass.

Continuation of Ser. No. 738,199, Jul. 30, 1991, abandoned. This application Oct. 8, 1993, Ser. No. 139,641

Int. Cl.<sup>6</sup> H02K 15/04

U.S. Cl. 242—1.05 A

5 Claims



1. Apparatus for winding a wire on an armature having an axial shaft, a core member mounted concentrically on said shaft, and a commutator mounted concentrically on said shaft at a location which is axially spaced from said core member, said core member having a plurality of circumferentially spaced, radially and axially extending slots, and said commutator having a plurality of circumferentially spaced coil lead termination structures, comprising:

- a wire dispensing member having a wire outlet;  
first actuator means operable to produce rotational motion of said armature relative to said wire dispensing member about said shaft;  
second actuator means operable separately from operation of said first actuator means to produce translational motion of said armature relative to said wire dispensing member parallel to said shaft;  
third actuator means operable separately from operation of said first and second actuator means to produce translational motion of said armature relative to said wire dispensing member parallel to a first axis which is transverse to said shaft;  
fourth actuator means operable separately from operation of said first, second, and third actuator means to produce translational motion of said armature relative to said wire dispensing member parallel to a second axis which is transverse to said first axis and also transverse to said shaft; and  
means for individually and separately controlling operation of each of said first, second, third, and fourth actuator means so that said means for controlling can operate said first, second, third, and fourth actuator means to produce any desired combination of said motions of said armature relative to said wire dispensing member in order to cause wire to be pulled from said wire dispensing member and wound on said armature.

5,413,290

# TAPE WINDING APPARATUS

Koichi Sota, Chofu, Japan, assignor to Otari Inc., Chofu, Japan

Filed Oct. 15, 1993, Ser. No. 137,620

Claims priority, application Japan, Dec. 25, 1992, 4-346576

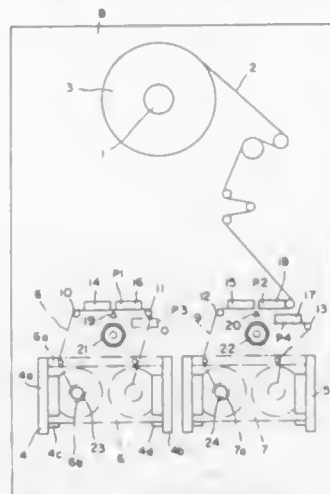
Int. Cl.<sup>6</sup> B65H 18/00

U.S. Cl. 242—532.1

3 Claims

1. A tape winding apparatus for winding a working tape into cassettes retained in a tape cassette holding and winding stations comprising: a plurality of said holding and winding stations being positioned in substantially the same plane; a fixed block and a sliding block at each of said plurality of holding

and winding stations; tape leader pulling means for pulling a leader tape out of a cassette held in one of said plurality of tape cassette holding and winding stations; tape cutting means for cutting said leader tape; splicing means splicing the cut end of said leader tape with a leading end of said working tape; a movable block means movable from one of said plurality of



tape holding and winding stations to another of said tape holding and winding stations to selectively supply said working tape to said splicing means; winding means for winding said working tape into said cassette; whereby said working tape may be spliced to said leader tape and wound into said cassette while another cassette is being prepared.

5,413,291

Patent Not Issued For This Number

5,413,292

## VEHICLE CABIN CONSTRUCTION

David Luria, Tel Aviv, Israel, assignor to Fuselage Engineering Services Ltd., Tel-Aviv, Israel

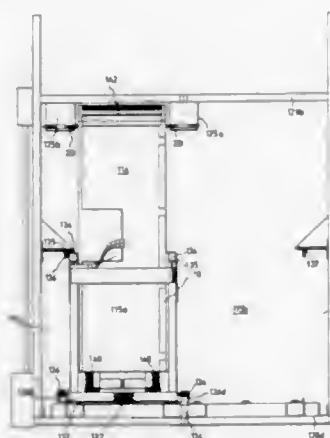
Filed Sep. 15, 1993, Ser. No. 121,407

Claims priority, application Israel, Sep. 18, 1992, 103217

Int. Cl.<sup>6</sup> B60P 1/64; B60N 3/00; B05G 67/00

U.S. Cl. 244—118.1

21 Claims



1. A vehicle cabin construction comprising:  
an outer fuselage wall;  
a deck therebelow;  
a plurality of passenger seats fixed to the deck and accessible by at least one longitudinally-extending main aisle;  
a ceiling overlying said seats and aisle and spaced from the outer vehicle wall;

a storage compartment in the space between said ceiling and outer cabin wall extending longitudinally of the vehicle cabin for storing article holders;  
an elevator for lowering the article holders from said storage compartment to the deck, and for raising the article holders from the deck to the storage department;  
said compartment including a bottom wall rotatably mounting a plurality of roller transfer members such that said members project outwardly from the upper surface of said bottom wall so as to rotatably engage the article holders when received within said storage compartment;  
and longitudinal transfer means engageable with said article holders for moving them longitudinally from or to different locations in said storage compartment on said plurality of roller transfer members;  
said longitudinal transfer means including a carrier having a longitudinal drive, a coupling device carried by said carrier and movable longitudinally therewith, and a coupling actuator for actuating said coupling device either to a coupling position or to a release position with respect to an article holder with which the coupling device is aligned.

5,413,293

## MAGNETIC TORQUE ATTITUDE CONTROL SYSTEMS

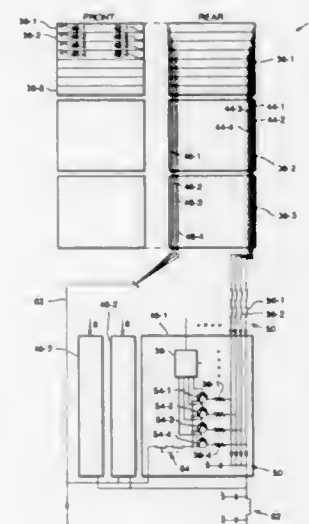
Louis Gomberg, Redondo Beach; Shibu Basuthakur, and Joseph H. Hayden, both of Rancho Palos Verdes, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 22, 1992, Ser. No. 995,114

Int. Cl.<sup>6</sup> B64G 1/00

U.S. Cl. 244—166

24 Claims



1. An attitude control system for a spacecraft having a main body and a solar panel extending from the main body, the solar panel having a plurality of solar cells grouped into strings, each cell being electrically connected to the other cells in its respective string, for generating electric current for use by the spacecraft comprising:

an electrically conducting coil having a plurality of conductors coupled to the solar cells for conducting the current generated by the solar cell to the spacecraft main body for use by the spacecraft, each conductor being electrically connected to a different one of the strings, the coil being positioned so as to generate a magnetic field to interact with an external magnetic field for adjusting the attitude of the spacecraft.

5,413,294

## PLATFORM POSITIONED ABOVE A KEYBOARD FOR USE WITH A COMPUTER MOUSE

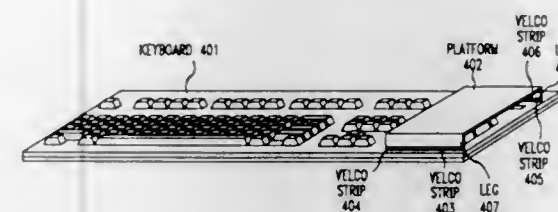
Marcia L. Greenquist, Westminster, Colo., assignor to AT&T Corp., Murray Hill, N.J.

Filed Dec. 23, 1993, Ser. No. 173,804

Int. Cl.<sup>6</sup> A45D 19/04

U.S. Cl. 248—127

9 Claims



1. An apparatus in combination with a keyboard for supporting a computer mouse above the keyboard, comprising:  
a platform positioned directly above a portion of the keyboard supported by a plurality of legs and the platform providing a surface on which to manipulate the computer mouse and placing the computer mouse in close proximity to the keyboard; wherein the keyboard has a length along a longitudinal axis of the keyboard and the platform also having a length along a longitudinal axis of the platform, and the length of the platform is less than half the length of the keyboard.

5,413,295

## WEIGHT BALANCER FOR TRIPOD HEAD

Masao Ishikawa, Yashio, Japan, assignor to Heiwa Seiki Kagya Co., Ltd., Yashio, Japan

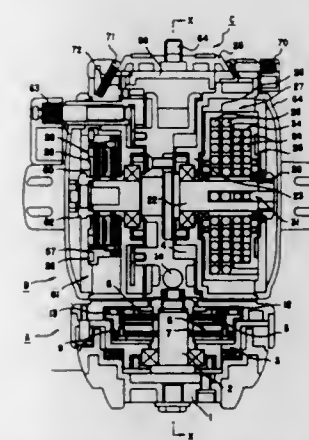
Division of Ser. No. 892,948, Jun. 4, 1992. This application Oct. 8, 1993, Ser. No. 133,332

Claims priority, application Japan, Aug. 9, 1991, 3-200940

Int. Cl.<sup>6</sup> F16M 11/12

U.S. Cl. 248—183

5 Claims



1. A weight balancer for a tripod head, said weight balancer being concentrically connected to a tilting shaft of the tripod head, said weight balancer comprising:

a plurality of spring units;  
a respective case for each of said spring units;  
a plurality of spiral springs having different elastic forces incorporated in the spring units;  
first ends of said spiral springs fixed on said tilting shaft of the tripod head;  
other ends of said spiral springs fixed to the respective case; recesses on a side of each said case arranged around at least

one circle with respect to one another, said recesses being positioned on an outer side of each said case;  
a respective check pin for each of said cases, said respective check pin being freely insertable into and removable from said recesses of the respective case;  
a righting moment switchover mechanism means including a check pin driving member which causes each of said check pins to stepwise insert into and remove from the respective recesses.

5,413,296

## PAINT CAN AND PAINTBRUSH HOLDING APPARATUS

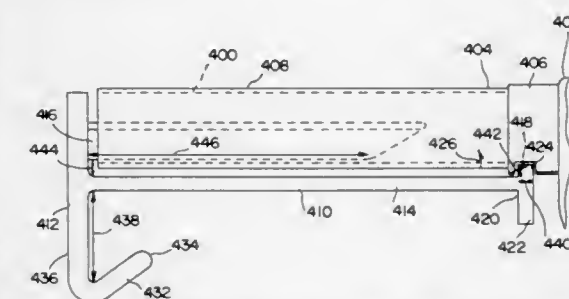
Roy A. LaFontaine, Port Colborne, Canada, assignor to Inventions Niagara Inc., Welland, Canada

Continuation-in-part of Ser. No. 906,897, Jun. 26, 1992, abandoned, which is a division of Ser. No. 628,602, Dec. 17, 1990, Pat. No. 5,145,226. This application May 17, 1993, Ser. No. 62,018

Int. Cl.<sup>6</sup> E06C 7/14

U.S. Cl. 248—210

6 Claims



1. Apparatus comprising a rigid first member including an elongate tubular portion receivable within an aperture of a ladder, an elongate portion to which said tubular portion is attached for engaging a paint can side, and means for removably attaching said first member to a paint can rim with said elongate portion disposed along the side of the paint can for holding the paint can with said tubular portion extending cantileverly from said elongate portion, the apparatus further comprising a second member including an elongate portion which is removably receivable within said tubular portion and means for removably attaching said second member to a ladder plate with said second member elongate portion disposed horizontally whereby a paint can may be mounted on a ladder by attaching the first member thereto and receiving the second member elongate portion within the tubular portion.

5,413,297

## DOOR HOOK

William E. Adams, Butler County, Pa., assignor to Adams Mfg. Corp., Portersville, Pa.

Filed Jan. 14, 1994, Ser. No. 182,738

Int. Cl.<sup>6</sup> A47B 96/06

U.S. Cl. 248—215

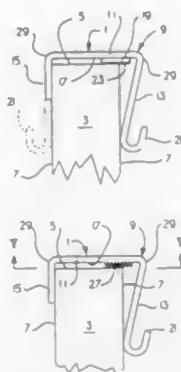
12 Claims

1. An improved mounting bracket to be extended over a door top to both sides of a door, comprising:

a) a U-shaped bracket having  
i) a top which has a bottom surface,  
ii) a front side which is attached to one edge of the top at an acute angle relative to the bottom surface of the top; and



- iii) a back side which is attached to an edge of the top opposite to the front side;



- b) a compressible pad attached to the bottom surface of the top wherein the compressible pad has an adhesive surface which abuts the door top; and  
c) a hook attached to the front side.

5,413,298

## DOOR FRAME MOUNT FOR SWING

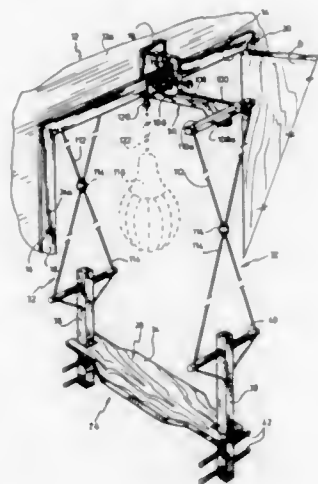
Ronald Perreault, 13, route Montmartre, Lamartre, Quebec, Canada G0E 2H0

Filed May 14, 1993, Ser. No. 60,967

Int. Cl.<sup>6</sup> A47B 96/06

U.S. Cl. 248—228

1 Claim



1. A swing assembly adapted for mounting to a top segment of a door frame, said swing assembly comprising in combination:

a swing mount member, for anchoring to said door frame top segment;  
seat means; and  
flexible suspender members, hanging said seat means to said mount member freely over a ground whereby said seat means are adapted to reciprocate through an aperture defined by said door frame, said door frame defining first and second opposite faces;

wherein said swing mount member consists of;

- (a) a first L-shape tubular member defining first and second legs, said first leg thereof endwisely carrying a first transverse pad member for releasably abutting an upper portion of said first face of said door frame top leg, said second leg thereof defining an end mouth opening into the hollow of said first tubular member;

(b) a second L-shape tubular member, defining first and second legs, said first leg thereof endwisely carrying a

second transverse pad member for releasably abutting an upper portion of said second face of said door frame top leg;

- (c) a third L-shape tubular member, defining first and second legs, said first leg thereof defining an outer and an inner portion, said outer portion thereof being slidably inserted through said mouth and into the hollow of said first tubular member second leg, said inner portion of said third tubular member transversely carrying a third pad member for releasably abutting a lower portion of said first face of said door frame top leg;

- (d) a fourth L-shape tubular member, defining a first leg and a second elongated leg, said first leg thereof defining an outer and an inner portion, said outer portion thereof defining a mouth opening into the hollow of said outer portion of the fourth tubular member, said second leg of said second tubular member slidably engaging through said mouth an into said hollow of said outer portion of said fourth tubular member first leg, said inner portion of the first leg of said fourth tubular member transversely carrying a fourth pad member for releasably abutting a lower portion of said second face of said door frame top leg, said second leg of the fourth tubular member defining a mouth opening into the hollow thereof, said second leg of said third tubular member slidably engaging through said mouth and into said hollow of said second leg of said fourth tubular member;

- (e) biasing means, for biasing said second leg of said third tubular member in sliding relative motion axially through the hollow of said second leg of said fourth tubular member;

- (f) an elongated rigid support bar, anchored at an intermediate section thereof to said elongated second leg of said fourth tubular member and transversely extending relative thereto, said flexible suspended members being anchored at opposite ends of said elongated rigid support bar for swinging motion thereabout; and

- (g) knee joint means for relative movement of said third and fourth pad members relative to said third and fourth tubular members respectively;

wherein said knee joint means is responsive to the swinging motion of said seat means to accordingly tilt said third and fourth tubular members against said door frame while insulating said first and second tubular members from this motion load.

5,413,299

## HOLDING DEVICE FOR CONTAINERS WITH TISSUES AND THE LIKE

Peter Holtsch, Wingsbach, Germany, assignor to Holtsch Metallwarenherstellung, Taunusstein, Germany

Filed Aug. 12, 1994, Ser. No. 289,760

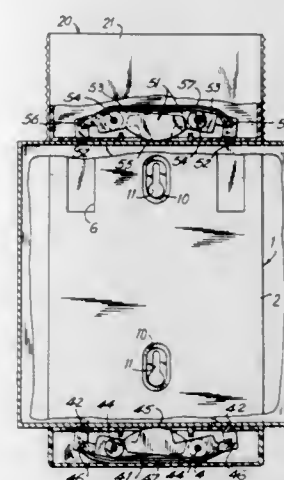
Int. Cl.<sup>6</sup> A47G 29/00

U.S. Cl. 248—313

6 Claims

1. A holding device for holding containers, comprising a housing; an insert movable relative to said housing between a proximal position in which the container can be clamped between said insert and said housing and a distal position in which said insert is moved away from said housing so that the container can be removed from the device and a new container can be placed between said insert and said housing; and means for engaging the container when the container is located between said insert and said housing so as to reliably hold the container in the device, said engaging means including at least one engaging projection which is elastically urged to a position in which said projection is hidden in one of said insert and said housing when there is no container between said insert and said

housing and which is displaced outwardly of said at least one of said insert and said housing to an extended position when the



container is inserted between said insert and said housing and applies a pressure to said engaging means.

5,413,300

## PROFILES FOR SUPPORTING AND MAINTAINING IN TENSION A FALSE CEILING OR A FALSE WALL

Guy Hosteing, 1, Clos du Guillan, 33370 Sadirac, France

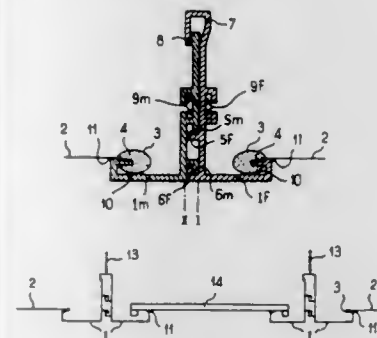
Filed May 13, 1993, Ser. No. 60,043

Claims priority, application France, May 13, 1992, 92 06009

Int. Cl.<sup>6</sup> A47H 1/10

U.S. Cl. 248—317

10 Claims



1. In a profile (1) to support and maintain under tension a false ceiling (2) or a false wall constituted by a sheet of plastic material having an integral border (3) forming a hook, said profile (1) being adapted to be fixed to a ceiling or wall and comprising angle members having a first horizontal flange including a shoulder (4) adapted to receive said border hooked thereover so as to form a throat of U-shaped cross section opening in the direction of a second flange of the angle member in which throat said border (3) is to be disposed; the improvement wherein there are two said profiles one of which comprises a male profile (1m) and the other a female profile (1f), said male and female profiles having interengaging means thereon whereby when interengaged, said profiles form an inverted T having a vertical web adapted to be suspended from a ceiling and whose first flanges with said shoulders (4) constitute a horizontal cross member supporting and maintaining in tension a false ceiling, each said male and female profile when disassembled from each other having a vertical web adapted to be secured to a wall to support a false ceiling or false wall.

5,413,301

## MOUNTING HOOK AND CLIP

Bernard V. Cadman, The Twitchell, Sutton-in-Ashfield, Nottinghamshire NG17 5BT, England

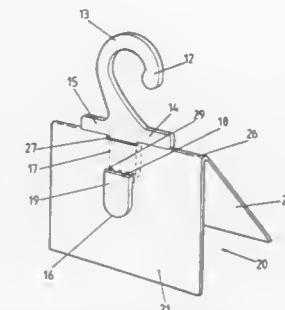
Filed Feb. 16, 1994, Ser. No. 197,584

Claims priority, application United Kingdom, Apr. 22, 1993, 9308320

Int. Cl.<sup>6</sup> B42F 13/00

U.S. Cl. 248—340

3 Claims



1. The combination of a mounting hook and a folded mounting card for suspending an item between two facing panels of the folded mounting card, there being a hole in each of the two facing panels, said holes being aligned with each other, the mounting hook having a hook portion and a pair of laterally offset limbs depending from the hook portion, an interconnecting bridge spanning between said limbs and laterally offsetting one limb from the other, said other limb passing through both said holes with said one limb being disposed on an outer side of one said facing panel and the other said limb being disposed on the outer side of the other said facing panel and said bridge being disposed in said holes.

5,413,302

## ANTI-SLIDE COASTER

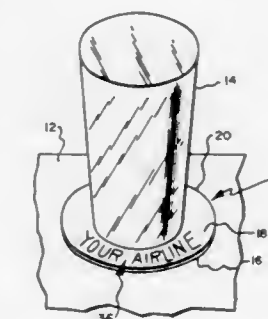
Reinhold C. Ferster, 90A Grandview, Amherst, N.Y. 14228

Filed May 27, 1993, Ser. No. 68,511

Int. Cl.<sup>6</sup> A47G 29/00

U.S. Cl. 248—346.1

17 Claims



1. A slide resistant coaster for use in a moving vehicle comprising a thin member composed of a single piece of material having a thickness which is less than about 1/8 inch and including an upper surface, a slide-resistant lower surface for engaging a supporting surface, an adhesive material on said upper surface for adhesively attaching said member to the bottom of an implement so as to remain attached to the bottom of the implement when the implement is picked up, and an adhesive material on said lower surface, said adhesive material on said upper surface having greater tackiness than said lower surface adhesive material.

5,413,303

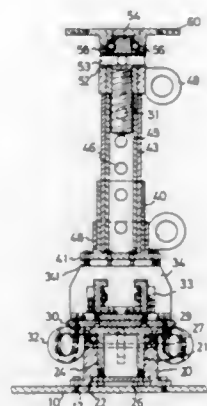
**SUPPORTING ASSEMBLY FOR A VEHICLE CHASSIS**  
Shih-Chiang Lee, 2nd Fl., No. 15, Land 249, Chang An St., Yung Kang Tsun, Lu Chou Hsiang, Taipei Hsien, Taiwan, Prov. of China

Filed Dec. 16, 1993, Ser. No. 168,522

Int. Cl.<sup>6</sup> A47F 5/00

U.S. Cl. 248—354.1

20 Claims



1. A supporting assembly for a vehicle chassis, comprising: a base plate (10) adapted to be securely mounted to a vehicle chassis adjusting device; a rotational device mounted on the base plate (10) and rotatable along a vertical axis; a track device including a fixed plate (30) securely mounted on the rotational device to rotate therewith, a fixed track (33) securely mounted on the fixed plate and extending in a horizontal direction, and a movable block (34) slidably mounted in the fixed track; a height-adjustable device mounted on the movable block to move therewith and being adjustable in a height thereof; and a clamping device (60) mounted on the height adjusting device and adapted to engage with and support a vehicle chassis to be adjusted.

5,413,304

**APPARATUS FOR SUPPORTING COIL MATERIAL SUPPLY DEVICE**

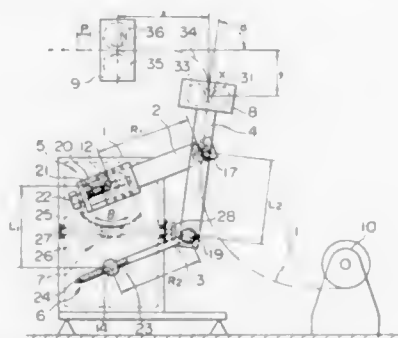
Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Seisakusho Co., Tokyo, Japan

Filed Nov. 9, 1993, Ser. No. 149,465

Int. Cl.<sup>6</sup> F16M 13/00

U.S. Cl. 248—421

5 Claims



1. Apparatus for supporting a coil material supply device adapted to feed a coil material to an intermittent feed device of a mechanical press, comprising: a first arm pivotally mounted at its proximal end portion on a frame;

a second arm pivotally mounted at its proximal end portion on the frame;  
a third arm pivotally supported on distal end portions of said first and second arms, said coil material supply device being adapted to be mounted on an upper end portion of said third arm;  
first and second length adjustment means for adjusting the lengths of said first and second arms, respectively; and rotating means for pivotally moving said first arm to adjust the angle of pivotal movement of said first arm.

5,413,305

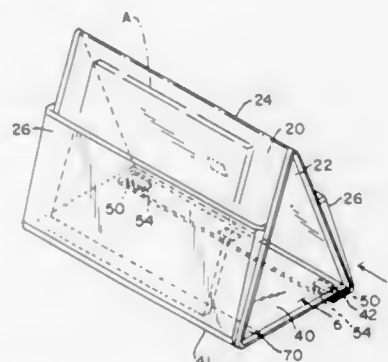
**LIGHTWEIGHT COLLAPSIBLE BOOK STAND**  
Joseph Leeb, Upper Saddle River, N.J., assignor to Joseph Leeb Enterprises, Inc., Upper Saddle River, N.J.

Filed Jul. 29, 1993, Ser. No. 99,224

Int. Cl.<sup>6</sup> A47B 97/04

U.S. Cl. 248—460

5 Claims



1. A lightweight collapsible stand comprising: (A) a strip of substantially rigid material defining: (i) a front major panel, (ii) a back major panel secured to said front major panel by a foldline, (iii) a bottom panel secured to said front major panel by a foldline, said bottom panel including a flexible section of substantially flexible material adjacent said front major panel, said flexible section acting as the foldline between said bottom panel and said front major panel and defining a non-slip surface for supporting an article thereon against slippage, and (iv) a securing flap secured to said back major panel by a foldline; said strip being movable between use and storage orientations, in said use orientation said major panels defining the sides of a triangle and said bottom panel and said securing flap cooperatively defining the base of the triangle, in said storage orientation said major panels being parallel and said bottom panel overlying said back major panel; (B) releasable securing means disposed on said securing flap and said bottom panel for cooperatively securing said securing flap and said bottom panel together in said use orientation; and (C) releasable securing means disposed on said bottom panel and said back major panel for cooperatively securing said bottom panel and said back major panel together in said storage orientation.

5,413,306

TEST FRAME

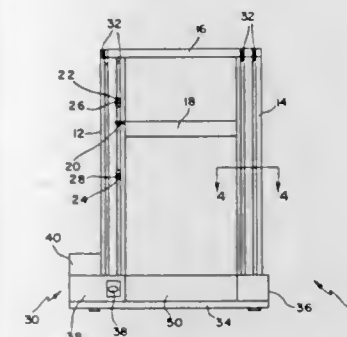
Richard J. Mahoney, III, Mansfield; Paulo A. Martin, Fall River, both of Mass.; Graham E. Mead, Buckinghamshire, England, and David W. Scanlon, Rehoboth, Mass., assignors to Instron Corporation, Canton, Mass.

Filed Mar. 5, 1993, Ser. No. 27,709

Int. Cl.<sup>6</sup> F16M 11/00; G01N 3/02

U.S. Cl. 248—676

10 Claims



1. A materials testing machine comprising a base, a top housing vertically spaced therefrom and extending parallel thereto, a first column and a second column, said first column being horizontally spaced from said second column and extending from said base to said top housing, said second column extending also from said base to said top housing, each said column including an enclosure wall shaped to provide a partial enclosure of a vertical zone and a vertical opening from said zone, said vertical opening of said first column facing said vertical opening of said second column, each said column having throughout said column the same extruded cross-sectional configuration.

5,413,307

PRECAST MANHOLE INVERT FORMING

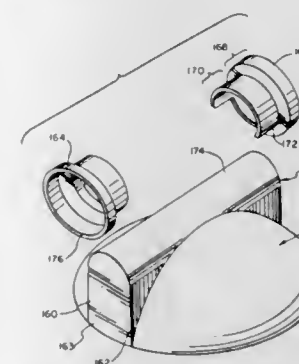
Joe Tidwell, Moreland, Ga., assignor to The Concrete Company, Columbus, Ga.

Filed Nov. 22, 1993, Ser. No. 155,226

Int. Cl.<sup>6</sup> B28B 7/28, 21/86

U.S. Cl. 249—11

7 Claims



1. A mold for casting an inverted base section of a manhole, said mold comprising a core for forming an inner surface of the base section, a jacket surrounding the core for forming an outer surface of the base section, said jacket having an interior surface and defining an annular space between it and said core, means for closing the bottom of the annular space, a domed plate atop the core but below an upper edge of said

jacket, and having a peripheral shape corresponding to that of the core, for preventing cementitious material from leaking into the core, and a trough former extending between points on the interior of said jacket above said domed plate, said trough former having downwardly projecting flanges, said flanges being cut along arcs conforming to the shape of said domed plate so that when cementitious material is poured into said mold, the material does not leak substantially between the domed plate and the trough former, and at least one hole former, slid hole former having a cylindrical portion whose interior diameter substantially equals that of the trough former's arch, part of the cylindrical portion being cut away so that the hole former can be seated on the trough former.

5,413,308

FAIL-OPEN SOLENOID ACTUATED VALVE

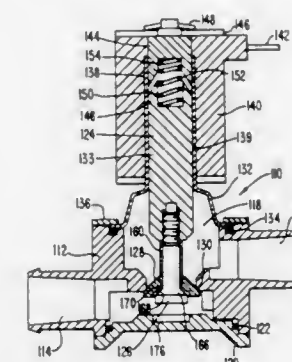
William R. Hayes, Cincinnati, Ohio, assignor to The Horton Company, Pittsburgh, Pa.

Filed Sep. 3, 1993, Ser. No. 115,871

Int. Cl.<sup>6</sup> F16K 25/00, 31/02

U.S. Cl. 251—77

19 Claims



1. A valve comprising: a body having an internal chamber including an inlet section and an outlet section, a valve seat defining a valve port between said inlet section and said outlet section of said internal chamber; a valve spool extending through the valve port of said internal chamber and reciprocally received therein, said valve spool having a stem slidably received in a central bore of said body and a sealing means for sealing off fluid communication between said inlet section and said outlet section; a displacement means for displacing said valve stem toward said valve seat; biasing means for biasing said valve spool such that the sealing means of said valve spool is urged away from said valve seat and; a dislodging means for contacting said sealing means when said valve stem is displaced away from said valve seat.

5,413,309

**PUSH-TO-CONNECT COUPLER WITH INTERLOCKING THREE-WAY VALVE**

Dennis C. Giesler, Maple Grove, Minn., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 986,373, Dec. 7, 1992, abandoned. This application Jun. 23, 1994, Ser. No. 264,850

Int. Cl.<sup>6</sup> F16L 37/28

U.S. Cl. 251—149.9

28 Claims

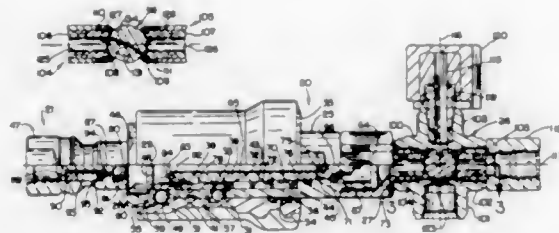
1. A coupler comprising a housing including a coupler body portion and a valve body portion, said coupler body portion including a socket for axially receiving a mating nipple, and said valve body portion having an inlet port, an outlet port and a vent port;



a locking sleeve mounted on said coupler body portion for axial movement between a lock position and a release position;

nipple retainer means responsive to the axial position of said locking sleeve for holding the nipple in said socket when said locking sleeve is in its lock position and for permitting axial insertion or removal of the nipple when said locking sleeve is in its release position;

a rotatable valve element mounted in said valve body portion between said inlet port, outlet port and vent port, said valve element having a closed position for blocking flow of fluid from said inlet port to said outlet port and an open position for permitting flow of fluid through a flow pas-



sage therein from said inlet port to said outlet port, and said valve element further including a vent passage operable to effect fluid communication between said outlet port and said vent port when said valve element is in said closed position and not when in said open position; and

a manually operable handle member movable between closed and open positions respectively for rotating said valve element between its closed and open positions, said handle member when in its open position being operative to interfere with said locking sleeve to prevent said locking sleeve from moving into its release position and when in its closed position to permit movement of said locking sleeve into its release position.

5,413,310

## VALVE ARRANGEMENT

Knut V. Horvei, Sandnes, Norway, assignor to Den Norske Stats Oljeselskap A.S., Stavanger, Norway

PCT No. PCT/NO92/00119, § 371 Date Jan. 11, 1994, § 102(e) Date Jan. 11, 1994, PCT Pub. No. WO93/01432, PCT Pub. Date Jan. 21, 1993

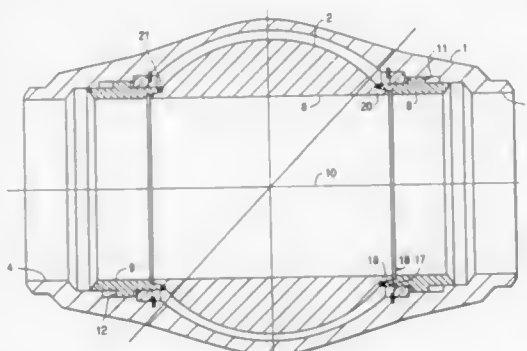
PCT Filed Jul. 10, 1992, Ser. No. 175,379

Claims priority, application Norway, Jul. 12, 1991, 912762; Jul. 12, 1991, 912763

Int. Cl.<sup>6</sup> F16K 5/06

U.S. Cl. 251-159

11 Claims



1. A Valve for use in oil and gas installations for offshore production, comprising: a movable valve member (2,32) having a through flow passage (6,36); at least one seat or seal holder (8,9,38,39); means (11,12,41,42) for moving said seat or

seal holder in directions towards and from cooperating parts (21,22,50,60,70,) of said valve member (2,32);

a partially conical first annular sealing surface (21,61,61A) formed by an edge portion surrounding at least one opening of said through flow passage (6,36);

a front portion (17,57,67) of said seat or seal holder (8,9,38,39) being formed with an annular holder sealing surface (18,58,59) adapted to cooperate with said first annular sealing surface (21,61,61A) when said valve member (2,32) is in an open position, and further adapted to cooperate with a second sealing surface (22,50B,71) on said valve member (2,32) when said valve member is in a closed position;

wherein the shape, conicity, choice of materials, and surface treatment of said first annular sealing surface and said annular holder sealing surface are adapted to give a sufficient degree of friction therebetween for said seat or seal holder (8,9,38,39) to be self-locking in relation to said valve member (2,32) upon being pressed against said valve member with a certain minimum force.

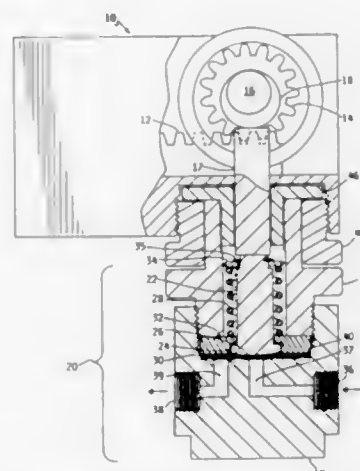
5,413,311  
GAS VALVE

Dale C. Arstein, Elk River, and Lee R. Rensberger, Monticello, both of Minn., assignors to Tescom Corporation, Elk River, Minn.

Filed Mar. 1, 1994, Ser. No. 203,431  
Int. Cl.<sup>6</sup> F16K 7/16

U.S. Cl. 251-331

6 Claims



1. A gas valve, comprising:
  - a) a valve body having an inlet and outlet port, an internal valve chamber, and passages respectively connecting said inlet and outlet ports to said chamber, said passages having openings into said chamber through a first wall in said chamber; wherein at least one of said passage openings through said first wall further comprises a circular seating area periphery, said seating area having a recessed taper toward its center;
  - b) a raised rib in said first wall, said rib defining a closed periphery about both of said passage openings;
  - c) a stop member adjacent said chamber, said stop member having a central opening therethrough and having a surface defining a second wall in said chamber, said second wall being in spaced apart and facing relationship to said first wall;
  - d) a diaphragm formed of one or more metallic disks in said chamber between said first and second walls, said diaphragm being sealably clamped between said rib and said stop member; wherein said diaphragm further comprises a surface facing toward said first wall, said surface having a fluorinated ethylene propylene film region positioned adjacent said circular seating area periphery;

- e) a valve stem having a spherical radius surface affixed to said diaphragm and extending through the central opening in said stop member, and means outside said chamber for spring-biasing said valve stem toward said stop member; wherein said one or more metallic disks is bonded to said valve stem spherical radius surface, and the other of said one or more metallic disks has said film region applied thereto; and
- f) actuator means for selectively forcing said valve stem and said diaphragm toward said first wall, whereby said diaphragm sealably closes at least one of said passage openings.

5,413,312

## JACK DEVICE FOR POSITIONING PLANKS OR OTHER ARTICLES ON FRAMEWORK

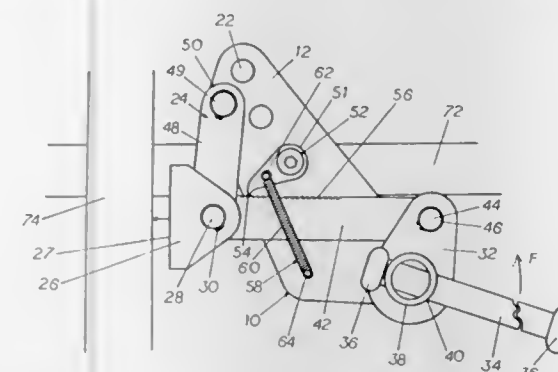
Dennis B. Bobel, 5134 Simpkins Rd., Whites Creek, Tenn. 37189

Filed Oct. 25, 1993, Ser. No. 140,420

Int. Cl.<sup>6</sup> B66F 3/00

U.S. Cl. 254-15

18 Claims



1. A device useful for positioning planks or other articles to be set on framing including a frame segment having a longitudinal axis, the device comprising:
  - a platform;
  - foot means attached to and extending from the platform for stabilizing the platform with respect to a frame segment;
  - jack means, pivotally attached to the platform and operable in a direction parallel to the longitudinal axis of the frame segment, for exerting a force on a plank or other article to be positioned;
  - handle means for transmitting a rotational torque in a plane parallel to the platform to the jack means;
  - the jack means further comprises a connecting rod pivotally attached to the handle means, a pivotal platen connected to the connecting rod and a guide rod pivotally connected to the connecting rod and the platform.

5,413,313

## INTEGRATED POWER SWITCH STRUCTURE HAVING A VERTICAL THYRISTOR CONTROLLED BY A LATERAL MOS TRANSISTOR

Bernward Mutterlein, Duisburg, and Holger Vogt, Mülheim, both of Germany, assignors to Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., Munich, Germany

PCT No. PCT/DE92/00011, § 371 Date Jul. 8, 1993, § 102(e) Date Jul. 8, 1993, PCT Pub. No. WO92/12541, PCT Pub. Date Jul. 23, 1992

PCT Filed Jan. 7, 1992, Ser. No. 87,799

Claims priority, application Germany, Jan. 9, 1991, 41 00 444.2

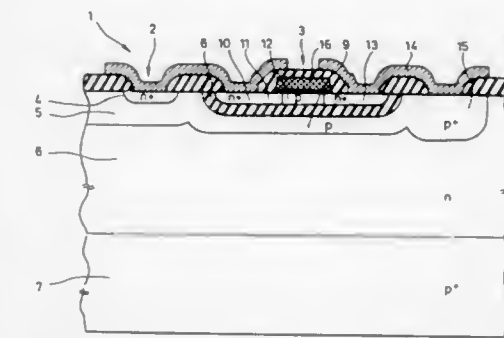
Int. Cl.<sup>6</sup> H01L 29/00, 27/02

U.S. Cl. 257-137

10 Claims

1. An integrated power switch structure, which comprises a vertical thyristor controlled by a lateral MOS transistor, wherein said thyristor is constructed as a four-layer thyristor comprising an anode layer, a first base layer doped contrary to

said anode layer, an additional base layer doped contrary to said first base layer, and a cathode layer, characterized in that in the main current path of the said power switch structure, said lateral MOS transistor has its drain-source path con-



nected in series with the cathode-anode path of the thyristor, a buried oxide layer insulates at least a source electrode of the lateral MOS transistor against the substrate, and the first base layer is arranged below said source electrode.

5,413,314

SPRAY UNIT FOR COOLING EXTRUDED SECTIONS

Miroslaw Plata, Vetroz; Bernard Bourqui, Noes, and Werner Strehmel, Sierre, all of Switzerland, assignors to Alusuisse-Lonza Services Ltd., Zurich, Switzerland

Division of Ser. No. 72,117, Jun. 7, 1993, Pat. No. 5,382,306.

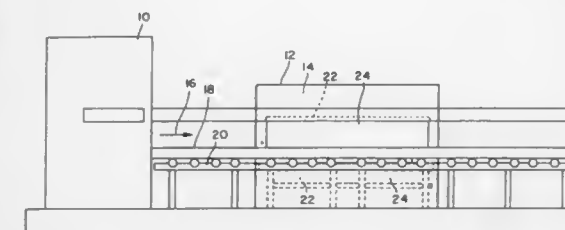
This application Jun. 14, 1994, Ser. No. 259,632

Claims priority, application Switzerland, Jun. 19, 1992, 1947/92

Int. Cl.<sup>6</sup> C21D 1/00

U.S. Cl. 266-113

13 Claims



1. A spray unit, for cooling metallic extruded sections, in-line and downstream of an extrusion press, comprising:
  - spray nozzles having nozzle outlets for spraying a program-controlled cooling medium onto an extruded section, wherein the distance, the distribution of cross-section and the direction of the spray nozzles are adaptable to take into account the specific geometric shape and distribution of mass of the extruded section, wherein the spray nozzles are arranged in nozzle beams running in the direction of the extruded section;
  - wherein the nozzle beams comprise at least one longitudinal water channel and two longitudinal air channels, and cross-intersecting channels which branch over from the water channels to the spray nozzles, the air channels terminating in air gaps directed at the nozzle outlets.

5,413,315

## INJECTION EQUIPMENT

Karl Venas, Saupstad, and Terje Pedersen, Furnes, both of Norway, assignors to Norsk Hydro a.s., Oslo, Norway

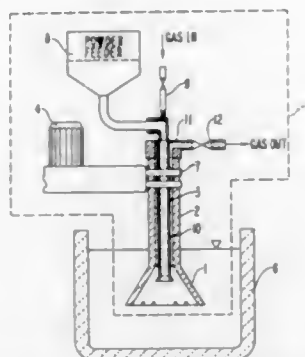
Filed Apr. 14, 1994, Ser. No. 227,332

Claims priority, application Norway, Apr. 14, 1993, 931360

Int. Cl.<sup>6</sup> C21C 7/04

U.S. Cl. 266—222

13 Claims



1. An injection apparatus for supplying gaseous or particulate material to a liquid such as molten metal, said apparatus comprising:

- a rotatable shaft;
- a substantially downwardly open rotation body mounted on and rotatable with said shaft and lowerable into the liquid; said shaft having therethrough a coaxial bore opening into said rotation body; and
- a stationary tube extending coaxially through said bore with an annular clearance between said tube and said shaft; whereby material can be supplied through said tube to the liquid.

5,413,316

## ADJUSTABLE RATE AIR SPRING

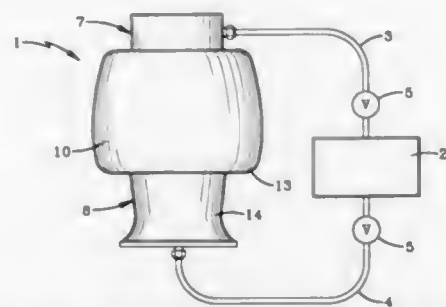
Mark R. Easter, Indianapolis, Ind., assignor to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Dec. 13, 1993, Ser. No. 166,416

Int. Cl.<sup>6</sup> F16F 9/04

U.S. Cl. 267—64.24

20 Claims



1. An adjustable rate air spring including a pair of spaced end members and a flexible sleeve extending therebetween forming an air chamber, said sleeve having a pair of opposed ends, at least one of which is closed; one of said end members being formed with a hollow interior which forms an auxiliary reservoir; an entrance formed in said one end member and located between said auxiliary reservoir and the air chamber; the closed end of the flexible sleeve extends across the entrance of the auxiliary reservoir and provides a flexible membrane separating the air chamber from said auxiliary reservoir; air supply means communicating with the air chamber for supplying said chamber with pressurized air; and fluid supply means of pressurized air communicating with the hollow interior of the said one end member for changing the volume of fluid in the auxiliary reservoir thereby changing the volume of the air chamber

by moving the flexible membrane with respect to the air chamber to change the spring rate of said air spring.

5,413,317

## DAMPING DEVICE

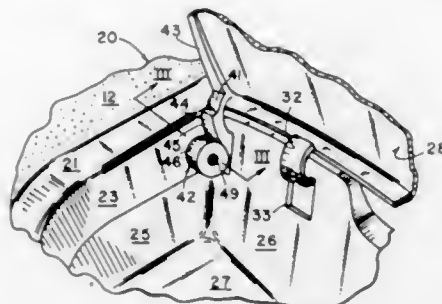
Steven M. Sporre, Holland, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Apr. 22, 1993, Ser. No. 51,165

Int. Cl.<sup>6</sup> F16F 1/00; B60N 3/12

U.S. Cl. 267—134

11 Claims



1. A damping device for a movable element of the vehicle accessory comprising:

- a first member having one of an arcuate surface and compressible roller made of a foam polymeric material; and
- a second member having the other of an arcuate surface and compressible roller mounted thereto with said roller and arcuate surface positioned in spaced relationship with respect to one another as said first and second members are moved with respect to one another to provide a controlled drag force as the arcuate surface engages the roller during movement of said first member with respect to said second member; wherein said first member includes a wall of a storage compartment and said second member comprises a door for said storage compartment, and wherein said wall includes an axle extending outwardly therefrom and said roller is rotatably mounted on said axle.

5,413,318

## MEANS FOR DAMPING VIBRATIONS, FOR EXAMPLE SELF-GENERATED OSCILLATIONS IN BORING BARS AND SIMILAR

Lauritz Andreassen, Trondheim, Norway, assignor to Teenes AS, Trondheim, Norway

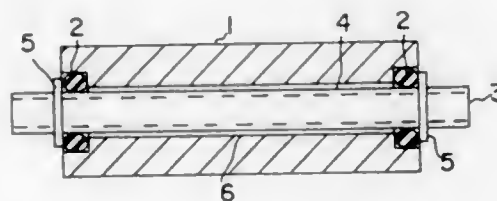
Filed Aug. 19, 1993, Ser. No. 107,707

Claims priority, application Norway, Feb. 21, 1991, 910700

Int. Cl.<sup>6</sup> F16F 7/00

U.S. Cl. 267—140

7 Claims



1. A damping device for objects which can be exposed to undesired vibrations, comprising:

- a substantially cylindrically shaped damper body, said damper body having a pair of ends having cutouts formed therein and an axial through bore;
- a cylindrical, central support extending axially through said axial through bore and rigidly connected to an object to be damped;
- resilient spring elements placed in said cutouts in the ends of

said damper body for connecting said damper body to said central support; and washers located axially outside of said spring elements and rigidly connected to said central support, said central support having an outer diameter defining a small clearance between said central support and a surface of said axial through bore for accommodating damping oil.

5,413,319

## FLUID DAMPED BUSHING

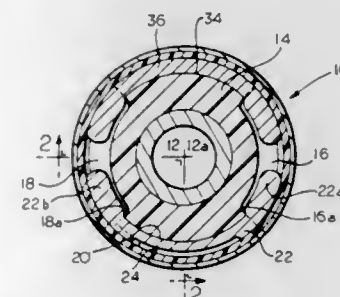
Richard D. Hein, Wabash; Paul T. Wolfe, and Douglas M. McLelland, both of Ft. Wayne, all of Ind., assignors to GenCorp Inc., Fairlawn, Ohio

Filed Aug. 10, 1994, Ser. No. 289,026

Int. Cl.<sup>6</sup> F16M 1/00

U.S. Cl. 267—140.12

9 Claims



1. A fluid damped bushing comprising:

- a rigid cylindrical member;
- an annular elastomeric member having an inner surface, said inner surface of said elastomeric member engaging an outer surface of said rigid cylindrical member in surface to surface contact, said annular elastomeric member further having a plurality of circumferentially spaced apart recesses in an outer surface thereof and an intermediate recess in the outer surface of said elastomeric member, the intermediate recess being spaced between an adjacent pair of spaced apart recesses;
- an arcuate inertia track plate positioned in said intermediate recess, said inertia track plate being formed from a relatively rigid material and having passage means extending therethrough to provide for flow of fluid therethrough between the adjacent recesses;
- first and second rings circumscribing said elastomeric member at locations external to the locations of said plurality of recesses and said intermediate recess;
- an outermost sleeve having an inwardly facing sealing member and circumscribing said elastomeric member and said first and second rings, said outermost sleeve being adapted to seal a damping fluid contained in the recesses;
- wherein said elastomeric member further comprises a second intermediate recess in the outer surface of said elastomeric member, said second intermediate recess being like said intermediate recess and being diametrically opposed thereto, and further comprising:
- an arcuate plate positioned in said second intermediate recess, said arcuate plate being formed from a relatively rigid material and being like said arcuate inertia track plate except that said arcuate plate is not provided with passage means extending therethrough.

5,413,320

## FLUID MOUNT FOR DEVICES SUCH AS ENGINES

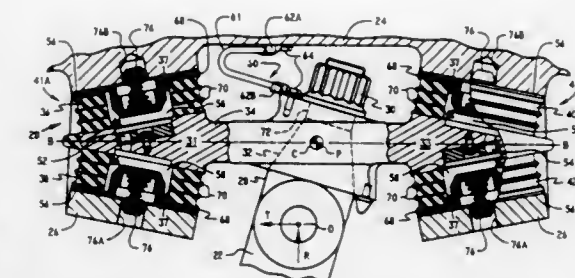
Paul T. Herbst, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Jun. 17, 1993, Ser. No. 79,294

Int. Cl.<sup>6</sup> F16F 9/10

U.S. Cl. 267—140.13

20 Claims



7. A unitary fluid and elastomer mount, comprising:

- (a) a beam having a length, width, and thickness, a first end having upper and lower surfaces, a second end spaced apart along said length of said beam and having upper and lower surfaces, said beam including means for attaching to a supported member, wherein said upper and said lower surfaces of at least one of said ends are non-parallel forming a tapered end portion;
- (b) elastomer means partially forming a first variable-volume chamber and a second variable-volume chamber adjacent said first end of said beam and at least partially defining a third variable-volume chamber and a fourth variable-volume chamber adjacent said second end of said beam, said elastomer means adjacent to means for attaching to a supporting member;
- (c) at least one fluid passageway, fluidically interconnecting at least two selected from the group of said first variable-volume chamber, said second variable-volume chamber, said third variable-volume chamber, and fourth variable-volume chamber;

whereby both radial and torsional loading each causes fluid to flow through said at least one fluid passageway, creating a fluid effect.

5,413,321

## SYSTEM AND METHOD FOR OPERATING A DOCUMENT ASSEMBLY SYSTEM

Jon M. Banks; Melvin R. Clearman, Jr.; James C. Colson, all of Austin; David O. Craig, Round Rock; David C. Loose, Austin, and James E. Varan, Georgetown, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 12, 1993, Ser. No. 3,382

Int. Cl.<sup>6</sup> B65H 39/02; G06F 15/20

U.S. Cl. 270—58

30 Claims

1. A method of operating a document assembly system, comprising the steps of:

- initiating assembly of a set of documents in a sequence, said documents to be assembled along multiple asynchronously operated sections of a document assembly line of the document assembly system;
- detecting improper assembly of a particular one of said documents at one of said asynchronously operated sections; and
- reinitiating assembly of a replacement for said particular document after each preceding document in said sequence of said set is no longer being assembled, at least one said preceding document being no longer assembled at a different one of said asynchronously operated sections.

6. A method of operating a document assembly system, comprising the steps of:

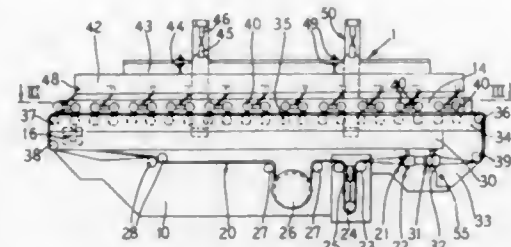
- initiating assembly of a set of documents in a sequence;
- detecting improper assembly of particular ones of said documents;



**U.S. Cl. 271—251** **5 Claims**

1. A device for aligning box blanks in a box blank processing machine, said device comprising a frame, a lengthwise guide rail fixedly mounted on the frame, an upper carrier and lower carrier, brackets directly connecting the upper and lower carriers in a fixed relationship to one another to provide an entrance end and an exit end, pivot means for pivotably mounting the exit end of the lower carrier on the frame for pivotable movement around a vertical axis adjacent the guide rail, adjustment means for positioning the entrance end of the upper and lower carriers relative to the guide rail to enable changing the angle of the path of the upper and lower carriers relative to the

guide rail, the lower carrier comprising an endless belt which is supported by lower rollers, the upper carrier comprising a row of upper rollers and a plurality of levers, each of the levers on an end carrying a pair of the upper rollers spaced apart in the direction of movement of the endless belt, each of the



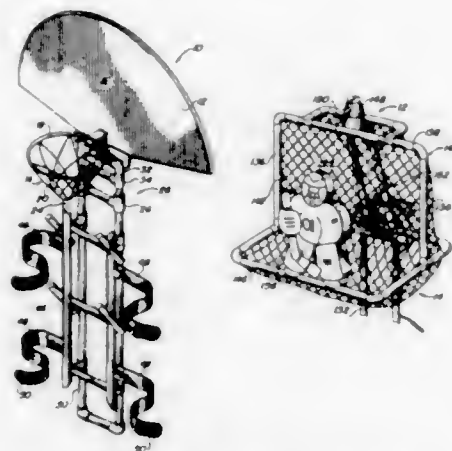
levers having an opposite end mounted for pivotable movement on a horizontal axis on a base element which itself is attached to an upper lengthwise beam by a second adjustment means for positioning the upper rollers in the vertical direction relative to the lower rollers.

5,413,328

**BODY SUPPORTED SPORTS TARGET AND METHOD**  
Timothy F. Glancey, 2929 Alamo Dr., Orlando, Fla. 32805; Walter H. Nickel, Orlando, Fla., and Jeffrey S. Deceder, Orlando, Fla., assignors to Timothy F. Glancey, Orlando, Fla. Continuation-in-part of Ser. No. 753,675, Sep. 3, 1991, Pat. No. Des. 344,558, and a continuation-in-part of Ser. No. 634,501, Dec. 26, 1990, Pat. No. Des. 344,394. This application Feb. 22, 1994, Ser. No. 199,478  
Int. Cl.<sup>6</sup> A63B 67/00

U.S. Cl. 273—1.5 A

41 Claims



1. A body supported sports target comprising:  
a target member having an image affixed to a surface of the target member, the member having a perimeter dimensioned to form a silhouette of the image;  
a container affixed to the target member, the container having an open portion for receiving an object tossed at the target member and a closed portion for holding the object;  
a multiplicity of concentric generally tubular members each having distal ends and proximal ends, the members having an innermost tubular member and an outermost tubular member, the innermost tubular member distal end affixed to the target member;  
means affixed to the tubular members for telescoping the concentric tubular members from a first position wherein the tubular member distal ends are proximate each other to a second position wherein the distal ends are separated by a distance sufficient to extend the target member a predetermined distance above a head of a person operating the target; and

means for affixing the outermost tubular member to the person operating the target

5,413,329

**GOLF CLUB ALIGNMENT GUIDE**

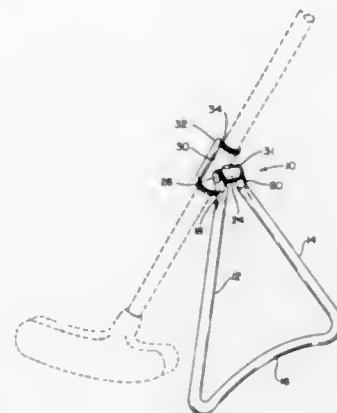
Julian E. Hirsch, 21 Marlwood La., Palm Beach Gardens, Fla. 33418

Filed Mar. 7, 1994, Ser. No. 206,372

Int. Cl.<sup>6</sup> A63B 57/00

U.S. Cl. 273—32 B

9 Claims



9. A detachable stand for supporting a golf club in situ in the upright position comprising bracket means having a base portion for resting on the ground, clamp means having an open end pivotally attached to one end of said bracket means remote from said base portion and being flexible and resilient to removably receive the shaft of the golf club through said open end for partially encircling a portion of said shaft for clamping said shaft whereby said detachable stand and golf club when in the assembled position is self supporting to stand upright on the ground.

5,413,330

**VENTED GOLF TEE**

Thomas A. Disco, Acworth, and Charles R. Parish, Jr., Powder Springs, both of Ga., assignors to Velocity Golf Products, Inc., Acworth, Ga.

Filed Jan. 19, 1994, Ser. No. 183,740

Int. Cl.<sup>6</sup> A63B 57/00

U.S. Cl. 273—33

12 Claims



1. A golf tee comprising:  
a pointed base portion; and  
a hollow body portion extending from said base portion defining an inner cavity and including, at least,  
a base end connected to said pointed base portion,  
a distal end including a ball receipt surface surrounding a first opening into said inner cavity, and  
a side wall extending between said base end and said distal end defining a second opening extending through said side wall into said inner cavity, wherein said second

opening defines a "V-shaped" vent whereby orientation of said golf tee during use is facilitated.

5,413,331

**SOFT REBOUNDABLE AMUSEMENT BALL AND OUTER SKIN MATERIAL**

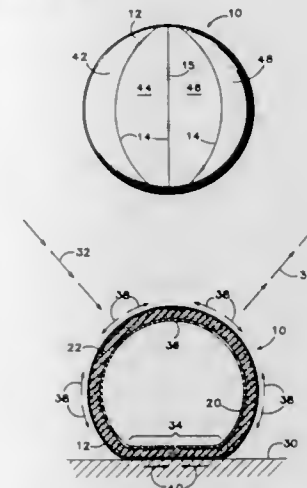
Scott H. Stillinger, Monte Sereno, Calif., assignor to OddzOn Products, Inc., Campbell, Calif.

Filed Dec. 21, 1992, Ser. No. 994,290

Int. Cl.<sup>6</sup> A63B 41/08

U.S. Cl. 273—58 BA

3 Claims



1. An amusement ball comprising:  
a resilient inner body;  
a layer of foam surrounding the inner body; and  
an expanse of material surrounding the intermediate layer and constituting an exterior surface of the ball, where the material comprises a stretchable area of fabric joined with a substantially less stretchable area of fabric, with the substantially less stretchable area constituting a portion of the exterior surface.

5,413,332

**EGGBALL**

Lawrence M. Montgomery, Crystal Bay, Nev., assignor to Amber Forrest, Inc., Incline Village, Calif.

Filed May 26, 1994, Ser. No. 249,782

Int. Cl.<sup>6</sup> A63B 37/02

U.S. Cl. 273—58 R

17 Claims



1. A ball for amusement exercise and athletic competition comprising in operative combination:  
a) a solid body of generally egg shaped exterior configuration having a first major axis and a second minor axis;  
b) the ratio of said major axis to said minor axis lying within the range of about 1.3 to about 1.6;  
c) said ball has a first small end generally parabolic in cross section, a second, opposed, larger end of generally hemispherical configuration, and an intermediate zone having a smooth generally flattened curve so that said opposed end smoothly fair into said intermediate zone;  
d) said ball is composed of an elastomer having a durometer in the range of from about 30 to about 40;

e) said ball has a length in the range of about 2½ to about 3½" along its major axis;  
f) said ball has a mass in the range of from about 60 to 120 grams; and  
g) said ball is of a size to fit comfortably in the human hand between the index and little fingers and which is controllable to impart spin along selective ones of said axes to control the rebound thereof.

5,413,333

**COLOR ADHESIVE FOR TENNIS BALL SEAMS AND A TENNIS BALL SEAM CONTAINING THE SAME**

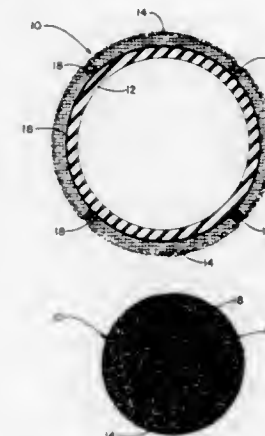
Richard Janes, Scottsdale, and Louis J. Gagnon, Phoenix, both of Ariz., assignors to GenCorp Inc., Fairlawn, Ohio

Filed Dec. 8, 1993, Ser. No. 163,977

Int. Cl.<sup>6</sup> A63B 39/00

U.S. Cl. 273—61 R

12 Claims



1. In a ball comprising a hollow elastomeric core having a spherical surface; a pair of dog-bone shaped yellowish felt panels being other than a white color, each said panel having an inner surface and an outer surface and a continuous lateral edge; said inner surface of said panels being adhered to a portion of said spherical surface by an elastomeric panel adhesive; said panels having juxtaposed lateral edges which are continuously joined to each other by an elastomeric rubber-containing seam adhesive and said seam adhesive being cured to form a seam which adheres to said elastomeric core, said seam and said panels forming a cover for said elastomeric core; the improvement comprising a non-white seam having an effective amount of one or more organic colorants so that said seam is substantially the same yellowish color as said panels.

5,413,334

Patent Not Issued For This Number

5,413,335

**INTERCHANGEABLE RACQUET COMPONENT SYSTEM**

Joseph M. Braun, 1103 Harrison Blvd., Boise, Id. 83702

Filed Mar. 31, 1994, Ser. No. 222,084

Int. Cl.<sup>6</sup> A63B 49/02

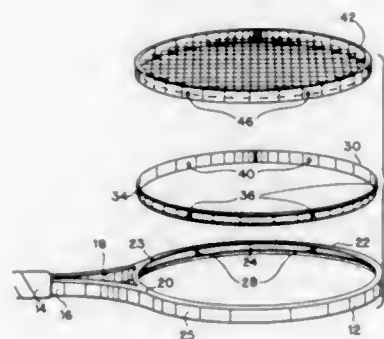
U.S. Cl. 273—73 L

7 Claims

1. A sports racquet comprising:  
(a) a frame having a handle and a generally hoop-shaped head possessing an inner surface and an outer surface, wherein the inner surface of the frame head contains a channel contoured to receive the outside surface of a damper membrane, and the channel contains a plurality of depressions for receiving a securing means wherein the depressions are disposed around the perimeter of the frame head;



- (b) a removable string head, correspondingly shaped to interfit the frame head and having holes therethrough disposed about the perimeter for forming a high tension grid of strings; and a plurality of securing means apertures for receiving a securing means, wherein the apertures are disposed around the perimeter of the string head positioned to correspond to the frame head depressions;
- (c) a damper membrane having an inner surface and outer surface and shaped for interfitting between the string head and the frame head, wherein the outside surface of the damper membrane possesses:



- (1) an elevated strip shaped for interfitting the outside surface of the damper membrane to the inside surface of the frame head; and
- (2) a plurality of projections for receiving a securing means, wherein the projections are shaped and placed to correspond to the securing means apertures in the string head and the frame head depressions; and
- (3) a plurality of reciprocal depressions on the inside surface that are contoured and located opposite the projections on the outside surface.

5,413,336

## IRON (CLUB) SET

Takeshi Iwanaga, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Kobe, Japan

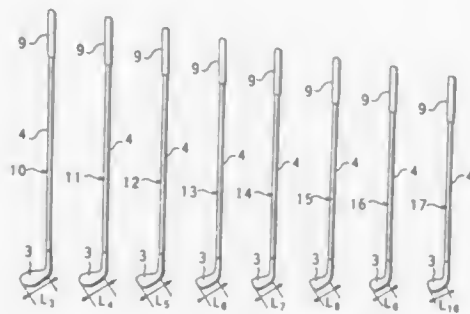
Filed Sep. 22, 1993, Ser. No. 124,482

Claims priority, application Japan, Oct. 22, 1992, 4-309330

Int. Cl.<sup>6</sup> A63B 53/04

U.S. Cl. 273—77 A

8 Claims



1. An iron set comprising a plurality of irons having increasing size numbers, wherein the component irons are respectively provided with a cavity in a back side thereof, and a horizontal face length of each club is gradually increased according to a decrease in the respective size numbers, while at the same time, the thickness of a ball hitting portion from the face to the bottom of the cavity of each club is gradually decreased according to a decrease in size numbers of the clubs.

5,413,337

## GOLF CLUB

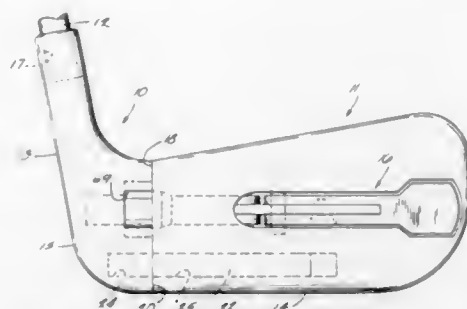
Phillip M. Goodman, 3129 W. Pierre Ct., Mequon, Wis. 53092, and Stanley M. Loncar, Oak Creek, Wis., assignors to Phillip Goodman, Mequon, Wis.

Filed May 27, 1994, Ser. No. 250,570

Int. Cl.<sup>6</sup> A63B 53/06

U.S. Cl. 273—79

18 Claims



1. A golf club having a normal address position when the user addresses the ball, said golf club including a shaft, a club head mounted on the lower end of the shaft and including a hosel, a heel portion and a blade portion, said hosel being integrally formed with said heel portion and being mounted on said shaft, said blade portion being mounted on said heel portion for limited pivotal movement about an axis which is generally horizontal when the club is in the address position, first coupling means on said heel portion, second coupling means on said blade portion and engageable with said first coupling means for rigidly coupling said blade portion to said heel portion, translating means coupled to said blade portion and to said heel portion for moving said blade portion into and out of engagement with said heel portion for engaging and disengaging said first and second coupling means, and adjustment means for selectively positioning said first coupling means in at least first and second positions so that said blade portion will pivot into one of first and second loft angles upon movement into engagement with said heel portion.

5,413,338

## GOLF CLUB SHAFT AND ITS MANUFACTURING MANDREL

Hideaki Kawamatsu, Takarazuka, Japan, assignor to Sumitomo Rubber Industries Inc., Kobe, Japan

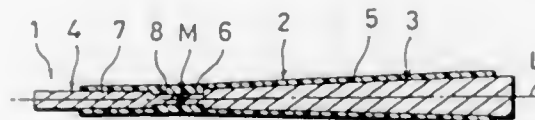
Continuation of Ser. No. 972,938, Nov. 6, 1992, abandoned. This application Aug. 8, 1994, Ser. No. 286,907

Claims priority, application Japan, Nov. 15, 1991, 3-328183

Int. Cl.<sup>6</sup> A63B 53/10

U.S. Cl. 273—80 B

7 Claims



1. A hollow golf club shaft made of reinforced fiber impregnated with a resin and having a basic end and a terminal end wherein an axial hollow portion, intermediate said basic end and said terminal end, is integrally formed in said reinforced fiber impregnated with said resin in said golf club shaft and has a decreased inside diameter in the hollow of said golf club shaft forming a portion of high rigidly intermediate said basic end and said terminal end, which high rigidly portion is locally increased in thickness and is produced by winding said reinforced fiber on a mandrel forming golf club shafts, said mandrel having a reduced diameter portion at which portion the outside diameter of said mandrel is locally decreased in the axial middle of said mandrel, said reduced portion being

formed with a jointing structure allowing said mandrel to be separated into a basic end side member and a terminal end side member.

5,413,339

## ROTATING GOLF CLUB HANDLE

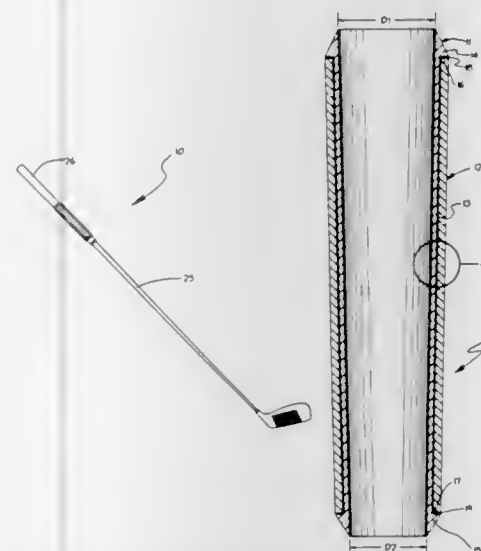
Dennis J. Martin, 1859 Mississippi St., New Brighton, Minn. 55112

Filed Mar. 3, 1994, Ser. No. 205,084

Int. Cl.<sup>6</sup> A63B 53/14

U.S. Cl. 273—81 C

10 Claims



1. A rotating golf club handle for use with a golf club including an elongate golf club handle shaft having a shaft first end and a shaft second end with a golf club head secured to said first end, and a fixed handle positioned about said second end along said fixed handle, said rotating golf club handle comprising: an inner sleeve concentrically positionable over and frictionally engageable to the fixed handle, whereby said inner sleeve is selectively removable from said fixed handle as desired when engaged thereto, and an outer sleeve rotatably mounted concentrically about the inner sleeve.

5,413,340

## ADJUSTABLE GOAL FRAME

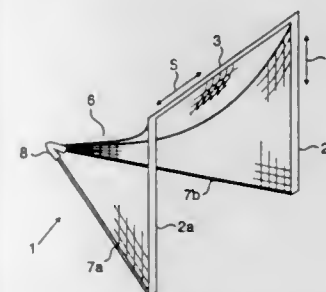
Denis C. Potvin, 8 Saddle Ridge Rd., Pound Ridge, N.Y. 10576, and Daniel Lilie, 176 W. 86th St., New York, N.Y. 10024

Filed Aug. 9, 1993, Ser. No. 104,183

Int. Cl.<sup>6</sup> A63B 63/02

U.S. Cl. 273—127 B

9 Claims



1. A frame for a goal assembly, said assembly comprising the frame and a net attached to the frame, the frame comprising two parallel vertical front components, each vertical front component being adjustable in the vertical direction to provide a plurality of heights for the frame, a horizontal front component coupled at one end with one

vertical front component and coupled at the other end with the other vertical front component, said horizontal front component being adjustable in the horizontal direction to provide a plurality of widths for the frame, and a rear stability device for maintaining the vertical front components in a direction substantially perpendicular to a surface on which the frame is placed, said rear stability device comprising two rear members which rest on the surface on which the frame is placed, each rear member having front and back ends, wherein the front end of one member is coupled with one vertical front component and the front end of the other member is coupled with the other vertical front component, and the back ends of each rear member converge to a flexible connection such that the angle defined by said converging members can vary to accommodate different widths of the horizontal front component.

5,413,341

## EQUIPMENT FOR, AND METHODS OF PLAYING, A PRIZE DRAWING GAME OF CHANCE

Leon D. Lieberman, 22210 Victory Blvd., Unit D-320, Woodland Hills, Calif. 91367

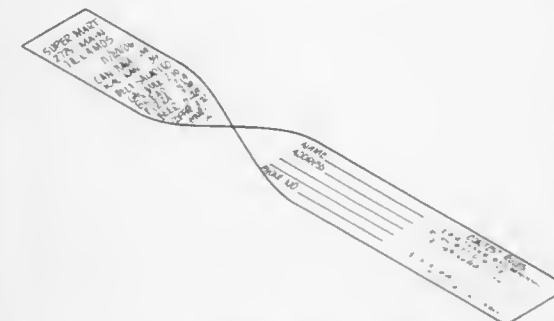
Continuation of Ser. No. 791,025, Nov. 12, 1991, abandoned.

This application Jun. 29, 1993, Ser. No. 84,578

Int. Cl.<sup>6</sup> A63F 3/06

U.S. Cl. 273—138 R

20 Claims



19. A set of prize drawing entry forms which are made available to an entrant of a prize drawing game of chance, from which set the entrant can select one or more prize drawing entry forms for use in playing a prize drawing game of chance, said set comprising:

- (a) a first prize drawing entry form comprising a cash register tape having a front side and a back side, said back side bearing thereon printed indicia including spaces for the insertion in writing of information identifying a prize drawing entrant and said front side being suitable for receiving data concerning items sold, wherein said front side of said first prize drawing entry form is blank; and
- (b) a second prize drawing entry form comprising a coupon adapted to be removed from a publication.

5,413,342

## PYRAMID SLOT MACHINE

Edward B. Kaplan, 45 S. New York Rd., #202-A Suite. #200, Absecon, N.J. 08201

Filed Nov. 5, 1993, Ser. No. 147,576

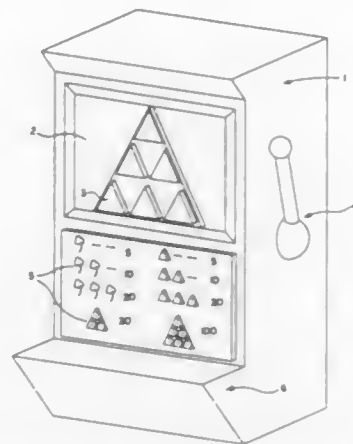
Int. Cl.<sup>6</sup> A63F 5/04

U.S. Cl. 273—143 B

16 Claims

1. A slot machine comprising a plurality of horizontal parallel reels in spaced horizontal planes, each reel having symbols displaying a plurality of symbols on said reels, drive means for driving said reels for rotation in a horizontal plane and control

means for stopping said reels at specific stopping points to illustrate specific symbols on said reels, a triangular display



window for showing said symbols in a triangular form with an apex of the triangle along a vertical axis.

5,413,343

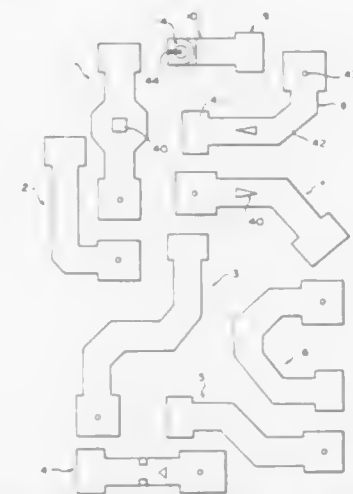
# REDEMPTION COUPON DISPENSING COIN-OR-BILL OPERATED MINI GOLF GAME

Thomas P. Foley; Robert T. Foley, both of Severna Park, and Albert C. Pritchard, Harwood, all of Md., assignors to Embark, Inc., Severna Park, Md.

Filed Oct. 19, 1993, Ser. No. 138,040  
Int. Cl.<sup>6</sup> A63B 69/36

U.S. Cl. 273—176 B

2 Claims



1. An automated mini-golf game comprising:  
a plurality of mini-golf holes each having a tee area, a fairway or putting green and at least one target hole,  
a combination ball dispenser and final hole unit located at a final mini-golf hole of said plurality of mini-golf holes,  
said combination ball dispenser and final mini-golf hole unit having;  
a housing and coin and bill acceptor means on said housing for delivering a golf ball to a player when actuated,  
means in said housing for retaining a plurality of golf balls for delivery to a player when said coin and bill acceptor means is actuated to deliver a golf ball,  
a ramp on said housing extending from an end of said fairway or putting green,  
said ramp having a hump to loft a putt golf ball,  
a target area on said housing at an elevated end of said ramp

having a plurality of target holes which permit return of putt golf balls to said means for retaining golf balls,  
switch and dispensing means in said housing for identifying a target hole of said plurality of target holes through which a golf ball has been putt and for thereafter dispensing redemption coupons corresponding to said target hole,

a set of racks on said housing to hold scorecards, pencils and golf clubs, to allow an entire game to be played sequentially by a multitude of players without an on-site attendant, and

a lockable collections means in said housing for collecting coins and currency expended to play said mini-golf game.

5,413,344

# PORTABLE BUMPER GOLF SYSTEM

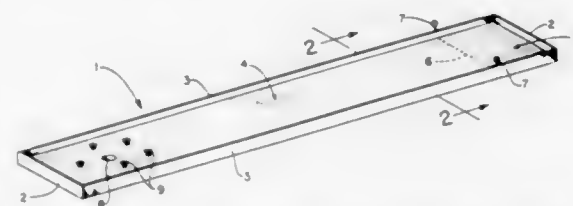
Hardy F. Darden, 826 - 95th Ave., North, Naples, Fla. 33963

Filed May 3, 1994, Ser. No. 237,581

Int. Cl.<sup>6</sup> A63B 67/02

U.S. Cl. 273—176 E

2 Claims



1. A portable, combination system comprising a plurality of holes for playing a game of miniature bumper golf wherein:  
each of the holes is constructed independently of all others, each is physically separated from all others, and each hole in the system has a design different from all other holes in the system;

each of the holes has a long dimension and a short dimension and a playing surface which is supported by a floor and is surrounded by sides and ends, at least some of said sides and ends projecting vertically above the level of the playing surface, thus acting as a border to confine the ball to the playing surface;

the playing surface of each hole includes a cup that projects downward from the playing surface and has an upper edge substantially flush with the playing surface;

the majority of the playing surfaces further include at least one substantially round resilient bumper of such height that the point at which the ball contacts a bumper is in a range about the middle portion of the ball, said bumper positioned on the playing surface so as to obstruct the path to the cup;

the sides and ends of each hole includes a resilient linear bumper on at least part of the inner face of said sides and ends, and positioned such that the point at which the ball contacts the bumper is in a range about the middle portion of the ball; and wherein

all structural components of each hole are fabricated from a hard plastic and are joined by aluminum or stainless steel fastening devices, wherein the playing surface further includes a synthetic carpet which is adhesively secured to the floor.

5,413,345

# GOLF SHOT TRACKING AND ANALYSIS SYSTEM

George S. Nauck, 2226 Spanish Moss Dr., Jacksonville, Fla. 32246

Filed Feb. 19, 1993, Ser. No. 19,911

Int. Cl.<sup>6</sup> G06F 15/44

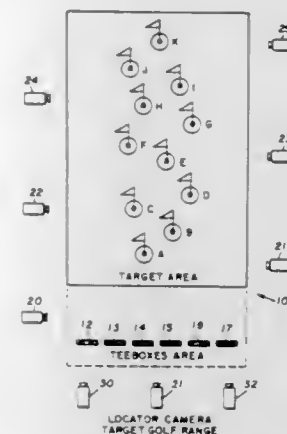
U.S. Cl. 273—185 R

10 Claims

1. A system for tracking, in three dimensions, the movement

of at least two golf balls and for analysis of said movement of each said golf ball, said system comprising:

means including at least two strategically directed video cameras for locating and tracking, in three dimensions, the movement of said at least two golf balls and for providing video output signals indicative of the progressive positions of each said ball in response to said tracking;



display means for reception of said video output signals and for display of the resultant track of each said golf ball;  
processing means for processing said video output signals; and  
storage means for storage of said processed video output signals.

5,413,346

# DOMINANT EYE SIGHT TRAINING APPARATUS

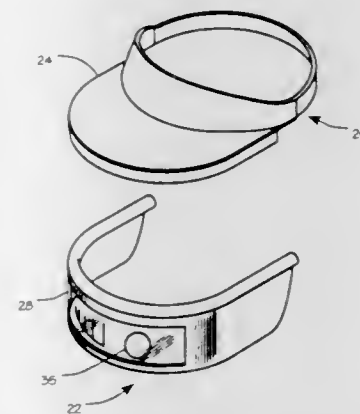
George Hedlund, 2004 W. Wind, Santa Ana, Calif. 92704, and Thad T. Owens, 2749 Adelaide Ct., Riverside, Calif. 92506

Filed Mar. 29, 1993, Ser. No. 38,261

Int. Cl.<sup>6</sup> A63B 69/36

U.S. Cl. 273—187.2

28 Claims



7. A training apparatus to teach eye dominance for any sport or application where eye dominance is required with respect to an object, the apparatus comprising:

a shield member configured for attachment to the brim of a cap or sun visor to be worn on the head of a user;  
generally transparent window means on said member, said window means being generally rectangular with the upper and lower edges thereof generally parallel and dimensioned and positioned for placement in the viewing area of the user to establish a plane of reference with respect to terrain on which the user is standing;

a first generally circular reference means within said win-

dow means and positioned for viewing and focusing on the object through one eye of the user;

a second reference means within said window means and positioned for viewing the object through the other eye of the user, said second reference means providing a point of reference relative to the object during movement of the user, said second reference means being configured as a matrix of lines for establishing a line of movement for the user while said first reference means provides a point of focus on the object for the user.

5,413,347

# DEVICES FOR HITTING GOLF BALLS WHEN IN CONFINED SPACES

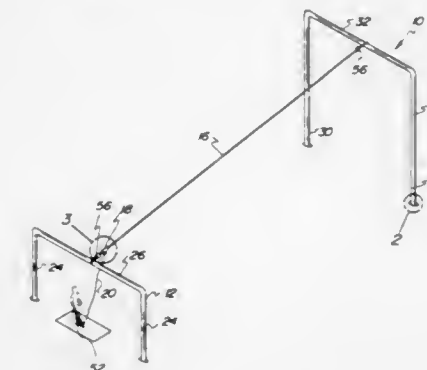
Billy G. Prater, R.R. 1 Box 54, Dover Plains, Wyo. 12522

Filed Dec. 2, 1993, Ser. No. 160,217

Int. Cl.<sup>6</sup> A63B 69/36

U.S. Cl. 273—200 A

7 Claims



1. A new and improved device for use in hitting golf shots when in a confined space comprising, in combination:

a first small inverted u-shaped member having parallel vertical legs and a linear horizontal cross leg coupling the upper ends of the parallel legs;

a second large inverted u-shaped member having parallel vertical legs and a linear horizontal cross leg coupling the upper ends of the parallel legs;

a main cable coupling the horizontal legs of the large inverted u-shaped member and the small inverted u-shaped member with the end of the cable attached to the large u-shaped member being at a higher elevation than the end of the cable attached to the smaller u-shaped member;

attachment means in the form of a downwardly extending central spike co-axial with each vertical leg, each attachment means having an upwardly extending projection to be slidably received by the lower end of each vertical leg, and with a horizontally extending flange therebetween with apertures for receiving supplemental stakes to securely couple each inverted u-shaped member to the ground at a distance to maintain the main cable in a taut orientation;

a hollow cylindrical sleeve secured about the main cable and traveling along the length thereof, the sleeve having a golf ball to be hit and a supplemental string having an upper end coupled to the sleeve and a lower end coupled to the golf ball to be hit with the length of the string sufficient to extend between the sleeve and the golf ball; and

a supplemental ball secured to the main cable at each end thereof adjacent to the associated horizontal leg of its associated u-shaped member to limit the path of travel of the golf ball.



5,413,348

**GOLF TEE ANCHORING SYSTEM**

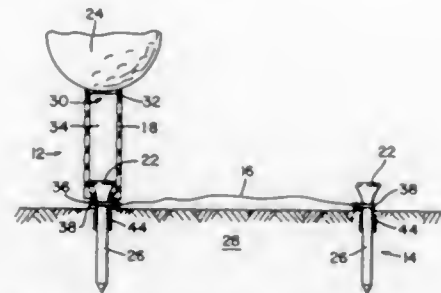
Alfonso Basso, R. D. I, Box 177B, South America Rd., Worcester, N.Y. 12197

Filed Jun. 6, 1994, Ser. No. 254,904

Int. Cl.<sup>6</sup> A63B 69/36, 57/00

U.S. Cl. 273—208

11 Claims



1. A golf tee anchoring system comprising:
  - a tee member including a substantially tubular, resilient upper portion for supporting a golf ball thereon, and a ground penetrating element for inserting said tee member into the ground, the upper ball support portion of said tee member further including an upper aperture for receiving and supporting said golf ball, and a lower aperture for snugly receiving a lower shaft portion of said ground penetrating element completely therethrough, with an enlarged upper head portion of said ground penetrating element positioned within the upper portion of said tee member adjacent said lower aperture;
  - an anchoring element having a ground penetrating element; and
  - a tethering system for coupling said tee member and said anchoring element, said tethering system including a first elastic O-ring which is secured about the ground penetrating element of said tee member, a second elastic O-ring which is secured about the ground penetrating element of said anchoring element, first and second elastic, elongated retainers, each secured about said ground penetrating elements below the first and second elastic O-rings, respectively, and a flexible tether for securing said first elastic O-ring to said second elastic O-ring.

5,413,349

**SCENIC GOLF GAME**

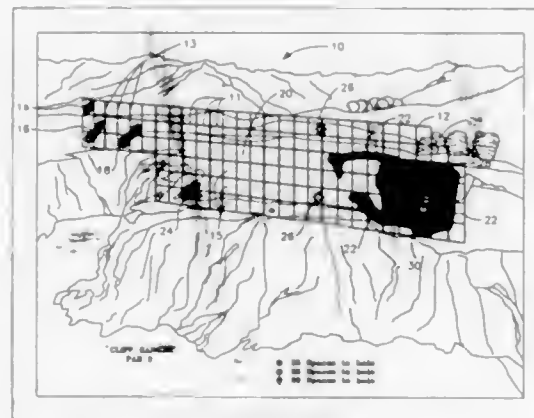
David M. Canther, 2051 E. Imperial Cir., Naples, Fla. 33942

Filed Aug. 16, 1994, Ser. No. 291,680

Int. Cl.<sup>6</sup> A63F 3/00

U.S. Cl. 273—245

19 Claims



1. A golf game apparatus comprising
  - a plurality of game boards, each game board having a different golf hole playing area comprising at least one tee

position, a fairway and a green, each playing area set within a different overlapping scenic setting, said overlapping scenic setting encompassing the game board,

a perspective grid pattern encompassing each playing area, said grid pattern comprised of intersecting longitudinal and transverse straight lines forming quadrilateral blocks gradually changing in size relative to the perspective distance of the scenic setting and playing area, said perspective grid pattern providing a playing surface for said golf game on said playing area within said scenic setting,

a plurality of playing pieces which move on said blocks of said perspective grid pattern, chance devices used on the tee position and on the fairway comprise a combination of dice at least one die having numerical indicia and a second die having weather conditions indicia and a card with indicia affecting the direction of the shot and club used, chance devices used on the green comprise a combination of different dice one die for numerical indicia and one die for playing conditions indicia and a card for affecting the length of the putt.

5,413,350

**ILLUMINATED GAME BOARD WITH LIGHT DIRECTING TRANSPARENT LENS**

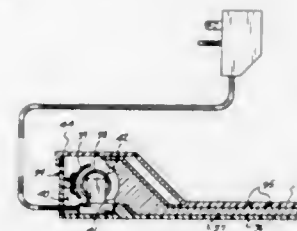
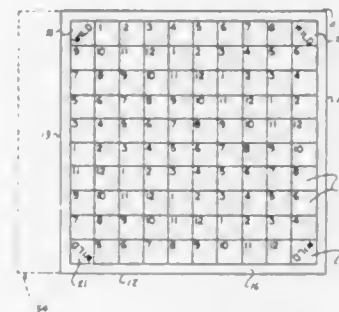
Thomas E. Taylor, 615 Frankham Rd.; Bruce R. Guymon, P.O. Box 1575; Dorothy I. Taylor, 615 Frankham Rd., and Helen E. Guymon, P.O. Box 1575, all of Grants Pass, Oreg. 97526

Filed May 17, 1993, Ser. No. 61,560

Int. Cl.<sup>6</sup> A63F 3/00

U.S. Cl. 273—271

4 Claims



1. A board game apparatus, comprising,
  - a game board, the game board including a game board first end wall, a game board second end wall, a game board first side wall, and a game board second side wall, the game board further including a game board top wall and a game board bottom wall,
  - and
  - the game board top wall including a plurality of rows and columns intersecting one another into a rectilinear matrix of game spaces, wherein the game spaces include corner spaces, each of the game spaces contain numerical indicia of contrasting value relative to adjacent game spaces of said game spaces, and each of the corner spaces are indicated as a "wild" space,
  - and
  - a card deck, wherein the card deck having a first category of cards, a second category of cards, and a third category of cards,

and

a plurality of token discs, wherein a total of the game spaces are equal to a predetermined number, and said token disc are equal to said predetermined number, and the first category of cards, the second category of cards, and the third category of cards equals to a second predetermined number greater than said predetermined number, wherein the third category of cards indicates an enumeration permitting a player to position a token disc upon one of said game spaces, the first category of cards is arranged permitting positioning of an additional game token on the game spaces, and the second category of cards permits removal of one of said token discs from said game spaces,

and

the game board includes an illumination housing mounted to the game board coextensive along the second end wall, with a transparent lens directed coextensively through the game board between the game board top wall and the game board bottom wall, with the transparent lens having a transparent lens periphery, and the game board having a game board periphery directed about the first end wall, the second end wall, the first side wall, and the second side wall, wherein the transparent lens periphery projects through the game board periphery, and the transparent lens is directed into the illumination housing from the second end wall, and terminating in a transparent lens housing end wall within the illumination housing, and an illumination bulb mounted within the illumination housing coextensive and parallel to the transparent lens housing end wall, and electrical supply means for directing electrical energy for effecting illumination of the illumination bulb directing illumination through the transparent lens,

and

each of the game spaces includes an opening in communication with the transparent lens to direct illumination through said opening medially of each of the game spaces.

5,413,351

**METHOD OF PLAYING A DICE GAME**

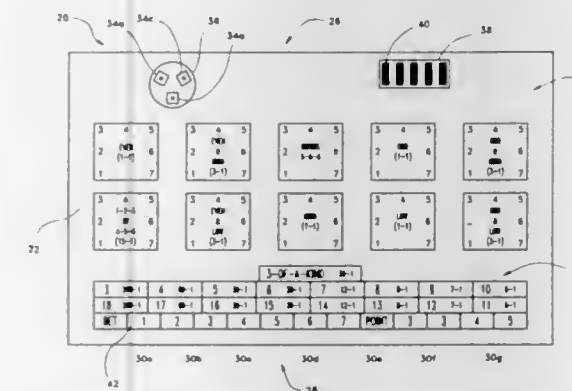
Thomas L. Franklin, 810 Ford St., Gulfport, Miss. 39507

Filed Jul. 1, 1994, Ser. No. 270,160

Int. Cl.<sup>6</sup> A63F 3/00

U.S. Cl. 273—274

19 Claims



1. A method of playing a game with three dies by at least one player and a dealer comprising:
  - (a) a player placing a first bet means and, optionally, a bonus bet means;
  - (b) a dealer activating a first throw of three dies;
  - (c) if the result of the first throw is a dealer-losing combination from a predetermined win-lose schedule, the dealer paying each player a payout based on the first bet means;
  - (d) if the result of the first throw is a dealer-winning combination from the win-lose schedule, the dealer collecting the first bet means; and
  - (e) if the result of the first throw is a bonus combination from the predetermined win-lose schedule, each player who has

placed a bonus bet means activating one player throw of the dice, and paying each player whose player throw is a player-bonus combination a payout of at least 1000 times the amount of the bonus bet.

5,413,352

**SELF-SETTING GAME BOARD DEVICE**

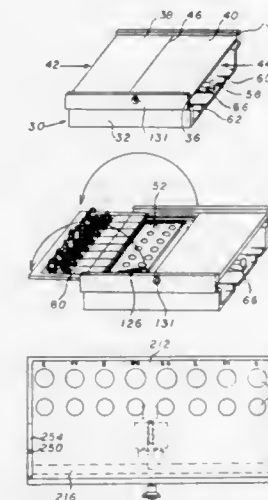
Andre M. Persidsky, and Maxim D. Persidsky, both of 35 Temescal, San Francisco, Calif. 94118

Filed Sep. 7, 1993, Ser. No. 118,444

Int. Cl.<sup>6</sup> A63F 3/02

U.S. Cl. 273—287

32 Claims



1. A game apparatus adapted for positioning a predetermined number of game pieces on a game board, comprising:
  - a single housing having a plurality of compartments for receiving all of said game pieces therein, said compartments can be gradually filled as said game pieces are gradually removed from said game board during game play, so that when said compartments are filled with said game pieces, including said game pieces that remain on said game board after a game, said housing can be positioned against said game board for simultaneously positioning all of said game pieces thereon.

5,413,353

**METHOD OF PLAYING A BLACKJACK TYPE CARD GAME**

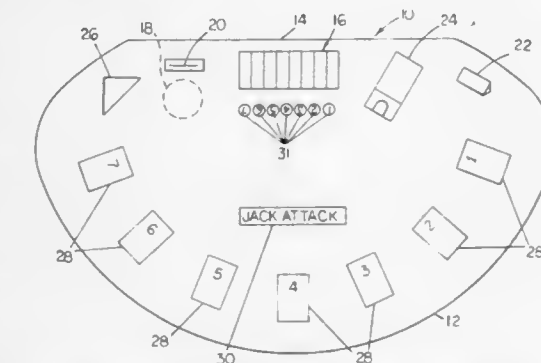
Phillip W. Demarest, 1291 Beeler St., Aurora, Colo. 80110, and R. Rick Allen, 1711 S. Nome Way, Aurora, Colo. 80012

Filed May 2, 1994, Ser. No. 213,869

Int. Cl.<sup>6</sup> A63F 1/00

U.S. Cl. 273—292

18 Claims



1. A method of playing a blackjack type game using at least

one standard deck of fifty two playing cards, said method comprising the steps of:

- three to seven players placing a predetermined wager to form a pot;
- a dealer dealing two cards to each of said players at least one of said two cards being face down;
- each of said players electing in turn to stand or draw additional cards without placing an additional wager;
- determining a card sum from each player's cards with a card from 2 to 10 counted at its face value, a jack, queen, or king counted as 10 and an ace counted as 11 unless that would give a total card sum in excess of 21 in which case said ace has a value of one;
- comparing each player's cards and determining a winner, said winner having a card sum that does not exceed 21 but exceeds that of every other player or alternately said winner having a blackjack with said two cards and no other player having a blackjack;
- after determining said winner paying said pot minus a predetermined rake to said winner; and
- rotating an imaginary dealer button from player to player to determine a starting point for a deal of a next game.

5,413,354

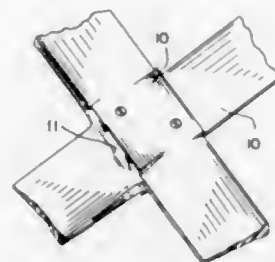
## FLYING TOY

Leo C. Miller, 1110 Dodson La., Wheaton, Md. 20902  
Filed Mar. 17, 1994, Ser. No. 214,126

Int. Cl.<sup>6</sup> A63B 65/08

U.S. Cl. 273—426

3 Claims



1. A hand-launched flying toy structure comprising in combination: (a) three or more streamlined elongated blades, attached at a central hub to extend radially from said central hub at equal angular spacing, each of said blades oriented to provide zero aerodynamic lift and zero dihedral, (b) said blades, each tapered in thickness from the hub to a thinner tip, (c) each of said blades rounded on its leading edge and smoothly contoured symmetrically to a thinner trailing edge to provide minimum air drag around the toy's spin axis.

5,413,355

## ELECTRONIC EDUCATIONAL GAME WITH RESPONSIVE ANIMATION

Carlos Gonzalez, Calle H 472, Urb. Constancia, Ponce, Puerto Rico 00731

Filed Dec. 17, 1993, Ser. No. 169,320

Int. Cl.<sup>6</sup> A63F 9/00

U.S. Cl. 273—429

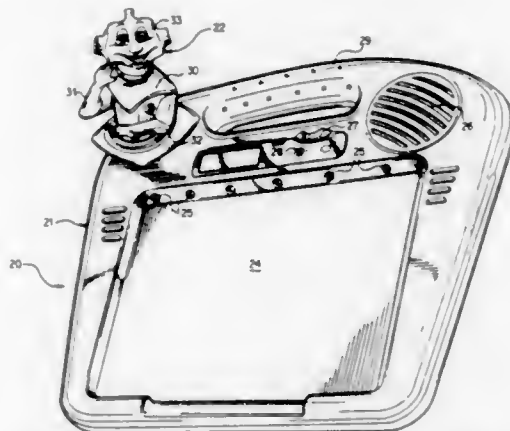
17 Claims

1. A unitary, portable, self-contained animated educational and entertainment game/toy constructed for encouraging continued use by children, said game/toy comprising:

- A. a housing incorporating audible indicia and visual indicia activated in response to the receipt of control signals;
- B. an input panel formed on the housing for producing a plurality of signals in response to user activation thereof;
- C. control means mounted in the housing for receiving the signals from the input panel and producing first control signals for activating the audible and visual indicia;
- D. an animatable three-dimensional character
  - a. removably mounted to the housing,
  - b. controllably connected to the control means for producing animated movements in response to receipt of

control signals from the control means, said control signals being produced in response to specific user initiated input signals and

- c. constructed for producing a first animated response representing the receipt of input signals consistent with a correct answer and a second animated response different from said first animated response and representing receipt of input signals consistent with an incorrect answer; and



E. a plurality of game cards constructed for overlying cooperating interrelationship with the input panel and comprising a plurality of separate zones each of which is aligned with an input zone of the panel and contains indicia representing a question or an answer, whereby the user is able to produce the desired input signal by pressing the particular question zone followed by pressing of the answer zone related thereto;

whereby an animated toy/game is attained which provides animation directly responsive to the input provided by the user.

5,413,356

## SET UP METHOD FOR A SOCCER NET

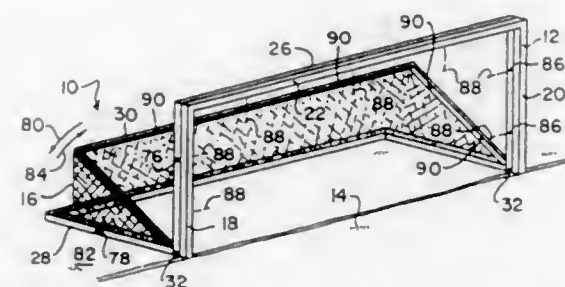
Robert Bigelow, 2511 Poppy St., East Meadow, N.Y. 11554  
Filed Mar. 4, 1994, Ser. No. 205,805

The portion of the term of this patent subsequent to May 3, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A63B 63/04

U.S. Cl. 273—400

1 Claim



1. A method of setting up a soccer net for a soccer game comprising the steps of providing as support for said soccer net a goal having an opening bounded by vertically oriented opposite side posts and a horizontally oriented top post connected in spanning relation therebetween, placing in facing relation an inner and outer cooperating pair of U-shaped frames disposed at ground level behind said goal, connecting a folded soccer net having a peripheral edge in between said frames with an upper peripheral length portion being connected to said inner frame and a lower peripheral length portion being connected to said outer frame, and raising only said inner frame into a

supported position onto said goal, whereby said soccer net is simultaneously unfolded and stretched open against the weight of the stationary outer frame to thereby provide goal-tending service behind said goal.

5,413,357

## PROGRAM CONTROLLED ENTERTAINMENT AND GAME APPARATUS

Ulrich Schulze, Wiesbaden; Horst Niederlein, Bingen; Peter Kubn, Wiesbaden, and Armin Frank, Mönchweiler, all of Germany, assignors to NSM Aktiengesellschaft, Bingen, Germany

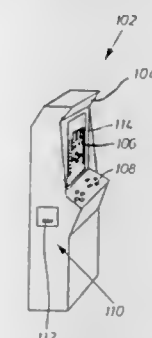
Filed Jun. 30, 1993, Ser. No. 83,769

Claims priority, application Germany, Jul. 6, 1992, 42 22 110.2

Int. Cl.<sup>6</sup> A63F 9/22

U.S. Cl. 273—436

30 Claims



1. A program-controlled coin-operated entertainment and game device comprising:

- a housing;
- a display unit arranged within the housing;
- means for receiving and verifying a coin;
- operating elements associated with the housing; and
- a playback unit associated with the housing for a CD-I disc on which program and data informations are stored, the playback unit being responsive to the means for receiving and verifying the coin when the coin is verified for causing the program and data informations stored on the CD-I disc to provide an entertainment function.

5,413,358

## SEAL FOR PUSH-BUTTON SWITCHES

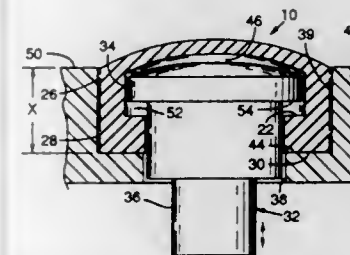
George K. Austin, Jr., Pierre M. LaPlante, both of Newberg; William F. Fisher, Beaver Creek, and Raymond G. Reed, Milwaukie, all of Oreg., assignors to A-Dec, Inc., Newberg, Oreg.

Filed Jan. 12, 1993, Ser. No. 3,276

Int. Cl.<sup>6</sup> F16J 15/32

U.S. Cl. 277—12

13 Claims



1. A seal assembly for a push-button switch, comprising: a panel surface in which is defined a counterbored opening defined by an inner wall and by a shoulder surface that is spaced from the panel surface;

a cylindrical body member having an inner surface and an outer surface and having one open end and one closed end, the body member being inserted within the opening

so that the open end abuts the shoulder surface thereby limiting the depth to which the body member may be inserted into the opening, the body member including at least one circumferential ridge projecting radially outwardly from the outer surface of the body member side wall, the ridge configured for sealing against the inner wall; and

a radially inwardly projecting circumferential lip formed in the open end of the body, wherein the lip defines an annular, planar, bottom surface of the seal member, which surface abuts the shoulder surface.

5,413,359

## GASKET

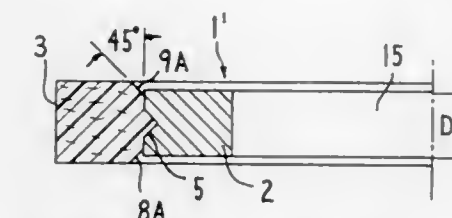
Cyril X. Latty, Saint Cloud, France, assignor to Latty International S.A., Orsay, France

Filed Aug. 31, 1993, Ser. No. 114,480

Int. Cl.<sup>6</sup> F16J 15/32

U.S. Cl. 277—180

2 Claims



1. In a gasket comprising an annular metal core and at least one radially outwardly projecting, compressible gasket ring made of a high-temperature resistant, expanded graphite material, said gasket ring being circumferentially arranged on said metal core, said gasket ring after mounting being essentially aligned with said metal core, said metal core having an annular V-shaped trough on an outer circumference, said gasket ring having a radially inwardly projecting annular bead that is received into said trough, said gasket ring also having planar axially facing sides, a radially outwardly facing circumferential wall and a radially inwardly facing wall concentric with said circumferential wall, the improvement wherein a juncture between each said axially facing sides and at least one of said circumferential wall and said radially inwardly facing wall includes an inclined slope of generally 45°, wherein each said inclined slope extends from a region greater than the thickness of said metal core to a region less than the thickness of said metal core when said gasket ring is in a noncompressed state, and wherein said annular metal core consists of a high strength metal alloy selected from the group consisting of 304L stainless steel, 316L stainless steel, 321 stainless steel, 329 stainless steel and inconel 600.

5,413,360

## ELECTROSTATIC CHUCK

Hitoshi Atari, Kyoto, and Kazuhiro Kuchimachi, Kokubu, both of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed Dec. 1, 1993, Ser. No. 160,685

Claims priority, application Japan, Dec. 1, 1992, 4-322078; Apr. 1, 1993, 5-075672

Int. Cl.<sup>6</sup> B23Q 3/15

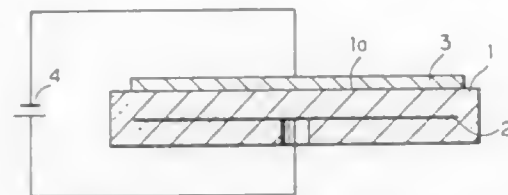
U.S. Cl. 279—128

12 Claims

1. An electrostatic chuck, comprising: a chuck body for generating a chucking force by means of minimal leak current, the chuck body comprising dielectric ceramic having a volume resistivity value not greater



than approximately  $10^{13} \Omega \text{cm}$  at a high temperature of not less than approximately  $250^\circ \text{C}$ , and



an electrostatic inner electrode embedded in the chuck body.

5,413,361

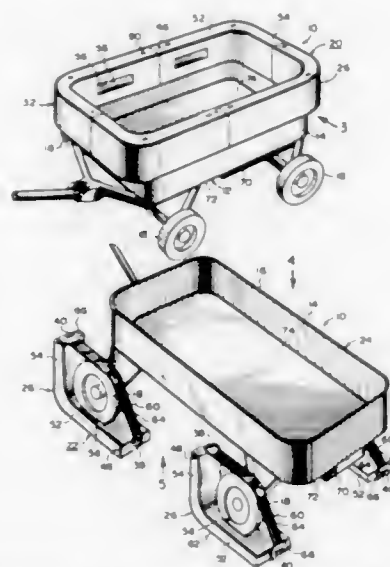
## SKI-RAIL FOR A WAGON

Max B. Mosher, 480 W. Charlotte St., Centreville, Mich. 49032  
Filed Mar. 28, 1994, Ser. No. 218,246

Int. Cl.<sup>6</sup> B62B 9/04

U.S. Cl. 280—7.12

10 Claims



1. A ski-rail for a wagon having a rectangular shaped, circumferentially extending side rail with an upper lip portion and four wheels, which comprises:

- four L-shaped bar members;
- means formed in each of said L-shaped bar members for engaging the lip portion of a respective quarter corner portion of the circumferentially extending side rail;
- means for interlocking said four L-shaped bar members together in a generally rectangular shaped ring configuration for forming a segmented railing which, when assembled onto and about the lip portion of the side rail of the wagon, raises the effective height of the side rail; and
- means for releasably securing each of said L-shaped bar members to a respective one of said wheels for forming four runners, when said segmented railing has been disassembled into said four L-shaped bar members, so as to convert the wagon into a sled to be used on ice and snow.

5,413,362

## FRONT WHEEL BRAKE FOR ROLLER SKATE

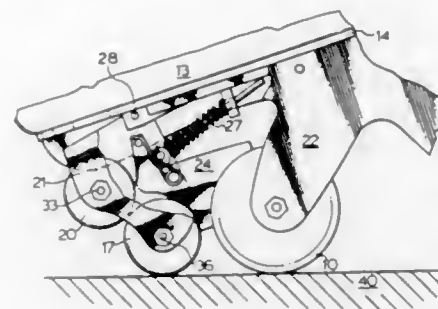
Mario De Santis, 234 Raymerville Dr., Markham Ontario, Canada L3P 6S2

Continuation of Ser. No. 45,112, Apr. 12, 1993, abandoned. This application May 5, 1994, Ser. No. 238,351

Claims priority, application Canada, Jul. 24, 1992, 2074587  
Int. Cl.<sup>6</sup> A63C 17/14

U.S. Cl. 280—11.2

7 Claims



1. A roller skate with a front end brake on said skate, said skate having a skate boot with a boot undersurface and a rigid frame secured to said undersurface, a plurality of rollers comprising a front roller and other rollers behind and inline with said front roller, all of said rollers being rotatably mounted on roller axles secured to said rigid frame, said brake comprising a brake wheel rotatably mounted on a brake wheel mount which is movably secured to said boot undersurface forwardly of said front roller, a brake member secured to said boot undersurface between and spaced from said brake wheel and said front roller, said skate being movable between a rolling position in which all of said rollers roll along a rolling surface on which said skate is supported to a braking position in which said skate is tipped forwardly from said rolling position onto said brake wheel, said brake wheel having a peripheral surface with a lower reach above that of said front roller and being freely rotatable and free of the rolling surface when said skate is in the rolling position and when said skate is in the braking position, said brake wheel is pushed rearwardly such that said peripheral surface of said brake wheel is moved onto and binds against rotation on said brake member; and a spring mounted on a spring support to said boot undersurface, said spring pushing on said brake wheel mount in a direction away from said front roller and biasing said brake wheel away from said front roller when said skate is in the rolling position.

5,413,363

## SNOW SLED

Russell O. Colin, and Bernadette D. Colin, both of 4981 Priscilla Ln., Sacramento, Calif. 95820

Filed Jan. 6, 1994, Ser. No. 178,009

Int. Cl.<sup>6</sup> B62B 13/16

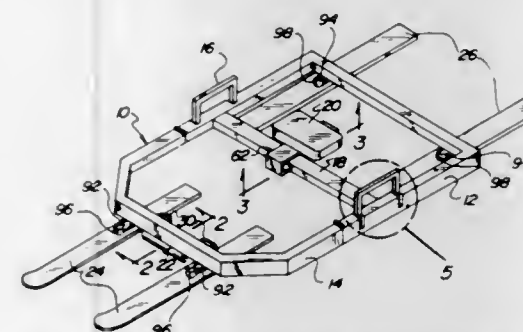
U.S. Cl. 280—14.1

2 Claims

1. A snow sled comprising in combination:
- a first substantially U-shaped frame having a front end, a rear end, a first side and a second side, the first and second sides both having interior and exterior surfaces, a cross brace interconnecting the first side and the second side, the cross brace being positioned adjacent the front end of the first frame, the cross brace having a first end connected to the first side of the first frame, and a second end connected to the second side of the first frame;
  - a second substantially U-shaped frame having a front end, a rear end, a first side and a second side, the first and second sides both having interior and exterior surfaces, the front end of the first frame being pivotally connected to the rear end of the second frame, the first and second frames together defining one superframe;
  - a first handle assembly positioned upon the first side of the

first frame, and a second handle assembly positioned upon the second side of the first frame, with each handle assembly having a handle with two legs and a cross piece therebetween, each of the two legs having a threaded internal aperture, the two legs being pivotally mounted within a set of slots, the slots being formed within one of the sides of the first frame adjacent one of the ends of the cross brace, the slots functioning to permit the pivoting of the handle only towards the exterior surface of one of the sides of the first frame, a first set of apertures formed beneath the set of slots, a second set of apertures formed adjacent the set of slots and through the interior surface of one of the sides of the first frame, a set of screws adapted to be positioned in one of two orientations, in the first orientation the screws are positioned through the first set of slots and within the threaded internal apertures of the legs of the handle, in the second orientation the screws are positioned through the second set of slots and within the threaded internal apertures of the legs of the handle;

- a hinge locking assembly including an aperture formed within the forward end of the first side of the first frame, an aperture formed within the forward end of the second side of the first frame, an aperture formed within the rearward end of the first side of the second frame, and an aperture formed within the rearward end of the second side of the second frame, a set of U-shaped locking pins, each pin adapted to be inserted into the apertures of one side of both the first and second frame;
- a seat assembly including a slot positioned within the cross



brace intermediate its first and second ends, an aperture formed within the cross brace intermediate its first and second ends, the aperture formed perpendicular to and in communication with the slot, a U-shaped seat holder positioned perpendicular to the cross brace and having a first and a second leg, the first leg having a plurality of apertures formed along its length, the second leg having a seat portion formed along its length, a spring biased handle positioned within aperture of the cross brace, the spring biased handle adapted for selective engagement with one of the plurality of apertures formed along the length of the first leg, the selection of the aperture into which the handle is engaged determining the position of the seat holder relative to the cross brace;

- a brake assembly including an angled slot formed within the forward end of the second frame, a brake element having a first end adapted for engagement with an operators foot, and a second end adapted to be inserted into snow, the brake element positioned within the angled slot of the second frame, the brake element being oriented such that the first end is positioned towards the end of the second frame and the second end is positioned towards the front of the second frame, a spring element connecting the second end of the brake element to the forward end of the second frame;

two forward male binding elements positioned upon the forward end of the second frame;  
two rear male binding elements positioned upon the rearward end of the first frame;  
two forward skis, each forward ski having a female binding

element, the two forward skis adapted to be secured to the two forward male binding elements; and  
two rearward skis, each rearward ski having a female binding element, the two rearward skis adapted to be secured to the two rearward male binding elements.

5,413,364

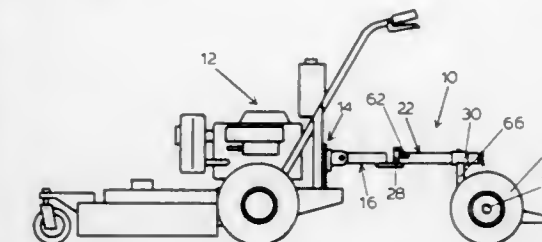
## SULKY FOR SELF-PROPELLED LAWN MOWER

James T. Hafendorfer, 12202 Old Shelbyville Rd., Louisville, Ky. 40243

Filed Nov. 22, 1993, Ser. No. 156,379

Int. Cl.<sup>6</sup> B62D 63/00; B60D 1/14; A01B 75/00  
U.S. Cl. 280—32.7

16 Claims



1. A sulky for transportation of an operator, attachable to self-propelled powered equipment comprising
- a first pivot means attached to the powered equipment,
  - a first arm with first and second ends wherein said first end of said first arm is pivotally connected to said first pivot means wherein the first arm comprises a pivot tubing element, a tubular element and a vertical shaft attached at the second end of the first arm,
  - a second pivot means pivotally connected to said second end of said first arm wherein the second pivot means is a vertical tubing element which can freely rotate about the vertical shaft of the second end of the first arm,
  - a second arm with first and second ends wherein said first end of said second arm is connected to said second pivot means,
  - a third pivot means pivotally connected to said second end of said second arm, and
  - a standing operator platform connected to the third pivot means.

5,413,365

## WHEEL SPINDLE

Jan-Olof Bodin, Alingsås, and Ingemar Dagb, Hisingsbacka, both of Sweden, assignors to AB Volvo, Gothenburg, Sweden  
PCT No. PCT/SE91/00869, § 371 Date Oct. 13, 1993, § 102(e)  
Date Oct. 13, 1993, PCT Pub. No. WO92/11154, PCT Pub. Date Jul. 9, 1992

PCT Filed Dec. 17, 1991, Ser. No. 78,186

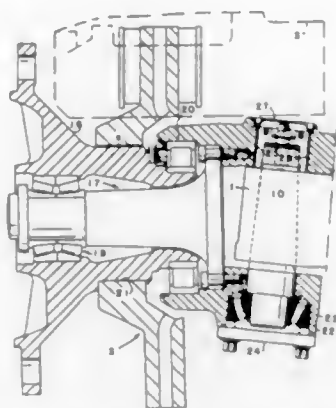
Int. Cl.<sup>6</sup> B60G 25/00

U.S. Cl. 280—96.1

9 Claims

1. Steering knuckle device for a non-driven steerable vehicle wheel for motor vehicles, comprising a knuckle unit with upper and lower axially spaced and axially aligned bores for rotatable mounting of a king pin having a conical portion supported in a conical bore in a wheel axle and with supporting means disposed to support a brake yoke for a disk brake and a stub axle unit which is joined to the knuckle unit and on which a wheel hub is adapted to be mounted, wherein said king pin is so mounted in the upper bore in first bearing means for absorbing at least radial forces, and said king pin's upper end with said associated first bearing means lies essentially co-planar with or below an upper edge of the upper bore, said king pin being

mounted in a lower bore in second bearing means disposed to absorb both axial and radial forces, and said brake yoke being

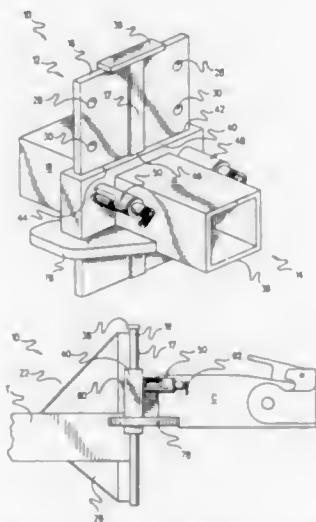


arranged so that at least a portion thereof lies above the upper end of the king pin.

5,413,366  
VERTICALLY ADJUSTABLE TRAILER HITCH  
Eldon L. Gibbons, 1002 Marilyn, Springdale, Ark. 72764  
Filed Jan. 7, 1993, Ser. No. 72,487  
Int. Cl.<sup>6</sup> B60D 1/06

U.S. Cl. 280—490.1

22 Claims



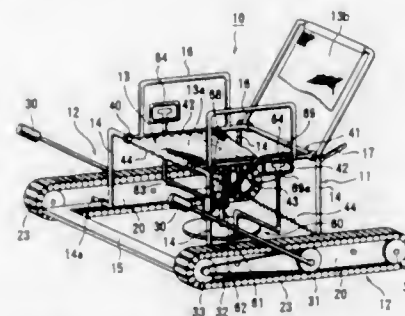
1. A vertically adjustable trailer hitch for use in coupling a trailer to a towing vehicle, comprising:  
a guide component;  
means for securing said guide component to one of said trailer and said towing vehicle;  
a slidable component mounted on said guide component for vertical reciprocal movement to a plurality of adjusted positions;  
means for securing said slidable component to the other of said trailer and said towing vehicle;  
means the retaining said slidable component in a selected adjusted position comprising a latch pin assembly including a latch pin and detent means for selectively retaining said latch pin in engaged and disengaged positions, said detent means comprising:  
a barrel at least partially receiving said latch pin for sliding movement therein;  
a longitudinally extending slot formed in a sidewall portion of said barrel;  
said slot including two spaced circumferentially offset

portions corresponding to said engaged and disengaged positions of said latch pin; and  
a detent member extending transversely from said latch pin disposed in engagement with said slot and selectively engageable with said circumferentially offset portions.

5,413,367  
MOVABLE CHAIR  
Shigeyoshi Ochiai, Tokyo, Japan, assignor to Nippon Telegraph and Telephone Corporation, Japan  
Continuation of Ser. No. 876,969, May 1, 1992, abandoned. This application Apr. 29, 1994, Ser. No. 235,249  
Claims priority, application Japan, May 7, 1991, 3-130307; May 7, 1991, 3-130308; May 7, 1991, 3-130309; Mar. 23, 1992, 4-094951

Int. Cl.<sup>6</sup> B62M 1/16  
U.S. Cl. 280—250.1

16 Claims



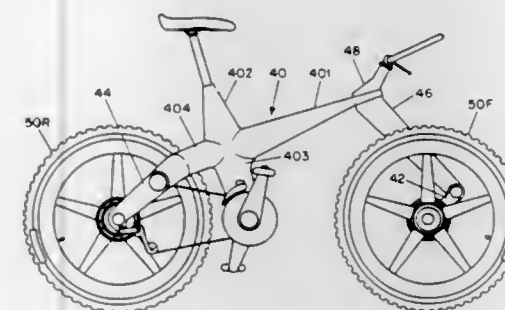
12. A movable chair comprising:  
a pair of left and right traveling devices, disposed on the left and right sides of the chair main body, for moving said chair while supporting said chair main body,  
said traveling devices including  
traveling frames disposed along the traveling direction,  
endless rail portions respectively disposed around said traveling frames,  
endless tracks respectively wound around said endless rail portions,  
driving means for driving said endless tracks,  
means for allowing a sitting person to control said driving means, and  
said endless tracks including,  
endless driving belts, and  
a plurality of ground contact feet mounted on said endless driving belts and having different shapes;  
a direction change device, disposed below said main chair body, for changing the traveling direction of said traveling devices;  
a chair main body having a seat portion; and  
a first rotating shaft, disposed as a separate member on an upper portion of said chair main body, for coupling said chair main body and said seat portion to each other to allow said chair main body and said seat portion to be relatively rotated,  
a second rotating shaft, disposed below said chair main body to be vertically movable and selectively brought into contact with the ground, for coupling said chair main body onto said direction change disk to allow said chair main body to be relatively rotated, and  
an elevating mechanism, disposed between said chair main body and said direction change disk, for vertically moving said disk below said chair main body to selectively switch a traveling mode in which said traveling devices supporting said chair main body is brought into contact with the ground and a direction change mode in which said direction change disk is brought into contact with the ground, said elevating mechanism being designed to shift axes of said first and second rotating shafts from each other in the

traveling mode, and cause the axes to coincide with each other in the direction change mode.

5,413,368  
BICYCLE WITH TRAILING ARM WHEEL  
SUSPENSIONS  
Alex Pong, Langley, and Skooks Pong, Freeland, both of Wash., assignors to Cannondale Corporation, Georgetown, Conn.  
Filed Sep. 16, 1993, Ser. No. 122,142  
Int. Cl.<sup>6</sup> B62K 25/04

U.S. Cl. 280—277

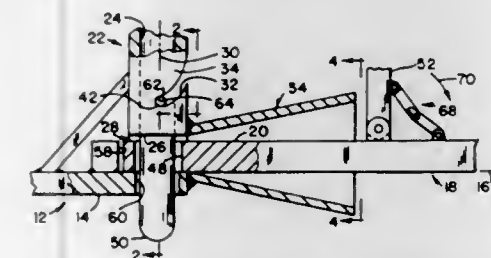
17 Claims



1. A bicycle comprising a single wheel-supporting frame member, a single swing arm mounted on the frame member on large diameter thin section angular contact bearings to pivot about a pivot axis, energy-absorbing and damping devices coupled between the swing arm and the frame member, and a wheel mounted on the swing arm for rotation about a rotation axis spaced apart from, rearwardly of and substantially below the pivot axis, a portion of the frame member and the entirety of the swing arm being located laterally of the wheel, the distance between the pivot axis and the rotation axis being substantially less than the radius of the wheel, and the pivot axis being located relative to the rotation axis such that upward vertical displacements of the rotation axis relative to the pivot axis upon rotation of the swing arm from a neutral position are accompanied by substantial rearward horizontal displacements of the rotation axis so as to increase the time for response of the energy-absorbing and damping devices.

5,413,369  
LATCH MECHANISM FOR TRACTOR HITCHES, FARM GATES OR THE LIKE  
Billy E. Trent, Rte. 1, Box 706, Rose Hill, Va. 24281  
Filed Apr. 25, 1994, Ser. No. 232,669  
Int. Cl.<sup>6</sup> B60D 1/02; E05C 1/04  
U.S. Cl. 280—477

8 Claims



1. A latching mechanism comprising a stationary member having a first segment adapted to lie in a substantially horizontal plane, a second member movable with respect to said stationary member and having a second segment adapted to lie substantially in said plane, cylinder means having a bore for slidably receiving a bolt and being affixed to said first segment with the lower end of said cylinder means spaced above said first segment to provide a latch gap, and with the axis of said bore oriented substantially normally to said horizontal plane, bolt means for providing a latch pin and being slidably

mounted in said bore and having a cam follower arm slot means formed through a wall section of said cylinder means and extending from an upper portion of said section to a lower portion thereof for slidably receiving and directing the motion of said cam follower arm, said cam follower arm projecting through said slot means and slidable therealong and extending generally laterally outwardly from said cylinder means a substantial distance therefrom, said upper and lower portions of said wall section being angularly offset at least about 20° around said cylinder means, first land means provided at the upper portion of said wall section and forming a substantially horizontal component of the upper end of said slot means, power means contacting said bolt means for applying a force thereto tending to move the same downwardly in said bore means, aperture means in said second segment for slidably receiving a lower end of said bolt means, said second segment being dimensioned to slide into said latch gap, and camming means on said second segment for engaging said cam follower arm, said camming means acting to move said arm of of said first land means and allowing said power means to force the lower end of said bolt means through said aperture means to pivotally connect said first and second embodiments as said second segment is moved into said latch gap.

5,413,370  
SKI BINDING  
Andreas Janisch, Oeyenhäusen; Helmut Wladar, Vienna; Hubert Wuerthner, Hainburg/Donau, and Engelbert Spitaler, Wr. Neudorf, all of Austria, assignors to HTM Sport- und Freizeitgeraete Aktiengesellschaft, Schwechat, Austria  
PCT No. PCT/EP92/02336, § 371 Date Jun. 17, 1993, § 102(e) Date Jun. 17, 1993, PCT Pub. No. WO93/07937, PCT Pub. Date Apr. 29, 1993  
PCT Filed Oct. 10, 1992, Ser. No. 78,302  
Claims priority, application Austria, Oct. 18, 1991, 2085/91  
Int. Cl.<sup>6</sup> A63C 9/08  
U.S. Cl. 280—618

8 Claims



1. A ski binding comprising a front jaw and a heel holder, a connecting element comprising a metal band consisting of two coupled partial sections, the connecting element extending in a longitudinal direction of the ski between the front jaw and the heel holder, the heel holder being arranged on a rearmost one of the two partial section of the metal band, adjustment means for facilitating a selective longitudinal positioning of the heel holder relative to the rearmost one of the two partial sections, the adjustment means including a ski-fixed guide rail, the front jaw being slidably supported for movement in a further ski-fixed guide rail and being selectively releasably fixable in predetermined positions to the further ski-fixed guide rail, and a locking means for lockingly connecting the further ski-fixed guide rail to the front partial section of the metal band, the improvement wherein the front partial section of the metal band includes a securement means for securing the front partial section to the further ski-fixed guide rail and against a relative movement with respect thereto along a longitudinal axis thereof, the further ski-fixed guide rail having at least two locking recesses therein, the securement means including a cover having at least two locking members which are received in the locking recesses, the two locking members being reciprocally operative against one another in vertical planes so as to prevent an inadvertent unlocking.



# 5,413,371 SKI BINDING BLOCK

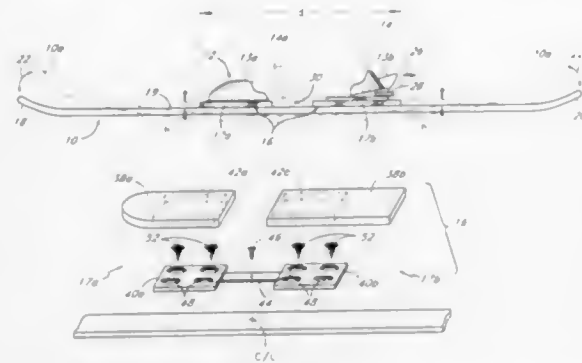
Alan M. Trimble, 25445 Via Estudio, Laguna Niguel, Calif. 92677

Division of Ser. No. 911,885, Jul. 10, 1992, Pat. No. 5,344,176, which is a continuation of Ser. No. 716,535, Jun. 17, 1991, abandoned. This application Jun. 21, 1994, Ser. No. 262,863. The portion of the term of this patent subsequent to Sep. 6, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> A63C 5/07

U.S. Cl. 280—602

12 Claims



1. A ski assembly comprising: an elongated ski which can flex, said ski having an upper surface; an elongated binding block extending longitudinally along the upper surface of the ski and adapted to have a ski binding mounted thereon, said binding block having opposite ends; an attachment fixing the binding block to the ski at a location intermediate the ends of the binding block; and longitudinally elongated regions of said binding block on opposite sides of said location being free to move longitudinally relative to the ski as the ski flexes.

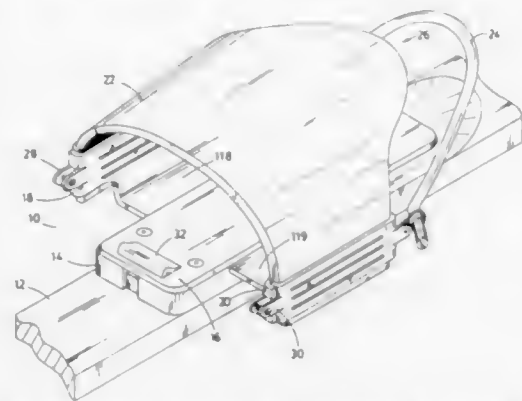
# 5,413,372 PIVOTAL AND ADJUSTABLE SLALOM MONASKI BINDING

Robert M. Evans, Hornell, and Franklin G. Miller, Orchard Park, both of N.Y., assignors to Evans Slalom Ski Binding Company, Hornell, N.Y.

Filed Apr. 6, 1993, Ser. No. 43,495  
Int. Cl.<sup>6</sup> A63C 9/085

U.S. Cl. 280—620

18 Claims



1. A ski binding for removably attaching a boot to a ski, wherein said ski binding is comprised of a base plate which is attachable to said ski, a first mounting stud attached to said base plate, a second mounting stud attached to said base plate, a binding base, means for removably and pivotally attaching said binding base to said first mounting stud, and means connected to said binding base for adjustably and releasably at-

taching said ski binding to said boot, such that said binding base is free to rotate and said binding has rotational flexibility to allow a user to control the ski during use.

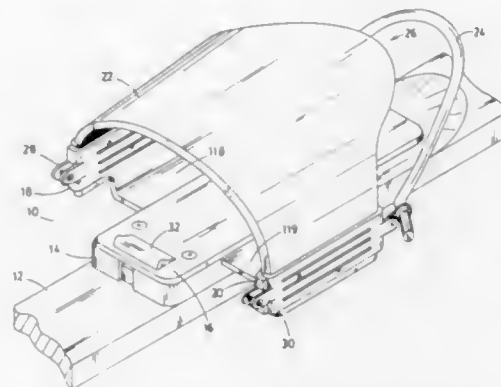
# 5,413,373 SOLO SKI SYSTEM

Robert M. Evans, Hornell, and Franklin G. Miller, Orchard Park, both of N.Y., assignors to Evans Slalom Ski Binding Company, Hornell, N.Y.

Continuation-in-part of Ser. No. 43,495, Apr. 6, 1993. This application Oct. 12, 1993, Ser. No. 135,049  
Int. Cl.<sup>6</sup> A63C 9/02

U.S. Cl. 280—620

18 Claims



1. A solo ski system comprised of a ski, a first releasable ski binding mounted on said ski, and a second releasable ski binding mounted on said ski in back of said first releasable ski binding, wherein said second releasable ski binding is comprised of a base plate which is attachable to said ski, a first mounting stud attached to said base plate, a second mounting stud attached to said base plate, a binding base, means for removably and pivotally attaching said binding base to said first mounting stud and means connected to said binding base for adjustably and releasably attaching said second releasable ski binding to a boot, such that said binding base is free to rotate and said binding has rotational flexibility to allow a user to control the ski during use.

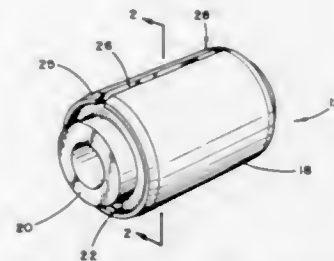
# 5,413,374 ADJUSTABLE BUSHING

William C. Pierce, Muskegon, Mich., assignor to NAI Neway, Inc., Muskegon, Mich.

Continuation-in-part of Ser. No. 753,040, Aug. 30, 1991, abandoned. This application Apr. 1, 1993, Ser. No. 41,819  
Int. Cl.<sup>6</sup> B60G 11/26; F16F 1/38

U.S. Cl. 280—713

23 Claims



1. A bushing assembly for a vehicle suspension wherein a suspension member is mounted to a vehicle frame through the bushing assembly with limited articulation between the suspension member and the vehicle frame, said suspension member having an aperture defined by a cylindrical wall having a predetermined circumference, said bushing assembly comprising:

- a rigid inner element adapted to be securely fixed to the vehicle frame,
- a substantially inflexible tubular outer element having an outer surface and having a circumference nominally greater than the predetermined circumference, said inner element being disposed within and spaced from the outer element,
- an elastomeric insert having a diameter in an uncompressed state greater than an inside diameter of the outer element and compressively retained between the outer element and the inner element and the outer element having sufficient rigidity to resist a spring force of the elastomeric insert in compression,
- the outer element including an adjustable portion for enabling the circumference thereof to be reduced by applying a force to the outer surface against the spring force, whereby upon reducing the circumference of the outer element to a dimension less than the predetermined circumference, the bushing assembly can be easily received in the aperture whereupon the spring force will urge the outer surface to bear directly against the cylindrical wall to frictionally retain the bushing assembly within the aperture.

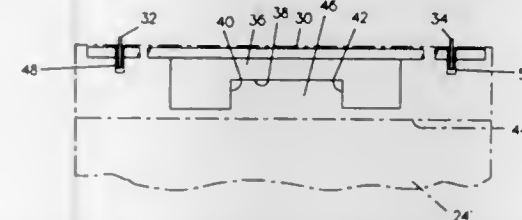
# 5,413,375 METHOD AND APPARATUS FOR RETAINING AN AIRBAG WITHIN A PASSENGER-SIDE AIRBAG MODULE

Michael J. Daines, Brigham City, and Michael D. Jones, Hooper, both of Utah, assignors to Morton International, Inc., Chicago, Ill.

Filed Mar. 15, 1994, Ser. No. 213,253  
Int. Cl.<sup>6</sup> B60R 21/16

U.S. Cl. 280—728.2

12 Claims



1. In an airbag for an automotive passenger airbag module formed from flexible material and having a mouth including first and second opposed edges, the improvement which comprises: each of said first and second opposed edges having incorporated therein a retainer rod; first and second disc-shaped flanges carried by each of said retainer rods; and a substantially planar stiffening rib carried by each of said retainer rods and extending radially outward therefrom longitudinally therealong intermediate said first and second flanges.

# 5,413,376 DRIVER'S SIDE AIR BAG COVER DOOR INCORPORATING A HORN ACTUATOR

Scott M. Filion, Newmarket, N.H.; Mary K. Marshall, York, Me., and Scott E. Rafferty, Rochester, N.H., assignors to Davidson Textron Inc., Dover, N.H.

Filed Nov. 12, 1993, Ser. No. 151,115

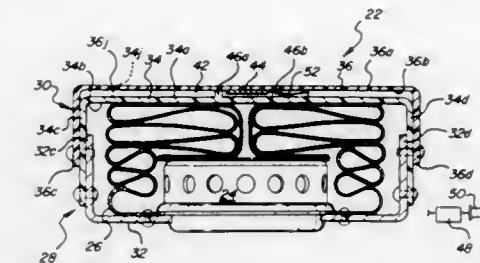
Int. Cl.<sup>6</sup> B60R 21/16

U.S. Cl. 280—728.3

19 Claims

1. An air bag cover door for use in a steering wheel mounted air bag module, comprising: an inner cover section having a tear seam formed therein; an outer cover section adapted to extend over said inner cover, said outer cover section having an inside surface deformable upon hand pressure being exerted on said

- outer cover section, said outer cover section further including a tear seam formed therein;
- a horn actuator attached to said inside surface and being constructed to undergo deformation upon hand pressure being exerted on said outer cover section, said horn actuator exhibiting a non-actuating characteristic in the absence



- of pressure being exerted on said outer cover section and exhibiting an actuating characteristic upon undergoing the deformation; and a protrusion adapted to extend between said inner cover section and said inside surface to space said inner cover section from said horn actuator when said inner and outer cover sections are attached to the steering wheel.

# 5,413,377 INFANT-RESTRAINING PROTECTIVE SEAT HAVING INFLATABLE SEAT BELT

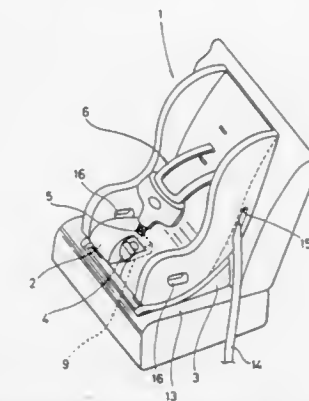
Misao Kamiyama, Hikone, and Yoshinori Ohishi, Ohtsu, both of Japan, assignors to Takata Corporation, Tokyo, Japan

Filed Oct. 19, 1992, Ser. No. 961,820

Claims priority, application Japan, Oct. 21, 1991, 3-272602  
Int. Cl.<sup>6</sup> B60R 21/18

U.S. Cl. 280—733

6 Claims



1. An infant-restraining protective seat, comprising: a seat main body; an infant seat belt; provided on said seat main body; a tongue attached to said infant seat belt, and a buckle device provided on said seat main body into which said tongue is insertable and lockable; gas generating means attached to said buckle device; a portion of said infant seat belt being arranged to contact an infant, at least part of said portion of said infant seat belt being formed as a bag-shaped portion; said bag-shaped portion being maintained in a belt-form under ordinary conditions and inflated by gas from said gas generating means at the time of an emergency; said buckle device having a first gas flow hole communicating with said gas generating means, and said tongue having a second gas flow hole communicating with the interior of said bag-shaped portion, wherein when said tongue is inserted into and locked with said buckle device, said first gas flow hole and said second gas flow hole communicate to form a gas flow passageway communicating said

gas generating means and said bag-shaped portion of said infant seat belt; and wherein said buckle device is provided with a first cap for shutting said first gas flow hole under ordinary conditions and opening said first gas flow hole by breaking at the time of an emergency, and said tongue is provided with a second cap for shutting said second gas flow hole under ordinary conditions and opening said second gas flow hole by breaking at the time of an emergency.

5,413,378

# METHOD AND APPARATUS FOR CONTROLLING AN ACTUATABLE RESTRAINING DEVICE IN RESPONSE TO DISCRETE CONTROL ZONES

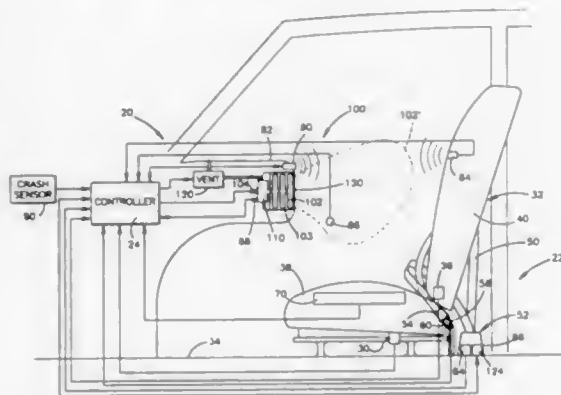
Charles E. Steffens, Jr., Washington; Thomas H. Vos, Rochester; Scott B. Gentry, Romeo; Joseph F. Mazur, Washington, and Brian K. Blackburn, Rochester, all of Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Dec. 2, 1993, Ser. No. 161,654

Int. Cl.<sup>6</sup> B60R 21/26, 21/28

U.S. Cl. 280—735

37 Claims



1. An apparatus for controlling an occupant restraint system, said apparatus comprising:  
position sensing means for sensing position of an occupant;  
weight sensing means for sensing weight of the occupant;  
regulating means operatively connected to an occupant restraining device of the occupant restraint system for regulating an occupant restraining function of said occupant restraining device in response to a control signal; and  
control means operatively connected to said position sensing means, to said weight sensing means, and to said regulating means and including (i) means for determining in which of a plurality of discrete occupant weight ranges the occupant's sensed weight falls, and (ii) means for determining in which of a plurality of discrete occupant position ranges the occupant's sensed position falls, said control means selecting one of a plurality of discrete control zones dependant upon both said determined discrete occupant position range and said determined discrete occupant weight range of the occupant and providing said control signal based on the selected one of said discrete control zones.

5,413,379

# KNEE BOLSTER STRUCTURE

Yasuyuki Koma, Columbus, Ohio, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 16, 1993, Ser. No. 121,526

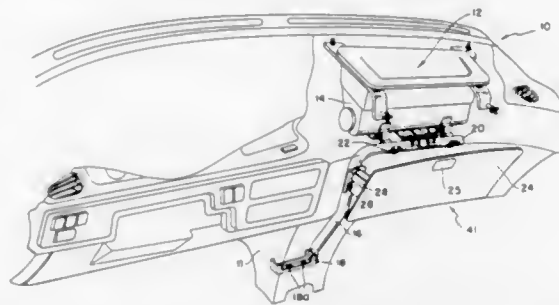
Int. Cl.<sup>6</sup> B60R 21/045

U.S. Cl. 280—752

7 Claims

1. A knee bolster for a vehicle for engaging a knee of a vehicle occupant in case of a vehicle crash comprising:  
a deformable energy absorbing member adapted to be positioned opposite to a knee of the vehicle occupant, said

deformable energy absorbing member having a first end and a second end defining a predetermined length;  
a support member operatively connected to at least one of said first end and said second end of said deformable energy absorbing member, said support member being a deformable energy absorbing connector extending at a predetermined angle relative to said deformable energy absorbing member to a distal end thereof;  
a guide member operatively positioned to engage said distal end of said support member, said guide member including a guide portion adapted to be received within the distal



end of said support member and overlap said distal end of said support member, said support member and said guide member being operatively arranged relative to each other for controlling the force of energy supplied from said knee bolster during a vehicle crash; and  
a deformable support beam for absorbing energy from said deformable energy absorbing member through said support member, said support beam including a first end and a second end;  
said guide member being secured to said support beam and at least one end of said support beam being adapted to be secured to a frame member of a vehicle.

5,413,380

# GYROSCOPIC IN-LINE BELT ROLLER SKATE

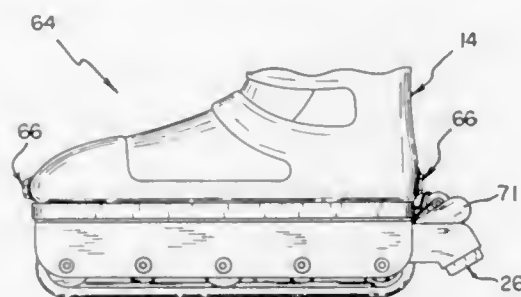
Juan M. Fernandez, 49 North Ridge Rd., Livingston, N.J. 07039

Filed Oct. 12, 1993, Ser. No. 134,754

Int. Cl.<sup>6</sup> A63C 17/10, 17/26

U.S. Cl. 280—844

2 Claims



1. A gyroscope in-line roller skate comprising:  
a boot having a sole;  
a wheel support secured to said sole;  
a plurality of wheels rotatably secured to said wheel support, said plurality of wheels being centered in a common plane;  
a gyroscope stabilizer means in mechanical communication with at least one of said plurality of wheels for imparting a gyroscopic resistance to rotational movement of said boot in a predetermined direction, said gyroscopic stabilizer means comprising a gyroscopic stabilizer rotatably coupled to said wheel support, and a pulley belt frictionally engaged to both said gyroscopic stabilizer and one of

said plurality of wheels, whereby said at least one gyroscopic stabilizer rotates proportionally with said wheel; a belt frictionally engaged with at least two of said plurality of wheels for engaging a ground surface; at least one light assembly mounted to said boot; and, a generator in mechanical communication with at least one of said plurality of wheels, said generator being electrically connected to said at least one light assembly for providing electrical power thereto.

5,413,381

# ADHESIVE BOUND PAD OF PAPER AND METHOD OF MANUFACTURE THEREOF

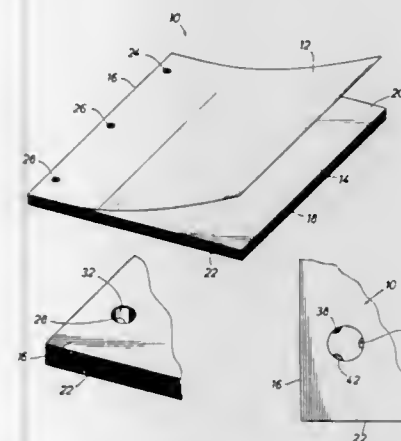
Reinier Beeuwkes, III, Concord; Thomas E. Salisbury, Wayland, and Robert C. Gorin, Newton Centre, all of Mass., assignors to Innoves, Inc., Concord, Mass.

Filed Jun. 14, 1993, Ser. No. 75,379

Int. Cl.<sup>6</sup> B42D 1/10; B42C 9/00

U.S. Cl. 281—21.1

14 Claims



1. A method for the manufacture of an adhesive bound pad of paper from which the sheets thereof are removable in serial manner, comprising:

- assembling a selected number of sheets of paper into a stack so that said sheets of paper collectively define at least one edge of said stack;
- forming holes in said stack of sheets along said at least one edge of said stack, said holes being collectively defined by registering holes in each of said sheets, each of said holes being defined by exposed edges of said sheets at said holes; and
- applying adhesive material to said exposed edges of said sheets within said holes of said stack so as to establish adhesive contact with each sheet of paper only at said exposed edges of said holes thereof to thus adhesively secure said sheets of paper in releasable assembly with one another to form said adhesive bound pad from which individual sheets may be selectively separated.

5,413,382

# CLIPBOARD

Stephen R. Cornell, Middleborough, and Robert G. Cornell, Duxbury, both of Mass., assignors to Cornell Concepts Corporation, East Taunton, Mass.

Filed Jan. 21, 1994, Ser. No. 184,831

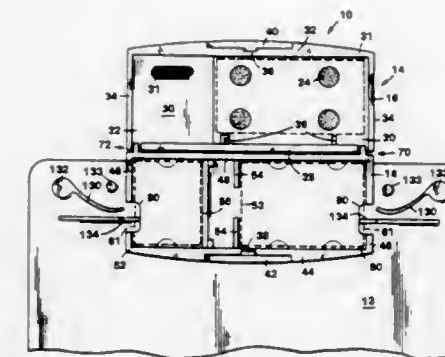
Int. Cl.<sup>6</sup> B42D 3/00

U.S. Cl. 281—45

32 Claims

1. A clipboard comprising  
a board for supporting paper, and  
a clip pivotally mounted to said board for clamping the paper to a surface of said board,  
said clip including a housing for storing an object therein, said housing having a lid that is selectively movable between a closed position, and an open position, said lid

being configured to prevent said object from being inserted in or removed from said housing through said lid



when said lid is in the closed position, whereby said object can be inserted into or removed from said housing only when said lid is in said open position.

5,413,383

# MULTIPURPOSE TUCK LABEL/FORM

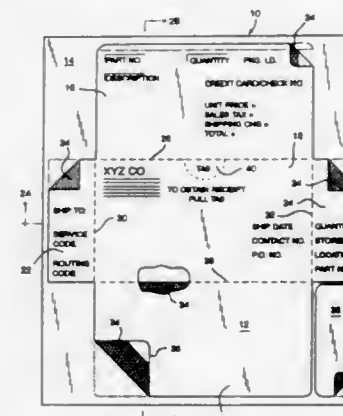
David F. Laurash, Bellbrook, Ohio, and George T. Taylor, Is-saguah, Wash., assignors to The Standard Register Company, Dayton, Ohio

Filed Sep. 8, 1993, Ser. No. 118,149

Int. Cl.<sup>6</sup> B42D 15/00

U.S. Cl. 283—79

20 Claims



1. A multipurpose tuck label/form in combination with an article comprising:  
an article, and

a tuck label/form secured to a surface of said article, said label/form comprising a label ply having first and second sides, said label ply including an upper panel, a center panel, a lower panel, and a pair of side panels; said upper and center panels being connected along a transverse perforated fold line, along which fold line said second side of said upper panel is folded to be in contact with said second side of said center panel, said center panel being connected to said lower panel and to respective side panels along generally transverse and vertical lines of perforation, said side panels including an adhesive on the respective second sides thereof securing said label to said article.



5,413,384

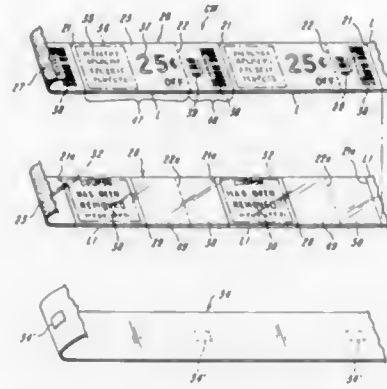
## COMPOSITE LABEL FOR USE IN COUPONING

Terry J. Principe, and Paul S. Schultz, both of Miamisburg, Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Mar. 8, 1993, Ser. No. 28,080  
Int. Cl.<sup>6</sup> G09F 3/02

U.S. Cl. 283—81

17 Claims



1. A composite label for use in couponing, comprising: a sheet of printable label material, a sheet of underlay material having an underside, a coating of dry-tack adhesive releasably adhering the label material and the underlay material to each other, printed indicia on the underlay material, a coating of pressure sensitive adhesive on the underside of the underlay material, a line of complete severing across the underlay material to provide first and second underlay parts, and the printed indicia being on the first underlay part.

5,413,385

## UNDERGROUND COLLAR

Edward O. Hilbus, III, West Chester, Pa., assignor to WCC Industries, Inc., West Chester, Pa.

Filed Jan. 21, 1994, Ser. No. 184,552  
Int. Cl.<sup>6</sup> F16L 55/175

U.S. Cl. 285—15

29 Claims



1. A collar for remotely sealing a joint between pipeline segments located at a depth greater than arm's length below the ground surface, comprising:

- a sheath contoured generally in the shape of the joint to envelop the outer surface of the joint and the portions of the pipeline immediately adjacent opposed sides of the joint upon installation, said sheath having a slit along its length defining opposed ends of said sheath;
- closure flaps formed on said opposed ends of said sheath, said flaps having eyelet means and being constructed and arranged to overlap and affix to each other to close said sheath along said slit and envelop the outer surface of the joint and adjacent pipeline portions;
- a plurality of installation clips on said sheath to cause said sheath to generally conform to the outline of the joint and adjacent pipeline portions, and to position and hold the body of said sheath on said joint and adjacent pipeline portions independent of said closure flaps; and

d) passage means to afford infusion of sealant into the interior of said sheath;

whereby said collar can be installed remotely around the joint and adjacent pipeline portions with said closure flaps overlapped to form a collar by using grappling hooks engaging said eyelet means, and by introducing a sealant through said passage means so that the interior of said collar is infused with sealant to form a leak-proof seal around the joint.

5,413,386

## VEHICLE PIPE-CONTAINER COUPLING ASSEMBLY

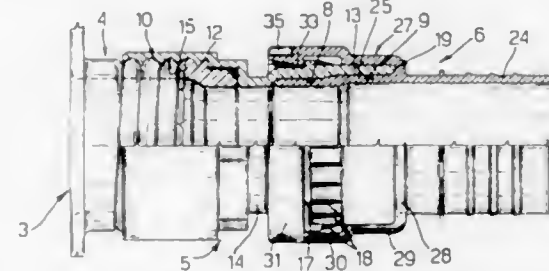
Attilio Dal Palù, Rivoli, Italy, assignor to Fabbria Italiana Serrature Torino, S.p.A., Torino, Italy

Filed Mar. 31, 1993, Ser. No. 40,421

Claims priority, application Italy, Mar. 31, 1992, TO92A0290  
Int. Cl.<sup>6</sup> F16L 3/04

U.S. Cl. 285—158

9 Claims



1. A coupling assembly for coupling a tubular body to a container, the coupling assembly comprising:

- an intermediate element having a first end and a second end, the first end of the intermediate element being removably fastenable to the container, the intermediate element being substantially tubular and having a first portion adjacent the first end and a second portion adjacent the second end, the second portion of the intermediate member having at least one retaining projection;
- a fitting body circumferentially fitted about the tubular body, the fitting body having first and second ends wherein the second end of the fitting body has receiving means for receiving that at least one retaining projection of the intermediate element; and
- wherein the container has a fitting portion projecting therefrom and wherein the first portion of the intermediate element is of a size to securely fit around the fitting portion projecting from the container.

5,413,387

## SWIVELABLE QUICK CONNECTOR ASSEMBLY

Donald D. Bartholomew, Marine City, Mich., assignor to Proprietary Technology, Inc., Southfield, Mich.

Division of Ser. No. 506,449, Apr. 6, 1990, abandoned, which is a continuation of Ser. No. 360,405, Jun. 2, 1989, Pat. No. 4,936,544, which is a division of Ser. No. 251,038, Sep. 26, 1988, Pat. No. 4,915,136, which is a continuation of Ser. No. 127,532, Dec. 19, 1987, abandoned, which is a continuation of Ser. No. 748,307, Jun. 24, 1985, abandoned, which is a continuation of Ser. No. 360,201, Mar. 22, 1982, Pat. No. 4,601,497, which is a continuation-in-part of Ser. No. 201,711, Oct. 29, 1980, Pat. No. 4,423,892. This application Jan. 26, 1993, Ser. No. 9,009

Int. Cl.<sup>6</sup> F16L 37/12

U.S. Cl. 285—319

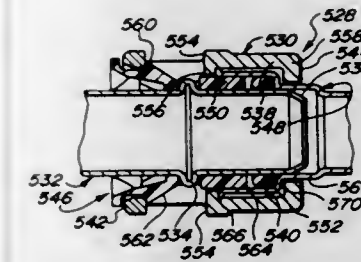
7 Claims

1. A connector assembly for use in fluidly connecting a first conduit to a second conduit, said connector assembly comprising:

- a connector housing having a wall forming a through bore and a first flange extending radially inward from said housing wall, said first flange dividing said through bore into a first axial bore at a first end thereof and a second axial bore at second end thereof, said first axial bore being

adapted for retaining a mating forward end portion of said first conduit and said second axial bore for retaining a forward end portion of said second conduit, said housing wall having at least one retention opening extending therethrough and communicating with said second axial bore, said first flange cooperating with said forward end of said first conduit to locate said forward end of said first conduit within said first axial bore;

a retainer disposed in said at least one retention opening and configured for releasably retaining said forward end por-



tion of said second conduit within said second axial bore and said forward end portion of said first conduit in said first axial bore in nested coaxial relationship with said forward end portion of said second conduit; and a sealing element disposed between said nested forward end portions of said first and second conduits, said sealing element having an outer diameter in fluid sealing engagement with the inner periphery of said first conduit and an inner diameter in fluid sealing engagement with the outer periphery of said second conduit.

5,413,388

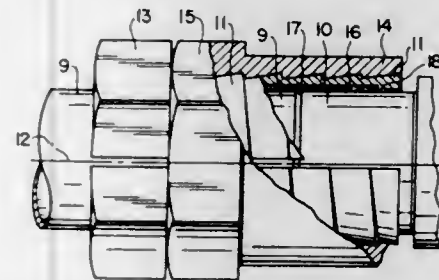
## COMPRESSION-TYPE PIPE JOINT USING THREADED CLAMP HAVING LONGITUDINALLY SLOTTED INNER SLEEVE

Harald Kolvereid, Lilleåsveien 21, N-8610 Grubbe, Norway  
Continuation of Ser. No. 917,038, Jul. 31, 1992, abandoned. This application Jan. 3, 1994, Ser. No. 177,184

Claims priority, application Norway, Jan. 31, 1990, 900454  
Int. Cl.<sup>6</sup> F16L 21/06

U.S. Cl. 285—323

12 Claims



1. A method for joining a pliable pipe at an end thereof, to a tubular element that is externally provided adjacent an end thereof with circumferential corrugations comprising:

- providing a clamp coupling including: an externally cylindrically threaded generally tubular inner sleeve longitudinally split by a total of one axially and radially complete longitudinal slot extending therealong and therethrough, and an externally accessible wrench gripping the slot having a width equating to a predetermined fraction of the outer diameter of the pliable pipe; and an internally cylindrically threaded tubular outer sleeve having an externally accessible wrench grip;
- assembling the pliable pipe to the tubular element so that the end of the pliable pipe is telescopically coaxially received upon the tubular element with said corrugations

engaging an internal circumferential wall surface of said pliable pipe;

- loosely threadedly assembling said inner and outer sleeves of said clamp coupling to one another and disposing said loosely assembled clamp coupling so as to radially surround said telescopically assembled pliable pipe and tubular element;
- wrenching in angularly opposite directions on said wrench grips and thereby tightening said clamp coupling until a marked rise in tightening torque is experienced, indicating sufficient tightening, said outer sleeve resulting radially compressing said inner sleeve sufficiently to substantially close said slot, as longitudinal edges of said inner sleeve bounding said slot engage one another, and causing said inner sleeve thereby to radially inwardly squeeze said pliable pipe against said corrugations on said tubular element, said inner sleeve slot being selected to be a predetermined width such that the amount of radial squeezing provided in step (d) is within a predetermined acceptable range of sufficiency, for providing a sound joint between the pliable pipe and the tubular element, without destroying said pliable pipe or tubular element.

5,413,389

## CAST CONVOLUTED PIPING FLANGE

Gunter Schlicht, 15 Briones View, Orinda, Calif. 94563

Filed Feb. 28, 1994, Ser. No. 203,226

Int. Cl.<sup>6</sup> F16L 19/00

U.S. Cl. 285—363

8 Claims



1. An improved convoluted flange ring for a flange member in a piping connector, the flange ring comprising:

- an annular bolting disk with concentric inner and outer portions having a flat bolting face with a plurality of bolting holes uniformly spaced around the disk;
- an outer rim portion integrally joined with the outer portion of the bolting disk;
- an inner rim portion integrally joined with the inner portion of the bolting disk, wherein the integrated bolting disk, inner rim portion and outer rim portion form a unitary flange ring with a U-shaped ring cross section that is configured for stress distribution, where the annular bolting disk has a thickness and the thickness of the bolting disk transitionally increases from the outer portion of the bolting disk to the inner portion of the bolting disk in substantial accordance with finite element stress analysis calculations for optimizing stress management and distribution in the flange ring when connecting a piping connector having the flange member with the improved convoluted flange ring to another piping connector.

5,413,390

## VEHICLE SUN ROOF FASTENING DEVICE

Aldo Filippi, Torino, Italy, assignor to Roltra Morse S.p.A., Rivoli, Italy

Filed Apr. 12, 1993, Ser. No. 46,030

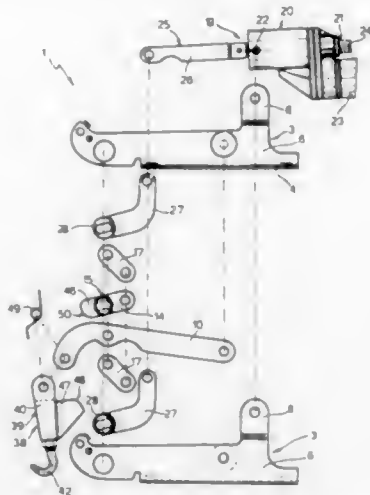
Claims priority, application Italy, Apr. 14, 1992, TO92A0337  
Int. Cl.<sup>6</sup> E05C 19/10; B60J 7/00

U.S. Cl. 292—96

16 Claims

- A device for fastening a vehicle sun roof comprising: a supporting bracket integral with the sun roof; a lever hinged to and movable relative to the bracket about a first axis; a latch element hinged to the lever; means for activating the lever including a first crank hinged

to the bracket to move relative to the bracket about a second axis;  
means for controlling the activating means for moving the latch element between a forward engaged first position, wherein the latch element positively engages a fixed connecting element on the vehicle, and a withdrawn released



second position, the control means including a powered rod moving reciprocatingly relative to the bracket and in a direction perpendicular to the first axis;  
a second crank connected to the rod to rotate about the second axis; and  
pin means extending along the second axis and connected to the first and second cranks and to the bracket.

5,413,391

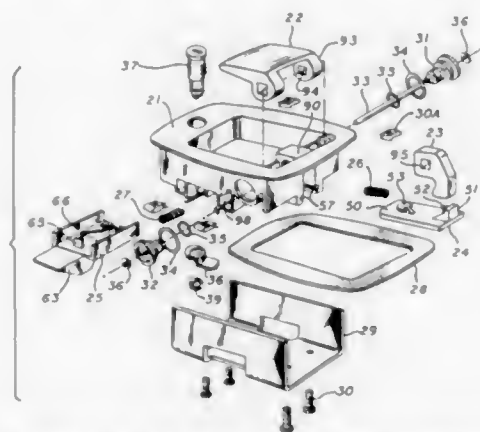
## SELF-CLOSING LATCH

Timothy J. Clavin, Placentia, and John P. Anderson, Norco, both of Calif., assignors to Hartwell Corporation, Placentia, Calif.

Filed Jul. 12, 1993, Ser. No. 89,343  
Int. Cl.<sup>6</sup> E05C 1/12

U.S. Cl. 292—170

15 Claims



1. In a latch having a housing and a handle mounted in said housing for pivoting between a rest position and an unlatching position, the improvement comprising in combination:  
a cam lever pivotally mounted in said housing for rotation by said handle about a first axis;  
a bolt drive slide mounted in said housing for translation along a second axis perpendicular to said first axis, with a slide cam carried thereon;  
a bolt mounted in said housing for translation along a third axis perpendicular to said second axis, said bolt having a cam track for engagement with said slide cam, said cam

track having opposed symmetrical surfaces selectively engageable with said cam for driving said bolt in opposite directions;

a slide spring mounted in said housing between said housing and bolt drive slide for urging said slide in a first direction, said cam lever and bolt drive slide including first interengaging means for urging said slide in a direction opposite to said first direction when said handle is pivoted to said unlatching position; and

a bolt spring mounted in said housing between said housing and bolt for urging said bolt in a second direction perpendicular to said first direction to a latching position, said bolt drive slide and bolt including second interengaging means for urging said bolt in a direction opposite to said second direction to an unlatched position when said handle is pivoted to said unlatching position.

5,413,392

## PAWL ASSEMBLY

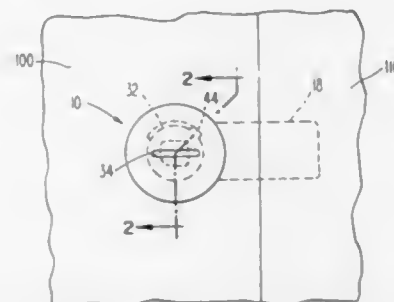
Richard E. Schlack, Rising Sun, Md., and David Milne, Lima, N.Y., assignors to Southco, Inc., Concordville, Pa.

Filed Apr. 6, 1993, Ser. No. 43,260

Int. Cl.<sup>6</sup> E05C 3/04

U.S. Cl. 292—204

51 Claims



1. A pawl assembly adapted for mounting in an aperture formed in a door panel for releasably retaining the door against a corresponding frame, the pawl assembly comprising:

a housing adapted for being received within the aperture of the door panel and including extending therethrough a substantially axial bore;

a drive member including a substantially elongated shaft adapted for being received within the bore of the housing for rotational movement relative thereto;

a biasing means adapted for providing frictional resistance to the drive member upon rotational movement thereof;

means provided between the housing and the drive member adapted for preventing rotational movement of the drive member shaft past a predetermined amount of rotation thereof, wherein the means provided between the housing and the drive member for preventing rotational movement of the drive member shaft past a predetermined amount of rotation thereof comprises at least one protruding member adapted for being received within at least one substantially elongated channel, the substantially elongated channel including a first end and a second end therein, wherein the first end and the second end function as a stop of the protruding member adapted for limiting the rotational movement of the drive member shaft corresponding to the first and second ends of the substantially elongated channel, wherein the substantially elongated channel further includes a first wall and a generally opposing second wall at a spaced separation for connecting the first and the second end thereof, wherein the protruding member received with the substantially elongated channel is confined between the first wall and the second wall thereof; and pawl means associated with the drive member shaft adapted for rotational movement corresponding with the

movement of the drive member shaft for engaging the frame in a secured position.

5,413,393

## REUSABLE SEAL FOR USE WITH ROD

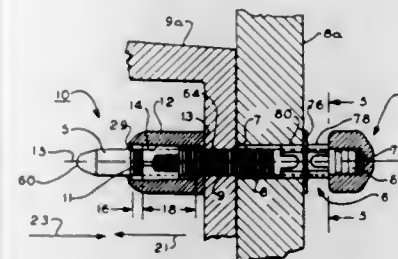
George Georgopoulos, Pine Brooks, and Richard C. Dreisbach, North Arlington, both of N.J., assignors to E.J. Brooks Company, Newark, N.J.

Filed Aug. 13, 1993, Ser. No. 106,428

Int. Cl.<sup>6</sup> B65D 33/34

U.S. Cl. 292—327

24 Claims



1. A locking device for securing a pair of hasps comprising: an elongated cylindrical rod having a longitudinal axis including a head secured thereto, said rod having an array of axially spaced circumferential grooves of like dimension, each groove having first and second side walls;

a housing having a bore therethrough for receiving the rod, at least a portion of the housing bore being frusto-conical, the housing bore having proximal and distal ends, the housing bore proximal end being larger than the housing bore distal end; and

a rod clamping member in the housing bore having an arcuate section of sufficient angular extent so as to receive and be retained on the rod in a direction transverse the axis and for axial displacement along the axis and at least one segment cantilevered from the member arcuate section toward the housing bore distal end, the arcuate section and the one segment lying on a frusto-conical surface of revolution having respective larger and smaller outer diameters at opposite clamping member ends, the clamping member being axially displaceable to a first lock position and to a second unlock position in the housing bore, the first lock position being closer to the housing bore distal end than the second unlock position, the one segment at an end distal the arcuate section having at least one ridge facing and in resilient engagement with one of the rod grooves, each at least one ridge for engaging a rod groove respective corresponding first and second side walls, the resilient radial force of the at least one ridge on the engaged rod groove is of such magnitude that axial displacement of the rod causes the engaged at least one ridge to be pulled by the rod in first and second opposing directions, the housing bore and clamping member dimensions are such that when the clamping member is pulled in the first direction to the first lock position, the housing radially locks the at least one ridge in the engaged rod groove and when the clamping member is pulled in the second direction to the second unlock position by the rod, the at least one ridge is free to resiliently radially disengage from that engaged rod groove in response to further relative axial displacement of the rod in the second direction.

5,413,394

## HANDLING DEVICE FOR A PLASTIC TRASH BAG

Marilyn Mitchell, 577 Franklin St., Denver, Colo. 80218

Filed Jan. 31, 1994, Ser. No. 189,599

Int. Cl.<sup>6</sup> B65B 67/04

U.S. Cl. 294—1.1

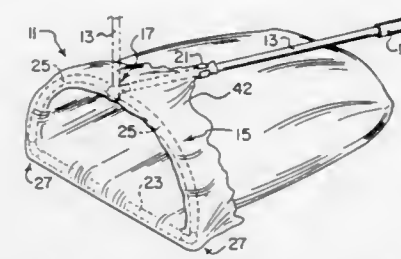
5 Claims

1. A device for handling a flexible, disposable plastic trash

bag of the type having an opening defined by a marginal edge portion, said device comprising:

a. a frame having a general D-shaped configuration and including a base, and an arching member that has an apex;  
b. an elongate tubular handle adapted for gripping by the operator of said device and having a free end with a hand grip attached thereto, and an opposite end adapted to be connected to said frame;

c. means for pivotally connecting said opposite handle end to the apex of said frame for adjustable movement about an axis parallel to the base of said frame, said connecting



means having a static frictional gripping force that is sufficient to hold said handle at a selected angle with respect to the plane of said frame, said handle being pivotable against said force by said operator to vary the angular orientation of said handle with respect to the plane of said frame, and wherein said connecting means comprises a T-connector having a middle member and a frame-embracing cross portion, said middle member secured to said handle opposite end, and said cross portion having a recessed portion for receiving and adjustably embracing said frame apex.

5,413,395

## CARRIER FOR BOTTLES AND LIKE CONTAINERS

Maurice W. Stewart, Birmingham, England, assignor to International Omni-Pak Corporation, Palm Beach, Fla.

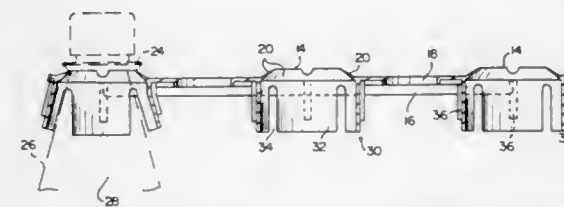
Filed Apr. 6, 1994, Ser. No. 223,580

Claims priority, application United Kingdom, Apr. 8, 1993, 9307372

Int. Cl.<sup>6</sup> B65D 71/00

U.S. Cl. 294—87.2

4 Claims



1. An integrally molded carrier for a plurality of bottles or like containers having a neck and upper circumferential projection, comprising a structural frame supporting a plurality of collars, each for receiving the neck of a bottle and engaging with the circumferential projection to retain the bottle to the carrier, a plurality of segments spaced apart by slots and depending from each collar for cooperating with a part of the exterior surface of a neck of a bottle below the circumferential projection when the neck is received in the collar, the segments being integrally formed with the frame at their upper ends and being deflectable outwardly for expansion at their lower ends, thereby to act in conjunction with the collar to restrain relative movement between the container and the carrier.



5,413,396

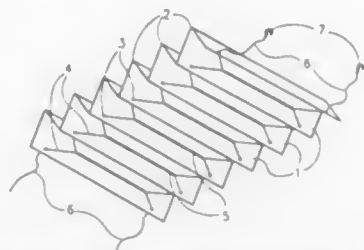
## VEHICLE PROTECTIVE COVER

Vlad Poznansky, 9/14 Hadekel, Karmiel, and Igor Goldberg, Yokneam Ilit, both of Israel, assignors to Vlad Poznansky, Karmiel, Israel

Filed Jan. 16, 1994, Ser. No. 261,075  
Int. Cl.<sup>6</sup> B60J 11/00

U.S. Cl. 296—136

13 Claims



1. A protective cover for a motor vehicle in the form of a strip of a length commensurate with the length of said motor vehicle and of a width slightly smaller than the width of the baggage compartment of said motor vehicle, said cover comprising,

a plurality of rectangular stiff panels connected along their long sides by flexible joints, permitting said cover to be folded into a close stack and to be stored inside the baggage compartment of said motor vehicle and to be pulled out and to be stretched over the body of said motor vehicle, wherein said strip is provided with means for attaching a first, near end to the inside of said baggage compartment and with means for attaching its other, far end to the front of said motor vehicle,

two lengths of strip or string means having their two ends attached to points proximate two corners of each adjoining pair of said panels, said strip or string means being of a length commensurate with the distance between said points on said panels in fully stretched state of said cover, each of said lengths of strip or string mechanism having a center and

elastic means connecting the centers of each two lengths of strip or string means adapted to pull said two strip or string means towards the center line of said cover and thereby pulling each said adjoining pair of panels into mutual contact and all said panels of said cover into a close stack.

5,413,397

## AUTOMOTIVE WINDOW ASSEMBLY SYSTEM

Peter N. Gold, 465 N. Wood Rd., Rockville Centre, N.Y. 11570

Filed Feb. 2, 1994, Ser. No. 190,601  
Int. Cl.<sup>6</sup> B60J 1/00

U.S. Cl. 296—146.15

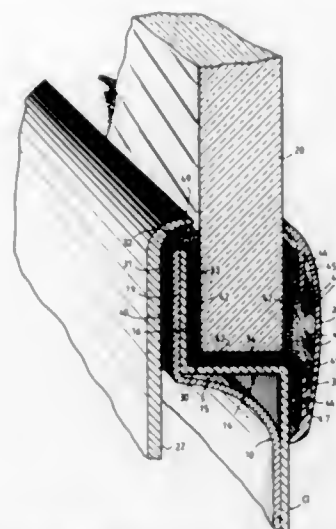
5 Claims

1. A retention system for an automotive window assembly of the type having a window insertable onto a recessed generally L-shaped peripheral flange of a flanged window aperture formed in an automotive vehicle body, said window to be adhesively secured to said peripheral flange, and the window assembly including an interior window trim member for covering the interior side of said flange and an edge of said window and an exterior window trim for covering the exterior of said flanged window aperture and an edge of the window, the improvement comprising:

adhesive-backed, paired hook and loop type fabric fastening means for securing said window to said flange, for securing said interior trim to said interior side of said flange and for securing said exterior trim member to said window and exterior body panel;

certain of said hook and loop fabric fastening means being adhesively bonded to said interior trim window, window edge and exterior trim and other of said hook and loop fabric fastening means being adhesively bonded to said interior and exterior side of said L-shaped flange and at

least one of said window edge and an exterior body panel; and curable adhesive means for securing said window to said window flanged aperture in cooperation with said hook



and loop fabric fastening means, said curable adhesive means being embedded in said hook and loop fabric fastening means and which, upon curing, permanently joins said hook and loop fabric fastening means together.

5,413,398

## ROOF MOLDING ASSEMBLY STRUCTURE FOR AN AUTOMOBILE

Choong Y. Kim, Kyungsangnam-do, Rep. of Korea, assignor to Hyundai Motor Co., Ltd., Seoul, Rep. of Korea

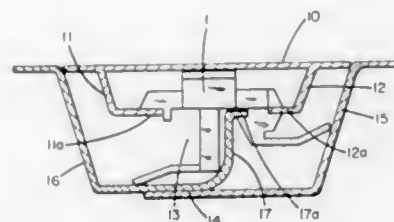
Filed Nov. 4, 1993, Ser. No. 148,087

Claims priority, application Rep. of Korea, Nov. 5, 1992, 92/21646

Int. Cl.<sup>6</sup> B60R 13/04

U.S. Cl. 296—210

1 Claim



1. A roof molding assembly structure comprising a roof molding for covering the open end of a fitting groove formed along a joint line joining a roof panel to a roof side panel of an automobile, which fitting groove thereby has a bottom surface and side wall, and a clip for supporting the roof molding in the fitting groove, wherein

the roof molding includes an upper surface and two longitudinal ends each including a downwardly protruded wing which curves inward and generally parallel to the upper surface, thereby defining an inner surface;

the clip includes a body with a top portion having two opposing ends in a longitudinal dimension each including a first elastic protruding piece in contact with and supporting the inner surface of the roof molding, a bottom portion including a second elastic piece protruding transversely in a first direction and elastically contacting the bottom surface of the fitting groove, two third elastic pieces protruding downwardly from the top portion of the

clip body and curved outwardly in a direction generally opposite the first direction and elastically contacting the side wall of the fitting groove, two engaging members protruding transversely from the top portion of the body which secure the roof molding wherein the downwardly protruded wings of the roof molding are inserted under the engaging members; and the roof side panel includes a vertical supporting piece which is curved horizontally to secure the third elastic pieces in the fitting groove.

5,413,399

## MULTIPURPOSE HIGHCHAIR AND SWING WITH DETACHABLE SEAT

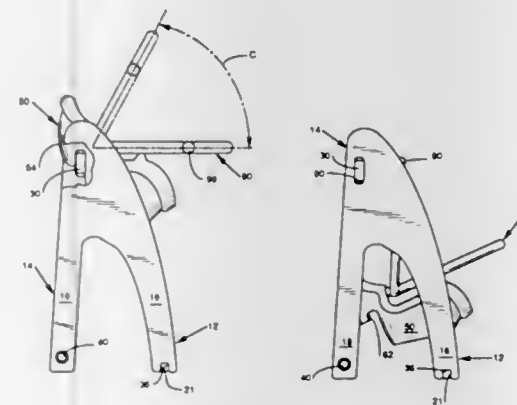
Peter J. Myers, and Philip M. Baerenwald, Both of Plano, Tex., assignors to Today's Kids, Inc., Boonesville, Ark.

Filed Feb. 4, 1994, Ser. No. 192,138

Int. Cl.<sup>6</sup> A47D 11/00

U.S. Cl. 297—118

13 Claims



1. A chair, comprising:

a frame member having two upstanding support members interconnected in parallel spaced-apart relationship by transverse connecting means, said support members having facing support elements thereon;

a seat member;

means attached to said seat member for removably attaching said seat member to said frame member in a fixed occupant supporting position; and

a handle member attached to said seat member for transporting said seat member apart from said frame member, said handle member sized to be substantially completely received between said upstanding support members and having pivot means attached thereto for detachably suspending said seat member from said support elements to enable said seat member to pivotally swing between said upstanding support members.

5,413,400

## PORTABLE DESK ASSEMBLY

Carlos Llanes, 3440 E. 9th Ct., Hialeah, Fla. 33013

Continuation-in-part of Ser. No. 904,034, Jun. 25, 1992, abandoned. This application Jan. 19, 1994, Ser. No. 183,314

Int. Cl.<sup>6</sup> A47C 4/00

U.S. Cl. 297—154

12 Claims

1. A folding chair assembly comprising:

a seat, a back pivotally connected to said seat, and two arms disposed in spaced, substantially parallel relation to one another and extending forwardly above and away from said seat and said back,

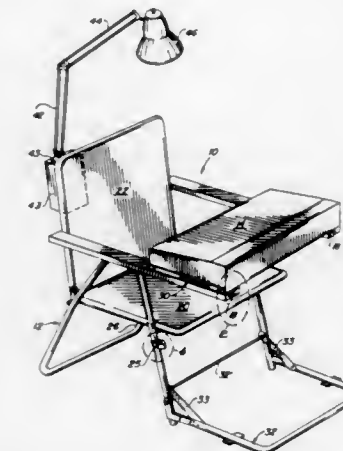
a desk pivotally and adjustably attached to one of said arms and selectively positionable between an operative position and an open position, said operative position being defined by said desk spanning said arms,

support means for supporting said seat and said back on a

supporting surface, said support means including a front leg assembly mounted adjacent a front portion of said seat and a rear leg assembly mounted adjacent a rear portion of said seat,

said front leg assembly and said rear leg assembly extending downwardly from said seat into engagement with a supporting surface and being structurally adapted to support said seat and said back,

said support means further including a retractable support base structure adapted to supplementally support said seat, said back, and said desk, and being pivotally con-



nected to said front leg assembly so as to be positionable between a stored position and a supporting position, said supporting position being defined by said support base structure extending downwardly from said front leg assembly into engaging relation with the supporting surface so as to be substantially beneath said desk when said desk is in said operative position, and

said seat, said back, said arms, said support means, and said desk all being pivotally interconnected so as to be collectively disposed between an open position and a fully collapsible position, whereby the chair assembly is substantially portable.

5,413,401

## RESTRAINING PROTECTIVE SEAT FOR INFANTS

Toshiro Koyanagi, Hikone, Japan, assignor to Takata Corporation, Tokyo, Japan

Filed Nov. 25, 1992, Ser. No. 981,413

Claims priority, application Japan, Dec. 5, 1991, 3-322095

Int. Cl.<sup>6</sup> A47C 1/08; A47D 1/10

U.S. Cl. 297—250.1

5 Claims

1. An infant-restraining protective seat comprising:

a seat portion for seating an infant;

a seat back for supporting the back of the seated infant;

infant restraining means for restraining and protecting the seated infant;

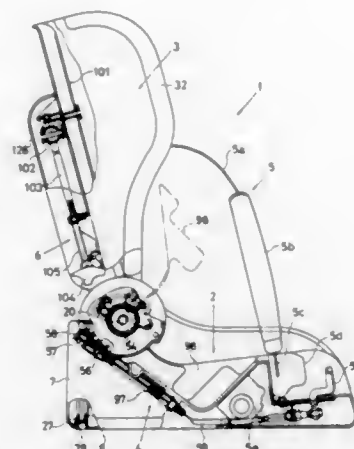
said seat back being tiltably attached to said seat portion, and said seat portion and seat back being adapted so as to be foldable; and

a torsion spring being interposed between said seat portion and said seat back;

said torsion spring being constructed so as to be capable of assuming a plurality of circumferential positions including a free state position where said torsion spring exerts zero spring force in either a first or opposite circumferential direction, wherein when said torsion spring is in said free state position, said seat back is capable of tilting forward to a folding position in a first circumferential direction under its own weight, when said seat portion is in a substantially horizontal attitude;

wherein as said seat back is tilted forward under its own

weight from said free state position to said folding position, said torsion spring exerts a spring force to said seat back in said opposite circumferential direction so as to mitigate an impact upon reaching said folding position due to said forward tilting motion of said seat back under its own weight; and



wherein as said seat back is tilted backward in said opposite circumferential direction from said free state position to at least one reclining position, said torsion spring exerts a spring force to said seat back in said first circumferential direction.

5,413,402

## SEQUENCED TAILGATE LOCK

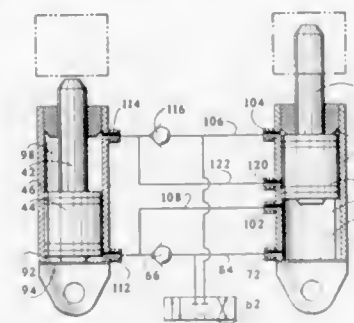
Gary G. Flerebinger, Hixson, and Jerald G. Zanzig, Signal Mountain, both of Tenn., assignors to The Heil Company, Chattanooga, Tenn.

Filed Apr. 27, 1993, Ser. No. 53,907

Int. Cl.<sup>6</sup> B60P 1/273

U.S. Cl. 298—23 M

21 Claims



1. A refuse collection vehicle comprising:
  - a refuse container body having an open end, a tailgate mounted on the refuse container body for movement between a closed position, wherein the tailgate covers the open end, and an open position, wherein the open end is uncovered, and a tailgate locking mechanism for locking the tailgate when the tailgate is in the closed position, the tailgate locking mechanism comprising:
    - first and second means for locking the tailgate into the closed position, the first and second locking means being moveable between a tailgate locked position and a tailgate unlocked position; and
    - first and second means for selectively moving the first and second locking means, respectively between their locked and unlocked positions so that the second locking means is moved to its tailgate locked position only after the first locking means is moved to its tailgate locked position.

5,413,403

## LEAD PULL ASSEMBLY

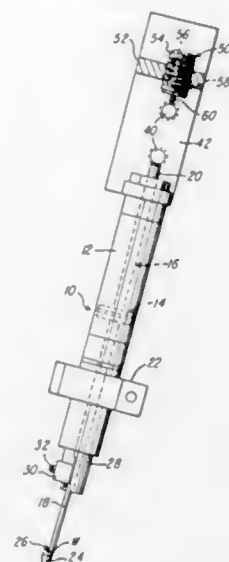
John M. Beakes, Fairborn, and James G. Stelzer, Springfield, both of Ohio, assignors to Globe Products Inc., Huber Heights, Ohio

Filed Aug. 9, 1993, Ser. No. 104,209

Int. Cl.<sup>6</sup> B66C 1/62; B25J 15/00

U.S. Cl. 294—88

12 Claims



1. In a lead pull assembly having a hook-like, U-shaped clamp jaw adapted to engage a strand of wire, a spring-biased jaw facing the bight of said U-shaped jaw, and a double acting pneumatic cylinder having a piston rod assembly including a first end portion projecting from one end of said cylinder to which said U-shaped jaw is connected that drives said U-shaped jaw from an extended position in which said U-shaped jaw is spaced from said spring-biased jaw to a retracted position in which said U-shaped jaw is drawn toward said spring-biased jaw to hold a strand of wire between said jaws, said lead pull assembly being movable to provide clearance for movements of associated apparatus, said piston rod assembly having a second end portion projecting from the opposite end of said cylinder, the improvement wherein a bias mechanism having a biasing member positioned remotely from said cylinder and engageable with said second end of said piston rod only when said U-shaped jaw approaches its fully retracted position biases said piston rod assembly to move in a direction and through a distance to ensure that, when air pressure is removed from said cylinder to release the clamping pressure exerted by said cylinder on said piston rod assembly, said jaws are slightly open so that the clamping pressure exerted by said jaws on a strand of wire therebetween is released to enable the wire to slide relative to said jaws.

5,413,404

## METHOD FOR DETECTING TROUBLE IN FLUID PRESSURE SYSTEM AND FLUID PRESSURE BRAKE SYSTEM FOR VEHICLE

Shinichi Inagawa, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 14, 1994, Ser. No. 209,857

Claims priority, application Japan, Apr. 14, 1993, 5-087610

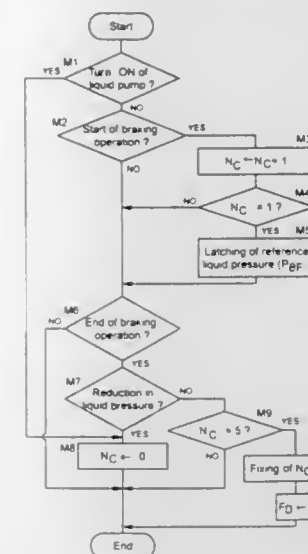
Int. Cl.<sup>6</sup> B60T 13/18, 17/22; B60Q 1/00

U.S. Cl. 303—92

2 Claims

1. A method for detecting trouble in a fluid pressure system comprising a fluid pressure source including a fluid pump, a pressure tank connected to said pump, a pressure detector for detecting a fluid pressure in the fluid tank, and a control means for controlling the operation of the fluid pump on the basis of an output signal from the pressure detector, said system being

operated by an output pressure from the fluid pressure source, wherein when an amount of variation in the output signal from the pressure detector is less than a first predetermined value during operation of the fluid pressure system, said fluid pump



is forcedly driven regardless of the output signal from the pressure detector, and as a result of such forced driving of the fluid pump, if the amount of variation in the output signal from the pressure detector is less than a second predetermined value, it is decided that there is trouble.

5,413,405

## ANTISKID BRAKE SYSTEM FOR VEHICLE

Haruki Okazaki, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

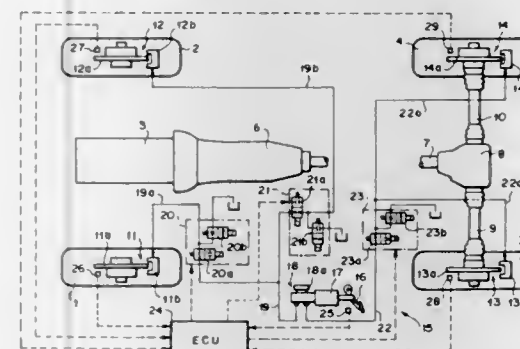
Filed Apr. 11, 1994, Ser. No. 226,082

Claims priority, application Japan, Apr. 12, 1993, 5-110103

Int. Cl.<sup>6</sup> B60T 8/32, 8/58

U.S. Cl. 303—103

6 Claims



1. An antiskid brake system for a vehicle comprising a wheel speed detecting means for detecting wheel speed of a wheel of the vehicle, a braking pressure control means for controlling the braking pressure applied to the wheel, an antiskid control means for effecting an antiskid control causing the braking pressure control means to periodically increase and reduce the braking pressure applied to the wheel on the basis of the wheel speed of the wheel,

an antiskid control termination determining means for comparing the wheel speed detected by the wheel speed detecting means with a reference value for determining that the antiskid control has been terminated when the wheel speed is lower than the reference value, a road surface condition detecting means for detecting the condition of a road surface on which the vehicle is running and a refer-

ence value changing means for lowering the reference value when the condition of the road surface detected by the road surface condition detecting means is more apt to cause the wheel to skid and operating said antiskid control means in response to the lower reference value for preventing the wheels of the vehicle from skidding on such road surface.

5,413,406

## FLUID PRESSURE CONTROL DEVICE HAVING CHANGEOVER AND ELECTROMAGNETIC VALVES HAVING A COMMON SLEEVE

Seiji Nokubo, Teruhisa Kohno, and Tsuyoshi Fujimoto, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

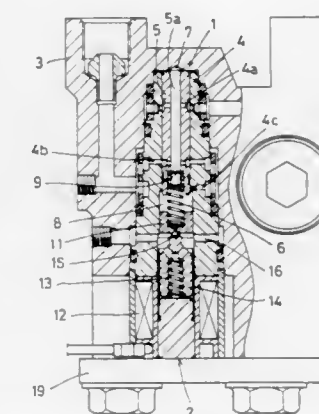
Filed May 18, 1994, Ser. No. 245,660

Claims priority, application Japan, May 21, 1993, 5-026655 U

Int. Cl.<sup>6</sup> F16K 31/00

U.S. Cl. 303—119.2

4 Claims



1. A fluid pressure control device comprising: an input chamber; a pressure reduction chamber; a changeover valve including a one-piece cylindrical sleeve of a magnetic material and having an inlet port, a first outlet and a second outlet, a spool slidably mounted in said sleeve, said spool having a fluid passage through which said input chamber and said pressure reduction chamber communicate via an orifice, one end of said spool confronting said input chamber and the other end of said spool confronting said pressure reduction chamber such that pressure in said chambers act on said ends of the spool, respectively, and a return spring biasing said spool in a direction toward said input chamber; and an electromagnetic discharge valve including a discharge port and a discharge passage leading from said pressure reduction chamber to said discharge port, and a valve member disposed in said sleeve, said valve member being movable in said sleeve between open and closed positions; said inlet port and said first outlet being connected, when said spool is biased by said return spring to an extreme position, by a portion of said fluid said fluid passage defined to one side of said orifice such that said inlet port communicates directly with said first outlet; said valve member opening said discharge passage when in said open position such that as the valve member of said discharge valve is moved to said open position, said spool is moved from said extreme position toward said pressure reduction chamber due to a pressure differential produced between said input chamber and said pressure reduction chamber, the fluid communication between said inlet port and said first outlet is cut off, and said second outlet communicates with said pressure reduction chamber; and when the valve member of said discharge valve is in said closed position and until said pressure differential decreases below a predetermined value, said second outlet remains in communication with said inlet through said orifice and said pressure reduction chamber.



5,413,407

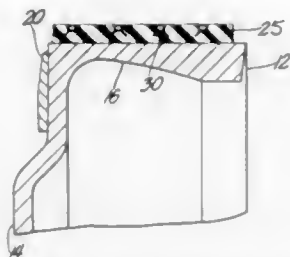
**ENGAGEMENT MEMBER FOR TRACK ASSEMBLY COMPONENTS**

Joseph G. Warner, 33828 Stonewood, Sterling Heights, Mich. 48077

Filed Sep. 9, 1993, Ser. No. 118,350  
Int. Cl.<sup>6</sup> B62D 55/14

U.S. Cl. 305—56

12 Claims



1. An engagement member for vehicle components such as road wheels and track units, comprising: an elastomeric layer faced on the component; an outer, exposed surface of the elastomeric layer; the elastomeric layer defining an aperture open at the outer surface, the aperture being a stepped bore having a larger diameter portion and a smaller diameter portion; a peripheral wall of the aperture; a rigid insert member conformingly fit to the peripheral wall of the aperture and recessed relative to the outer surface, the insert member being more thermally conductive than the elastomeric layer; the insert member defining a hollow open toward the outer surface; a head of the insert member in the larger diameter portion of the bore, the head defining the hollow; a shank of the insert member in the smaller diameter portion of the bore, the shank extending from the head into connection with the component; an inner surface of the hollow exposed to air.

5,413,408

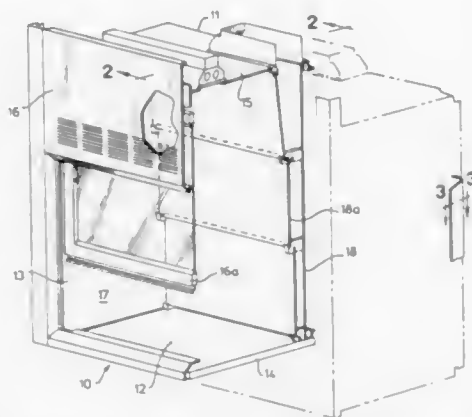
**FUME HOOD WITH PANEL RETENTION SYSTEM**

Marshall K. Beck, and John M. Bastian, both of Manitowoc, Wis., assignors to Fisher Hamilton Scientific Inc., Two Rivers, Wis.

Continuation of Ser. No. 947,775, Sep. 18, 1992, abandoned. This application Feb. 14, 1994, Ser. No. 195,909  
Int. Cl.<sup>6</sup> A47B 47/00

U.S. Cl. 312—263

7 Claims



1. A fume hood comprising: a housing having an interior chamber with a front opening which allows access to the chamber, said housing including: a base member; a plurality of wall panels disposed substantially perpendicularly to the base member; a ceiling panel disposed substantially perpendicularly

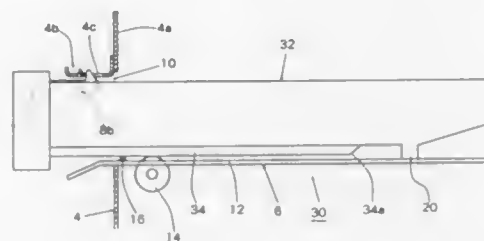
to the wall panels; said wall panels extending between the base member and the ceiling panel; first connecting means for securing the ceiling panel to a wall panel, said first connecting means including clip means with a resilient portion which defines a recess for receiving an edge portion of one of either said wall panel or the ceiling panel and first securing means for securing the clip means to the other one of the ceiling panel or said wall panel, said clip means receiving an edge portion of only one of either said wall panel or the ceiling panel; and second connecting means for connecting adjacent wall panels together, said second connecting means including block members for engaging adjacent edge portions of adjacent panels and second securing means for securing the block members to the adjacent edge portions.

5,413,409

**DEVICE FOR SUPPORTING A PAPER CASSETTE**  
Kiyotaka Arai, Osaka, Japan, assignor to Mita Industrial Co., Ltd., JapanFiled Aug. 3, 1993, Ser. No. 101,310  
Claims priority, application Japan, Sep. 16, 1992, 4-246621  
Int. Cl.<sup>6</sup> A47B 88/00

U.S. Cl. 312—330.1

3 Claims



1. A device for supporting a paper cassette comprising: a support means provided in a housing body and a paper cassette supported by said support means, said support means including a pair of support rails arranged, in parallel and spaced from each other on right and left sides of said support means, rollers which are located at a front side of the support rails, the rollers having outer peripheral surfaces that partly protrude beyond upper surfaces of the support rails, and stoppers that protrude from the upper surfaces of said support rails in front of said rollers, wherein a distance between said rollers is different from a distance between said stoppers, said paper cassette including a pair of cassette rails on a bottom surface of said cassette said rails being arranged, in parallel with and spaced from each other on right and left sides of said cassette and downwardly protruding from said bottom surface of said cassette, and a pair of contact portions arranged on the right and left sides of said cassette at a predetermined distance toward a rear side of said paper cassette, said contact portions downwardly protruding from said cassette bottom surface, said cassette rails being supported by corresponding rollers, said contact portions being slidably supported by the upper surfaces of corresponding support rails, so that said paper cassette is supported in a manner allowing free withdrawal from and insertion into said housing body, and said paper cassette has a withdrawn position which is where said contact portions come into contact with corresponding stoppers of the support means, wherein ends of a rear side of the cassette rails are located in front of said contact portions by a predetermined distance, so that when said paper cassette is being withdrawn from said housing body, said cassette rails are separated from said corresponding rollers before said contact portions come into contact with said corresponding stoppers, and said paper cassette there-

after is supported by said support rails only at said contact portions.

5,413,410

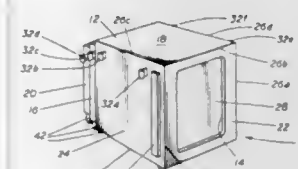
**TELESCOPING HARDENED AIRCRAFT UNIT LOAD DEVICE**

Paul F. Mlakar, Vicksburg, Miss., assignor to Jaycor, San Diego, Calif.

Continuation-in-part of Ser. No. 816,309, Dec. 26, 1991, Pat. No. 5,312,182. This application Jan. 12, 1994, Ser. No. 180,376  
Int. Cl.<sup>6</sup> A47B 96/00

U.S. Cl. 312—409

11 Claims



1. A telescoping hardened unit load carrying device which comprises: a plurality of telescoping container sections for holding said load; a first channel bordering an edge of a first said container section, said first channel having a first outwardly oriented lip; and a second channel bordering an edge of a second said container section, said second channel having a second inwardly oriented lip, said second lip being oriented to engage said first lip on said first channel in an interlocking fashion when said first container section is fully extended from said second container section, to prevent separation of said first and second container sections, and to enclose said load in said device; wherein said first and second channels interlock with increased sealing force in response to an explosive blast within said device to resist rupturing said device and to seal said blast within said device.

5,413,411

**LOCAL NETWORK, IN PARTICULAR FOR A CONTROL AND SELF-MONITORING SYSTEM OF AN ELECTRICAL APPARATUS**

Gérard Ebersohl, La Mulatière, France, assignor to GEC Alsthom T&amp;D SA, Paris, France

Filed Jun. 8, 1993, Ser. No. 73,059

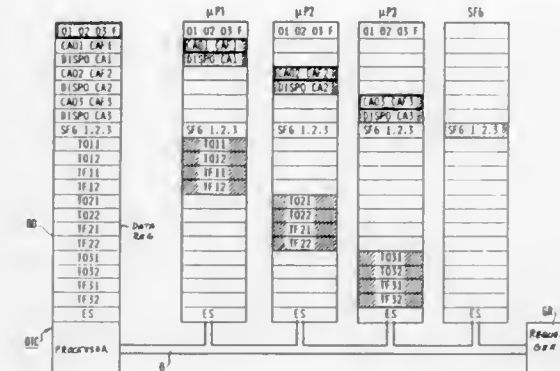
Claims priority, application France, Jun. 9, 1992, 92 06921  
Int. Cl.<sup>6</sup> H04L 12/40

U.S. Cl. 370—85.1

14 Claims

1. A local network comprising no more than eight stations, each station being able to be both a source and a sink for data, and, thus being able both to receive and emit a message, the stations being interconnected by a serial bus and providing data to a distributed data base, which data is renewed cyclically under the control of a request generator that emits requests in the form of binary messages, wherein the stations

have addresses in the form of bytes respectively constituted by bytes of binary numbers representing powers of 2 in the range 0 to 7, a binary message emitted by the request generator containing the addresses, of all the stations designated to be sinks for said emitted binary message, in the form of a compos-



ite byte constituted by an OR UNION of the addresses of said stations designated to be sinks, a station thus observing that it is chosen as a sink by performing an AND INTERSECTION between said composite byte and the station's own address byte.

5,413,412

**EASY OPEN BAG**

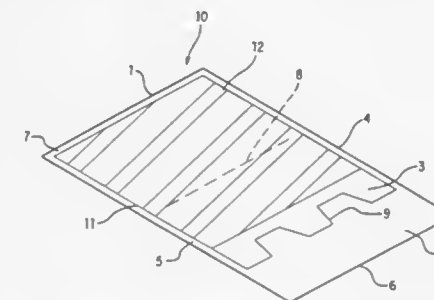
Robert A. Odabashian, Greer, S.C., assignor to W.R. Grace &amp; Co.-Conn., Duncan, S.C.

Filed Feb. 24, 1993, Ser. No. 21,714

Int. Cl.<sup>6</sup> B65D 30/10; B31B 1/14

U.S. Cl. 383—208

4 Claims



1. A thermoplastic heat-shrinkable easy opening bag comprising: (a) congruent front and rear panels of a thermoplastic heat-shrinkable material defining the front and rear of the bag, the front and rear panels having longitudinal side edges joined fluid-tight to form bag side edges and the front and rear panels having common ends including a first closed end and a second opposite open end; (b) at least one of said front and rear panels having a line of perforations therein; and (c) a tear tab panel of a thermoplastic heat shrinkable material adhered to the outer surface of said at least one perforated panel and positioned to cover and seal the line of perforations in said at least one perforated panel; wherein each of said tear tab panel and said at least one perforated panel has a corona-treated surface at which said tear tab panel and said at least one perforated panel are mutually adhered.

5,413,413

## BEARING DEVICE

Hiroshi Sakashita, and Yukio Kotagiri, both of Nagano, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

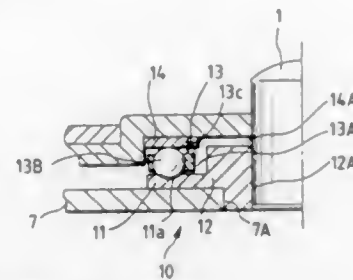
Filed Oct. 8, 1993, Ser. No. 131,956

Claims priority, application Japan, Oct. 9, 1992, 4-076520 U; Jun. 10, 1993, 5-036314 U

Int. Cl.<sup>6</sup> F16C 21/00, 19/10

U.S. Cl. 384—126

8 Claims



1. A bearing device comprising:
  - a rotating shaft;
  - a first bearing including a bearing ring rotating with the rotating shaft and a plurality of rolling bodies which are contacted on one side by the bearing ring; and
  - a second bearing comprising a sintered and oil impregnated bearing in which the rotating shaft is rotatably mounted, the second bearing having a flange member which is brought into contact with the plurality of rolling bodies, is integrally formed as part of the second bearing and is disposed on the opposite side of the rolling bodies, in an axial direction of the rotating shaft through the bearing ring.

5,413,414

## GUIDE SLEEVE FOR A LENGTH-ADJUSTABLE COLUMN FOR CHAIRS OR TABLES

Hans J. Bauer, Altdorf, Germany, assignor to Suspa Compart Aktiengesellschaft, Altdorf, Germany

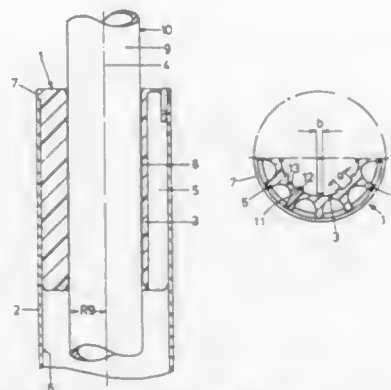
Filed Jan. 22, 1993, Ser. No. 8,569

Claims priority, application Germany, Jan. 25, 1992, 9200884 U

Int. Cl.<sup>6</sup> F16C 33/02; F16M 11/00; A47C 3/00

U.S. Cl. 384—276

10 Claims



1. A guide sleeve for a length-adjustable column for chairs or tables, of which an outside is formed to be received and supported in a guide tube (2) of the column and which is provided on an internal surface (8) with a guide surface concentric of a central longitudinal axis (4) to guide a cylindrical housing (9) of an adjusting element (10) and which is made in one piece of plastic material, wherein guide webs (110) are formed on said internal surface (8) which project towards the central longitudinal axis (4) and which are separated from each other

by recesses (13) and wherein, produced on the guide webs (11) by chip removal, partial cylinder surfaces (12) concentric of the axis (4) are formed as guide surfaces for the housing (9) and wherein it is provided with rib webs (5) which project outwards radially to the central longitudinal axis (4) and wherein the guide webs (11) are arranged radially to the central longitudinal axis (4) each in alignment with the rib webs (5).

5,413,415

## ROTARY TABLE DECK BUSHING

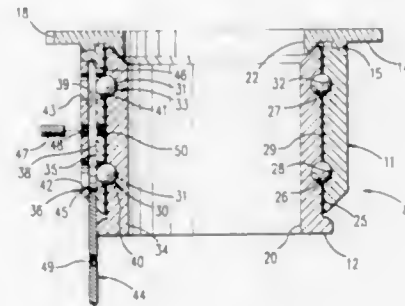
Stephen M. Collinsworth, P.O. Box 358, Stanton, Ky. 40380

Filed Mar. 24, 1994, Ser. No. 217,275

Int. Cl.<sup>6</sup> F16C 43/06; E21C 9/00

U.S. Cl. 384—508

21 Claims



1. A rotary table deck bushing including:
  - an outer sleeve having an axial passage extending therethrough;
  - an inner core disposed within said axial passage in said outer sleeve;
  - said outer sleeve having at least one bearing race in its inner surface defining said axial passage;
  - said inner core having at least one bearing race in its outer surface, said inner core and said outer sleeve having the same number of said bearing races;
  - said one bearing race in said outer sleeve cooperating with said one bearing race in said inner core to form a raceway therebetween;
  - ball bearings disposed within said raceway;
  - said inner core having an axial passage extending therethrough to receive a drill string of a drilling tool;
  - said inner core being formed of a metal softer than the metal of the drill string extending through said axial passage in said inner core or the metal of said outer sleeve;
  - said outer sleeve having at least one access passage extending therethrough from its exterior to communicate with said one bearing race in said inner surface of said outer sleeve to enable said ball bearings to be supplied to said raceway and removed therefrom, the number of said access passages being equal to the number of said bearing races in said outer sleeve;
  - removable blocking means for blocking each of said access passages in said outer sleeve when said removable blocking means is in its blocking position;
  - said removable blocking means having a substantially flat surface substantially parallel to the longitudinal axis of said outer sleeve when said removable blocking means is in its blocking position, said substantially flat surface of said removable blocking means engaging one of said ball bearings through at least said one access passage with only a single point contact so that said removable blocking means is load bearing when said removable blocking means is in its blocking position;
  - and retaining means for retaining said removable blocking means in its blocking position so that said substantially flat surface of said removable blocking means is substantially parallel to the longitudinal axis of said outer sleeve.

5,413,416

## ROLLER GUIDE MEMBER FOR FULL COMPLEMENT ROLLER BEARING

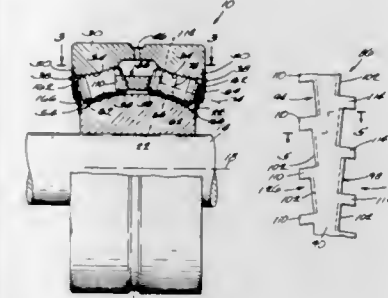
Mark R. Grunze, Naperville, and Robert B. Warrick, St. Charles, both of Ill., assignors to Rexnord Corporation, Milwaukee, Wis.

Filed Dec. 3, 1993, Ser. No. 162,448

Int. Cl.<sup>6</sup> F16C 33/36, 33/49

U.S. Cl. 384—572

12 Claims



1. A roller bearing apparatus comprising
  - an inner ring member,
  - an outer ring member encircling the inner ring member, the inner and outer ring members defining therebetween a raceway space,
  - a plurality of rollers arranged in an axially inclined annular row in the raceway space, each of the rollers in the annular row including opposite first and second end portions, the second end portion of each of the rollers in the annular row being engageable with adjacent ones of the rollers in the annular row, and
  - a guide member including a ring, the ring including opposite radially extending sides, and the guide member including means for skewing the rollers so that the rollers precess when the bearing apparatus is used in an oscillatory application, the means for skewing the rollers including a plurality of circumferentially slanted surface portions on one of the radially extending sides, and a plurality of prongs extending in an axial direction from the ring, each of the prongs being circumferentially slanted in the same direction as the circumferentially slanted surface portions, and the prongs defining circumferentially slanted pockets therebetween, each of the circumferentially slanted surface portions defining a pocket bottom, and each of the rollers being positioned in one of the pockets so that each of the prongs extends between the first end portions of a pair of the rollers in the annular row to separate said first end portions circumferentially.

5,413,417

## PRESTRESSED ROLLING BEARING WITH IMPROVED CAGE AND ITS APPLICATION PARTICULARLY TO A STEERING COLUMN

Jean-Denis Labedan, Bourges, France, assignor to Nadella, Vierzon Cedex, France

Filed Feb. 9, 1994, Ser. No. 194,155

Claims priority, application France, Apr. 14, 1993, 93 04385

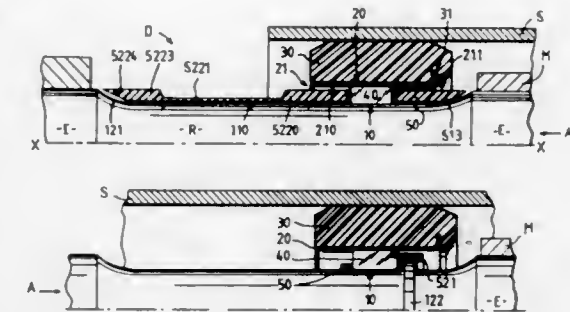
Int. Cl.<sup>6</sup> F16C 33/48; B62D 1/18

U.S. Cl. 384—572

17 Claims

1. A prestressed rolling bearing interposed between a shaft with a median neck bordered by two ends one of which is capped by a sleeve capable of sliding axially when it is subjected to a load which exceeds a predetermined threshold and a support, said bearing comprising:
  - an inner race associated with the shaft;
  - an outer race associated with the support;
  - a retaining ring exerting a centripetal radial stress on said outer race;
  - rolling members interposed between and running on said inner and outer races;

a case including a body having cells retaining said rolling members; said body having two opposite terminating edges; and at least one of said edges having a resting element, and the neck being equipped with an abutment element interacting



with said resting element to normally contribute to holding in place said cage fixed axially relative to the shaft and to allow an axial sliding of said cage upon deformation of said resting element when the sleeve encounters said cage following an axial load which is at least equal to a prefixed limit below the predetermined threshold.

5,413,418

## RETAINER FOR HOLDING RELATIVE POSITIONS OF ROTATING MEMBERS

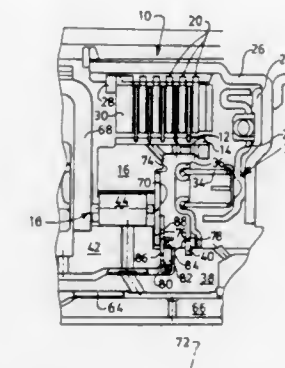
George C. Lee, Novi, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 182,527, Jan. 18, 1994, abandoned, which is a continuation of Ser. No. 913,330, Jul. 15, 1992, abandoned. This application Aug. 5, 1994, Ser. No. 286,596

Int. Cl.<sup>6</sup> F16C 19/30

U.S. Cl. 384—620

10 Claims



1. A device for limiting displacement, comprising:
  - a first ring mounted for rotation about a first axis and displacement along said axis;
  - a second ring mounted for rotation about said axis and displacement along said axis;
  - a retainer located adjacent the first and second rings; and
  - an antifriction bearing fixed against displacement along said axis and mounted for rotation about said axis, having tabs overlapping and contacting the retainer.



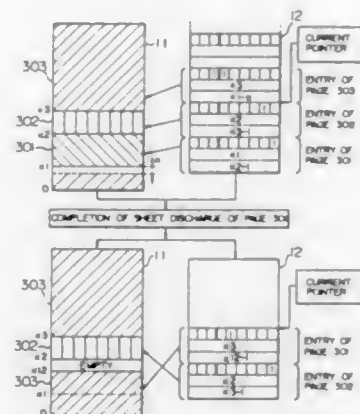
5,413,419

## PRINTER, A PRINTER CONTROL SYSTEM AND METHOD

Mitsuyoshi Oami, Sagamihara, and Hiroo Fujisaki, Hadano, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Mar. 10, 1993, Ser. No. 29,132  
 Claims priority, application Japan, Mar. 16, 1992, 4-057683  
 Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 400—61

20 Claims



1. A method for controlling printing operation of a printer having a buffer memory for temporarily storing print data and a full dot memory for saving a page of print data in a dot pattern form, said method comprising the steps of:

when there is new print data to store in said buffer memory and said buffer memory does not have an empty area for said new print data to be stored therein, determining the presence of:

a first state in which the buffer memory is storing print data of a first page being printed and, the new print data is of a second page being different from the first page, or a second state in which the buffer memory stores print data of the first page and a portion of the second page; in response to determining the presence of the first state, storing the new print data in said buffer memory after printing of a first sheet corresponding to the first page is completed; and

in response to determining the presence of the second state, developing the print data stored in said buffer memory into said full dot memory in a first dot pattern, and after completion of the development, storing the new print data in said buffer memory while holding the first dot pattern in the full dot memory.

5,413,420

## WORDPROCESSING DEVICE

Kazuko Ishida, Kounan, and Kengo Omura, Toyooka, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 1, 1993, Ser. No. 71,651

Claims priority, application Japan, Jun. 1, 1992, 4-166912

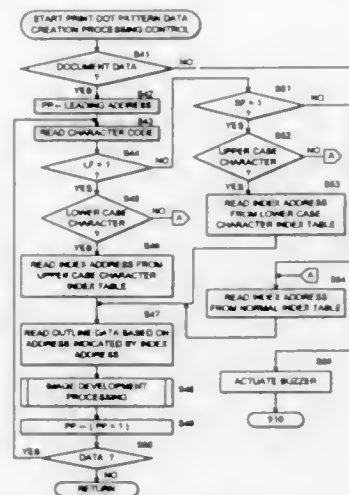
Int. Cl.<sup>6</sup> G06F 5/00

U.S. Cl. 400—61

14 Claims

1. A wordprocessing device which comprises: input means for inputting character codes, each of said character codes comprising a character and one of a plurality of attribute information; memory means for storing said character codes input through said input means; a character generator for generating output character data, each output character data comprising a character having one attribute; output attribute selecting means for selecting the attribute of the character to be outputted; an index means for mapping said input character codes to said output character data, said output character data

having the attribute that is selected by said output attribute selecting means, wherein said index means maps said input character codes having a first of said plurality of attributes onto the output character data having a different one of said plurality of attributes; and



output control means for outputting characters corresponding to said output character data with the attribute selected by said output attribute selecting means, with said stored input character codes remaining unchanged.

5,413,421

## PRINTING HEAD DEVICE

Masaya Okamoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

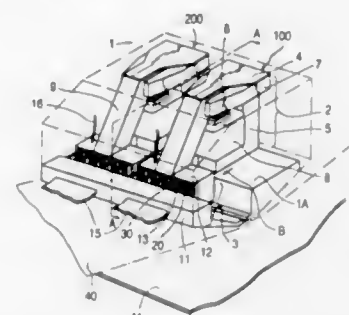
Filed Mar. 21, 1994, Ser. No. 216,024

Claims priority, application Japan, Mar. 22, 1993, 5-086742

Int. Cl.<sup>6</sup> B41J 2/27

U.S. Cl. 400—124.15

13 Claims



1. A printing head device of a dot-impact type printer for printing a dot pattern on a recording sheet according to a printing signal, comprising:

- a plurality of printing pins corresponding to dots;
- a plurality of first pin drive plates having said printing pins fixed thereon and having surfaces on which first electrodes are formed;
- a plurality of second pin drive plates having second electrodes opposing to said first electrodes respectively;
- a first drive plate support member for movably supporting said first pin drive plates respectively;
- a second drive plate support member for supporting said second pin drive plates;
- a drive unit for vibrating said second drive plate support member in a direction toward a top end of said printing pins; and
- a drive circuit for applying a voltage based on a printing signal between said first and second electrodes with a

vibration timing of said drive unit to produce Coulomb force between said first and second electrodes.

5,413,422

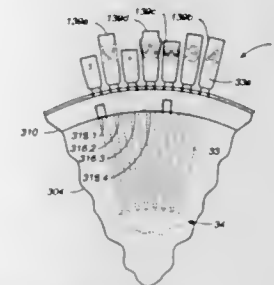
PRINT WHEELS AND METHODS OF USING SAME  
 Roger M. Gray, Lewisville, and Warren K. Shannon, Highland Village, both of Tex., assignors to Taurus Impressions, Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 78,792, Jun. 17, 1993. This application Aug. 5, 1993, Ser. No. 102,601

Int. Cl.<sup>6</sup> B41J 1/22

U.S. Cl. 400—144.2

9 Claims



1. A print wheel comprising:

- a center portion;
- a plurality of petals having characters thereon, the petals extending radially from the center portion; and
- a plurality of signs running along the center portion generally circularly in one plane with the petals, each sign being either a predetermined sign S1 or a predetermined sign S2, the signs being in groups of three or more consecutive signs, each group containing a unique variable bit of information, each group when examined in sequence in a predetermined circular direction comprising: one or more consecutive signs S1 marking a beginning of the group; p2 one or more identical consecutive signs "I" following said one or more signs S1, each sign "I" being one of S1 and S2, the signs "I" providing the unique bit of information; and one or more consecutive signs S2 which follow said one or more signs "I" and which mark an end of the group, wherein a sign sequence "S2 S1" identifies the end of one group and the beginning of another group to allow a print engine to synchronize with the groups.

5,413,423

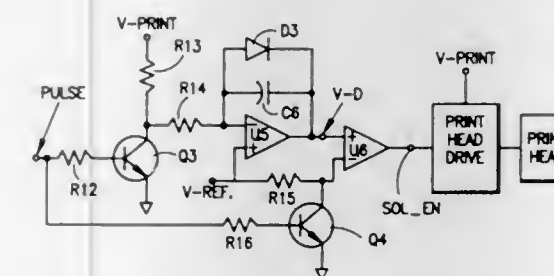
PRINT ELEMENT DRIVE CONTROL WITH CONSTANT CURRENT CHARGE AND DISCHARGE OF CAPACITOR  
 Tee-Huang Chou, Taipei, Taiwan, Prov. of China, assignor to Veri Fone Inc., Redwood City, Calif.

Filed Mar. 22, 1994, Ser. No. 216,493

Int. Cl.<sup>6</sup> B41J 2/30

U.S. Cl. 400—157.2

11 Claims



1. A dot matrix printer comprising a print head having a plurality of print solenoids; a print head carriage for carrying said print head;

carriage drive means for driving said print head carriage across a print medium; print timing means for supplying a sequence of print timing pulses as said print head and said carriage traverse said print medium;

power supply means for supplying a print voltage; drive pulse circuit means responsive to each of said print timing pulses for producing a solenoid enable pulse of a duration which varies inversely with the magnitude of said print voltage;

a central processing unit responding to each of said print timing pulses for supplying a set of individual solenoid address signals corresponding to dots to be printed by said print head;

driver circuit means responsive to coincidence of said solenoid enable signal and said solenoid address signals for applying said print voltage to solenoids of said print head associated with said solenoid address signals;

said drive pulse circuit means comprising: timing means for providing a first timing interval having a prearranged start time relative to each of said print timing pulses and a prearranged duration;

first circuit means, including a capacitor, and responsive to said timing means for charging said capacitor in a first direction with a constant current of prearranged fixed magnitude for the duration of said first timing interval and thereafter discharging said capacitor to a first reference voltage of prearranged first magnitude with a constant current of magnitude varying directly with the magnitude of said print voltage to provide a second timing interval of a duration varying inversely with the magnitude of said print voltage;

second circuit means responsive to said first circuit means for producing an output pulse having a duration equal to the combined durations of said first timing interval and said second timing interval to serve as said solenoid enable pulse.

5,413,424

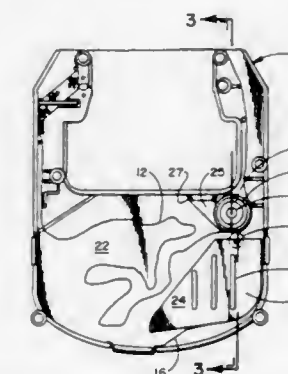
RIBBON CASSETTE INCLUDING AN INKING DEVICE  
 Irwin Silverstein, 3610 Yacht Club Dr., Unit 708, North Miami, Fla. 33180

Filed Nov. 26, 1993, Ser. No. 157,308

Claims priority, application Brazil, Oct. 8, 1993, 7301978 U  
 Int. Cl.<sup>6</sup> B41J 27/12

U.S. Cl. 400—202.4

2 Claims



1. A high speed ribbon for printers comprising, a cartridge having an interior and exterior thereof; a means for closure of said cartridge comprising a lid having channels therein; an inked ribbon such that said ribbon runs through the interior of said cartridge; a drive roller and a contact roller wherein said ribbon runs through said drive and contact rollers and is kept under traction thereby; an inking device within the interior of said cartridge, and; a means for urging said contact roller into and against the

said drive roller tangentially and perpendicularly thereto, said urging means comprising a plurality of matable projections with said channels which result in a track to position the said inking device and contact roller into and against the said drive roller when the said lid is secured onto the said cartridge.

5,413,425

# PRINTER RIBBON DISTINGUISHING METHOD AND APPARATUS THEREOF

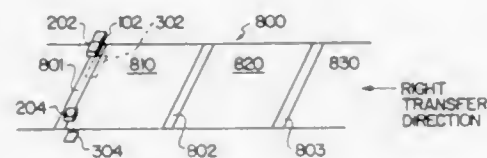
Mun-Bae Park, Suwon-city, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyungki-do, Rep. of Korea  
Filed Dec. 29, 1993, Ser. No. 174,813

Claims priority, application Rep. of Korea, May 14, 1993, 93-8288

Int. Cl.<sup>6</sup> B41J 31/09

U.S. Cl. 400—240.3

16 Claims



1. A printer ribbon distinguishing method comprising:
  - a first step of providing three color sensors, wherein a first of said three color sensors is located above the ribbon and has a characteristic in that light which is generated by a light emitting unit of said first sensor penetrates yellow, magenta and clear patches of the ribbon, but does not penetrate cyan or black patches, wherein a second of said three color sensors is installed in a straight line with the first sensor widthwise of the ribbon and has a characteristic in that light generated by a light emitting unit of said second sensor penetrates yellow and clear patches, but does not penetrate magenta, cyan or black patches, and a third sensor installed on an opposite side of said first and second sensors widthwise of the ribbon, but not on a straight line with said first and second sensors, has a characteristic in that light generated by a light emitting unit of said third sensor penetrates yellow and clear patches, but does not penetrate magenta, cyan or black patches;
  - a second step of transferring the ribbon in one direction for a predetermined period of time to thereby recognize the ribbon as a black and white ribbon with no clear patch if there is no change in an output of the second sensor;
  - a third step of discriminating a ribbon penetrability of light generated by the light emitting unit of the third sensor to thereby discriminate the ribbon as a black and white ink ribbon having a clear patch if the light is impenetrable, when there is a change in the output of the second sensor and the light generated by the first sensor changes from a ribbon impenetrable state to a ribbon penetrable state; and
  - a fourth step of recognizing the ribbon as a color ink ribbon if it is discriminated that the light generated by the third sensor at the third step is penetrable as a result of a discrimination of penetrability.

5,413,426

# RECORDING APPARATUS

Kazuya Ijuin, Tokyo; Michio Kasuya, Yokohama, and Shinnichihiro Otsuki, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1992, Ser. No. 889,398

Claims priority, application Japan, May 29, 1991, 3-152287

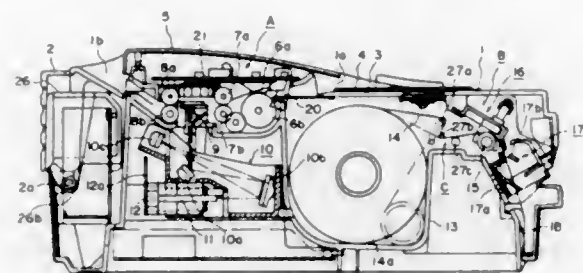
Int. Cl.<sup>6</sup> B41J 15/16, 11/70

U.S. Cl. 400—621

26 Claims

1. A recording apparatus, comprising:
  - a conveying member for conveying a sheet;

recording means for recording an image on the sheet conveyed by said conveying member;  
a cutter disposed downstream of said recording means for cutting the sheet conveyed by said conveying member;  
a drive source rotatable in a forward and a reverse direction; drive force transmitting means for transmitting a drive force to said conveying member during the forward rotation of said drive source, and transmitting the drive force to said conveying member after a predetermined amount of reverse rotation of said drive source so as to await cutting of the sheet by said cutter;



- a one-way clutch which does not transmit the drive force to said cutter during the forward rotation of said drive source, and transmits the drive force to said cutter to operate said cutter during the reverse rotation of said drive source; and
- curl correcting means to correct for curling of the sheet, including means for shifting said curl correcting means to an operating position in response to the forward rotation of said drive source to correct for curling of the sheet, and for shifting to a non-operating position in response to the reverse rotation of said drive source so as not to correct for the curling of the sheet.

5,413,427

# PRINTER ARCHITECTURE STRUCTURE

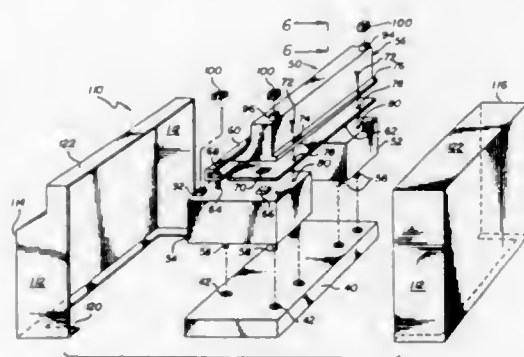
Robert R. Giles, Escondido; Richard M. Kemplin, Poway, and Ronald J. Kaplan, San Marcos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 9, 1993, Ser. No. 149,862

Int. Cl.<sup>6</sup> B41J 29/02

U.S. Cl. 400—691

13 Claims



1. A printer architecture structure comprising:
  - a) a rigid base;
  - b) printer chassis structure mounted on said base;
  - c) an exterior case which is relatively flexible compared to said rigid base, said case substantially enclosing said chassis structure and said base;
  - d) resilient grommets between said base and said chassis structure; and
  - e) resilient pads between said chassis structure and said case;
  - f) a plurality of mounting posts extending between said chassis structure and said base for positioning and mount-

ing said chassis structure on said base, one of said base and said chassis structure having mounting holes therein and the other of said base and said chassis structure including said mounting posts affixed thereto, said grommets being received in said mounting holes and said posts being received in said holes, said case having means thereon engaging said base whereby inherent flexibility of said case compresses said pads and urges said posts into said grommets to affix said chassis structure to said base.

5,413,428

# WRITING INSTRUMENT

Shuhei Kageyama, Kawagoe, Japan, assignor to Kotobuki & Co. Ltd., Kyoto, Japan

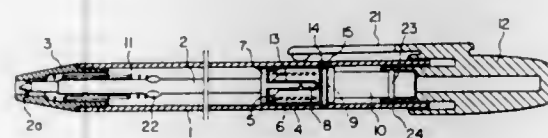
Continuation of Ser. No. 63,456, May 18, 1993, abandoned, which is a continuation of Ser. No. 863,793, Apr. 6, 1992, abandoned. This application May 31, 1994, Ser. No. 250,938

Claims priority, application Japan, May 20, 1991, 3-035471 U

Int. Cl.<sup>6</sup> B43K 7/12, 24/08

U.S. Cl. 401—110

7 Claims



1. A writing instrument including:
  - a tubular front casing having a constant diameter through-hole extending longitudinally there-through, said tubular front casing having an annular recess in an interior periphery thereof;
  - a refill inserted in said through-hole in said tubular front casing;
  - a cam mechanism for extending and retracting said refill from a nose cone on said tubular front casing, said cam mechanism comprising:
    - a cam body located in said through-hole in said tubular front casing, said cam body having a plurality of cam grooves formed on an inner surface alternating with a plurality of cam slits, said plurality of alternating cam grooves and cam slits terminating at a shoulder portion at the end of said cam body;
    - said cam body having a plurality of cam surfaces on an end adjacent to said plurality of alternating cam grooves and cam slits and a flange on the other end, said flange constructed to engage said annular recess on the interior periphery of said casing;
    - a rotatable cam, having a plurality of cam surfaces engageable with said plurality of cam surfaces and cam slits on said cam body, said rotatable cam fitting over and engaging an end of said refill;
    - connecting means on an axis portion of said rotatable cam;
    - a cam bar having a plurality of projections constructed to slidably engage said plurality of alternating cam grooves and cam slits up to said shoulder portion, said plurality of projections on said cam bar constructed to engage said plurality of cam surfaces on said rotatable cam to push said rotatable cam in an axial direction to alternately disengage and re-engage said plurality of cam surfaces on said rotatable cam with said plurality of slits in said cam body;
    - connection receiving means on said cam bar for receiving said connecting means on said rotatable cam to mount and retain said cam bar on said rotatable cam; resilient elastic means pushing said refill toward and into engagement with said rotatable cam; and a rear casing mounted on the end of said tubular front casing, said rear casing being secured to said cam bar.

5,413,429

# WRITING INSTRUMENT WITH LIGHT ASSEMBLY

Shoel-Shuh Shiau, No.18, Alley 33, Lane 730, Chien-Hsing Rd., Taichung City, Taiwan, Prov. of China

Filed May 18, 1994, Ser. No. 246,344

Int. Cl.<sup>6</sup> B43K 29/10

U.S. Cl. 401—195

4 Claims



1. A writing instrument with a light assembly, said writing instrument including:
  - a conductive barrel having an open top end and an open bottom end;
  - a nib assembly including a transparent hollow nib casing which has an open top end connected to said open bottom end of said conductive barrel and an open bottom end, an ink tube which has an upper end and a lower writing tip and which is disposed inside said nib casing, a coil spring sleeved around said ink tube, said coil spring having a first end that bears against said nib casing and a second end that pushes said ink tube to be extensible into said conductive barrel;
  - a lamp assembly disposed slidably inside said conductive barrel, said lamp assembly having a lowermost end abutting said upper end of said ink tube, said lamp assembly including an insulating lamp holder that retains a lamp with a first electrode in electrical communication with said conductive barrel and a second electrode, said lamp assembly further including an insulating battery seat which has an upper end abutting against said lamp holder, said battery seat receiving a battery therein, said battery having a first terminal connected electrically to said second electrode of said lamp and a second terminal;
  - a thrusting assembly including a hollow insulating cap member which has an open bottom end connected to said open top end of said conductive barrel and an open top end, a push-button provided on said open top end of said cap member, an elongated insulating switch bar which has an upper end portion extending into said cap member and which is in sliding contact with a lower end of said push-button, said insulating switch bar further having a lower end portion with a threaded axial blind bore and two split members extending axially and downwardly from said lower end portion to define cooperatively a receiving slot therebetween and which communicates with said blind bore, and means for rotating said insulating switch bar relative to said push-button upon operation of said push-button between a switch-off condition to turn off said lamp and a switch-on condition to turn on said lamp, said push-button being operable against biasing action of said coil spring to move said ink tube between a first position, wherein said writing tip is disposed in said nib casing while said lamp at said switch-off condition, and a second position, wherein said writing tip extends out of said nib



casing through said open bottom end of the latter while said lamp is at said switch-on condition; a metallic clip assembly clamped between said cap member and said open top end of said barrel; wherein the improvement comprises:

said thrusting assembly including: an insulating sleeve member sleeved around said split members and having an external surface; a pair of conductive tongues mounted to said insulating sleeve member in such a manner that said conductive tongues cover said external surface of said insulating sleeve member at two opposed portions, said conductive tongues having a pair of curved portions extending into said receiving slot of said split members and cooperatively forming a clamping ring between said split members; and a conductive locking bolt inserted axially between said split members and threaded to said blind bore and engaging said clamping ring to retain said insulating sleeve member on said split members, said split members extending into said conductive barrel such that a lowermost end of said conductive locking bolt is in electrical communication with said second terminal of said battery;

said metallic clip assembly including a ring member sleeved around said split members of said insulating switch bar and disposed between said insulating sleeve member and said push-button, a pair of opposed rib members extending axially and downwardly from said ring member and being in contact with said external surface of said insulating sleeve member, and a clip member which is exposed exteriorly of said barrel and which is in electrical communication with an external surface of said conductive barrel; whereby, said conductive tongues of said insulating sleeve member are spaced from said axially extending rib members of said clip assembly when said insulating switch bar is at said switch-off condition, and said conductive tongues of said insulating sleeve member are in electrical contact with said axially extending rib members of said clip assembly when said insulating switch bar is at said switch-on condition.

5,413,430

#### CLAMPING DEVICE AND A CLAMPING FILE EQUIPPED THEREWITH

Kurt Schrem; Herbert Kratzert, both of Pfullendorf, and Alexander Benn, Stuttgart, all of Germany, assignors to Kratzert & Schrem GmbH, Pfullendorf, Germany

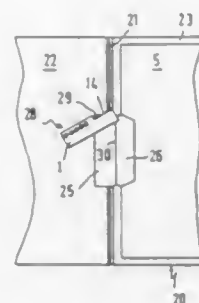
Filed Jan. 28, 1994, Ser. No. 187,515

Claims priority, application Germany, Jan. 29, 1993, 9301246 U

Int. Cl.<sup>6</sup> B42F 13/02; B42D 17/00

U.S. Cl. 402—60

17 Claims



1. A clamping file assembly comprising: two file covers connected with one another along a folding edge, and a clamping device fastened to at least one of the file covers at a narrow distance from the folding edge by means of a swivelable holding connection, said clamping device having an essentially U-shaped cross-section with a first and second leg connected with one another by way of a back, said legs being elastically pressed

apart on their free longitudinal edges to define a clamping gap therebetween for the inserting and clamping-in of paper sheets,

wherein the free longitudinal edge of the first leg is formed at a distance from the free longitudinal edge of the second leg in the area of face-side longitudinal ends of the first and second legs as a paper sheet inserting mouth, which distance increases in a direction toward the face-side ends and,

wherein a face-side end of the back adjacent the inserting mouth is shortened with respect to the face-side ends of the legs so that a slot is formed between face-side ends of the first and second legs.

5,413,431

#### PROTECTIVE COVER FOR A BALL JOINT ASSEMBLY

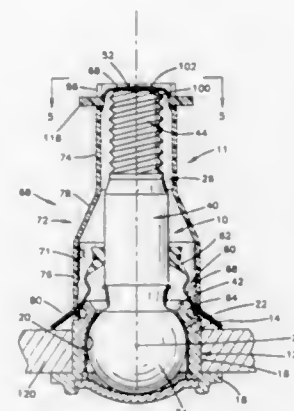
Russell T. Fellows, Mt. Clemens, Mich., assignor to TRW Inc., Lyndhurst, Ohio

Filed May 7, 1993, Ser. No. 58,417

Int. Cl.<sup>6</sup> B65D 59/00

U.S. Cl. 403—12

11 Claims



1. A protective cover for a ball joint assembly having a socket with an outwardly extending ball stud and a seal between the socket and ball stud, said cover comprising:

a side wall and an end wall for enclosing the stud and the seal;

a plurality of arms directly attached to said end wall of said cover;

said arms being movable between a retracted position and an extended position in which said arms extend outward from said side wall; said arms providing means for facilitating removal of said cover from said ball joint assembly when in the extended position.

5,413,432

#### MULTIPURPOSE PROCESSING SYSTEM AND METHOD FOR THE BENEFICIAL USE AND MANAGEMENT OF SLUDGE

James B. Cummings, Pittsburgh, Pa., assignor to Chambers Development Co., Inc., Pittsburgh, Pa.

Continuation of Ser. No. 947,052, Sep. 18, 1992, abandoned. This application Feb. 14, 1994, Ser. No. 194,815

Int. Cl.<sup>6</sup> B09B 1/00

U.S. Cl. 405—129

11 Claims

1. A landfill system comprising: a first facility for disposing sludge with waste in a landfill; a second facility for forming a compost pile of yard waste mixed with sludge; a third facility for pelletizing sludge for ultimate use as a fuel; a fourth facility for processing sludge for use in land enhancement applications, said first, second, third and fourth facilities located within a common landfill area; and means for transporting a portion of sludge brought to the

landfill to each of the first, second, third and fourth facilities, said transporting means disposed in said landfill and in communication with each of the first, second, third and fourth facilities, said transporting means including means for disposing sludge in the landfill with the waste during formation of the landfill and wherein the first facility includes means for collecting gas produced within the



landfill from the sludge mixed with the waste directly from the landfill, a piping network connected to the collecting means through which gas from the landfill is channeled, and means for generating electricity from the collected gas, said generating means in fluidic connection with the collecting means through the piping network such that gas collected directly from the landfill is channeled to the generating means.

5,413,433

#### TREATMENT OF MINERAL TAILINGS

Peter Davies, P.O. Box 2328, Durban 4000, South Africa

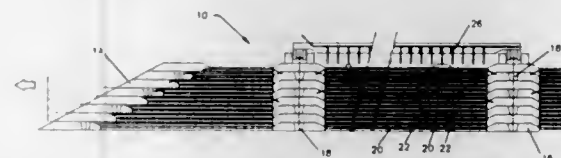
Filed Feb. 23, 1993, Ser. No. 21,079

Claims priority, application South Africa, Feb. 24, 1992, 92/1312

Int. Cl.<sup>6</sup> C02F 1/00; E02D 17/18

U.S. Cl. 405—129

7 Claims



1. A method of treating mineral tailings containing slimes and a coarser fraction, which comprises: separating the slimes from the tailings and forming a plurality of superimposed alternating layers of slimes and coarser fraction between berms constructed of a material coarser than the slimes, whereby due to pressure exerted on lower slimes layers by upper layers, water from said slimes layer is forced out of said slimes layer into adjacent layers of coarser fraction, and thereafter horizontally towards and into said berms from which said water drains away.

5,413,434

#### METHOD AND INSTALLATION FOR LAYING A PIPELINE

Gerhardus A. P. Stenfort, Nootdorp; Robert P. Hovinga, Naaldwijk, and Eugène A. Bajema, Zoetermeer, all of Netherlands, assignors to Allseas Engineering B.V., Netherlands

Filed Aug. 20, 1993, Ser. No. 109,617

Claims priority, application Belgium, Aug. 21, 1992, 09200748

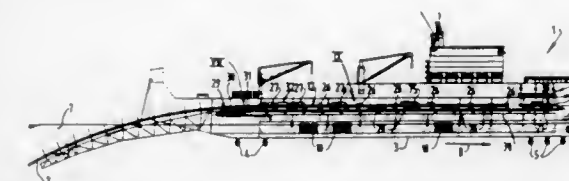
Int. Cl.<sup>6</sup> F16L 1/16

U.S. Cl. 405—166

6 Claims

1. Method for laying a pipeline (2) on a surface located under water which includes on a vessel (3) fitting a pipe to a pipe string (12) of the pipeline (2), each time during a fitting step while this pipe (9) is held in line behind the pipe string (12) by means of positioning means (21) and is welded to the pipe string welding means (26), which also includes during the fitting step moving the vessel (3) substantially continuously in lengthwise direction of the pipe string (12) while fitting a pipe (9) to the pipe string (12) by moving of positioning means (21)

relative to the vessel (3) and by moving welding means (26) relative to the vessel (3), characterized in that during an operational phase moving a train of positioning means (21), welding means (26) and clamping means (27) relative to the vessel (3) in lengthwise direction of the pipe string (12) substantially together with the pipe string (12) and that during a resetting



phase set between two successive operational phases, displacing said train in the direction of the prow of the vessel (3) relative to the pipe string (12) and relative to the vessel (3), wherein the pipe string (12) is held fixedly on said train by means of the clamping means (27) and wherein said train is held fixedly on the vessel (3) by means of coupling means (80, 81, 82).

5,413,435

#### PREFABRICATED PANEL FOR THE CONSTRUCTION OF DIRECTED FRAGILITY WALLS

Juan B. Batlle, Vinya del Rei 3, 08328-Alella (Barcelona), Spain

PCT No. PCT/ES90/00044, § 371 Date Aug. 19, 1991, § 102(e) Date Aug. 19, 1991, PCT Pub. No. WO91/09187, PCT Pub. Date Jun. 27, 1991

Continuation of Ser. No. 752,445, Aug. 19, 1991, abandoned.

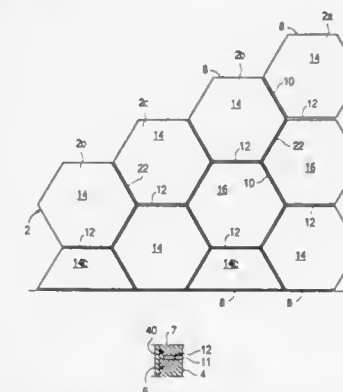
This PCT application Dec. 19, 1990, Ser. No. 122,174

Claims priority, application Spain, Nov. 16, 1990, 8904269

Int. Cl.<sup>6</sup> E02D 29/02

U.S. Cl. 405—284

22 Claims



1. A device comprising:

a directed fragility earth retention wall, adapted for attachment to at least one resistant member complementary to the earth retention wall, the earth retention wall comprising a plurality of panels, each panel of the plurality of panels comprising:

a front seen face;

a rear face;

end edges extending lengthwise; and

side edges extending crosswise, said panel being provided with at least one hollowed out portion opening onto at least said front seen face and formed by at least one of a groove and a series of holes, such that the hollowed out portion extends generally between two end edges defining a preferred fracture line, said panel being divided into rigid modules being defined by at least one hollowed out portion and at least two side edges, each module being provided with association means for independent attachment to said resistant member complementary to the earth

retainment wall and each module having a tensile strength of at least approximately 1 ton per m<sup>2</sup>.

#### 5,413,436 SUPPORT COLUMN

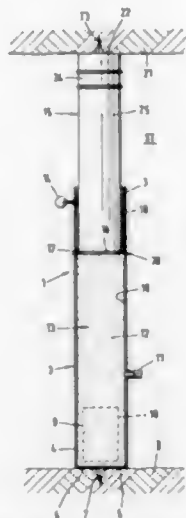
Volker Merz, Iserlohn, Germany, assignor to MBK-Hydraulik Meuwesen & Brockhausen GmbH, Kamp-Lintfort, Germany  
Filed Nov. 24, 1993, Ser. No. 157,682

Claims priority, application Germany, May 17, 1993, 43 16 390.4

Int. Cl.<sup>6</sup> E21D 15/14

U.S. Cl. 405—290

12 Claims



1. A support column for underground mining to be clamped between an upper abutment and a lower abutment, the support column comprising an upper hollow column component and a lower hollow column component, the upper column component being telescopically mounted in the lower column component, the upper and lower column components each having an interior space, means for completely closing off the interior space of the upper column component relative to the interior space of the lower column component, the lower column component comprising a filling unit for filling a non-hardening filler mixed with an auxiliary agent into the lower column component, an annular gap being defined between an outer surface of the upper column component and an inner surface of the lower column component, the gap having a width, the width being selected such that the auxiliary agent and air can pass through the gap and filler is prevented from passing through the gap, whereby filler accumulating in the interior space of the lower column component causes the upper column component to slide relative to the lower column component in an outward direction and finally clamps the support column between the upper and lower abutments.

10. A method of clamping a support column for underground mining between an upper and a lower abutment, the support column including an upper hollow column component and a lower hollow column component, the upper column component being telescopically mounted in the lower column component, the upper and lower column components each having an interior space, means for completely closing off the interior space of the upper column component relative to the interior space of the lower column component, the lower column component comprising a filling unit for filling a non-hardening filler mixed with an auxiliary agent into the lower column component, an annular gap being defined between an outer surface of the upper column component and an inner surface of the lower column component, the gap having a width, the width being selected that the auxiliary agent and air can pass through the gap and filler is prevented from passing through the gap, whereby the method comprising filling the filler mixed with the auxiliary agent into the interior space of

the lower column component so that the filler accumulates in the interior space of the lower column component and the auxiliary agent and air escape through the annular gap until the filler presses the upper and lower column components against the abutments.

#### 5,413,437

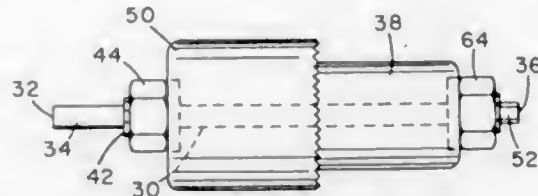
#### DOUBLE-SIDED HOLE SAW

Michael M. Bristow, 1605 Jade Ave., Chula Vista, Calif. 91911  
Continuation-in-part of Ser. No. 840,135, Feb. 24, 1992, abandoned. This application Jun. 6, 1994, Ser. No. 254,256

Int. Cl.<sup>6</sup> B23B 35/00; 51/04

U.S. Cl. 408—1 R

13 Claims



9. A method for centering a circular blade of a second diameter over a previously cut hole of a first diameter, said method which comprises:

- selecting an arbor assembly having a fixed mounting means and a slideable mounting means;
- mounting said circular blade on a fixed portion of said arbor assembly;
- mounting a first hole saw having said first diameter on a slideable portion of said arbor assembly so that said circular blade is directed toward said first hole saw and so that said first hole saw is concentric with said circular blade;
- mounting said arbor assembly in a driving means; and
- inserting said first hole saw into said previously cut hole to guide and center said circular blade.

#### 5,413,438

#### COMBINED HOLE MAKING AND THREADING TOOL

Manuel C. Turchan, 12825 Ford Rd., Dearborn, Mich. 48126

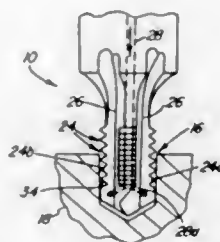
Continuation of Ser. No. 229,493, Aug. 8, 1988, abandoned, which is a continuation of Ser. No. 7,344, Jan. 27, 1987, Pat. No. 4,761,844, which is a continuation-in-part of Ser. No. 840,443, Mar. 17, 1986, Pat. No. 4,651,374. This application Mar. 18, 1991, Ser. No. 673,166

The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl.<sup>6</sup> B23C 3/00; B23G 5/20

U.S. Cl. 409—66

36 Claims



26. In combination with a machine tool of the type having a spindle adapted to simultaneously rotate a cutting tool about its axis and feed said cutting tool axially for cutting a hole in an imperforate surface of a solid portion of a workpiece and thereafter concurrently move said axis in an orbital path and axially whereby a point on said cutting tool defines a helical path, the improvement comprising a hole making and threading tool having:

an elongated straight body having a shank at one end; a hole making means at the other end for making said hole in said imperforate surface of said solid portion of said workpiece, said hole having a wall; and a thread making means intermediate said one end and said other end;

at least one chip removal passage extending from said hole making means through said thread making means; and chamfer cutting means disposed adjacent said thread making means; and

said thread making means having a maximum diameter which is no greater than the maximum diameter of said hole making means whereby said thread making means can enter said hole made by said hole making means in said imperforate surface of said solid portion of said workpiece without interference with said wall of said hole to thereafter form a thread in said wall.

#### 5,413,439

#### UNIVERSAL SPINDLE HEAD FOR MACHINE TOOL

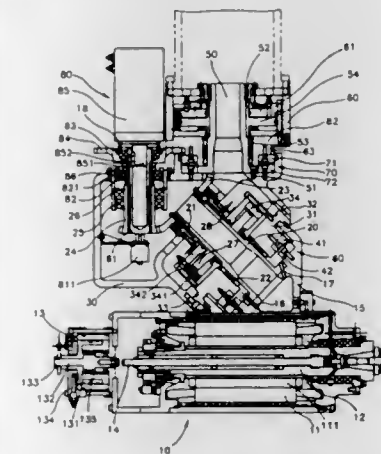
Jinn-Fa Wu, and Chun-Hung Huang, both of Hsinchu, Taiwan, Prov. of China, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China

Filed Mar. 18, 1994, Ser. No. 210,550

Int. Cl.<sup>6</sup> B23C 1/12

U.S. Cl. 409—216

6 Claims



1. A universal spindle head device for machine tool comprising:

- a spindle head having a main spindle for holding a cutter for rotary process of workpiece;
- a built-in motor for driving said main spindle in rotation;
- a first rotating spindle having its end affixed to said spindle head at an inclined angle of 45 degrees toward said main spindle of spindle head, the center of said first rotating spindle having a hollow passage along a longitudinal axis through the center of said first rotating spindle;
- a rotary base for said first rotating spindle rotably mounted thereon said rotary base being slidable reciprocally along said longitudinal axis;
- a first locating device mounted between said spindle head and said rotary base for locating a turning angle and position of said spindle head;
- a first driving device for driving said first rotating spindle to move reciprocally along said longitudinal axis;
- a second rotating spindle having an end affixed to said rotary base;
- a connection seat fixedly mounted on a machine tool table and being provided for said second rotating spindle to be rotably and slidably mounted thereon;
- a second driving device for driving said second rotating spindle in reciprocal displacements along said longitudinal axis;
- a second locating device mounted between said rotary base

and said connection seat for locating a turning angle and position of said rotary base;

a power unit;

a first transmission mechanism for driving said first rotating spindle in rotation;

a second transmission mechanism for driving said rotary base in rotation centering around said second rotating spindle;

a power switchover device for switching a power of said power unit to either said first transmission mechanism or said second transmission mechanism;

whereby said universal spindle head for machine tool can be directly driven by said built-in motor to simplify power unit and transmission mechanism of said spindle head and at same time to promote rotational speed of said main spindle, and said hollow passages of said first and second rotating spindles allowing oil lines connected to said spindle head to pass therethrough so as to prevent pollution and damage as well as prevent the oil lines from swinging.

#### 5,413,440

#### UNIT FOR MILLING AND DRILLING

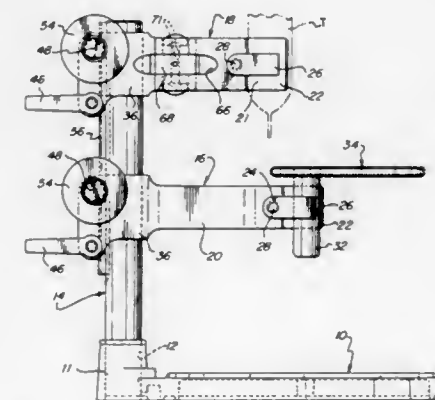
Donald W. Willson, East Hartford, and Donald W. Willson, II, Manchester, both of Conn., assignors to Willson Manufacturing, Inc. of Connecticut, Manchester, Conn.

Filed Mar. 31, 1994, Ser. No. 220,517

Int. Cl.<sup>6</sup> B23C 1/06; B23B 47/28

U.S. Cl. 409—235

3 Claims



1. A unit for the support of power tools and the like, comprising:

- a base;
- an elongate post affixed at one end to said base in a normally upright attitude, said post having a toothed rack spaced upwardly from said base and extending longitudinally thereon, and said post being of generally circular cross section, at least in a lower section of its length lying between said base and said rack;
- a first rigid arm supported for longitudinal movement on said post; and
- a second, articulated arm supported for longitudinal movement on said post; both of said arms having opposite end portions with clamping means and post-engaging means thereon, respectively; said clamping means defining an opening of variable effective cross section for receiving and clampingly engaging therein bodies of different sizes; and said post-engaging means comprising a mounting part having an axial passage therethrough for slidably receiving said post, a pinion mounted on said mounting part and operatively engageable with said rack for raising and lowering the associated arm, and securing means for securing said associated arm at selected levels on said post, said mounting part of at least one of said arms being of sufficiently small axial length to pass between said base and said rack and said passage therethrough being of



generally circular cross section, said one arm thereby being rotatable on said post with said mounting part and said base section thereof, respectively, in mutual registration.

5,413,441

## HYBRID ECCENTRIC WEDGE ANCHOR

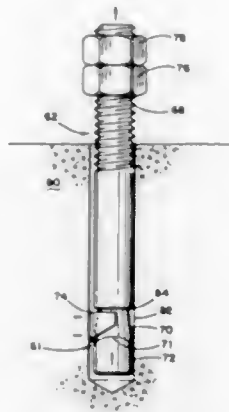
David V. Heminger; David Dorr; Michael E. Berry, all of Tulsa; Dennis Chadwick, Broken Arrow; Christopher C. Martin, Tulsa, and George Halley, Owasso, all of Okla., assignors to United Industries Corporation, Tulsa, Okla.

Filed Jul. 19, 1993, Ser. No. 94,245

Int. Cl.<sup>6</sup> F16B 13/06, 39/00

U.S. Cl. 411—55

20 Claims



1. A concrete anchor, comprising: an elongated body having a longitudinal axis, a first end and a second end; said elongated body being a unitary piece of material and having a substantially uniform diameter; at least one eccentric unit cut into said body, said unit having a section having longitudinal axis not aligned with the longitudinal axis of said body; a clip mounted on said section, said clip having a longitudinal dimension not greater than the longitudinal dimension of said section; said clip including a middle portion and two end portions with said middle portion having a greater thickness than said end portions.

5,413,442

## BOLT-NUT ASSEMBLY FOR RAILROAD CROSSING FROGS

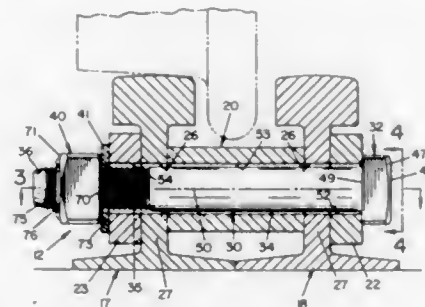
John J. Grey, Berea, Ohio, assignor to Barnes Group, Inc., Bristol, Conn.

Filed Sep. 21, 1993, Ser. No. 124,708

Int. Cl.<sup>6</sup> F16B 25/00, 35/00, 35/04; E01B 11/00

U.S. Cl. 411—366

14 Claims



1. In a railroad frog crossing bolt and nut assembly for clamping railroad rail sections together, said assembly including an elongated cylindrical shank body with a given diameter

of at least about 1.0 inches and a length of at least about 8", an integral square head having an orthogonal bearing surface, an unthreaded body portion adjacent said head and a terminal threaded portion with the threads of said threaded portion having a diameter not greater than said given diameter and a square lock nut adapted to be threaded onto said threaded portion after said cylindrical body has been passed through at least two of said rail sections, the improvement comprising:

- forming said threads by a rolling action to provide increased physical strength while maintaining the outside diameter of said thread at said given diameter, said unthreaded portion also maintained at said given diameter and said body and orthogonal bearing surface being machined to a preselected mechanical tolerance with said surface and body being mutually perpendicular;
- said nut includes an internal, continuous thread and a plurality of mechanically deformed indentations on said nut and intersecting said threads whereby said threads are deformed to provide an interference fit when said nut is screwed onto said threaded portion; and
- said bolt has a tapering frusto-conical forward end prior to rolling said thread, said forward and tapering inwardly at an angle of about 14° to 16° relative to said longitudinal centerline of said bolt for a distance of about one-half inch whereby said bolt has an unthreaded forward guide edge permitting alignment of said rail sections to minimize distorting the threads on said threaded portion.

5,413,443

## METHOD AND APPARATUS FOR MOUNTING AN INSULATOR THREAD ONTO A PIN OF A POWER LINE

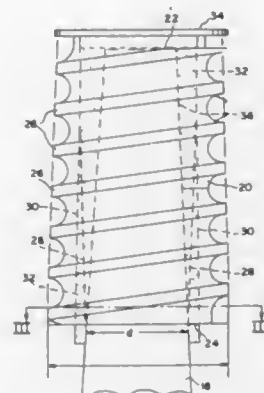
Hossein Aghamehdi, Lancaster, Pa., assignor to Joslyn Manufacturing Co., Chicago, Ill.

Filed Sep. 22, 1993, Ser. No. 125,626

Int. Cl.<sup>6</sup> F16B 35/02, 35/04; H01B 17/16

U.S. Cl. 411—383

13 Claims



1. An apparatus for mounting a threaded element, for engaging an insulator, on a pin comprising: a pin having an outer peripheral surface; a threaded element, surrounding a portion of said pin, having: (a) an opened bottom end; (b) a top end; (c) a threaded outer diameter; and (d) an inner diameter which decreases along its length from the top end to the bottom end, forming a gap defined by the outer peripheral surface of said pin and the inner diameter of said threaded element; and an adhesive resinous material hardened within said gap and forming a strong bond with said pin.

5,413,444

## SELF-DRILLING FASTENER

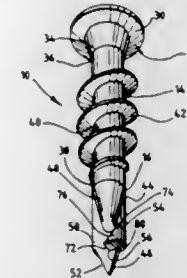
Louis Thomas, Maywood; Daniel J. Kenny, Itasca; Syed Riaz-Ul Hasan, and George G. Dewey, both of Palatine, all of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill.

Continuation of Ser. No. 178,096, Jan. 6, 1994, abandoned. This application Aug. 17, 1994, Ser. No. 291,740

Int. Cl.<sup>6</sup> F16B 25/00

U.S. Cl. 411—387

4 Claims



1. A self-drilling fastener, comprising: a head integrally formed on a first end of said fastener; a first shank portion integrally formed with a first side of said head and extending away from said head a predetermined distance, said first shank portion including a plurality of threads formed thereon for forming a mating thread in a desired material into which said fastener is driven for connecting said fastener thereto; and a second shank portion integrally formed with said first shank portion opposite said head and forming a second opposite end of said fastener, said second shank portion substantially being formed as a taper shank flat drill having a tapered portion connected to said first shank portion and a flat drill portion forming said second end, said tapered portion substantially being in the shape of a cone tapering toward said second end, said flat drill portion having a predetermined thickness with opposing planar surfaces and forming a substantially triangular shaped drill tip at said second end, each planar portion including a wing portion integrally formed therewith proximate a base of said triangular shaped drill tip, each wing portion defining a substantially helical cutting edge.

5,413,445

## END LINK AND SWIVEL ASSEMBLIES FOR CHAINCABLES

Gerardo Cartellone, Mendoza, Argentina, assignor to Aceros Cartellone, S.A., Mendoza, Argentina

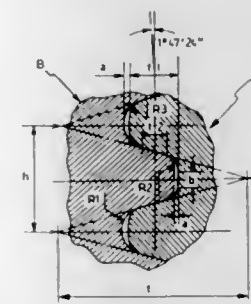
Filed Nov. 13, 1992, Ser. No. 976,694

Claims priority, application Argentina, Nov. 22, 1991, 321,216

Int. Cl.<sup>6</sup> F16B 23/00, 35/04; B66C 1/00

U.S. Cl. 411—400

7 Claims



1. An end link and swivel assembly comprising: an end link having a threaded end rod; an adjusting nut being engaged with said threaded end rod, wherein said rod and said nut of the assembly being manufactured by casting, said rod and said nut having a threaded coupling region

wherein said rod and nut threads having rounded thread corners; said rod and nut threads having flank surfaces that are substantially planar and thus form relatively long contact surfaces therebetween, said rod having a root surface that is substantially planar.

5,413,446

## BOOK COVER ASSEMBLY APPARATUS

Horst Rathert, Minden, and Reimer Voss, Belm, both of Germany, assignors to Kolbus GmbH & Co. KG, Rahden, Germany

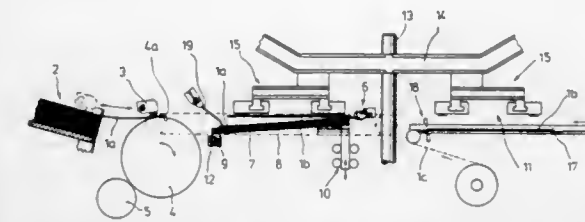
Filed Dec. 3, 1993, Ser. No. 162,536

Claims priority, application Germany, Dec. 9, 1992, 42 41 387.7; Mar. 17, 1993, 43 08 469.9

Int. Cl.<sup>6</sup> B42C 7/00

U.S. Cl. 412—17

20 Claims



1. An improved book cover assembly apparatus having feeder stations for a cover cloth having head, foot and lateral turn-in flap regions and for cover boards which define head, foot and lateral edges of a cover to be formed, the assembly apparatus also having a glue application station for the cover cloth, a cover table for receiving and uniting the cover cloth and cover boards, and a pressing station for pressing the cover cloth and cover boards, the improvement comprising: a turn-in station substantially in alignment with the cover table, said turn-in station having turn-in elements for turning the head and foot flaps over the respective cover board head and foot edges in a first plane, turn-in elements for turning the lateral flaps over the cover board lateral edges in a second plane vertically displaced from said first plane, upper transport means for horizontally transporting the united cover cloth and cover boards from the cover table to said turn-in station, and lower transport means for vertically transporting the united cover cloth and cover boards between said first plane and said second plane; and means for transporting the united cover cloth and cover boards from said turn-in station to the pressing station.

5,413,447

## COVER-FEEDING APPARATUS FOR A BOOK BINDING MACHINE

Horst Rathert, Minden, Germany, assignor to Kolbus GmbH & Co. KG, Rahden, Germany

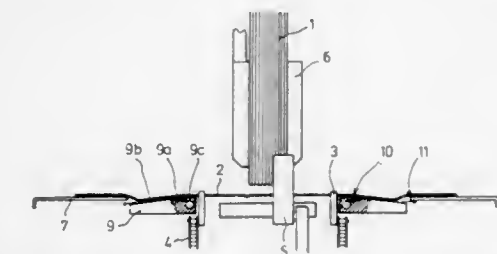
Filed Oct. 22, 1993, Ser. No. 142,166

Claims priority, application Germany, Oct. 24, 1992, 42 36 033.1

Int. Cl.<sup>6</sup> B42C 11/04

U.S. Cl. 412—19

20 Claims



1. In apparatus for establishing alignment between a moving

book block and a book cover, said apparatus having grippers which move a book block along a path, said apparatus further having a cover transport which is located below the book block movement path, the cover transport including at least first pusher means for imparting movement to individual covers which have been withdrawn from a magazine, the improvement comprising a pair of stationary lateral support members which respectively receive and support portions of a cover on the opposite sides of said book block path, said support members cooperating to define a planar transport path for the cover, means for generating a pneumatic hold-down force for a cover supported by said lateral support members, said hold-down force generating means each having a bearing surface which slopes downwardly and generally outwardly with respect to said planar path, each of said bearing surfaces being provided with the discharge ends of a plurality of nozzles, said nozzles having axes which are directed upwardly at a shallow angle whereby pressurized gas delivered to said nozzles will pass through said discharge ends and will impinge on a cover supported on said support members and be deflected along a said bearing surface, gas flowing along said bearing surfaces being discharged away from said cover at regions displaced inwardly with respect to said support members to thereby provide a pressure differential which produces the hold-down force.

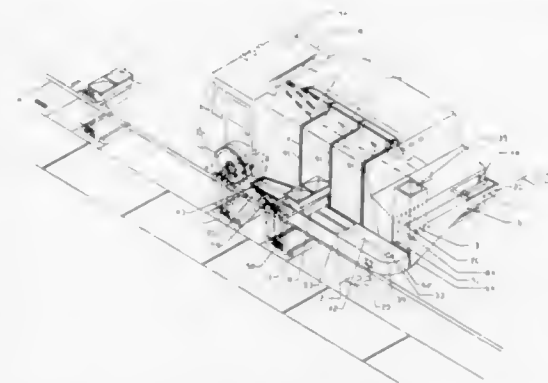
5,413,448

# SYSTEM FOR COLLECTION OF MATERIALS FROM A MOVING VEHICLE

Donald A. Peshkin, 82 Roger Dr., Port Washington, N.Y. 11050  
Filed May 20, 1993, Ser. No. 63,644  
Int. Cl.<sup>6</sup> B65G 67/02

U.S. Cl. 414—338

9 Claims



1. A refuse collection system comprising:
  - a. at least one garbage can having an openable and closable top member and an openable and closable bottom member which can be filled from its top and emptied from its bottom and said can having a removable divider member which, when in place, serves to separate two kinds of garbage;
  - b. a mobile supporter having track members which support said can, in a cantilevered manner, perpendicularly to a curb or a side of a road;
  - c. anchoring members to attach said mobile supporter to an in-ground anchor means for securing said mobile supporter;
  - d. a collection vehicle with a hopper and a vertically movable collection means mounted thereon for opening said can while mounted on said mobile supporter, said collection means having a first power means to move material from a collection area toward a rear of said vehicle, a second power means attached to a rear of said collection means for turning said material, a conveying means for moving material to said hopper mounted on said vehicle and abutting said turning means, said conveying means having a power means to move material through said

conveying means to chutes attached to said conveying means, which chutes are variable in length and are attached to said hopper; and  
e. a guide means that aligns said collection means and said can both horizontally and vertically and maintains said alignment while said bottom member is opened.

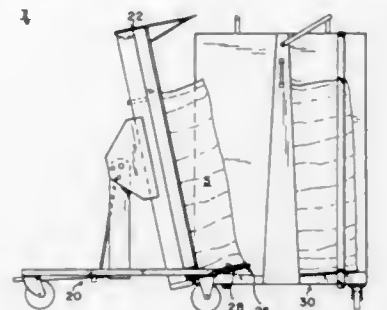
5,413,449

# APPARATUS AND METHOD FOR HANDLING BUSINESS FORMS

William R. Schoenherr, Hinsdale, and Donald J. Nauheimer, LaGrange Park, both of Ill., assignors to Wallace Computer Services, Inc., Hillside, Ill.  
Continuation-in-part of Ser. No. 60,795, May 12, 1993, Pat. No. 5,322,496. This application Dec. 29, 1993, Ser. No. 174,306  
Int. Cl.<sup>6</sup> B60P 1/28

U.S. Cl. 414—343

9 Claims



1. Apparatus for handling business forms comprising a printed forms transport movable on a floor for receipt of a string of business forms arranged in a folded zig-zag configuration from a folder having a forms outlet above the floor, said printed forms transport including a caster-equipped undercarriage, a generally elongated box means pivotally supported on said undercarriage, said box means having a pair of sides, an open end for receiving said forms and a closed end, an open top and a planar bottom, time means positionably mounted on said box means at said open end; and a printed stack transport releasably engaged with said printed forms transport, and means connecting said undercarriage with said box means for pivoting said box means through a vertical arc to convert said string to a stack of business forms and to deposit said stack on said printed stack transport, said printed stack transport having a platform equipped with elongated slot means aligned with said time means when said printed forms transport and said printed stack transport are engaged.

5,413,450

# APPARATUS FOR TRANSPORTING A LOAD

Fredric Salsburg, Victor; William E. Roberts, Fairport; Stephen A. Yaeger, Rochester, all of N.Y., and Robert B. Overbeek, Naperville, Ill., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 31, 1993, Ser. No. 40,951

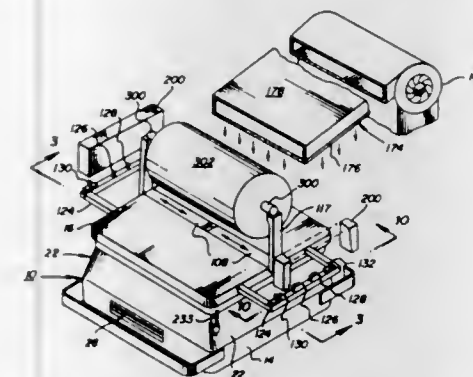
Int. Cl.<sup>6</sup> B65G 67/02; B60P 1/64

U.S. Cl. 414—495

16 Claims

1. A vehicle for transporting a load, comprising:
  - a first frame;
  - means supported by the first frame for driving and turning the vehicle on a path;
  - a second frame having an underside comprising a seating surface;
  - means supported by the second frame for loading, carrying and unloading a load;
  - a third frame, supported by the first frame;
  - means, supported by the third frame, for supporting the second frame for rotatable and pivotable movement on the seating surface; and

a plurality of biasing means, supported by the third frame, for contacting the second frame and allowing limited



off-vertical movement, relative to the third frame, of the means for loading, carrying and unloading.

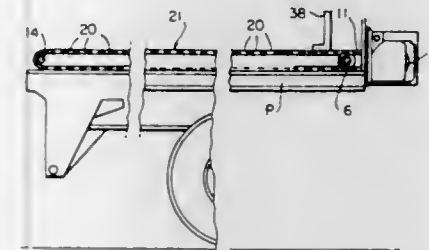
5,413,451

# LOADING AND UNLOADING POWERED APPARATUS FOR TRUCKS AND THE LIKE

Luigi Pellegrino, Rivalba, Italy, assignor to Space S.r.l., San Mauro Torinese, Italy  
Filed Feb. 16, 1994, Ser. No. 197,189  
Claims priority, application Italy, Feb. 16, 1993, T093A0096  
Int. Cl.<sup>6</sup> B60P 1/36

U.S. Cl. 414—528

10 Claims



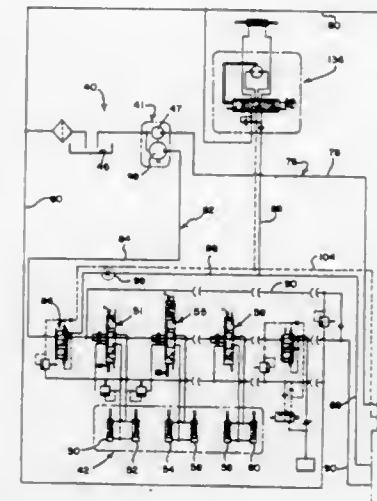
1. A loading and unloading powered apparatus for a truck having a horizontal load platform, said apparatus comprising:
  - a support frame fixable horizontally onto said load platform of the truck and including a plurality of mutually connected longitudinal members and transverse members, said support frame having a front end and a rear end,
  - a first and a second transverse shaft rotatably supported at said ends of the support frame, said first shaft having a central portion,
  - a plurality of side by side slat conveyors each of which comprises a pair of endless chains having chain pins operatively engaged onto said first and second transverse shafts, said chains having respective upper and lower runs guided along said longitudinal members with said chain pins projecting laterally of said chains, and a plurality of adjacent slats having respective opposite ends formed with laterally extending tubular bosses within which said projecting chain pins of the two chains are engaged, and
  - a powered driving assembly for driving said chains of the slat conveyors, including at least one motor located adjacent to the first transverse shaft and transmission means between said motor and said central portion of said first shaft.

5,413,452

HYDRAULIC SYSTEM FOR A BACKHOE APPARATUS  
Richard J. Lech, Burlington, Iowa, and Patrick J. Pieper, Carol Stream, Ill., assignors to Case Corporation, Racine, Wis.  
Filed Mar. 29, 1993, Ser. No. 38,703  
Int. Cl.<sup>6</sup> E02F 3/00

U.S. Cl. 414—695.5

6 Claims



1. A hydraulic system for a backhoe apparatus mounted on a machine, said backhoe apparatus including a swing bracket for connecting a boom assembly to the machine for swinging sideways movements, said hydraulic system comprising:
  - a source of actuating fluid carried on the frame of the machine and capable of providing a predetermined output flow of fluid;
  - a first series of hydraulic motors for moving the boom assembly relative to the swing bracket;
  - a first series of open center operator controlled valves for controlling the flow of actuating fluid between said actuating fluid source and the first series of hydraulic motors thereby positioning the boom assembly relative to the swing bracket;
  - a second series of hydraulic motors for swinging the swing bracket relative to the frame of the machine;
  - a closed center operator controlled swing valve for controlling the flow of actuating fluid between said actuating fluid source and said second series of hydraulic motors, said swing valve operating to positively hold the backhoe apparatus in a desired position as long as said swing valve is maintained in a closed center position and for causing the second series of hydraulic actuators to swingably move the swing bracket and the boom assembly connected thereto in swinging sideways movements when said swing valve is removed from its closed center position;
  - first hydraulic circuitry extending from the actuating fluid source for directing actuating fluid to and from said first series of hydraulic motors used to position the boom assembly relative to the swing bracket; and
  - second hydraulic circuitry arranged independent of said first hydraulic circuitry and including a priority circuit for directing a priority flow of actuating fluid between the actuating fluid source and the second series of hydraulic motors, and a secondary circuit for directing a residual flow of actuating fluid to said first series of hydraulic motors; and
  - a priority valve operably disposed between said actuating fluid source and said priority and secondary circuits, said priority valve having an inlet port connected to said actuating fluid source, a first outlet port that opens to said priority circuit, and a second outlet port that opens to the secondary circuit; and



structure arranged in said priority circuit downstream of said priority valve for positioning said priority valve such that a prioritized flow of fluid from said actuating fluid source is directed to the second series of hydraulic motors through the priority circuit and for positioning the priority valve to direct a residual flow of fluid from said actuating fluid source to the first series of hydraulic motors after the prioritized flow has been established to the second series of hydraulic motors, and wherein said structure limits the fluid flow that is delivered to the second series of hydraulic motors to a level less than the predetermined output flow of the actuating fluid source whereby regulating the speed of the swinging movements of the swing bracket and thereby the backhoe apparatus.

5,413,453

## NUT SHAKER

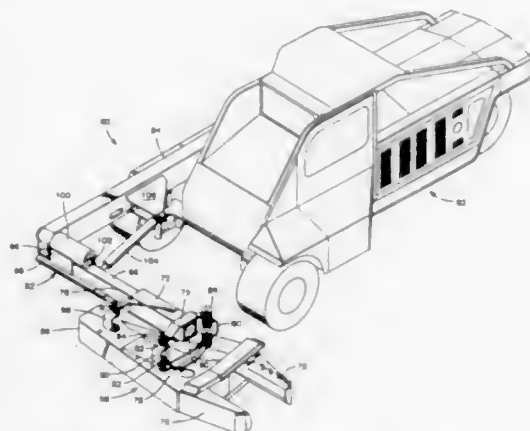
Daryl G. Hill, Yakima, Wash., assignor to Orchard-Rite Ltd., Inc., Yakima, Wash.

Filed Apr. 23, 1993, Ser. No. 51,676

Int. Cl.<sup>6</sup> B66C 1/42

U.S. Cl. 414—729

9 Claims



1. A nut shaker apparatus comprising:
  - a tractor,
  - a boom section mounted on said tractor and extending in a direction of travel of said tractor,
  - a carriage rotatably mounted on said boom section about an axis perpendicular to said boom section,
  - means for rotating said carriage about said axis perpendicular to said boom section,
  - a member slidably mounted on said carriage, and
  - a shaking head for engaging a nut tree and shaking the tree, said shaking head being mounted on said slidably member for movement of said shaking head along said carriage in a direction perpendicular to said boom section and perpendicular to the direction of travel of said tractor.

5,413,454

## MOBILE ROBOTIC ARM

Peter Movsesian, 17844 Toivabe, Fountain Valley, Calif. 92708

Filed Jul. 9, 1993, Ser. No. 89,316

Int. Cl.<sup>6</sup> B25J 5/00

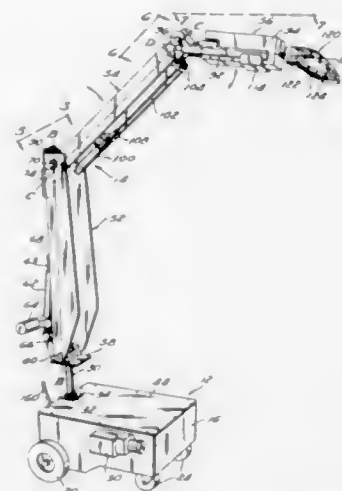
U.S. Cl. 414—729

6 Claims

1. A mobile robotic arm for grasping objects at low-level, intermediate level and high reach areas of a domestic dwelling, comprising:
  - a mobile base defining a horizontal axis extending therethrough;
  - an elongate lower arm having a proximal end, a distal end and defining a first axis extending longitudinally therethrough, said lower arm having a channel formed therein, said proximal end being rotatably and pivotally connected to said base in a manner wherein said lower arm is selec-

tively articulable to angled orientations of approximately 0 degrees to 90 degrees relative said horizontal axis; an elongate mid-arm received within the channel of said lower arm such that said mid-arm is nested within said lower arm along said first axis, said mid-arm having a first end, a second end, and defining a second axis extending longitudinally therethrough, said first end being pivotally connected to said distal end of said lower arm in a manner wherein said mid-arm is selectively articulable to angled orientations of approximately 0 degrees to 180 degrees relative said first axis;

an elongate forearm disposed along side of said mid-arm along said second axis, said forearm having a front end, a back end, and defining a third axis extending longitudinally therethrough, said back end being pivotally connected to said second end of said mid-arm in a manner wherein said forearm is selectively articulable to angled orientations of approximately 0 degrees to 270 degrees relative said second axis; and



a gripper rotatably connected to said front end of said forearm for selectively grasping and releasing objects; said gripper includes:

- (a) a base;
- (b) two flexible bands attached to said base;
- (c) a plurality of gripper pads disposed along said flexible bands, said flexible bands and said gripper pads defining gripper jaws, said gripper jaws having a releasing position and a grasping position, said flexible bands urging said gripper jaws into the grasping position;
- (d) a cam disposed within said base; and
- (e) at least one roller member cooperating with each of said flexible bands such that urging said cam intermediate said roller members moves said gripper jaws to the releasing position thereof against the urging of said flexible bands and such that withdrawing said cam from between said rollers allows said flexible bands to urge said gripper jaws into the grasping position thereof.

5,413,455

## APPARATUS FOR COLLECTING AND ORDERED BUNDLING OF LONG ROLLING STOCK

Johann-Heinrich Rohde, Ratingen; Eberhard Adamitzki, Mönchengladbach, and Rainer Derix, Heinsberg, all of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Germany

Filed May 25, 1993, Ser. No. 66,768

Claims priority, application Germany, May 29, 1992, 42 18 336.7

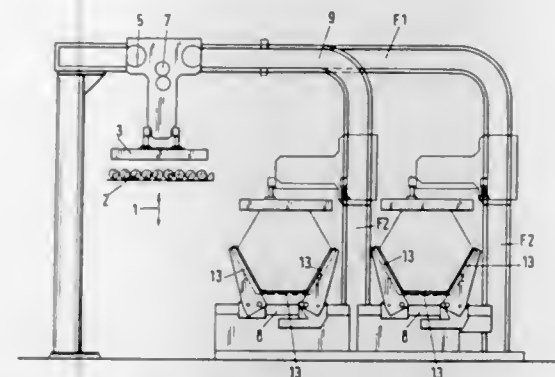
Int. Cl.<sup>6</sup> B65G 57/04

U.S. Cl. 414—793.2

7 Claims

1. An apparatus for collecting and bundling of long rolling

stock, comprising: a collecting station for a layer of rolling stock lying side-by-side; a receiving device for the layer of rolling stock, said receiving device including magnetic shoes; a bundle forming station arranged at a side of the collecting station; means for transporting the layer of rolling stock into a depositing position in the bundle forming station, said transporting means including two support arches that stand at a distance from one another and span at least to the collection station and the bundle forming station, each of the support arches having rails which define a travel path having a hori-



zontal segment and two vertical segments, which vertical segments are in a region of the bundle forming station, a carriage being arranged at each support arch so that both carriages are synchronously movable on the travel paths; a cross-piece for joining together the two support arches and for supporting the receiving device, each end of the cross-piece being supported by one of the carriages so that the cross-piece is movable parallel to the rolling stock; conveying means for carrying off bundled rolling stock from the bundle forming station; and switches for switching the travel path between the vertical segments from the plurality of horizontal segments.

5,413,456

## AIRCRAFT FAN CONTAINMENT STRUCTURE

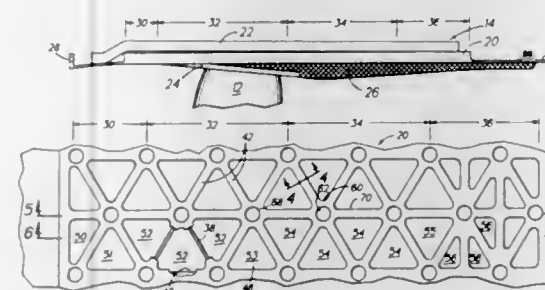
Andrew C. Kulak, Hartford; Kurt M. Dembeck, Vernon, and Richard T. White, West Hartford, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 29, 1994, Ser. No. 236,281

Int. Cl.<sup>6</sup> F01D 21/00

U.S. Cl. 415—9

9 Claims



1. An aircraft fan containment system for a turbofan engine having a rotating plurality of fan blades comprising:
  - a cylindrical case surrounding said plurality of fan blades;
  - said cylindrical case having a forward containment zone upstream of said fan blades, an inplane containment zone downstream of said forward containment zone, an aft containment zone downstream of said inplane containment zone, and a rear support zone downstream of said aft containment zone;
  - a multiple layer winding of ballistic fabric surrounding said case;
  - said case formed of an isogrid having a lattice of flanged ribs

in isometric triangular relationship, with a flange on the outside edge of each rib, said ribs running parallel to the axis of the case and 60° from said axis; a skin on the inside edge of said isogrid whereby triangular skin segments are formed between said ribs; and said skin segments having a maximum thickness in said inplane containment zone, and a lesser thickness in said forward containment zone and said aft containment zone.

5,413,457

## TWO STAGE LATERAL CHANNEL-REGENERATIVE TURBINE PUMP WITH VAPOR RELEASE

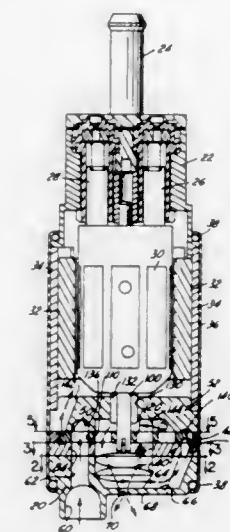
Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed Jul. 14, 1994, Ser. No. 275,148

Int. Cl.<sup>6</sup> F01D 1/12

U.S. Cl. 415—55.6

6 Claims



1. A two-stage fuel pump utilizing a single rotor which comprises:

- (a) a base housing having an inlet in communication with an inlet of an annular lateral channel in a first radius, a swirl chamber located centrally of said housing and spaced inwardly from said first radius and within a second radius, a lateral channel outlet in communication with said swirl chamber, and a regenerative sweep channel outside said first radius and within said housing, said swirl chamber having an outlet in communication with said sweep channel, said sweep channel having an outlet for fuel under pressure, and
- (b) a single rotor in said base housing having a first series of circumferentially spaced blades to operate in said sweep channel, a second series of blades forming axial openings at the first radius to rotate adjacent said lateral channel, and a third series of blades forming axial openings in the area of said swirl chamber to pass fuel from said lateral channel to said swirl chamber.

5,413,458

## TURBINE VANE WITH A PLATFORM CAVITY HAVING A DOUBLE FEED FOR COOLING FLUID

John C. Calderbank, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 29, 1994, Ser. No. 219,316

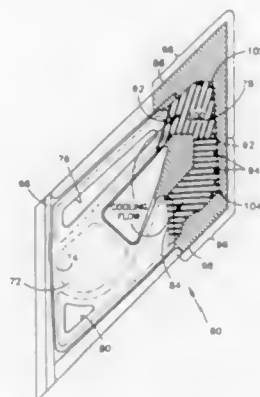
Int. Cl.<sup>6</sup> F01D 5/18

U.S. Cl. 415—115

5 Claims

1. A turbine vane having an airfoil and a platform extending about and laterally from the airfoil, the airfoil having a pressure side, a suction side, and a trailing edge, the platform including:

- a flow surface,  
 a rail adapted to provide attachment means for the turbine vane,  
 a platform trailing edge downstream of the airfoil trailing edge, the platform trailing edge including a first corner and a second corner, the first corner located on the pressure side and the second corner located on the suction side, and  
 a cavity, the cavity extending under the rail and into the platform trailing edge, the cavity having a cooling surface, a first inlet located on the pressure side, a second inlet located on the suction side, and a plurality of pas-



sages extending between the cavity and the flow surface, the cooling surface including a plurality of trip strips disposed thereon, the trip strips engaging fluid flowing through the cavity to disturb the flow of fluid and enhance heat transfer between the fluid and the cooling surface, the trip strips including a first group and a second group, the first group being adjacent the first inlet and angled, relative to the direction of flow through the first inlet, to encourage flow towards the first corner, the second group being adjacent the second inlet and angled, relative to the direction of flow through the second inlet, to encourage flow towards the second corner.

5,413,459

## VERTICLE TURBINE PUMP

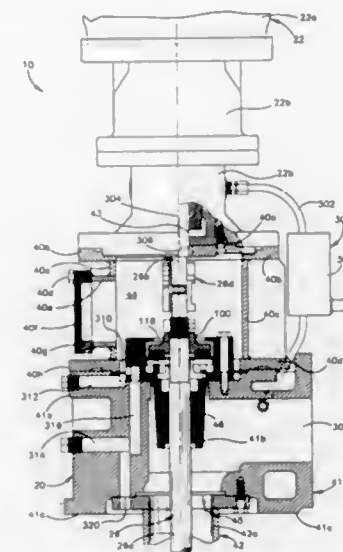
Richard P. Woodall, Hanoverton; William J. Swetye, Salem; Brian R. Faison, Youngstown, and Robert E. Your, Beloit, all of Ohio, assignors to Crane Co., Salem, Ohio  
 Continuation of Ser. No. 770,972, Oct. 1, 1991. This application  
 Jun. 13, 1994, Ser. No. 259,352  
 Int. Cl.<sup>6</sup> F01D 3/00

U.S. Cl. 415—104

16 Claims

1. A vertical turbine pump, said pump being configured to pump fluid in a vertical direction whereat a vertical thrust compound is generated comprising: a housing, a magnetic drive assembly, a vertical shaft assembly, an impeller assembly, a thrust compensating mechanism including an up-thrust compensating device and a down thrust-compensating device; said magnetic drive assembly being attached to said housing; said vertical shaft assembly having an impeller-rotating section, a drive-interfacing section, and a transfer section therebetween; said impeller assembly being mounted to said impeller-rotating section of said shaft assembly; said housing including an impeller-interfacing section which interfaces with said impeller assembly; said drive-interfacing section of said vertical shaft assembly being situated in a drive-interfacing position whereat rotational motion is magnetically conveyed from said magnetic drive assembly to said shaft assembly free of mechanical connection therebetween and thus to said impeller assembly; said down-thrust compensating device including a thrust bearing assembly connected between said housing and

said vertical shaft assembly for compensating for down-thrust forces produced by said impeller assembly during rotation and said up-thrust compensating device including a mechanism connected between this vertical shaft assembly and said housing for compensating for up-thrust force produced by said impeller assembly during rotation to



5,413,460

## CENTRIFUGAL PUMP FOR PUMPING FIBER SUSPENSIONS

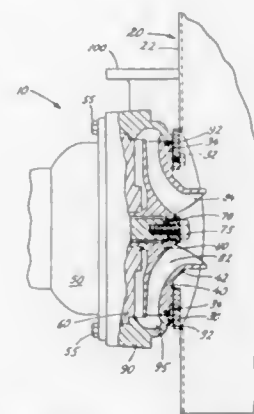
George Wilson, Skaneateles, and Daniel R. Roll, Seneca Falls, both of N.Y., assignors to Goulds Pumps, Incorporated, Seneca Falls, N.Y.

Filed Jun. 17, 1993, Ser. No. 78,575

Int. Cl.<sup>6</sup> F04D 1/00, 29/60

U.S. Cl. 415—206

24 Claims



1. A centrifugal pump for pumping high consistency fiber suspensions, said pump comprising: a sideplate disposed in fixed relation to a vessel adjacent an opening in said vessel; a pump housing assembly adapted to be in a fixed relation to said sideplate and including a shaft and a bearing frame rotatably supporting said shaft; and an impeller mounted for rotation with said shaft, said impel-

thereby maintain said impeller assembly in a predetermined vertical interfacing position relative to said impeller-interfacing section of said housing, whereby vertical movement both downwardly and upwardly of the shaft assembly due to said thrust components is essentially eliminated.

ler having vanes including elongated portions which extend axially, said vanes and elongated portions having radially outermost surfaces which form an outside contour including a substantially axial portion, said elongated portions being immediately adjacent and extending at least partially into the interior of said vessel;

said sideplate extending at least partially and in close proximity along the outside contour of said vanes and elongated portions, at least a portion of said sideplate extending along the substantially axial portion of said outside contour of said vanes and said elongated portions for determining the directions from which the fiber suspension enters said impeller.

5,413,461

## METHOD AND APPARATUS FOR CONTROLLING A PROPULSION ENGINE OUTPUT BASED ON THE NET AXIAL FORCE ON A PROPELLER SHAFT

Oddvard Johnsen, Postboks 161, N-3401 Lier, Norway

PCT No. PCT/NO91/00130, § 371 Date Apr. 12, 1993, § 102(e)

Date Apr. 12, 1993, PCT Pub. No. WO92/06890, PCT Pub.

Date Apr. 30, 1992

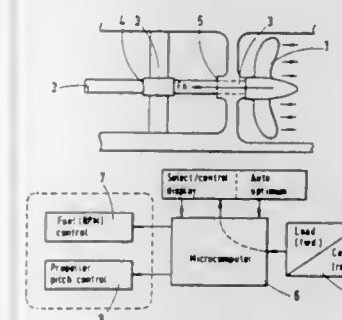
PCT Filed Oct. 11, 1991, Ser. No. 39,200

Claims priority, application Norway, Oct. 12, 1990, 904418

Int. Cl.<sup>6</sup> B63H 3/00, 3/06, 21/21

U.S. Cl. 416—1

13 Claims



1. A method for achieving optimum utilization of engine power to a vessel's propeller (1) via a solid propeller shaft (2) supported by at least one bearing (4,5), where a computer (6) is used in a regulating loop which continuously controls the power by regulating the number of revolutions of said solid propeller shaft produced per interval of time by the vessel's engine (8), wherein said method comprises the steps of:

monitoring continuously a net axial force exerted longitudinally along the length of said solid propeller shaft (2) using a force sensor (3) mounted on one of said at least one bearing (4,5); and

using said net axial force as a main parameter in controlling said power, in such a manner that the net axial force remains optimized in relation to propeller (1) efficiency and economic engine fuel consumption.

9. An apparatus for achieving optimum utilization of engine power to a vessel's propeller (1) via a solid propeller shaft supported by at least one bearing (4,5), said apparatus comprising a regulating loop with a computer (6) which continuously controls fuel delivery (7) to an engine of the vessel in accordance with predetermined control algorithms, dependent on real time measuring values for at least one physical parameter in addition to the velocity of the vessel, said apparatus further comprising a force sensor (3) mounted on at least one of said at least one bearing (4,5) for providing said at least one physical parameter, said force sensor (3) being adapted for continuously measuring axial forces exerted longitudinally along the length of said solid propeller shaft (2).

5,413,462

## MECHANICAL POWER TRANSMISSION SYSTEM HAVING IMPROVED LUBRICANT CIRCULATION APPARATUS

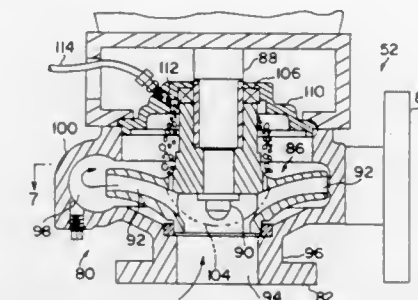
Fred M. Alberni, Bellevue, Wash., assignor to Reliance Electric Industrial Co., Greenville, S.C.

Filed Mar. 8, 1994, Ser. No. 207,593

Int. Cl.<sup>6</sup> F16N 13/00; F04D 29/22

U.S. Cl. 415—169.1

26 Claims



1. A transmission system for transmitting mechanical power from a source of mechanical power to a power consuming load, said transmission system comprising:

a gear box having an input shaft operatively connected to the source of mechanical power and an output shaft operatively connected to the power consuming load, said gear box defining a sump for maintaining a lubricant fluid therein;

a pump having a pump housing defining a pump inlet, a pump outlet and further defining an air exhaust hole in an upper portion thereof, said centrifugal pump having an impeller defining at least one air escape orifice to provide fluid communication between said pump inlet and said upper portion of said pump housing;

fluid inflow means for providing fluid coupling between said sump and said pump inlet to permit inflow of the lubricant fluid from the sump into the centrifugal pump;

fluid outflow means for providing a fluid flow path between said pump outlet and said gear box to permit return flow of the lubricant fluid from said centrifugal pump back to said sump;

a heat exchanger operatively connected in the return flow path of said fluid outflow means to dissipate heat in the lubricant fluid; and

means for operatively driving said impeller of said centrifugal pump.

5,413,463

## TURBULATED COOLING PASSAGES IN GAS TURBINE BUCKETS

Paul Chiu, Scotia, and Nesim Abuaf, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 30, 1991, Ser. No. 814,607

Int. Cl.<sup>6</sup> F01D 5/08

U.S. Cl. 416—95

7 Claims

1. A blade for a turbine comprising:

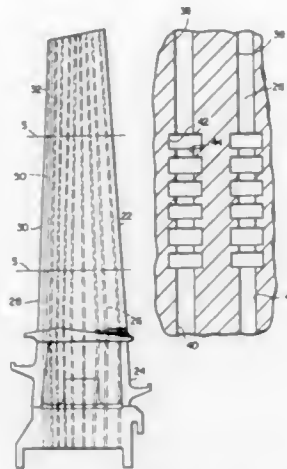
a blade body having a cross-section generally airfoil in shape, with root and tip portions adjacent opposite ends and a portion intermediate said root and tip portions;

a plurality of cooling passages extending within said blade body through said root and tip portions and said intermediate portion for conducting cooling fluid along said blade body in heat transfer relation therewith, at least one of said cooling passages having a series of turbulence promoters formed along said intermediate portion to provide a turbulent flow of cooling fluid through said intermediate portion and enhanced heat transfer between the blade body and the cooling fluid flowing through said one passage;

said turbulence promoters including generally annular recess-



ses about said one passage and axially spaced one from the other along said one passage to define generally annular radially inwardly projecting ribs axially spaced one from the other along said one passage;



the portions of said one passage passing through said root and tip portions having smooth bores to provide substantially non-turbulent flow of cooling fluid through said root and tip portions of said one passage.

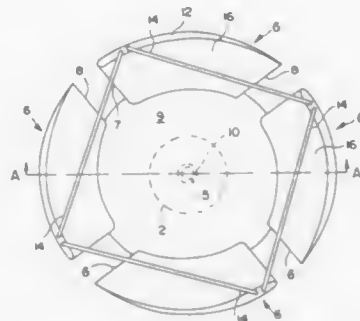
**5,413,464**  
**PROPULSION DEVICE HAVING CIRCULAR ARRAY OF INCLINED AIRFOIL ELEMENTS WITH RADIALLY-INWARDLY DIRECTED VACUUM-INDUCING SURFACES**

William H. Daniel, Rogers, Ark., assignor to LCD, Inc., Rogers, Ark.

Filed Jan. 27, 1994, Ser. No. 186,843  
Int. Cl.<sup>6</sup> F04D 29/34

U.S. Cl. 416—182

8 Claims



1. A propulsion device comprising a circular series of airfoil elements, each airfoil element comprising a leading edge, a trailing edge, and a pair of generally parallel upper and lower edges interconnecting said leading edge and trailing edge, each airfoil element being mounted via its lower edge to a rigid interconnecting member, each airfoil element having a pressure surface and an opposed vacuum-inducing surface, said airfoil elements being inclined such that the vacuum-inducing surfaces of the airfoil elements face upwardly and inwardly of said circular series, and the pressure surfaces of said airfoil elements face downwardly and outwardly of the circular series, each airfoil element having a region of greatest thickness located substantially nearer its leading edge than its trailing edge, said leading and trailing edges of each airfoil element converging toward said upper edge and diverging toward said lower edge; said circular series of airfoil elements and said interconnecting member collectively describing a generally cup-shaped structure being open at the lower edges of said airfoil elements; a motor output shaft being centrally attached to said rigid interconnecting member and extending perpendicularly therefrom; and means for rotating said cup-shaped structure in the direction of said leading edges.

of airfoil elements and said interconnecting member collectively describing a generally cup-shaped structure being open at the upper edges of said airfoil elements; and a motor output shaft being centrally attached to said rigid interconnecting member and extending perpendicularly therefrom.

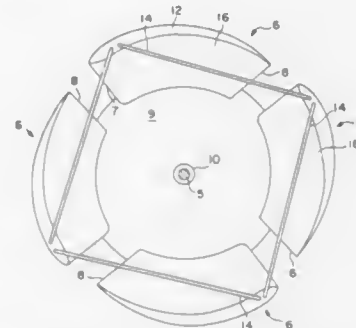
**5,413,465**  
**PROPULSION DEVICE HAVING CIRCULAR ARRAY OF INCLINED AIRFOIL ELEMENTS WITH RADIALLY-OUTWARDLY DIRECTED VACUUM-INDUCING SURFACES**

William H. Daniel, Rogers, Ark., assignor to LCD, Inc., Rogers, Ark.

Filed Feb. 15, 1994, Ser. No. 196,477  
Int. Cl.<sup>6</sup> F04D 29/38

U.S. Cl. 416—182

7 Claims



1. A propulsion device comprising a circular series of airfoil elements, each airfoil element comprising a leading edge, a trailing edge, and a pair of generally parallel upper and lower edges interconnecting said leading edge and trailing edge, each airfoil element being mounted to a common rigid interconnecting member, each airfoil element having a pressure surface and an opposed vacuum-inducing surface, said airfoil elements being inclined and oriented such that the vacuum-inducing surfaces of the airfoil elements face upwardly and outwardly of said circular series, and the pressure surfaces of said airfoil elements face downwardly and inwardly of the circular series, each airfoil element having a region of greatest thickness located substantially nearer its leading edge than its trailing edge, said leading and trailing edges of each airfoil element converging toward said upper edge and diverging toward said lower edge; said circular series of airfoil elements and said interconnecting member collectively describing a generally cup-shaped structure being open at the lower edges of said airfoil elements; a motor output shaft being centrally attached to said rigid interconnecting member and extending perpendicularly therefrom; and means for rotating said cup-shaped structure in the direction of said leading edges.

**5,413,466**  
**UNIFIED FUEL PUMP ASSEMBLY**  
George L. Bennett, Hebron, and Jack G. Sundberg, Meriden, both of Conn., assignors to Coltec Industries Inc., New York, N.Y.

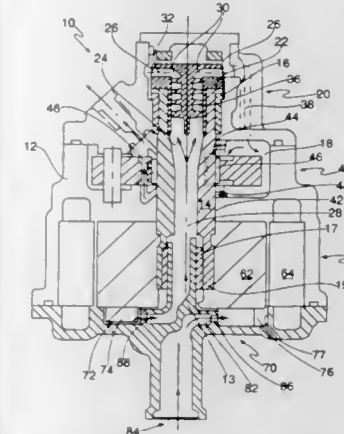
Filed Oct. 25, 1993, Ser. No. 142,274  
Int. Cl.<sup>6</sup> F04C 19/00; F04R 23/14

U.S. Cl. 417—69

9 Claims

1. A unified fuel pump assembly of the type used aboard aircraft, comprising:  
a housing;  
a pair of spaced-apart rotary bearings mounted to said housing;  
an axially extending shaft, having an axial portion of given diameter, said shaft being supported by said bearings for rotation relative to said housing;  
a vane pump subassembly having a plurality of radially displaceable pumping vanes extending radially from said

given diameter axial portion of said shaft in peripherally spaced-apart relationship;  
each of said radially displaceable pumping vanes having a root area adjacent to the said axial portion of said shaft;  
a boost pump subassembly, having a dynamic impeller axially supported by said shaft for rotation therewith, coupled to said shaft in axially spaced relationship to said vane pump subassembly;



said dynamic impeller having an inlet passage for receiving fluid to be pumped, and a plurality of outlet passages defining a diameter of said impeller not substantially greater than the said given diameter portion of said shaft; and  
fluid passage means in said housing for guiding pumped fluid from said outlet passages of said impeller to the root areas of said pumping vanes adjacent to the given diameter axial portion of said shaft.

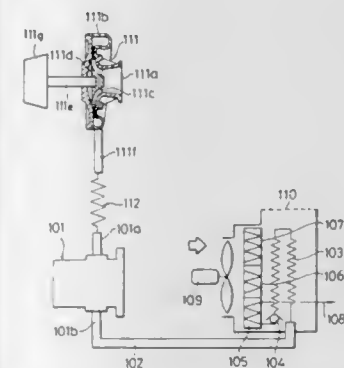
**5,413,467**  
**OIL-FREE TYPE SCREW COMPRESSOR DEVICE**  
Akira Suzuki, Shimizu, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 825,094, Jan. 24, 1992, abandoned. This application Jun. 14, 1993, Ser. No. 75,804

Claims priority, application Japan, Jan. 24, 1991, 3-007075  
Int. Cl.<sup>6</sup> F04B 23/14

U.S. Cl. 417—203

2 Claims



1. A oil-free screw compressor device for producing compressed air from the atmosphere, the oil-free screw compressor device comprising:  
an oil-free screw compressor having an air inlet port and a compressed air delivery port; and  
a turbo-supercharger including a casing having a suctioning port for suctioning air from the atmosphere and increasing the pressure of the suctioned air to a higher pressure of 2000–5000 mm Ag, an air discharge port for discharging said higher pressure air to said inlet port of said oil-free

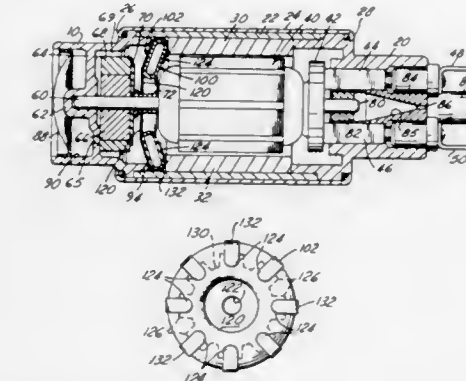
screw compressor, and a runner having a blade rotated in said casing in a non-contact state with said casing.

**5,413,468**  
**PULSE DAMPER**  
Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 156,428, Nov. 23, 1993, abandoned. This application Aug. 18, 1994, Ser. No. 292,937  
Int. Cl.<sup>6</sup> F04B 11/00

U.S. Cl. 417—540

13 Claims



1. In a rotary fuel pump that includes an elongate housing with an inlet at one end and an outlet at the other end, a rotary pump at the inlet end and an electric motor rotating on the axis of said housing within the housing to drive the pump, that improvement which comprises a hollow and sealed pulse reducing chamber formed of flexible plastic walls with a gas such as air captured within the chamber at a pressure above ambient atmospheric pressure, said chamber being disposed in a pump pressure outlet area in the vicinity of a rotating drive shaft of the pump, and means forming a retaining plate at least partially disposed on opposite sides of said pulse reducing chamber having portions to confine the walls of the chamber against axial expansion in spaced area of said walls, said plate having a central body portion overlying the opening on one side of said toroid and having a central hole to mount on an element on the rotating axis of said pump to centrally locate said plate and said chamber.

**5,413,469**  
**THRUST BEARING ARRANGEMENT FOR A DRIVE SHAFT OF A SCROLL COMPRESSOR**  
Nobuyuki Nakajima; Masakuni Ishikawa, and Susumu Saito, all of Konan, Japan, assignors to Zexel Corporation, Tokyo, Japan

Filed Jun. 16, 1994, Ser. No. 261,102  
Claims priority, application Japan, Jun. 17, 1993, 5-171099; Jun. 17, 1993, 5-171102

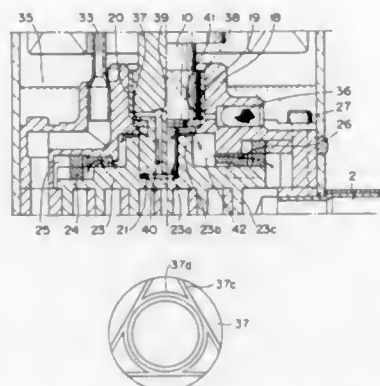
Int. Cl.<sup>6</sup> F01C 1/04

U.S. Cl. 418—55.1

7 Claims

1. A scroll compressor, comprising:  
a sealed case having a high pressure space and a low pressure space in said sealed case;  
an electric motor in said high pressure space of said sealed case comprising a stator fixed in said sealed case and a rotor rotatably mounted in said sealed case, said rotor being fixed with a drive shaft;  
an eccentric shaft that extends from and is axially decentered with respect to said drive shaft;  
an orbiting scroll member having an insertion hole therein into which said eccentric shaft is fitted, said eccentric shaft and said orbiting scroll member having a space defined therebetween in said insertion hole and said orbiting scroll member being located in said low pressure space;  
a fixed scroll member fixed in said sealed casing and posi-

tionally related to said orbiting scroll member so as to form a compression space therewith;  
a block having a hole therein accommodating a main bearing, said main bearing holding said drive shaft, and said block holding said orbiting scroll member such that said orbiting scroll member is orbitally moveable between said block and said fixed scroll member;  
an oil reservoir in a lower area of said high pressure space;



a thrust bearing located between said block and said drive shaft so as to rotatably support said drive shaft, said thrust bearing communicating with a high pressure side space that communicates with said oil reservoir, and said thrust bearing sealing said high pressure side space from said low pressure space; and  
an oil supply through hole having one end open to said high pressure side space and another end open to said space defined between said eccentric shaft and said orbiting scroll member.

5,413,470

**INTERNAL GEAR PUMP FOR WIDE SPEED RANGE**  
Siegfried A. Eisenmann, Conchesstrasse 25, 88326 Aulendorf, Germany

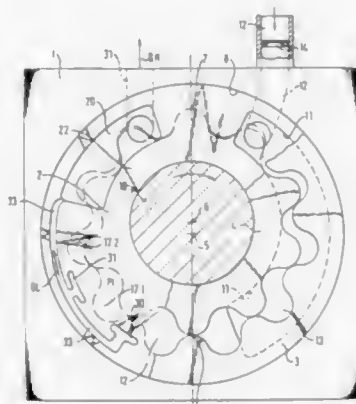
Filed Mar. 3, 1994, Ser. No. 205,613

Claims priority, application Germany, Mar. 5, 1993, 43 07 034.5; Sep. 9, 1993, 43 30 586.5

Int. Cl.<sup>6</sup> F01C 1/10

U.S. Cl. 418—171

13 Claims



1. Internal ring gear pump for a wide speed range comprising:  
a housing containing a gear chamber,  
a ring gear in the housing,  
a pinion which has one tooth less or only a few teeth less than the ring gear, meshes with the ring gear and is arranged in the ring gear, the teeth of the pinion forming together with the teeth of the ring gear increasing and

again diminishing consecutive displacement cells for the working liquid and sealing said cells with respect to each other,

inlet and outlet passages passing through the housing for the supply and discharge of the operating liquid, the inlet and outlet passages opening into the gear chamber at respective inlet and outlet mouths on both sides of a point of deepest tooth engagement, the inlet and outlet mouths being located such that they are passed over by the displacement cells, and the end of the outlet mouth furthest from the point of deepest tooth engagement being located such that between it and a point at which the displacement cells start to diminish there is always more than one displacement cell, and

a plurality of openings in a wall of the gear chamber in a region of diminishing displacement cells, the openings being peripherally spaced from the mouth of the outlet passage and located such that the displacement cells and teeth defining said cells alternately pass thereover, the openings being connected via a common connecting passage to the outlet passage, and each opening being located such that on each passage of a tooth thereover it is covered by said tooth completely or at least to a major degree.

5,413,471

**RESIN-SEALING APPARATUS INCLUDING A GAS SPRING**

Shunji Yamauchi, Fukuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

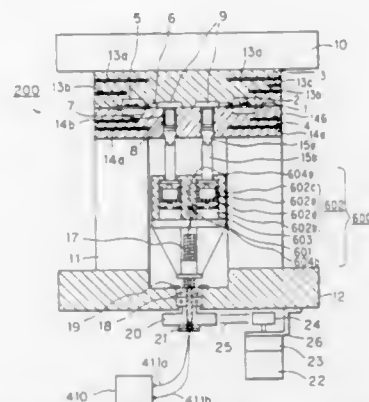
Filed Feb. 11, 1993, Ser. No. 16,371

Claims priority, application Japan, May 12, 1992, 4-118731

Int. Cl.<sup>6</sup> B29C 45/02, 45/77, 45/78

U.S. Cl. 425—129.1

8 Claims



1. A resin-sealing apparatus for apply a compressive force to at least one plunger fitted respectively in at least one corresponding pot to transmit resin fed into said pot to a cavity of a predetermined configuration provided in a mold under pressure to perform sealing, said apparatus comprising:

buffer means for applying an elastic restoring force to said at least one plunger, said buffer means including a housing means for housing said gas spring and at least one gas spring using a filling gas as a buffer medium and substantially abutting respectively against said at least one plunger, pressure regulating means for regulating a pressure of said filling gas predetermined pressure, and force applying means for applying said compressive force to said plunger through said buffer means;

an upper mold having a lower major surface for defining a first part of said cavity, and a lower mold having an upper major surface opposed to said lower major surface for defining a second part of said cavity, said pot extending through said lower mold,

wherein said housing means includes

a portion having a screw hole formed therein in such a direction as to enable application of said compressive

force to said plunger, and said force applying means includes a male screw threadably engaging said screw hole, screw supporting means for rotatably supporting said male screw stationarily relative to said pot, and rotation imparting means for imparting rotation to said male screw, and

wherein said housing means further includes heating means for heating said housing means, and temperature detection means for detecting a temperature of said housing means, and temperature control means for controlling an operation of said heating means as a function of a value of temperature detected by said temperature detection means.

5,413,472

**MOLDING APPARATUS**

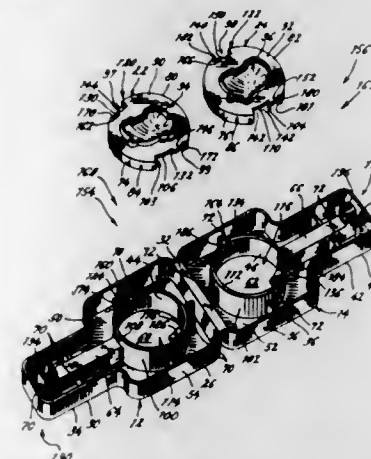
Charles W. Dieterich, Broadheads ville, Pa., and Richard A. Tarozzi, Gales Ferry, Conn., assignors to Binney & Smith, Inc., Easton, Pa.

Filed Nov. 3, 1992, Ser. No. 970,617

Int. Cl.<sup>6</sup> B29C 33/00

U.S. Cl. 425—183

27 Claims



1. A molding device for making molded items from molding compound comprising:

a first mold insert having a first angular alignment portion, said first mold insert defining at least one cavity for forming a first portion of the molded item;

a first mold insert holder to hold said first mold insert, said first mold insert holder having a surface to rotatably engage said first mold insert and a second angular alignment portion operatively engaging said first angular alignment portion for aligning said first mold insert with respect to said first mold insert holder when said first mold insert is rotated relative to said first mold insert holder, said first mold insert being removable from said first mold insert holder;

a second mold insert having a third alignment portion said second mold insert defining at least one cavity for forming a second portion of the molded item; and

a second mold insert holder to hold said second mold insert, said second mold insert holder having a surface to rotatably engage said second mold insert and a fourth angular alignment portion operatively engaging said third angular alignment portion for aligning said second mold insert with respect to said second mold insert holder when said second mold insert is rotated relative to said second mold insert holder, said second mold insert being removable from said second mold insert holder, said first and second mold insert holders being operatively engaging such that said cavities of said first and second mold inserts align to form said molded item when said molding device is closed with said first and second mold inserts attached to said first and second mold insert holders.

5,413,473

**MECHANISM FOR MOUNTING AND DISMOUNTING MIXER IN AN AUTOMATIC NOODLE MAKING MACHINE**

Kazuhiko Takano, Kounosu, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

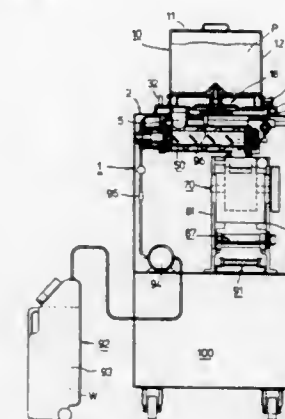
Filed Apr. 26, 1993, Ser. No. 52,765

Claims priority, application Japan, Apr. 30, 1992, 4-137736

Int. Cl.<sup>6</sup> A21C 1/14

U.S. Cl. 425—192 R

11 Claims



1. An automatic noodle making machine having a housing and including a mixer for a flour kneading unit into which flour and water is dispensed for kneading comprising:

said mixer including a cylinder for receiving the flour and water and a kneading member removably located within said cylinder;

a stationary support arm and an oppositely disposed movable support arm mounted to said machine housing, each of said support arms having means for supporting one end of said cylinder and for rotatably supporting the kneading member therein for rotation within the cylinder; and means for moving said movable support arm axially of the mixer (a) away from said stationary support arm to permit detachment of said mixer from between said support arms and removal of said kneading member from said cylinder, and (b) toward said stationary support arm to permit mounting of said mixer between said support arms.

5,413,474

Patent Not Issued For This Number

5,413,475

**SERIAL TWO-STAGE EXTRUDER**

Yoshinori Murata; Yukio Goto; Yukio Tamura; Ryoji Mouri; Toshio Miki, all of Nagoya, and Masaki Ishikawa, Ichinomiya, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1993, Ser. No. 24,311

Claims priority, application Japan, Feb. 27, 1992, 4-075565; Feb. 28, 1992, 4-075791; Sep. 11, 1992, 4-267781

Int. Cl.<sup>6</sup> B29C 47/00

U.S. Cl. 425—205

5 Claims

1. A serial two-stage extruder comprising:

a first-stage extruder including a barrel defining a raw material feed port and an outlet, and a rotatable screw disposed in said barrel, said screw including a feed section, a mixing section and a metering section disposed coaxially in the foregoing sequence in a direction from said feed port to said outlet, said feed section having an axial length within a range of 5 to 9 times the major diameter thereof, and said barrel having an inner cylindrical wall surrounding the feed section of said screw, said mixing section having a



hexagonal cross section and a lead within a range of 1 to 3 times the major diameter thereof, and said barrel having an inner wall of a hexagonal cross section surrounding the mixing section of said screw, said metering section defining grooves between adjacent thread forms thereof, said grooves having a depth within a range of 0.07 and 0.11



times the major diameter of the metering section of said screw, and said barrel having an inner cylindrical wall surrounding the metering section of said screw; and a second-stage extruder connected to the outlet of the barrel of said first-stage extruder so as to receive material extruded from the first-stage extruder.

5,413,476

# REDUCTION OF NITROGEN OXIDES IN OXYGEN-ENRICHED COMBUSTION PROCESSES

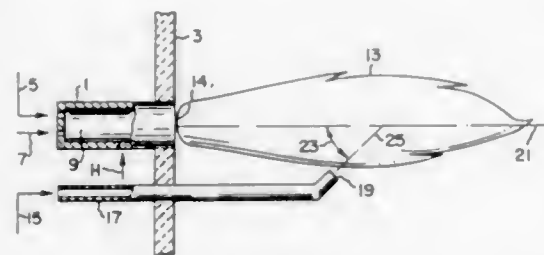
Charles E. Baukal, Jr., Harleysville, and Augustine I. Dalton, Macungie, both of Pa., assignors to Gas Research Institute, Chicago, Ill.

Filed Apr. 13, 1993, Ser. No. 58,697

Int. Cl.<sup>6</sup> F23M 3/04

U.S. Cl. 431-10

7 Claims

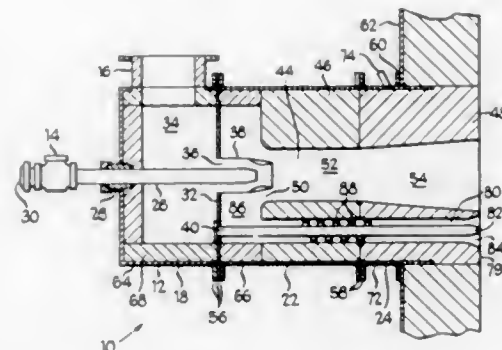


1. A method for operating a burner used to combust a fuel which method comprises introducing oxygen-enriched air and said fuel into said burner and combusting the resulting combustible mixture, and introducing an oxidizing gas containing oxygen or oxygen enriched air at a point of injection directly into a region of the visible flame produced by said burner, wherein the total amount of oxygen contained in said oxygen-enriched air and said oxidizing gas is equal to at least the stoichiometric amount such that the molar ratio of said total amount of oxygen to said fuel is at least 2.0, said region being defined by  $x/L > 0.3$  where  $x$  is the axial distance from the point at which combustion products exit said burner and  $L$  is the total length of the visible flame produced by said burner, and wherein said oxidizing gas is injected into said flame such that essentially no mixing occurs between said oxidizing gas and the furnace gases surrounding said flame, whereby the beneficial effects of oxygen enrichment are realized while decreasing the formation of nitrogen oxides in the operation of said burner, said beneficial effects including reduced amounts of nitrogen to said burner and in said combustion products.

5,413,477  
STAGED AIR, LOW NOX BURNER WITH INTERNAL RECUPERATIVE FLUE GAS RECIRCULATION  
Donald P. Moreland, Hershey, Pa., assignor to Gas Research Institute, Chicago, Ill.  
Continuation-in-part of Ser. No. 964,550, Oct. 16, 1992, Pat. No. 5,269,679. This application Dec. 13, 1993, Ser. No. 166,449  
Int. Cl.<sup>6</sup> F23M 3/00

U.S. Cl. 431-9

28 Claims



1. A gas-fired burner comprising:  
a housing adapted to be mounted to an opening in a furnace;  
a jet pump body within said housing, said jet pump body including a jet pump defining a suction chamber, a mixing chamber, and a diffuser formed in said body, said mixing chamber being formed downstream from said suction chamber, said diffuser being formed downstream from said mixing chamber, said diffuser further having an exit for communication with the furnace, said diffuser further comprising a combustion chamber for primary zone partial combustion;

an air inlet port on said housing for supplying air under pressure to said housing;  
said jet pump including a jet pump primary air nozzle within said housing interconnecting said air inlet port and said suction chamber for forcing air into said suction chamber;  
a fuel inlet port on said housing and terminating in a fuel nozzle for directing fuel into said jet pump;

means forming a plurality of recirculating flue gas channels for directing flue gases from the furnace into said suction chamber, said jet body channels being spaced circumferentially about said jet pump, said flue gas channels having an entrance for communication with the furnace and an exit in communication with said suction chamber;

means forming a plurality of secondary air passages, each of said plurality of passages being disposed within a respective one of said recirculating flue gas channels, each of said secondary air passages being further connected to said air inlet port, each of said plurality of secondary air passages having an exit for communication with the furnace;

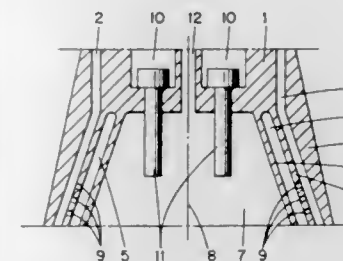
whereby air under pressure passing through said primary air passage and, in turn, through said jet pump means air nozzle and fuel gas under pressure passing through said fuel nozzle create a suction for drawing recirculating flue gas through said plurality of recirculating flue gas channels and said suction chamber and into said mixing chamber for mixing with the air and fuel to provide a fuel-rich combustion zone in said diffuser, whereby air under pressure passing through said plurality of secondary air passages mixes with the primary flame extending from said diffuser to produce a fuel-lean combustion zone in the furnace, thereby reducing NO<sub>x</sub> content, and whereby the air passing through said secondary air passages is heated by the recirculating flue gas passing through said recirculating flue gas channels.

5,413,478  
BURNER WITH AN ELECTRIC IGNITION DEVICE  
Werner Lang, Jestetten, Germany, assignor to Asea Brown Boveri Ltd., Baden, Switzerland  
Filed Sep. 22, 1993, Ser. No. 124,539  
Claims priority, application European Pat. Off., Oct. 23, 1992, 92118170

Int. Cl.<sup>6</sup> F23D 14/00

U.S. Cl. 431-265

7 Claims



1. A burner with an electric ignition device, comprising:  
two hollow part-conical bodies positioned to form a conical combustion chamber having a vertex end, the bodies having longitudinal axes extending parallel and offset so that tangential inflow slots for combustion air fed into the conical combustion chamber through a combustion air duct are formed, which duct has, in a region of the inflow slots, inflow orifices through which fuel is fed in and mixed with the combustion air;  
an electric ignition device positioned centrally in the vertex end of the conical combustion chamber; and  
at least one fuel duct disposed in the vertex end adjacent to the electric ignition device;  
wherein a ratio of a sum of cross-sectional areas of the inflow orifices to a cross-sectional area of the fuel duct is in a range of 30 to 60.

5,413,479

# DISCHARGE-TYPE IGNITION DEVICE FOR OIL BURNER

Yutaka Nakanishi, Kounan; Toshihiko Yamada, Anjou, and Toru Nakagaito, Nagoya, all of Japan, assignors to Toyotomi Company, Ltd., Aichi, Japan

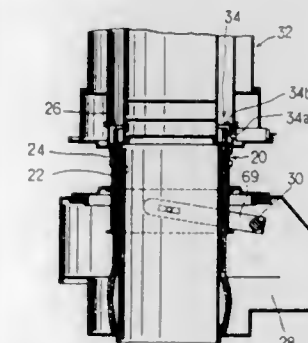
Filed Jan. 27, 1994, Ser. No. 187,318

Claims priority, application Japan, Jan. 29, 1993, 5-034343; Jan. 29, 1993, 5-034344

Int. Cl.<sup>6</sup> F23D 3/28

U.S. Cl. 431-304

18 Claims



1. A discharge-type ignition device for an oil burner, comprising:  
a wick receiving cylinder structure including an inner cylindrical member and an outer cylindrical member arranged so as to be spaced from each other with a space being defined therebetween;  
a wick arranged in said space of said wick receiving cylinder structure so as to be vertically movable;

a wick operating shaft rotated for vertically moving said wick;  
a discharge electrode means including a first discharge electrode and a second discharge electrode which are arranged for generating spark discharge therebetween sufficient to ignite a raised portion of said wick raised so as to upwardly extend from said space of said wick receiving cylinder structure;  
an ignition knob for rotating said wick operating shaft in a wick raising direction; and  
an ignition switch operated depending on actuation of said ignition knob;  
said ignition switch being turned off when said ignition knob is moved to a wick lowered position and turned on in the course of an upward movement of said wick;  
one of said first and second discharge electrodes being arranged in a manner to be in substantial contact with said wick during said upward movement thereof;  
and said ignition switch causing said discharge electrode means to carry out said spark discharge during said upward movement of said wick.

5,413,480

# OVERDENTURE ATTACHMENT SYSTEM

Barry L. Musikant; Allan S. Deutsch, both of New York, and Brett I. Cohen, Nanuet, all of N.Y., assignors to Essential Dental Systems, Inc., South Hackensack, N.J.

Filed Sep. 8, 1993, Ser. No. 118,509

Int. Cl.<sup>6</sup> A61C 8/00, 13/12, 13/225

U.S. Cl. 433-173

14 Claims



1. An overdenture attachment system comprising:  
a keeper element permanently affixed to a denture element and including a flange with a threaded interior;  
a dental implant adapted to be fixed in and extend from a tooth, root canal or oral bone; and  
a cap element releasably connectible to said keeper element by means of a threaded exterior and having socket means for selective releasable coupling with said extending implant including means for enabling selective rotation of said cap element with respect to said keeper element;  
wherein said cap element is adapted to be selectively and releasably threaded into and unthreaded from said flange of said keeper element by operating on said rotation enabling means once said cap element is uncoupled from said extending implant.

5,413,481

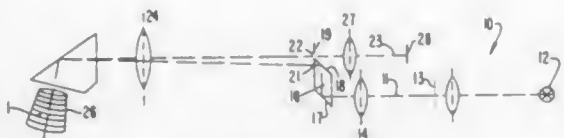
## METHOD AND APPARATUS FOR MANUFACTURING FITTING MEMBERS

Thomas Göppel, and Susanne Neipp, both of Karlsruhe, Germany, assignors to G. Krieg, Karlsruhe, Germany  
Filed May 6, 1993, Ser. No. 57,465  
Claims priority, application Germany, May 6, 1992, 42 14 421.3

Int. Cl.<sup>6</sup> A61C 9/00

U.S. Cl. 433—214

29 Claims



1. A method for producing a fitting member, the method comprising the steps of repeatedly projecting an optical groove grating in a slightly offset manner onto a reception part for the fitting member, photographing the reception part, and calculating the fitting member on the basis of the photographs, wherein the photographs of the optical groove grating projected onto the reception part are taken by a matrix camera for producing moiré fringes.

5,413,482

## METHOD OF TRAINING AN OPERATOR IN THE USE OF DETECTION APPARATUS

David R. Ward, Holly House, Maidenhead Road, Wokingham, Berkshire RG11 5RR, England  
PCT No. PCT/GB90/01542, § 371 Date Feb. 8, 1993, § 102(e)  
Date Feb. 8, 1993, PCT Pub. No. WO92/06458, PCT Pub. Date Apr. 16, 1992

PCT Filed Oct. 8, 1990, Ser. No. 983,555

Int. Cl.<sup>6</sup> F41A 33/00

U.S. Cl. 434—11

16 Claims

1. A method of training an operator in the use of first detection apparatus responsive to a first sensible emission, comprising the step of training said operator in the use of an alternative second detection apparatus responsive to a second sensible emission of a gaseous or vaporous nature.

5,413,483

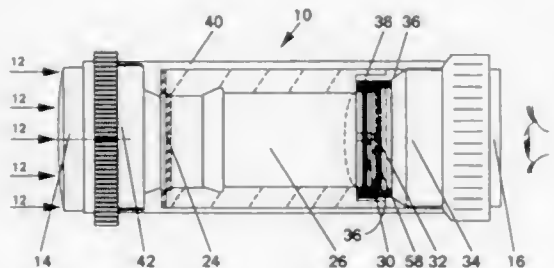
## NIGHT VISION GOGGLE SIMULATOR

Frank A. Witt, III, West Columbia, S.C., assignor to Instrument Flight Research, Inc., Cayce, S.C.  
Continuation of Ser. No. 912,868, Jul. 13, 1992, abandoned. This application May 20, 1994, Ser. No. 246,580

Int. Cl.<sup>6</sup> F41A 33/00

U.S. Cl. 434—11

19 Claims



14. A night vision goggle simulator, comprising:  
an objective lens,  
a filter,  
an inverter,  
liquid crystal means for simulating night vision goggle effects,  
control means operably connected to said liquid crystal

means for varying said liquid crystal means to achieve different night vision goggle effects,  
compensating means operably connected to said liquid crystal means for adjusting said liquid crystal means to maintain a constant level of simulated low light level under varying brightness conditions, and  
an eyepiece.

5,413,484

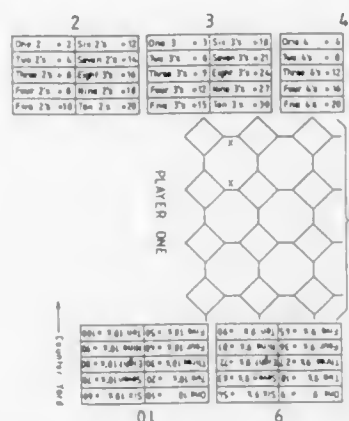
## BOARD GAME AND METHOD OF USE

Paul Banerjee, Sr., and Paul Banerjee, Jr., both of 30 Harley Road, Leeds LS13 4QF, United Kingdom  
Filed Mar. 6, 1992, Ser. No. 846,816  
Claims priority, application United Kingdom, Mar. 8, 1991, 9104944; Apr. 26, 1991, 9109046

Int. Cl.<sup>6</sup> G09B 19/22

U.S. Cl. 434—128

10 Claims



1. Game apparatus which comprises:

- a board bearing a regular pattern comprising a plurality of adjoining octagonal units arranged in horizontal rows and vertical columns and a plurality of square units interposed between the octagonal units;
- a series of markers each bearing a numeral and being placed at the commencement of the game on said octagonal units;
- two series of counters, one for each player or team of players, each series of counters comprising a number of counters each of which bears a numeral;
- a first counter-yard located in the region of one edge of the board for receiving the counters of one player or team of players;
- a second counter-yard located in the region of the opposite edge of the board for receiving the counters of the other player or team of players.

5,413,485

## METHOD FOR TEACHING A PERSON TO SWIM

Keith Adey, 1705 Whitehall Dr., Apt. 104, Fort Lauderdale, Fla. 33324

Filed Dec. 21, 1993, Ser. No. 170,691

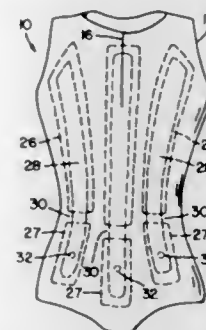
Int. Cl.<sup>6</sup> A63B 69/10

U.S. Cl. 434—254

3 Claims

1. A process for teaching a person to swim comprising:
  - (a) placing a swimsuit having a front portion with a variable buoyancy means thereon on a person wherein said person is maintained in a swimming position;
  - (b) placing said person in water with their chest facing the water in a swimming position;
  - (c) instructing the person to use proper swimming techniques and strokes wherein the person attempts to swim;
  - (d) repeating steps a), b) and c) and periodically after step c)

adjusting the buoyancy using said variable buoyancy means to reflect the swimming skills of said person until



the person is capable of swimming without using said buoyancy means.

5,413,486

## INTERACTIVE BOOK

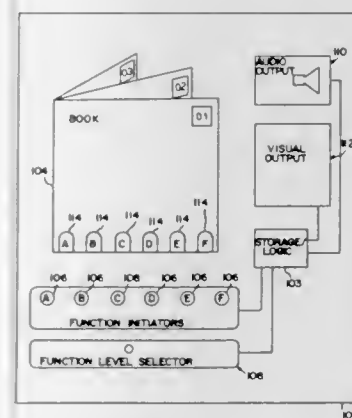
Roger I. Burrows, Fairfield, and Michael J. Morris, Western, both of Conn., assignors to Joshua Morris Publishing, Inc., Wilton, Conn.

Filed Jun. 18, 1993, Ser. No. 77,900

Int. Cl.<sup>6</sup> G09B 3/00

U.S. Cl. 434—317

43 Claims



1. An apparatus comprising:
  - means for storing a set of discrete sensory outputs;
  - means for outputting each of said sensory outputs;
  - a book having a plurality of pages, each of said pages including a plurality of visual indicia;
  - a plurality of function initiators coupled to said output means, each of said function initiators initiating the output of a unique sensory output by said output means, each of said function initiators corresponding to at least one of said visual indicia, and all of said function initiators being physically distinct from all of said visual indicia;
  - a function level selector coupled to each of said function initiators, said function level selector selectively changing a function level of the apparatus and thereby selectively changing the sensory output corresponding to each of said function initiators, each of said function initiators being associated with a different sensory output at each of said function levels; and
  - a support member supporting said storage means, said output means, said plurality of function initiators, said function change selector and said book.

5,413,487

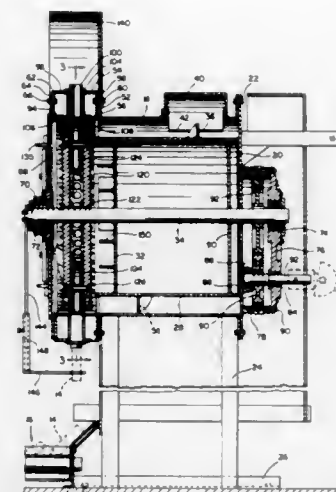
## DENSIFIER AND COOLING ELEVATOR

Vernon J. Lundell, Box 171, Cherokee, Iowa 51012  
Filed Oct. 2, 1992, Ser. No. 955,404

Int. Cl.<sup>6</sup> B29C 47/00

U.S. Cl. 425—311

18 Claims



1. A densifier for compacting and compressing comminuted waste material comprising a stationary housing, a rotatable drum mounted in concentrically spaced relation within the housing, means on the drum for conveying waste material axially along the external surface of the drum, a plurality of die tubes rigidly mounted on the housing in a stationary manner in a circular pattern circumferentially at one end of the drum, said die tubes having inner ends positioned to receive waste material from the drum, said die tubes having outer ends spaced radially outwardly from the inner ends, roller means mounted on the drum engaging waste material on the inner ends of the die tubes and compressing and compacting said waste material into the die tubes to form dense cubes that are extruded from the outer ends of the die tubes, means forming a closure for the housing axially outwardly of the die tubes to prevent material from being discharged past the die tubes by the drum and means varying the entry dimensions of the die tubes and forming a peripheral trough receiving waste material from the drum.

5,413,488

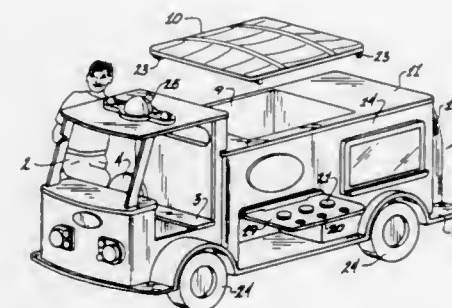
## EDUCATIONAL STRUCTURE

Robert S. Gibson, E. Aurora, and Reed C. Rankin, Marilla, both of N.Y., assignors to Stanford Calvin Corp., E. Aurora, N.Y.  
Filed Sep. 29, 1993, Ser. No. 128,861

Int. Cl.<sup>6</sup> A47B 39/00

U.S. Cl. 434—432

17 Claims



1. A substantially stationary educational play-on structure comprising a child size play-educational toy and a plurality of teaching stations and having in combination a main body portion with a storage area section, said main body portion com-



prising a seating area with seating for at least two children, said storage area section being substantially open and having access means therein, each of said teaching stations having a substantially different structure from the other stations and comprising a reading teaching station, a writing teaching station, a study teaching station and a communication teaching station, said reading teaching station including book storage means, and a plurality of shape and color recognition means, said writing teaching station comprising a writing surface and marking means, said study teaching station comprising a drop-down desk top with a supporting surface for books, and said communication teaching station comprising means for accommodating at least two children, said structure having means to provide play sections for a plurality of children at one time, and at least some of said teaching stations located on the exterior portion of said play-on structure.

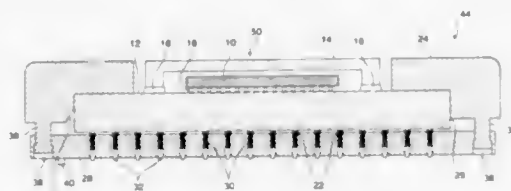
5,413,489

**INTEGRATED SOCKET AND IC PACKAGE ASSEMBLY**  
Andrew Switky, Palo Alto, Calif., assignor to Aptix Corporation, San Jose, Calif.

Filed Apr. 27, 1993, Ser. No. 53,610  
Int. Cl.<sup>6</sup> H01R 23/72

U.S. Cl. 439—71

8 Claims



1. A reusable, self-contained integrated circuit die package for demountable attachment to a printed circuit board or like device comprising:

a spreader having a first surface and a second surface, said first surface including a first array of electrical contacts bounded by a first area, said electrical contacts adapted to be permanently bonded and electrically connected to at least one integrated circuit die, said second surface including a second array of electrical contacts bounded by a second area larger than said first area;

a socket base having a first surface and a second surface and a first array of conformal electrical contacts extending through and beyond said first surface of said socket base and adapted to make electrical contact with the contacts of said second array of electrical contacts, said first array of conformal electrical contacts in electrical contact with a second array of non-deformable conformal electrically conductive plungers extending through and beyond said second surface of said socket base and adapted to electrically contact electrically conductive pads on the printed circuit board;

a socket cover attached to said socket base by compressive attachment means for applying a compressive force urging said spreader against said first conformal contacts; and

means located only at a periphery of the package for removably attaching the package to a circuit board by applying a compressive force urging all portions of the package toward said circuit board.

5,413,490

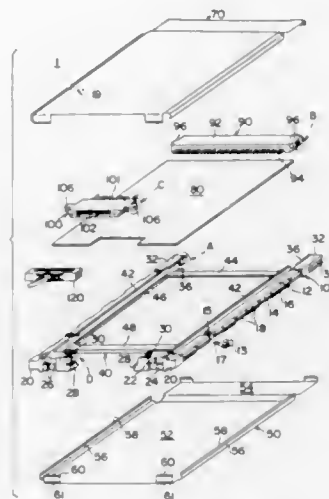
**IC CARD WITH GENERALLY EFFICIENT CIRCUMFERENTIAL SHIELDING**

Haw-Chan Tan; Frank C. Ma, both of Diamond Bar, and Vincent S. Chen, Walnut, all of Calif., assignors to Genrife Company Limited, Hong Kong

Filed Oct. 26, 1993, Ser. No. 142,769  
Int. Cl.<sup>6</sup> H01R 9/09

U.S. Cl. 439—76

13 Claims



1. An I/O card assembly comprising:  
a main frame having two side walls, an elongated space extending horizontally along generally a centerline of each side wall in a front-to-end direction;  
an auxiliary frame integrally formed in the main frame;  
a pair of blocks positioned at front ends of the side walls, respectively;  
a pair of socket supports positioned at rear ends of the side walls, respectively;  
a PC board seated on said auxiliary frame;  
a socket positioned between said pair of socket supports, said socket having contact tails conductively mounted at a rear end of the PC board;  
an I/O connector positioned between said pair of blocks, said I/O connector having contact tails conductively mounted at a front end of the PC board; and  
a top cover and a bottom cover being attached to the main frame from the top and from the bottom, respectively, each cover having a main plate and a pair of shielding walls vertically extending, along opposite side edges of the main plate in the front-to-end direction, a distance which is generally one half of a height of the side wall of the main frame wherein said shielding walls of the top cover extend downwardly and said shielding walls of the bottom cover extend upwardly.

5,413,491

**SMALL FORM FACTOR CONNECTORS WITH CENTER GROUND PLATE**

Rocco J. Noschese, Wilton, Conn., assignor to Burndy Corporation, Norwalk, Conn.

Filed Oct. 13, 1993, Ser. No. 135,678  
Int. Cl.<sup>6</sup> H01R 4/66

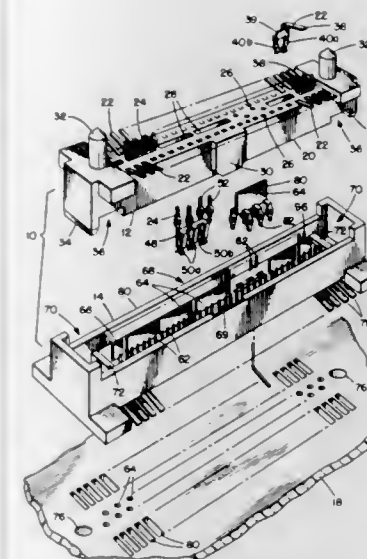
U.S. Cl. 439—108

16 Claims

1. An electrical connector assembly comprising:  
a first connector having a first housing, a plurality of first signal contacts, and a plurality of first ground contacts, the first signal contacts being aligned in at least two rows, with the first ground contacts located between the at least two rows, the first ground contacts each comprising a plurality of through-hole mounting sections extending from the first housing, a plurality of opposing pairs of

cantilever arms aligned in a row in a receiving area of the first housing, and a rectangular center section between the mounting sections and pairs of cantilever arms, the rectangular center section being aligned generally perpendicular to the mounting sections and the pairs of cantilever arms; and

a second connector connected to the first connector having a second housing, a plurality of second signal contacts, and



a plurality of second ground contacts, the second signal contacts being aligned in at least two rows and being electrically connected to the first signal contacts, the second ground contacts each comprising a plurality of through-hole mounting sections extending from the second housing and a ground plate electrically connected to and located between the opposing arms of at least one of the first ground contacts.

5,413,492

**TRANSMISSION APPARATUS BETWEEN ROTARY BODY AND FIXED BODY**

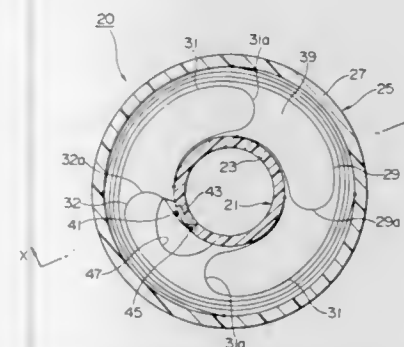
Ken Obata, Tokyo, Japan, assignor to The Furukawa Electric Co., Ltd., Japan

Filed Aug. 30, 1993, Ser. No. 113,107

Claims priority, application Japan, Sep. 4, 1992, 4-067930 U  
Int. Cl.<sup>6</sup> H01R 35/02

U.S. Cl. 439—164

10 Claims



1. A transmission apparatus between a rotary body and a fixed body comprising:

an outside case having a flange portion and an outer tubular portion,

an inside case having a flange portion and an inner tubular portion disposed at the inner circumference side of said

outside case and rotatable with respect to said outside case,

at least one flat cable with an inner end connected to the outer circumference of the inner tubular portion and an outer end connected to the inner circumference of the outer tubular portion and for exchanging signals between a rotary body and a fixed body, and

at least one dummy cable with an inner end connected to the outer circumference of the inner tubular portion and an outer end connected to the inner circumference of the outer tubular portion at different connecting positions from connecting positions of said flat cable in the circumferential direction,

said flat cable and said dummy cable forming winding direction inversion portions at portions midway in the longitudinal directions of the cables in the space defined by the outer tubular portion, inner tubular portion, and flange portions and further being wound up and housed so that the respective winding direction inversion portions are at intervals in the circumferential direction,

a first stopper member having a projecting portion being provided on said at least one dummy cable near a said connection portion to the inner tubular portion, a first engagement groove housing the first stopper member being formed at the outer circumference of the inner tubular portion, and a first depression portion in which the projecting portion of the first stopper member enters when the first stopper member leaves the first engagement groove being formed at the inner circumference portion of the flange portion of the outside case.

5,413,493

**ELECTRICAL CONNECTOR ASSEMBLY, ESPECIALLY FOR ELECTRIC VEHICLE**

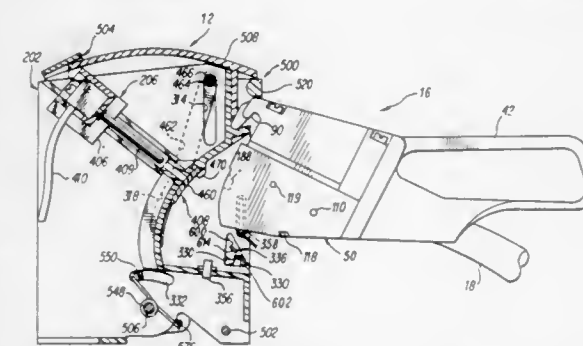
Ernest G. Hoffman, Middlefield, Conn., assignor to Hubbell Incorporated, Orange, Conn.

Continuation-in-part of Ser. No. 5,108, Jan. 15, 1993, Pat. No. 5,344,330. This application Sep. 2, 1993, Ser. No. 115,091

Int. Cl.<sup>6</sup> H01R 13/453, 13/703

U.S. Cl. 439—188

12 Claims



1. An electrical connector system, comprising:

a first electrical connector having a first housing with a first power transferring means coupled to a power source; non-contacting indicia means, coupled to said first housing of said first electrical connector at a first location, for representing magnitude of said power source;

a second electrical connector having a second housing with a second power transferring means coupled to a load, said second housing being dimensioned to mate with said first housing in a full insertion position in which said housings remain stationary during transfer of power from said first power transferring means to said second power transferring means; and

sensing means, coupled to said second housing of said second connector at a second location, for responding to said non-contacting indicia means to determine compatibility of power from said first electrical connector with said second electrical connector upon mating of said first hous-

ing with said second housings in said full insertion position, said non-contacting indicia means and said sensing means being positioned on said first and second housings at said first and second locations, respectively, to interact after said first and second housings reach said full insertion position and prior to engagement of said first power transferring means with said second power transferring means.

5,413,494

**JACK MODULE ASSEMBLY**

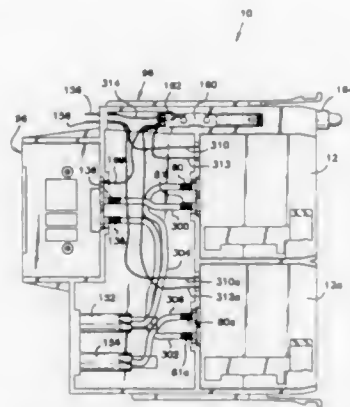
James D. Dewey, Plymouth, and Dennis M. Burroughs, Savage, both of Minn., assignors to ADC Telecommunications, Inc., Minneapolis, Minn.

Continuation of Ser. No. 956,674, Oct. 5, 1992, abandoned. This application Jul. 15, 1994, Ser. No. 275,912

Int. Cl.<sup>6</sup> H01R 29/00

U.S. Cl. 439—188

9 Claims



9. A jack module assembly comprising:

a. first and second jack modules, each having:

- i) an electrically conductive body having a plurality of walls including a top wall, a bottom wall, a front wall, a rear wall and generally parallel spaced apart side walls;
- ii) at least a first port formed through said front wall and sized to receive a jack plug;
- iii) first and second coax connectors on said rear wall with each connector having means for connection to a coax conductor having a central conductor and a ground shield, wherein said ground shield can be electrically connected to said body upon connection of said coax conductor to either of said first and second coax connectors;
- iv) circuit means contained within said body for electrically connecting said connectors in the absence of a plug inserted into said first port and for opening said connection upon insertion of a plug into said first port;

b. a molded dielectric, electrically insulating frame in which said jack modules are mounted, said frame comprising:

- i) a top rail and a spaced apart bottom rail;
- ii) means for supporting said first and second jack modules between said top and bottom rails with said first and second jack modules in generally co-planar alignment and with said jack modules maintained in electrically insulated separation; and with said front walls of each of said first and second jack modules exposed to an exterior of said frame, and with at least one of said first and second sidewalls of said bodies of each of said first and second jack modules exposed to an exterior of said frame;

iii) said frame having a frame interior with first, second, third and fourth coax conductors disposed within said interior, said first coax conductor connected to said first connector of said first jack module, said second coax conductor connected to said second connector of said

first jack module, said third coax conductor connected to said first jack module, said third coax conductor connected to said first connector of said second jack module and said fourth coax conductor connected to said second connector of said second jack module;

- c. first, second, third and fourth coax connection means secured to said frame and disposed within said frame interior and accessible from an exterior of said frame; said first through fourth coax connection means connected to said first through coax conductors, respectively.

5,413,495

**FEMALE TERMINAL**

Kunihiko Takeuchi; Akihiko Chiriku; Satsuki Kanezashi, and Hiroto Tanishita, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

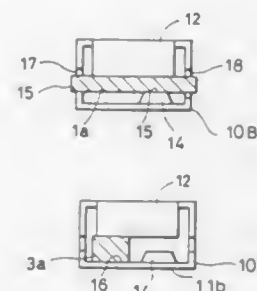
Filed Nov. 23, 1993, Ser. No. 155,779

Claims priority, application Japan, Nov. 24, 1992, 4-313734

Int. Cl.<sup>6</sup> H01R 27/00

U.S. Cl. 439—223

4 Claims



1. A female terminal electrically connectable with both first and second male terminals having different thickness, comprising:

- a. an insertion portion constructed with a tubular member in which either one of the first and second male terminals is inserted, the tubular member having first and second side walls facing each other and third and fourth side walls connecting these first and second side walls, the third and fourth side walls respectively having slits for receiving the second male terminal therein;
- b. a common contact portion formed with a spring plate extending integrally with the first side wall of the insertion portion to contact commonly with the first or second male terminal;
- c. a first individual contact portion provided in the second side wall to contact with the first male terminal; and
- d. a second individual contact portion constructed with a projection formed in the second side wall and an inner wall of the slit formed in the third side wall so as to contact with the second male terminal.

5,413,496

**ENHANCED ELECTRICAL CONNECTOR**

Wang-I Yu, #2, Lane 242, Nun-Sun Road, Chung-Ho, Taipei Hsien, Taiwan, Prov. of China

Filed Sep. 14, 1993, Ser. No. 121,210

Int. Cl.<sup>6</sup> H01R 13/62

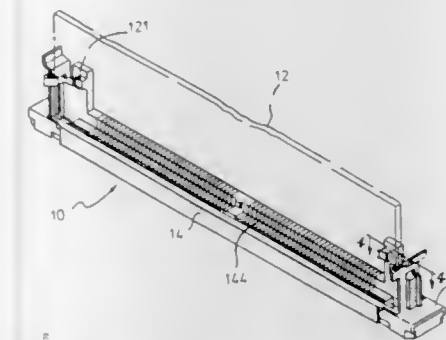
U.S. Cl. 439—326

19 Claims

1. An enhanced electrical connector for connecting together first and second circuit boards, said connector, comprising:

- a. an elongated housing, formed from an insulating resin material, said housing including a bottom to which said first circuit board is to be attached, a top surface in which the second circuit board is to be attached, the top surface having a longitudinal groove to receive an end portion of the second circuit board therein and a pair of latch members each extending from the top surface and positioned

near each end portion of the housing, said latch members having a rib projecting along an edge thereof; a plurality of contact terminals provided in the groove of the housing for connecting together the first and second circuit boards; and



a pair of metal latches each attached to the housing adjacent to one of said latch members and including a mounting section and a spring section, the mounting section being attached to the end portion of the housing and the spring section being provided with a slot and placed in elastic contact with one of said latch members so that said rib extends through said slot.

5,413,497

**ELECTRICAL CONNECTOR**

Nai Hock Lwee, 34196 Finnigan Terr., Fremont, Calif. 94555

Filed Dec. 9, 1992, Ser. No. 987,835

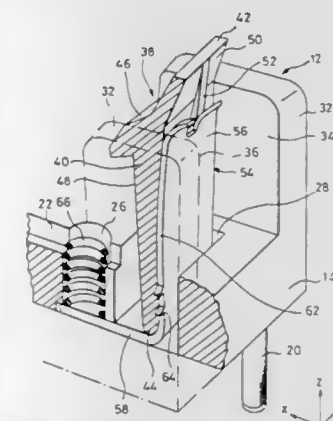
Claims priority, application Japan, Dec. 9, 1991, 3-324611

The portion of the term of this patent subsequent to Jul. 13, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H01R 13/00

U.S. Cl. 439—328

6 Claims



1. An electrical connector for connecting a first circuit board to a second circuit board, comprising:

- a. an insulating housing mountable on the first circuit board, the housing having a recess for receiving the second circuit board and a pair of latch members for latching the second circuit board to take a predetermined posture with respect to the first circuit board, the pair of latch members arranged in an opposed relation with the recess placed therebetween;

a plurality of contacts positioned in the recess for establishing an electrical interconnection to the second circuit board;

a pair of restricting members for restricting the latch members from being flexed in a direction to move the paired latch members away from each other, the pair of restricting members arranged in an opposed relation with the paired latch members located therebetween; and spring means for enabling a spring force to be applied to the

second circuit board in a direction to urge the second circuit board into a predetermined posture against a push force by the second circuit board received in the recess.

5,413,498

**SELF-LOCKING FEMALE RECEPTOR FOR ELECTRICAL CORD**

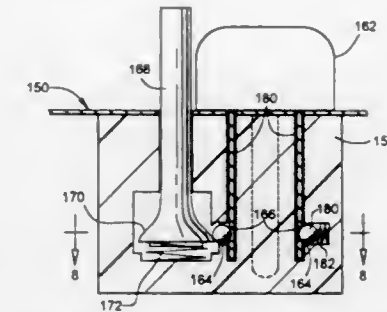
Nels E. Ursich, 6809 W. Brementowne Dr., Apt. 2W, Tinley Park, Ill. 60477

Continuation-in-part of Ser. No. 911,752, Jul. 10, 1992, Pat. No. 5,281,162, which is a continuation of Ser. No. 719,930, Jun. 24, 1991, Pat. No. 5,129,836. This application Jan. 3, 1994, Ser. No. 176,663

Int. Cl.<sup>6</sup> H01R 4/50

U.S. Cl. 439—346

9 Claims



1. A locking female electrical receptor comprising a female receptor body having a pair of holes for receiving a male plug having spaced prongs with punched holes for electrically connecting two electrical lines respectively coupled to said receptor body and the male plug,

said receptor body having actuator means mounted for selective relative movement within said receptor body, said actuator means having a manually operated element being accessible from the outside of said receptor body, a pair of locking elements mounted in said receptor body in operative relationship to said actuator means at a position between the spaced prongs for selectively engaging the punched holes of the male plug locking the prongs of the male plug to said receptor body,

said actuator means being movable along an axis parallel to the spaced prong to a first position between the spaced prongs for permitting insertion and removal of the prongs relative to said locking elements, and

said actuator means being movable along said axis parallel to the spaced prongs to a second position between the spaced prongs in said receptor for rigidly urging said pair of locking elements outward in opposite directions into locking contact with the prongs of the male plug, said manual element having a greater width at said second position than at said first position.

5,413,499

**BATTERY HOLDER**

Austin J. Wright, Jr., Aurora, and Joseph P. Pecukonis, Englewood, both of Colo., assignors to Amprobe Instrument, Lynbrook, N.Y.

Filed Oct. 12, 1993, Ser. No. 135,022

Int. Cl.<sup>6</sup> H01R 3/00

U.S. Cl. 439—500

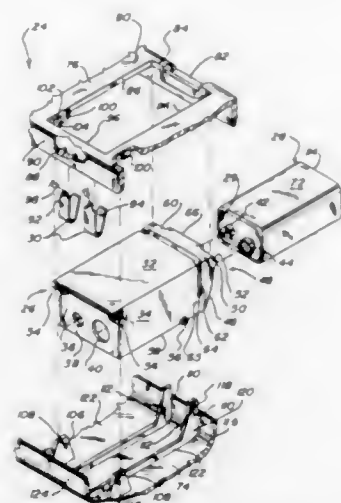
21 Claims

1. A battery holder for retaining a battery within a housing of an electrical device and for electrically connecting said battery to said electrical device, said battery having a first end and a second end and further including both a positive terminal and a negative terminal fixed to said first end, said housing defining an opening having a forward edge and a rear edge, and electrical contacts positioned within said housing to



contact said positive and negative terminals, said battery holder comprising:

- a battery drawer comprising a rear end wall defining a first aperture adapted to receive said positive terminal and a second aperture adapted to receive said negative terminal; means pivotably connecting said battery drawer to said housing within said opening for swinging movement between a closed position in which said drawer is received within said housing, and an open position in which said



drawer extends outwardly from said housing for receiving said battery with said positive terminal extending through said first aperture and said negative terminal extending through said second aperture; and means biasing said battery towards said rear end wall when said battery drawer swings from said open position to said closed position to maintain said terminals extended through said apertures and effect engagement of said terminals with said electrical contacts.

5,413,500

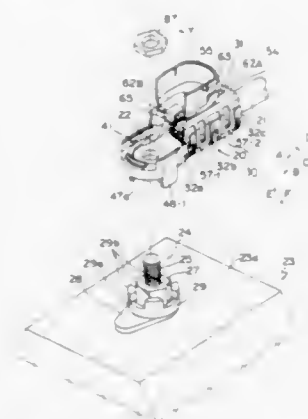
**TERMINAL CAP AND CAP ATTACHMENT STRUCTURE**  
Tsutomu Tanaka, Yokkaichi, Japan, assignor to Sumitomo Wiring Systems, Ltd., Yokkaichi, Japan

Filed Dec. 16, 1993, Ser. No. 167,037

Claims priority, application Japan, Dec. 25, 1992, 4-088982 U  
Int. Cl.<sup>6</sup> H01R 13/52

U.S. Cl. 439—521

8 Claims



1. A terminal cap comprising:  
a fixed member having an opened top and including a connector-side member for accommodating a connecting member of a terminal element, and a base-side member for

accommodating a base of the terminal element, said base having one end of a wire connected thereto; and  
a cover member comprising a first cover portion for closing the base-side member, and a second cover portion for closing the connector-side member;  
wherein the connector-side member comprises a connector opening in which a terminal connector of an electrical device is inserted for engaging with the connecting member, and a wall member projecting in a direction reducing a diameter of the connector opening, and wherein the connecting member of the terminal element positioned at the connector opening and positioned at a bottom side of the connector-side member is engaged by said wall member wherein the first cover portion of the cover member is connected to the fixed member such that first cover portion can be selectively opened and closed, and the second cover portion is connected to the first cover portion such that the second cover portion can be opened and closed independently of the first cover portion.

5,413,501

**ELECTRICAL OUTLET**

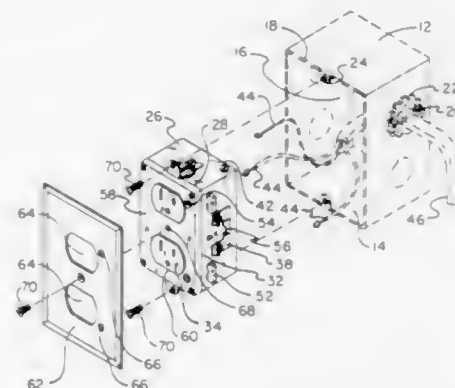
Roger D. Munn, 6520 Dorchester Rd., Apt. 2900-G, Charleston, S.C. 29418

Filed Jan. 31, 1994, Ser. No. 188,685

Int. Cl.<sup>6</sup> H01R 23/02

U.S. Cl. 439—535

2 Claims



1. An electrical outlet for supplying electrical power to electrical devices comprising, in combination:

- a hollow outlet box having a central opening, a space therein, a peripheral edge therearound disposed near the central opening thereof, a wire hole disposed on one of the sides of the outlet box, a clamp connector disposed within the hole and adapted to couple a power cable to the outlet box and an upper mounting hole and a lower mounting hole disposed on the peripheral edge for mounting the outlet box to an external structure;
- a hollow receptacle box having a central opening, a space therein, and a peripheral edge therearound disposed near the central opening thereof, the receptacle box further having a pair of electrical receptacle disposed therein, each receptacle having a positive terminal, a negative terminal, and a ground terminal coupled thereto, each terminal adapted to receive a terminal wire of a power cable, each said electrical receptacle adapted to receive an external male connector plug of an electrical device, pairs of electrical contacts coupled to the receptacle box and adapted and aligned to receive respective male connector plugs through their respective electrical receptacles, a fuse coupled between each pair of electrical contacts and the respective positive terminal for discontinuing the conduction of electrical power if the maximum amperage rating is exceeded, an indicator light coupled between each fuse and its respective electrical contacts for providing an indication when the maximum amperage rating is

exceeded in each respective receptacle, and a breakaway tab coupled between the positive terminals of each receptacle whereby allowing a user to isolate the pair of receptacles from each other and make one active at all times and the other controlled with an external switch, and a receptacle cover coupled over the central opening of the receptacle box adjacent to the peripheral edge thereof to seal the receptacles therein, the receptacle cover having a pair of holes disposed thereon to allow access to the receptacles;

- a cover plate adapted for securing the receptacles box adjacent to a wall, the cover plate having a pair of receptacle holes disposed thereon to allow access to the receptacles, indicator holes for allowing light from the indicator lights to pass therethrough for viewing, and a screw hole for securing the cover plate to the receptacle box; and a plurality of screws for securing the receptacle box to the outlet box and the cover plate to the receptacle cover.

5,413,502

**AUTO TERMINATION TYPE ELECTRICAL CONNECTOR**

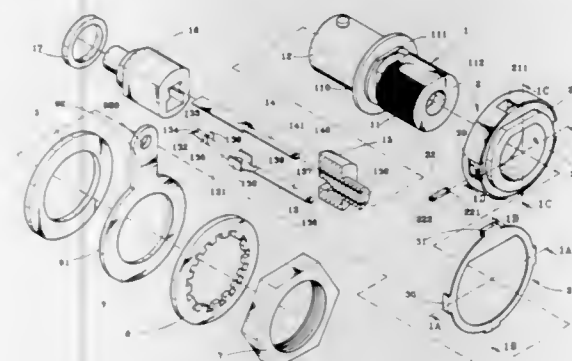
Tsan-Chi Wang, 1 Fl., No. 13, Lane 312, Chung Chen Rd., Hsin Tien, Taipei Hsien, Taiwan, Prov. of China

Filed Feb. 1, 1994, Ser. No. 189,760

Int. Cl.<sup>6</sup> H01R 4/54

U.S. Cl. 439—551

3 Claims



1. An electrical connector comprising  
a casing having an outer thread portion at one end fastened to a metal panel of a computer network system by an annular insulator, an insulative ring, an internally toothed cushion ring, and a nut, and a BNC jack at an opposite end for connecting a BNC plug; and  
an auto termination circuit, wherein said auto termination circuit comprises:  
a ground contact plate mounted around said outer thread portion and retained between said insulative ring and said internally toothed cushion ring, and having a lug projecting radially outward;  
a first contact metal plate horizontally fastened in a first insulative socket member and a second insulative socket member inside said casting for connecting to the center conductor of a coaxial cable of the computer network system, said first contact metal plate having a front end extended out of said first insulative socket member and said casing and a rear end disposed in the center hole in said second insulative socket member;  
a second contact metal plate horizontally fastened in said first and second insulative socket members and spaced from said first contact metal plate for connecting to the outer conductor of the coaxial cable of said computer network system, said second contact metal plate having a front end extended out of said first insulative socket member and said casing and a rear end disposed in the center hole in said second insulative socket member; and  
a resistor element having one end connected to said lug of

said ground contact plate and an opposite end connected to said second contact metal plate.

5,413,503

**PHONO PLUG**

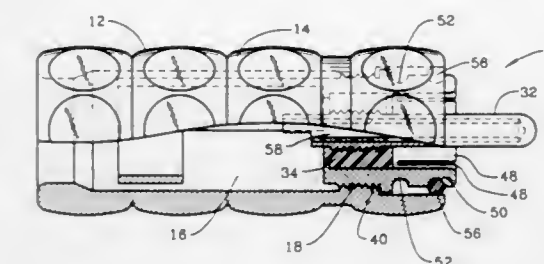
David B. Salz, Dania, Fla., assignor to Wireworld by David Salz, Inc., Fort Lauderdale, Fla.

Filed Apr. 1, 1993, Ser. No. 41,766

Int. Cl.<sup>6</sup> H01R 9/05

U.S. Cl. 439—578

18 Claims



1. A coaxial connector for connecting a coaxial cable to a female receptacle, the coaxial cable having a center conductor, the center conductor having an exposed leading portion, said connector comprising: a plug housing means having an inner surface and an outer surface; a plug having a body member and a hollow center pin, said plug operatively associated with said plug housing, the body member having a first end, a second end and a central portion therebetween, the leading portion of the center conductor operatively associated with the center pin; and means for preventing materials from entering said hollow center pin, wherein said means for preventing is an insulator disposed within at least a portion of said hollow center pin.

5,413,504

**FERRITE AND CAPACITOR FILTERED COAXIAL CONNECTOR**

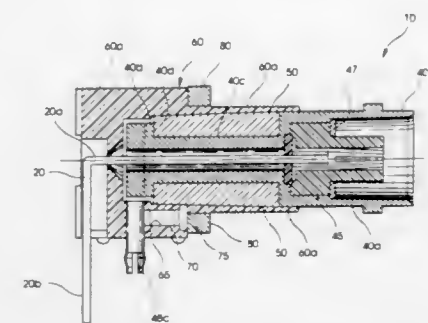
Michael F. Kloecker, and David R. Corey, both of Meadville, Pa., assignors to NT-T, Inc., Meadville, Pa.

Filed Apr. 1, 1994, Ser. No. 221,839

Int. Cl.<sup>6</sup> H01R 13/66

U.S. Cl. 439—620

10 Claims



1. A filtered coaxial connector for mounting to a conductive enclosure panel of a device, comprising:  
a center conductor for conducting a signal through the connector;  
a conductive shell located concentrically around and coaxial with said center conductor;  
an insulated liner disposed between said center conductor and said shell for isolating said center conductor from said shell;  
a cylindrical inductor located concentrically around at least a portion of said conductive shell;  
an insulated housing surrounding said cylindrical inductor and at least a portion of said conductive shell, to isolate

said conductive shell from the conductive enclosure panel, when the filtered coaxial connector is mounted thereto; and  
at least one chip capacitor having first and second capacitor contacts, said chip capacitor being electrically connected between said conductive shell and the conductive enclosure panel.

5,413,505

## FUSED ELECTRICAL CONNECTORS

Brian B. Hayes, Melbourne, Australia, and Colin J. Hayes, London, England, assignors to Multico International Pty., Limited, Melbourne, Australia

PCT No. PCT/GB92/01042, § 371 Date Nov. 23, 1993, § 102(e) Date Nov. 23, 1993, PCT Pub. No. WO92/22945, PCT Pub. Date Dec. 23, 1992

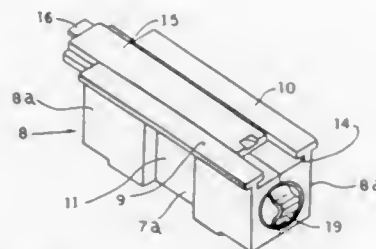
PCT Filed Jun. 10, 1992, Ser. No. 142,302

Claims priority, application United Kingdom, Jun. 11, 1991, 9112513; Nov. 7, 1991, 9123632; Nov. 20, 1991, 9124603

Int. Cl.<sup>6</sup> H01R 13/68, 33/26

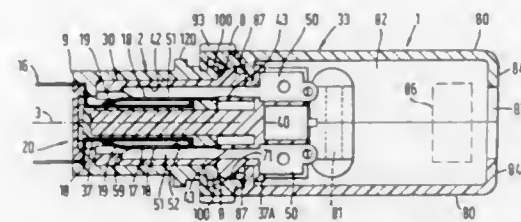
U.S. Cl. 439—622

5 Claims



1. A fused electrical connector comprising;  
a body provided with a cavity defined by a plurality of sidewalls,  
key/keyway formations on at least one said cavity sidewall, spaced apart electrical contacts affixed within said body cavity,  
a fuse receptacle including a plurality of substantially permanently assembled parts having an interior cavity and providing a plurality of sidewalls, a cartridge fuse having endmost electrical conductors and non-detachably mounted within said interior cavity of said substantially permanently assembled receptacle parts with said endmost electrical conductors exposed to the exterior of said fuse receptacle,  
key/keyway formations on at least one said receptacle sidewall complementary to said key/keyway formations on said at least one said body cavity sidewall, and  
said receptacle with said fuse therein insertable within said connector body cavity in a single straight line motion with said complementary key/keyway formations on said fuse receptacle and body cavity permitting of said insertion, whereby  
cartridge fuses of a similar external dimension but of varying ratings are non-detachably mounted within a single size of said fuse receptacle while said complementary key/keyway formations on said cavity and fuse receptacle sidewalls are specific for each rating of any one said fuse, thereby precluding insertion of any one said fuse receptacle having an improperly rated fuse for a particular electrical connector.

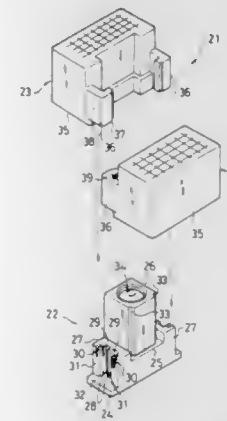
5,413,506  
ELECTRICAL CONNECTOR ASSEMBLY  
Ray Thompson, Dudley, Great Britain, assignor to Cliff Electronic Components Limited, Great Britain  
Filed Apr. 27, 1993, Ser. No. 54,045  
Claims priority, application United Kingdom, Jul. 8, 1992, 9214531  
Int. Cl.<sup>6</sup> H01R 17/00  
U.S. Cl. 439—660  
28 Claims



1. An electrical connector assembly comprising first and second members which are engageable and disengageable co-axially with each other in a direction axially of those members for making and breaking respectively contact between terminals in the members; each of said first and said second members having an axially extending tubular body with axially opposed first and second ends which respectively lead and trail during said engagement; the tubular body of each of said first and second members comprising an axially extending outer tubular wall part and a co-axial core within said axially extending outer tubular wall part to form a cavity between the core and said outer tubular wall part which cavity is open at said first end of each of said respective first and second members; the core of one of said first and second members being tubular for its bore to open at said first end of its member, said bore axially receiving the core of the other of said first and second members when the first and second members are axially engaged; said first member having axially extending substantially straight and flat blade terminals within its tubular body and spaced circumferentially about its axis; said blade terminals extending from said second end of said first member body and terminating short of said first end thereof and each blade terminal presenting an axially extending contact edge and an axially extending support edge, the support edges of said blade terminals engaging substantially over their axial length with the body of said first member; said second member having spring terminals which extend axially within its tubular body from the second end of that body and terminate short of the first end thereof; said spring terminals being spaced circumferentially about the axis of said second member to correspond with the blade terminals when the two members are engaged; each spring terminal comprising a base part mounted on said body of said second member and a leaf terminal part which is cantilevered from and resiliently biased relative to the base part and presents a contact face that is inclined relative to the axis of said second member to converge towards the base part of its spring terminal as it approaches the end at which it is cantilevered and the first end of said second member; the terminals of said one of said first and second members being carried on that tubular core in the cavity of that one member and the terminals of the other of said first and second members being carried on the outer tubular wall part in the cavity of said other member; and wherein during engagement of said first and second members the outer tubular wall part of said other member is received axially within the outer tubular wall part of said one member and the core of said other member is received axially within the bore of the core of said one member and said engagement is initially without contact between the blade terminals and the spring terminals and subsequently the contact edges of the blade terminals engage and slide over the contact faces of the respective leaf terminal parts causing said leaf terminal parts to be displaced against their resilient biasing for substantial axial lengths of the contact edges of the blade terminals to abut in edge-to-face relationship the contact faces of the

leaf terminal parts while the blade terminals are restrained from radial displacement relative to the axis of the second member by engagement of their support edges axially along the body of the first member.

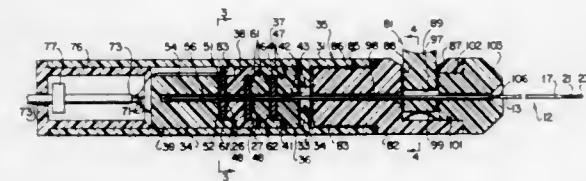
5,413,507  
HIGH DENSITY MULTI-POLE CONNECTOR  
Yoshitsugu Sawada, Shizuoka, Japan, assignor to Yazaki Corporation, Japan  
Filed Jan. 19, 1994, Ser. No. 183,326  
Claims priority, application Japan, Jan. 20, 1993, 5-7323  
Int. Cl.<sup>6</sup> H01R 13/502  
U.S. Cl. 439—701  
9 Claims



1. A high density multi-pole connector comprising:  
a male connector having a plurality of separate male connector housings each formed with a plurality of terminal accommodating chambers;  
a female connector formed with a plurality of terminal accommodating chambers;  
a coupling block for coupling a plurality of the separate male connector housings of said male connector integral with one another;  
coupling means provided for both said separate male connector housings and said coupling block respectively, for removably coupling said coupling block with the separate male connector housings in an engagement direction between both; said coupling means including a slidable engaging means provided for both said coupling block and said male connector housings, for slidably engaging said coupling block with said male connector housings, respectively; and locking means provided for both said coupling block and said male connector housings, for locking said coupling block with said male connector housings, respectively;  
wherein said locking means includes a plurality of flexible locking levers each formed with a projection at each free end thereof and formed on two opposing outer surfaces of said coupling block, respectively so as to extend in the engagement direction between both;  
a plurality of stopper plates formed at both ends of a bottom surface of said coupling block, respectively; and  
a plurality of arms each formed with a locking hole at an end thereof and formed on an inner surface of each of said male connector housings, respectively so as to extend in the engagement direction between both;  
the projections of said flexible locking levers of said coupling block being engaged with the locking holes of said arms of said connector housings and end surfaces of said arms of said connector housings being brought into contact with said stopper plates of said coupling block, respectively, mechanical fastening means provided for both said female connector and said coupling block re-

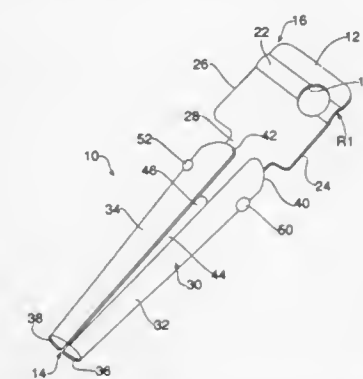
spectively, for fastening said coupling block to said female connector.

5,413,508  
ROTARY CONNECTOR FOR FLEXIBLE ELONGATE MEMBER HAVING ELECTRICAL PROPERTIES  
Robert Z. Obara, Sunnyvale, Calif., assignor to Cardiometrics, Inc., Sunnyvale, Calif.  
Division of Ser. No. 114,767, Aug. 31, 1993, Pat. No. 5,358,409.  
This application Aug. 2, 1994, Ser. No. 284,309  
Int. Cl.<sup>6</sup> H01R 17/18  
U.S. Cl. 439—729  
1 Claim



1. A grip mechanism in a rotary connector for use with a flexible medical guide wire, comprising a member having a transversely extending well disposed therein, a push button mounted in the well for movement transversely of the member, cooperative means in the push button and in the member permitting limited movement of the push button relative to the well and yieldable means disposed in the well yieldably urging the push button out of the well, said push button having the hole therein extending transversely of the direction of movement of the push button in the well, said member having a hole therein extending in a direction parallel to the hole in the push button, the push button being movable by depression of the push button against the force of the yieldable means so that the hole in the push button is moved into axial alignment with the hole in the member whereby when the flexible elongate element is inserted into the hole in the member and the hole in the push button while the push button is depressed, the push button when released will clamp the flexible elongate element between the push button and the member.

5,413,509  
MULTI-WIRE LOCKING SYSTEM  
Cosmo Castaldo, Westbury, N.Y., assignor to Leviton Manufacturing Co., Inc., Little Neck, N.Y.  
Filed Jan. 18, 1994, Ser. No. 183,591  
Int. Cl.<sup>6</sup> H01R 11/22  
U.S. Cl. 439—851  
13 Claims



1. A unitary one-piece ground contact for use as a component within an electrical connector, comprising, in combination:  
a body formed from a single blank, said body having a first end and a second end, said body including  
a mounting tab portion at said body first end formed with an opening therethrough,



a neck portion integral with said mounting tab portion, a generally cylindrical tube grip portion at said body second end, said tube grip portion integral with said mounting tab portion via said neck portion;

said tube grip portion comprising:

at least two spring members each formed with an arcuate configuration about a central longitudinal axis extending along said body from said first end to said second end, said spring members together generally describing a circular configuration with their respective concave inner surfaces facing one another, said spring members being disposed so as to define at least a pair of gaps therebetween, and said second end inwardly flared to receive a ground pin of an electrical plug,

and self-centering means for aligning said contact within a bore in which said contact is disposed when in a functioning mode, said self-centering means including at least two protrusions, one for each of said at least two spring members formed as an integral part of its associated spring member for contacting the inner surfaces defining said bore.

5,413,510

## CORDLESS ELECTRICAL APPLIANCES

John C. Taylor, Balladoole, Isle of Man, assignor to Strix Limited, Castletown, Isle of Man

PCT No. PCT/GB91/01569, § 371 Date Mar. 16, 1993, § 102(e) Date Mar. 16, 1993, PCT Pub. No. WO92/05604, PCT Pub. Date Apr. 2, 1992

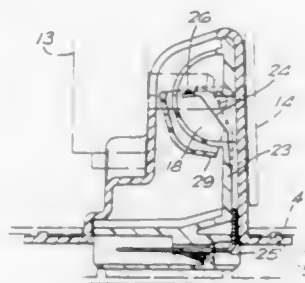
PCT Filed Sep. 13, 1991, Ser. No. 30,003

Claims priority, application United Kingdom, Sep. 17, 1990, 9020308

Int. Cl.<sup>6</sup> H01R 9/24

U.S. Cl. 439—886

18 Claims



1. An electrical appliance and base comprising: an electrical appliance including a male pin connector; a base for the appliance, the base including a female socket connector which is arranged to be engaged by the male pin connector when the appliance is placed on the base, and

at least one electrical connection between the male pin and female socket connectors being formed by a leaf spring mounted silver faced contact with a corresponding male pin, the male pin being made, at least in a contact forming region thereof, of copper, the male pin wiping against the silver faced contact during engagement and disengagement of the female socket connector and the male pin connector so that silver from the silver faced contact is transferred to the pin.

5,413,511

## OUTBOARD MOTOR DRIVE SYSTEM

Bruce R. Hawkenon, 1667 Rebman Crescent, Prince George, British Columbia, Canada V2L 4Z9

Filed Jun. 13, 1994, Ser. No. 261,056

Int. Cl.<sup>6</sup> B63H 1/14

U.S. Cl. 440—49

2 Claims

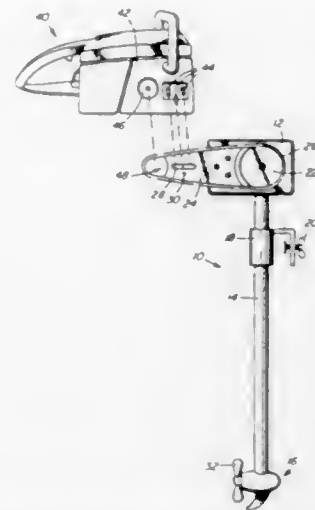
1. An outboard motor adaptor, comprising: an upper housing provided with a connection bar having

formations thereon for engaging with bar studs on a chain saw housing;

a stem extending from said housing;

a lower skeg and propeller portion on the opposite end of said stem provided with a propeller thereon;

a drive sprocket on said upper housing adjacent said bar, said drive sprocket being operatively connected to the propeller on said lower portion for driving said propeller; and



a drive chain extending around said drive sprocket and said connection bar, wherein a space is provided between said bar and said drive chain at a location opposite said drive sprocket for receiving a chain saw sprocket of a chain saw motor in said space to engage with said drive chain, thereby to drive said drive sprocket and said propeller through said drive chain.

5,413,512

## MULTI-PROPELLER DRIVE SYSTEM

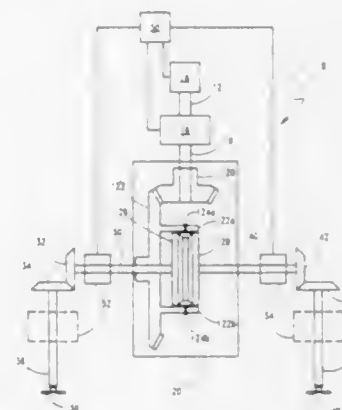
Robert V. Belenger, Raynham, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 5, 1994, Ser. No. 273,438

Int. Cl.<sup>6</sup> B63H 21/28

U.S. Cl. 440—74

13 Claims



1. A drive system comprising:

a differential means, having an input drive shaft and a plurality of output drive shafts, for dividing rotational motion from said input drive shaft between said plurality of output drive shafts wherein one output drive shaft may rotate at a different rate than the other output drive shafts;

a plurality of shaft coupling means, each shaft coupling means keyed to a corresponding one of said output drive

shafts of said differential means, for transferring rotational motion from said output drive shafts;

a plurality of propulsion drive shafts, each propulsion drive shaft drivenly coupled to a corresponding one of said shaft coupling means, for rotating therewith; and

at least one brake mechanism disposed between said output drive shafts of said differential means and said propulsion drive shafts, said brake mechanism being selectively engageable for changing the rotational speed of one propulsion drive shaft with respect to the other propulsion drive shafts.

5,413,513

## METHOD OF MAKING FLAT ELECTRON DISPLAY DEVICE WITH SPACER

Remko Horne, Maarten A. Van Andel, and Gerardus N. A. Van Veen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

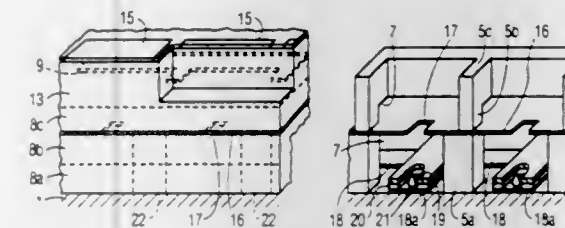
Division of Ser. No. 195,975, Feb. 10, 1994, Pat. No. 5,371,433, which is a continuation of Ser. No. 825,673, Jan. 27, 1992, abandoned. This application Mar. 30, 1994, Ser. No. 221,147

Claims priority, application Netherlands, Jan. 25, 1991, 9100122

Int. Cl.<sup>6</sup> H01J 9/02

U.S. Cl. 445—24

10 Claims



1. A method of manufacturing spacer elements comprising: a) providing a layer comprising of at least two sublayers of radiation-curable organic polymer material on a surface of a substrate, b) providing a mask on said layer, c) exposing said sublayers to radiation through said mask to thereby cure unmasked portions of said sublayers and then developing said sublayers to thereby remove uncured portions of said sublayers to thereby form said spacers.

5,413,514

## RECOVERABLE AERIAL TOY

Tim V. Milligan, Canon City, Colo., assignor to Centuri Corporation, Penrose, Colo.

Filed May 28, 1993, Ser. No. 69,175

Int. Cl.<sup>6</sup> A63H 27/127

U.S. Cl. 446—36

12 Claims

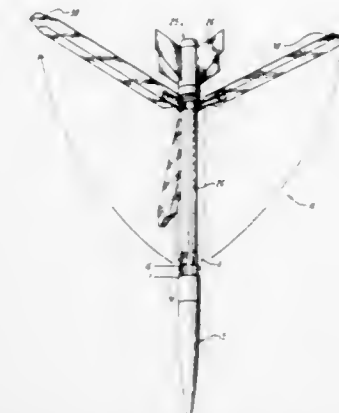
1. Recoverable aerial toy apparatus having a gyro-rotating recovery system, said apparatus having a main body extending along a longitudinal axis between front and back ends and removably and replaceably mounting a fuel propellant and further comprising

A. rotor hub means mounted on said main body at a location distal from said front end and rotatable relative thereto about said axis,

B. a plurality of rotor blades, each hingedly coupled to said hub means for rotation therewith about said axis and for hinged movement relative thereto between a closed position and an open position, said rotor blades extending along said longitudinal axis when disposed in said closed position and extending radially relative to said axis and outward from said body when disposed in said open position,

C. releasable retaining means, mounted on said front end of said main body and movable relative thereto between a hold position and a release position, for selectively hold-

ing said rotor blades in said closed position when said retaining means is disposed in said hold position and tier releasing said blades into said open position when said retaining means is disposed in said release position, said retaining means including means for the release of gas



from within said main body when in said release position and not when in said hold position, and D. engagement means for maintaining said releasable retaining means assembled with said main body in both said hold position and said release position.

5,413,515

## TOY CRANE CONFIGURABLE INTO THREE DIFFERENT OPERATING MODES

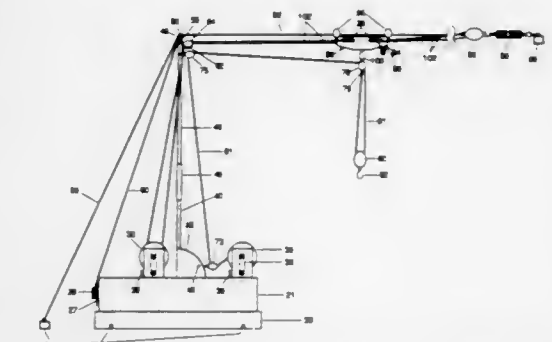
Richard F. Knox, 212 S. 21st Pl., La Crosse, Wis. 54601

Filed Jan. 3, 1994, Ser. No. 176,266

Int. Cl.<sup>6</sup> A63H 33/30, 33/04

U.S. Cl. 446—75

16 Claims



1. A material handling toy configurable by disassembly and reassembly of component parts of the toy into alternative modes for handling loaded materials including a crane mode for hoisting the materials about a central axis, a highline carrier mode for suspending and moving the loaded materials along a highline, and a highline hoist mode for hoisting and moving the materials along the highline, said toy comprising:

a) a supportive base equipped with detachable mobile means for transporting the toy over a surface when the toy is configured in the crane mode;

b) a detachable boom carried by said supportive base with the boom serving to support the loaded materials when said toy is configured to the crane mode;

c) pivotal means for axially pivoting said boom about a central axis;

d) boom elevating means for raising and lowering said boom;

e) material engaging means for retainingly engaging the loaded materials handled by said toy;

f) hoisting means for hoisting materials engaged by said

material engaging means when said toy is configured in said crane mode and said highline hoist mode;  
g) an upwardly extending mast for mooring said boom elevating means and said hoisting means to said mast when said toy is configured to the crane mode and said highline hoist mode, with said mast further serving for mooring said highline to said mast when said toy is configured in said highline carrier mode and said highline hoist mode; and  
h) a trolley for moving the loaded materials along the highline when said toy is configured to the highline carrier mode and the highline hoist mode,

5,413,516

## TALKING TOY DOLL

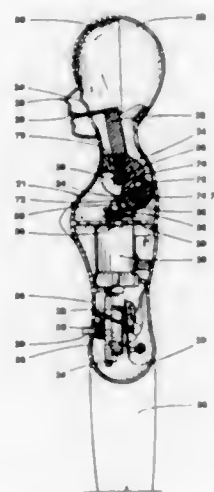
Wing F. Lam, Scarborough, Canada, assignor to Fung Seng Industrial Co., Ltd., Kowloon, Hong Kong

Filed Dec. 20, 1993, Ser. No. 169,061

Int. Cl.<sup>6</sup> A63H 3/28, 3/36

U.S. Cl. 446—301

13 Claims



1. A doll with simulated speech and coincident lip movements comprising:

- a hollow rigid body having a head support portion, the head support portion having an aperture;
- a flexible head having a face with lips, wherein the head is mounted over the head support portion so that the head support portion projects into the head and contacts and supports the face, with the lips being positioned over the aperture;
- a cam follower having an upper end, a lower end and a fulcrum intermediate between the upper and lower ends, the fulcrum contained in the body and the cam follower being adapted to pivot about the fulcrum backward and forward in relation to the face, and the upper end being attached to an interior portion of the lips such that on backward movement of the upper end, the lips are pulled inwardly, and on forward movement of the upper end, the lips are pushed outwardly to stimulate the appearance of speech;
- a cam that produces oscillation of the cam follower;
- a motor contained in the body that drives the cam;
- coupling means coupling the motor to the cam;
- sound generating means contained in the body for generating pre-defined speech phrases from the doll;
- switch means for activating the sound generating means; and
- circuitry means for activating the motor to move the lips coincidentally with the speech phrases.

5,413,517

## ACTION MECHANISM FOR DOLL

Tadashi Kamijima, Nagano, Japan, assignor to Sankyo Seiki Mfg. Co., Ltd., Nagano, Japan

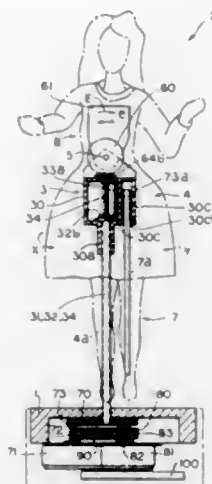
Filed Feb. 22, 1993, Ser. No. 20,645

Claims priority, application Japan, Feb. 28, 1992, 4-009708 U; Apr. 13, 1992, 4-092719

Int. Cl.<sup>6</sup> A63H 3/20, 3/46, 31/08; F16H 37/06

U.S. Cl. 446—354

5 Claims



1. In a doll action mechanism comprising:
- a first rotational drive source for imparting an initial motion;
  - a first movable member enabled to move by said first rotational drive source;
  - a first rotational shaft for connecting said first rotational drive source with said first movable member;
  - a planetary gear mechanism having a sun gear disposed on a rotational axis of said first movable member and a planetary gear rotating around the sun gear with said first movable member;
  - a second movable member connected with said planetary gear mechanism;
  - a second rotational drive source for rotating said sun gear;
  - a second rotational shaft for connecting said second rotational drive source with said sun gear;
  - said second rotational shaft being disposed coaxially with said first rotational shaft; and
  - control means for controlling said first rotational drive source and said second rotational drive source independently.

5,413,518

## PROXIMITY RESPONSIVE TOY

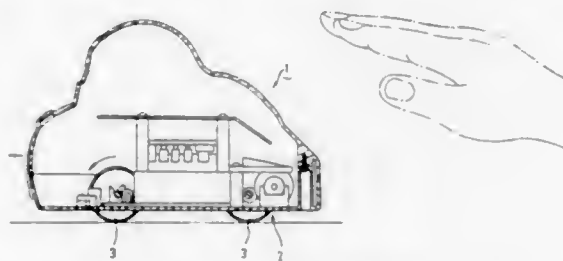
Ming-Tuan Lin, 8F, No. 196-10, Chung-Hwa Rd., Yung-Kang Hsiang, Tainan Hsien, Taiwan, Prov. of China

Filed Jan. 18, 1994, Ser. No. 182,775

Int. Cl.<sup>6</sup> A63H 30/00

U.S. Cl. 446—454

2 Claims



1. A proximity responsive toy, comprising:
- a power supply means for supplying electrical energy;

motor-driven drive means connected to said power supply means for propelling said toy;  
variable frequency oscillator means including a capacitor plate means on said toy for sensing approach of a capacitive body, said oscillator means having a frequency output which decreases in response to proximity of the capacitive body from said toy;  
a programmable frequency divider connected to said oscillator means, said frequency divider dividing said frequency output of said oscillator means by a predetermined factor; and  
a programmable microcomputer control unit connected to said frequency divider and said drive means, said microcomputer control unit including: counter means for generating a count output corresponding to a divided frequency output from said frequency divider; register means; programmable timer means for controlling said register means to store said count output of said counter means therein a predetermined time period after activation of said power supply means; reset means for resetting said counter means, said register means and said timer means upon activation of said power supply means; programmable offset value generating means for generating a predetermined offset value; adder means for generating an output corresponding to the sum of said count output of said counter means and said offset value from said offset value generating means; and comparator means controlled by said timer means to compare said output of said adder means and contents of said register means periodically, said comparator means resetting said counter means and said timer means when said output of said adder means is at least equal to the contents of said register means, said comparator means activating said drive means for a predetermined period when said output of said adder means is less than the contents of said register means.

5,413,519  
INTERCONNECTED RING TOY

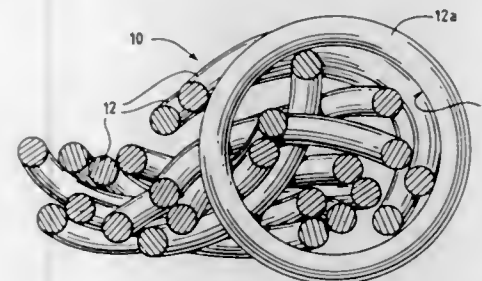
Ronald M. Simon, 521 McMillan Ave., Winnipeg, Manitoba R3L 0N4, Canada

Filed Jul. 20, 1994, Ser. No. 277,615

Int. Cl.<sup>6</sup> A63H 33/00; A63F 9/08; A44C 9/00

U.S. Cl. 446—487

9 Claims



1. A stress-relieving, manipulable ring toy comprised of a plurality of at least 10 essentially annular ring elements, each ring element defining a central aperture and a portion of each ring element disposed within said central aperture of each other ring element, said plurality of ring elements providing guided means for manipulating each said ring.

5,413,520

## METHOD AND APPARATUS FOR FINE MACHINING OF SPUR GEARS

Armin Feisel, Schaffhausen, Switzerland, assignor to Reishauer AG., Wallisellen, Switzerland

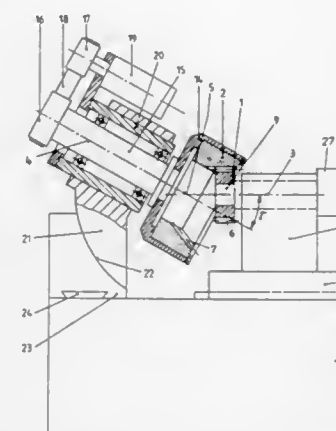
Filed Aug. 12, 1992, Ser. No. 928,444

Claims priority, application Switzerland, Aug. 28, 1991, 2519/91

Int. Cl.<sup>6</sup> B24B 49/00

U.S. Cl. 451—1

11 Claims



11. A method for dressing a toothed spur gear grinding tool (2), wherein teeth (7) of the tool are defined on a conical surface, comprising the steps of:

- mounting a toothed dressing spur gear on a first spindle (9) rotatable about a first axis (3), said dressing spur gear being coated with grains of diamond or cubic boron nitride and having tooth shapes corresponding to those of a spur gear workpiece to be fine machined by the grinding tool;
- mounting the grinding tool on a second spindle (15) rotatable about a second axis (4);
- orienting the first and second spindles such that the first and second axes cross at an acute angle ( $\gamma$ ) equal to an angle of conicity of the tool, with the tool teeth meshing with teeth (6) of the dressing spur gear;
- rotating one of the first and second spindles, and
- simultaneously with step d), feeding the tool toward the dressing spur gear in a direction of the second axis.

5,413,521

## INNER DIAMETER SAW SLICING MACHINE

Seiichi Terashima, and Masao Kita, both of Annaka, Japan, assignors to Shin-Etsu Handotai Company, Ltd., Tokyo, Japan

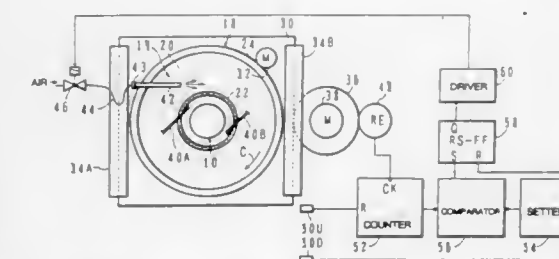
Filed Nov. 29, 1993, Ser. No. 158,856

Claims priority, application Japan, Nov. 27, 1993, 4-319052

Int. Cl.<sup>6</sup> B24B 49/00

U.S. Cl. 451—1

4 Claims



1. An inner diameter saw slicing machine for cutting a semiconductor ingot (10), comprising an inner diameter blade (19),



an inner circumference cutting edge (22) of the blade being formed on a thin ring-shaped metal base (20), the blade (19) being lowered and rotated so as to cut the semiconductor ingot (10) while a liquid coolant is sprayed on the inner circumference cutting edge; the improvement comprising:

a nozzle (42), an open end of said nozzle being positioned in close proximity to and facing a surface of the metal base on a side with a portion of the semiconductor ingot (10b) that is being cut off; and

a control means (48-60) for supplying compressed air to said nozzle during cutting operation, whereby said compressed air emitted from said open end travels in a direction of rotation of the metal base, enters a notch of the partially cut portion of the semiconductor ingot created by the inner circumference cutting edge, and blows out the liquid coolant from between the metal base and the semiconductor ingot;

wherein said control means (48-60) including:

a valve (46) for opening and closing the passage through which compressed air is supplied to said nozzle (42);

a first detection means (48, 50U, 52-56) for detecting a point of time before and near completion of cutting performed by said blade on said semiconductor ingot (10);

a second detection means (50D) for detecting a point of time after completion of the cutting performed by said blade on the semiconductor ingot (10); and

a valve control means (58, 60) for opening said valve in response to said detection made by said first detection means and closing said valve in response to said detection made by said second detection means.

5,413,522

## DEBURRING METHOD AND MACHINE

Raymond Husson, Nancy, France, assignor to Pont-A-Mousson S.A., Nancy, France

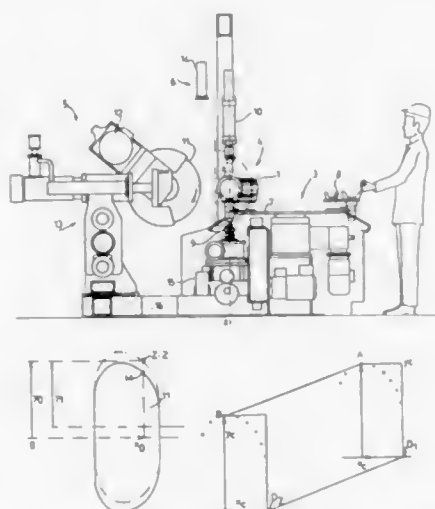
Continuation of Ser. No. 976,251, Nov. 13, 1992, abandoned, which is a division of Ser. No. 932,935, Aug. 21, 1992, Pat. No. 5,321,914. This application Feb. 9, 1994, Ser. No. 193,892

Claims priority, application France, Aug. 22, 1991, 91 10536

Int. Cl.<sup>6</sup> B24B 49/12

U.S. Cl. 451-21

8 Claims



1. A deburring machine comprising a rotary grinding wheel (11), means (13) for displacing the grinding wheel perpendicularly to an axis of rotation of said grinding wheel, towards a part to be deburred, means (8, 9, and 10) for positioning said part (1, 2), and further comprising means (6) for measuring a position of at least one active point of the grinding wheel and means (16) for calculating a trajectory of the grinding wheel as a function of the position of said at least one active point of the

grinding wheel and as a function of a profile of a seam line of the part to be deburred,

wherein said measuring means (6) comprises means for establishing a fixed reference and means (13) for bringing a predetermined point of the grinding wheel into coincidence with said fixed reference, said means for establishing a fixed reference including a light source (14) and a photoelectric cell (15) disposed along a line orthogonal to both the axis of rotation of said grinding wheel and to a direction in which said grinding wheel is displaced toward a part to be deburred.

5,413,523

## DRIVING MECHANISM FOR MOVING TABLE

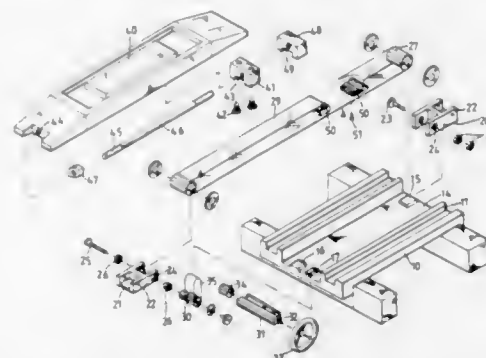
A-Po Tsai, P.O. Box 1750, Taichung, Taiwan, Prov. of China

Filed Nov. 30, 1993, Ser. No. 159,467

Int. Cl.<sup>6</sup> F16H 19/06

U.S. Cl. 451-364

1 Claim



1. A driving mechanism comprising a base including a pair of channels in parallel with each other, a working table slidably engaged on said channels, bearing means engaged between said channels and said working table for slidably supporting said working table, a space formed between said channels and including two ends each having a first wheel rotatably supported therein, an opening formed in one of said ends of said space, a first belt engaged over said first wheels, said first belt including two end portions, a shaft fixed in one of said first wheels, a second wheel fixed on said shaft and rotating in concert with said shaft, a rod rotatably provided below said base and including two ends, a rotating wheel secured to a first of said ends of said rod and a third wheel secured to a second of said ends of said rod, a second belt extended through said opening of said base and engaged over said third wheel and said second wheel, a first block fixed to said working table, a bolt engaged through said first block and including a first end threadedly engaged with said working table, said bolt including a second end, a second block threadedly engaged with said second end of said bolt, said end portions of said first belt being fixed to said blocks respectively, said second block being moved toward or away from said first block when said bolt is rotated in order to adjust tension of said first belt, said first belt being engaged between said channels and received in said space, and said second belt being engaged through said opening of said space and being shielded by said working table such that said first belt and said second belt are prevented from being contaminated by contaminants.

5,413,524

## METHOD OF TAKING OUT VISCERA OF FISH AND APPARATUS THEREOF

Masanori Yoshida, Kushi, Japan, assignor to Kabushiki Kaisha Nikko, Kushi, Japan

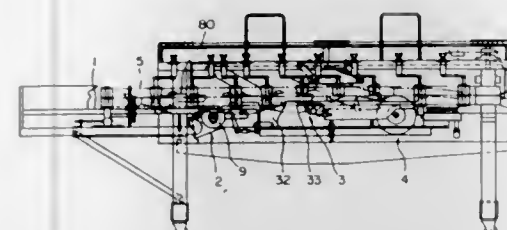
Filed Feb. 7, 1994, Ser. No. 192,269

Claims priority, application Japan, Feb. 9, 1993, 5-021428; Jul. 7, 1993, 5-168080

Int. Cl.<sup>6</sup> A22C 25/14

U.S. Cl. 452-110

3 Claims



1. An apparatus of taking out the viscera of a fish comprising: carrying means for moving forward said fish the head of which is cut off;

cutting blade means for incising the belly of said fish which is being moved;

guide rod means which is positioned at the upstream side of said cutting blade means and which is adapted to be inserted into the body of said fish from the head side of said fish and to be drawn out from the anus to control the position of said fish when being cut by said cutting blade means;

stationary bone-supporting plate means which is positioned at the downstream side of said cutting blade means, and which has an upper surface inclined downstream with a rising gradient to place the bone within the body of said fish thereon to cause said fish to rise, thereby performing the positioning of the bone of said fish; and

blade means for peeling off a membrane of the fish, which is positioned at the downstream side of said bone-placing plate means and which has an inverted U-shaped cross section which is adapted to be inserted between the inner wall of the meat of said fish and a coelomic membrane and enables roe, viscera and the like to be stripped from the meat of said fish together with said coelomic membrane.

5,413,525

## FISH PROCESSING ARRANGEMENT

Horst H. Braeger, Lübeck; Klaus-Dietrich Nüske, Stockelsdorf, and Siegfert Wruck, Stralsund, all of Germany, assignors to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG, Lübeck, Germany

Filed Jun. 6, 1994, Ser. No. 254,709

Claims priority, application Germany, Jun. 7, 1993, 43 18 810.9

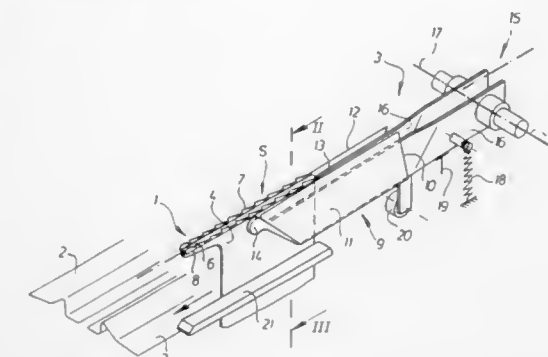
Int. Cl.<sup>6</sup> A22C 25/16

U.S. Cl. 452-165

17 Claims

1. A fish processing machine for processing decapitated fish trunks, said fish trunks comprising a tail portion and a ventral side and having an abdominal cavity with an abdominal cavity end, said abdominal cavity being open on said ventral side, said machine comprising conveying means defining a longitudinal direction of movement and including at least one saddle-like supporting member defining a supporting surface for supporting said fish trunks in their abdominal cavities and for conveying the same with the tail portion leading in said longitudinal direction, said supporting surface describing a path of movement, and auxiliary saddle means for initially supporting said fish trunks, wherein said auxiliary saddle means comprises supporting elements provided with adjacent supporting edges extending in said longitudinal direction, a gap being formed between said supporting elements for allowing the passage of

said at least one supporting member, said auxiliary saddle means being controllable to move between a first position in which said supporting edges protrude beyond said path of said



supporting surface of said at least one supporting member and a second position in which said supporting surface protrudes beyond said supporting edges of said auxiliary saddle means.

5,413,526

## SOLID COOLANT INSERTER

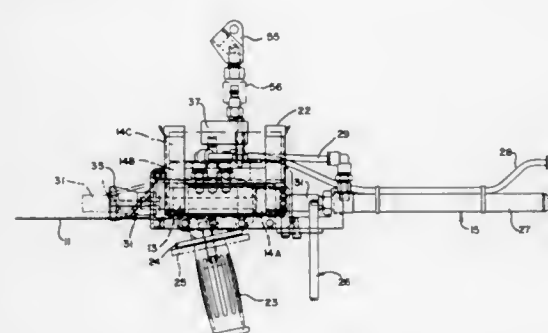
Norman C. Abler, Madison; Gary R. Skaar, Marshall, and William Paulos, McFarland, all of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Feb. 28, 1994, Ser. No. 203,160

Int. Cl.<sup>6</sup> A22B 5/00

U.S. Cl. 452-176

32 Claims



1. A tool for inserting a solid coolant charge into a carcass muscle area of an animal carcass or portion thereof, the insertion tool comprising:

a compartment for receiving and holding a charge of solid coolant;

a spear blade rigidly positioned with respect to a leading end portion of said compartment;

a thruster for moving the insertion tool into the carcass muscle area to thereby insert the spear blade into the muscle area, form a slit in the muscle area and access a carcass pocket within the animal carcass or portion thereof;

an actuator assembly that is triggered by the action of said spear blade being inserted into the carcass muscle area; and

a ram assembly in operative communication with said actuator assembly, which ram assembly moves the solid coolant charge from out of the compartment and into the carcass pocket in response to actuation thereof by said actuator assembly.

5,413,527

## ENVIRONMENTAL CONTROL APPARATUS

Yoshitaka Dansui, Osaka, and Hiroko Sakai, Tokyo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

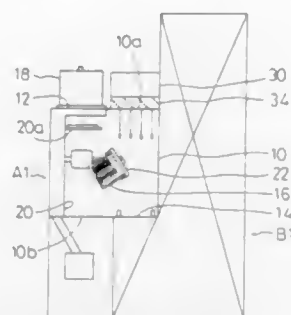
Filed Aug. 31, 1993, Ser. No. 113,691

Claims priority, application Japan, Aug. 31, 1992, 4-230889

Int. Cl.<sup>6</sup> F24F 3/16

U.S. Cl. 454—57

6 Claims



4. An environmental control apparatus to be mounted in a device fabrication apparatus which requires a clean environment in producing plate-like devices, comprising:

- an air-tight chamber;
- an entrance provided in said air-tight chamber through which devices are carried in said air-tight chamber;
- an exit provided in said air-tight chamber through which the devices are carried out of said air-tight chamber toward said device fabrication apparatus, said devices staying in the same position since they were carried in through said entrance;

means for conveying the devices in said air-tight chamber from said entrance to said exit while keeping the devices in the same position throughout the conveyance since they were carried in through said entrance; and means for circulating gas comprising a duct which is provided outside of said air-tight chamber, a fan for circulating the gas in said duct which is provided inside of said duct, a high-efficiency filter for cleaning the circulating gas and a chemical adsorbent for removing a gaseous impurity from the circulating gas, whereby said means for circulating gas absorbs from said air-tight chamber the dirty gas flowing through between the devices and supplies said air-tight chamber with a clean gas in a laminar flow parallel to the surface of the devices.

5,413,528

## AIR CONDITIONING SYSTEM FOR MOTOR VEHICLES

Hans G. Pabst, Gaimersheim; Holger Grossmann; Heinz Wiedemann, both of Ingolstadt, and Fritz Naumann, Stammham, all of Germany, assignors to Audi AG, Ingolstadt, Germany

PCT No. PCT/EP89/00582, § 371 Date Feb. 8, 1991, § 102(e) Date Feb. 8, 1991, PCT Pub. No. WO90/01428, PCT Pub. Date Feb. 22, 1990

PCT Filed May 26, 1989, Ser. No. 654,606

Claims priority, application Germany, Aug. 12, 1988, 38 27 377.2

Int. Cl.<sup>6</sup> B60H 1/24

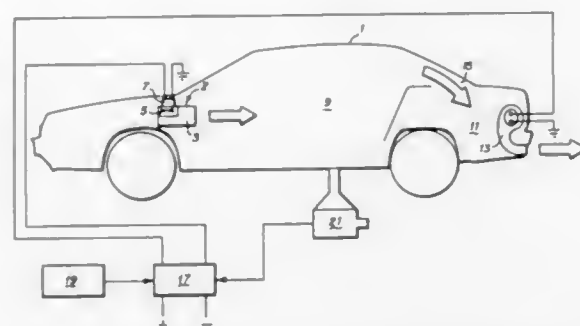
U.S. Cl. 454—70

10 Claims

1. An air conditioning system for the climate control of the passenger compartment of motor vehicle having at least two compartments, a forward compartment and a passenger compartment, comprising in operative combination:

- a) a first fan for directing the flow of air into and pressurizing said passenger compartment;
- b) a second fan for exhausting said air flow from said passenger compartment; and
- c) means for regulating the speed of both of said fans with respect to each other wherein:
  - i) said regulating means adjusts the workload and air throughput of each fan over the course of a driving trip

in response to changes in pressure associated with variances in automobile velocity to reduce audible fan noise and maintain a slight overpressure in said passenger compartment to promote rapid air exchange with the



outside ambient atmosphere in a first, window-closed operating condition; and

ii) said regulating means reduces the workload and air throughput of each fan in a second, window-open operating condition.

5,413,529

## MULTI-COMPONENT HOUSING

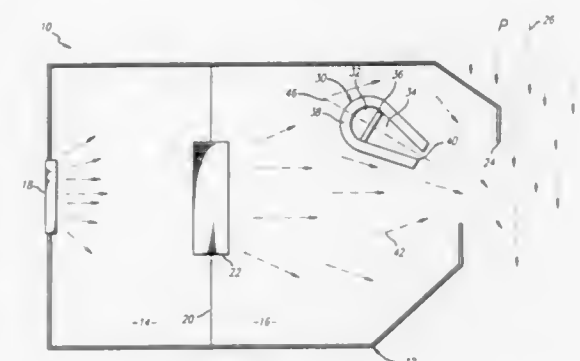
Joel T. Aragon, Everett, Wash., assignor to Intermec Corporation, Everett, Wash.

Filed Sep. 9, 1993, Ser. No. 119,464

Int. Cl.<sup>6</sup> F24F 9/00

U.S. Cl. 454—251

20 Claims



1. A multi-compartment housing, positioned in an ambient fluid having an ambient pressure P, comprising:

- a) an outer housing wall defining an enclosed volume,
- b) at least first and second compartments formed within said enclosed volume, including heat generating equipment in at least one of said at least first and second compartments,
- c) a fluid egress port in said housing wall for the restricted egress of fluid from said second compartment to the ambient fluid,
- d) filter means in said housing wall providing a filtered ingress from the ambient fluid to said first compartment,
- e) compressor means positioned between said first and second compartments to maintain fluid pressure in said first compartment at a pressure less than the ambient pressure P, and to maintain fluid pressure in said second compartment at a pressure greater than the ambient pressure P, and
- f) a multi-chamber inner housing positioned within said second compartment defining an inner housing volume including:
  - 1) an equipment chamber defining a first chamber volume within said inner housing volume that is sealed from said second compartment fluid pressure,

- 2) a still-fluid chamber defining a second chamber volume within said inner housing volume and having a restricted port placing said second chamber volume in fluid communication with said second compartment, and
- 3) an optically transparent wall between said first and second chamber volumes placing said equipment chamber in a line-of-sight alignment with said second compartment fluid egress port through said restricted port.

5,413,530

## DEVICE FOR CONTROLLING TEMPERATURE IN A ROOM

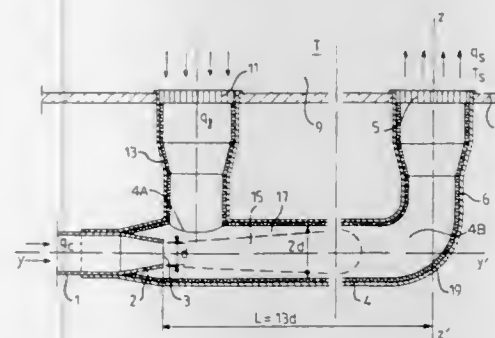
Edmond Montaz, Le Vesinet, France, assignor to S P I R E C -sarl-, Paris, France

Continuation of Ser. No. 952,516, Dec. 3, 1992, abandoned. This application Jan. 14, 1994, Ser. No. 182,669

Int. Cl.<sup>6</sup> F24F 7/06, 13/04

U.S. Cl. 454—262

21 Claims



1. A device for regulating the temperature in a room (9) using pulsed low-velocity air flow ( $q_s$ ) to provide a silent flow of air to a room at a low output speed, comprising:

- an extraction vent (11, 72) and a delivery vent (5, 74) disposed in the room (9);
- a pipe (4, 70) having an extraction orifice (4A) and a delivery orifice (4B), said pipe (4) being in communication with a plant for receiving an air flow ( $q_c$ ) through a pressurized air duct (1) forming a central and axial air flow therein for delivery of air flow ( $q_c$ ) through said delivery orifice (4B) to said delivery vent (5, 74) and for receiving an air flow taken up by said extraction vent (11, 72) for delivery to said pipe (4), said extraction vent (11, 72) opening out into said pipe (4, 70) and said delivery orifice (4B) opening out to said delivery vent (5, 74) from said pipe (4, 70) into the room (9);

means combining the air flow from said extraction vent (11, 72) through said extraction orifice (4A) with the air flow directed to said delivery vent (5, 74) from said pressurized air duct (1) for forming in said pipe (4, 70), between said extraction orifice and said delivery orifice, coaxial air streams including a central air stream (15) in which the air moves at a high velocity towards said delivery vent (5, 74) and a peripheral annular air stream (17) delivered from said extraction orifice and surrounding said central air stream (15) in which the air moves at low velocity between said extraction orifice and said delivery orifice; and said pipe (70) being a tubular element with a circular cross section having an axis ( $yy'$ ) thereby creating an annular and external air stream at very low speed which protects said central air stream at a higher speed, whereby different perturbations of the air stream are avoided.

5,413,531

## ROTOR ASSEMBLY FOR A COMBINE

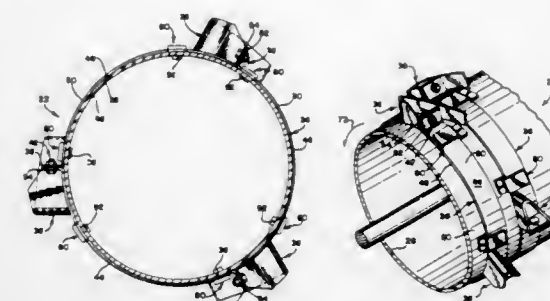
Dale R. Tanis, Naperville, Ill., assignor to Case Corporation, Racine, Wis.

Filed Aug. 6, 1993, Ser. No. 103,070

Int. Cl.<sup>6</sup> A01F 12/18

U.S. Cl. 460—72

19 Claims



1. A combine having a mobile frame and a threshing assembly mounted on the frame, said threshing assembly comprising: a stationary generally cylindrical casing mounted on the frame; and

a rotor coaxially mounted for rotation and operable in conjunction with the cylindrical casing to thresh and separate grain from material other than grain, said rotor comprising an elongated drum having a generally cylindrical outer wall extending along the length of the drum, and a plurality of longitudinally spaced straps circumferentially arranged along and about the outer wall of the drum, each strap having at least one threshing element connected thereto, and a clamp mechanism for releasably clamping the strap against the outer wall of the drum, said clamping mechanism permitting the respective strap and the threshing element connected thereto to be quickly and easily replaced and/or shifted relative to adjacent threshing elements carried by adjacent straps thus enabling the same rotor to handle different crop materials depending upon the circumferential orientation and longitudinal spacing of the straps relative to each other about and along the rotor.

5,413,532

## ID CARDS FOR IMPACT AND NON-IMPACT PRINTERS

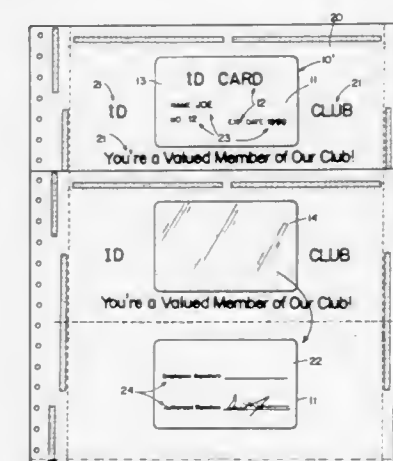
James M. Raby, Niagara, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Mar. 29, 1993, Ser. No. 38,632

Int. Cl.<sup>6</sup> B41L 1/20

U.S. Cl. 462—2

19 Claims



1. An identification card assembly, comprising:



a plurality of identification cards each having top and bottom faces;  
 indicia imaged on each said card top face; and  
 an intermediate carrier for said cards, comprising: a release material web; permanent adhesive disposed on a first face of said release material web; stock having first and second faces, said stock first face operatively disposed on said permanent adhesive; and a repositional adhesive operatively associated with said stock second face, said repositional adhesive engaging a face of each of said cards;  
 said repositional adhesive having greater affinity for said cards than said permanent adhesive has for said release material web; and said repositional adhesive having greater affinity for said stock second face than said repositional adhesive has for the faces of each of said cards engaged thereby.

5,413,533

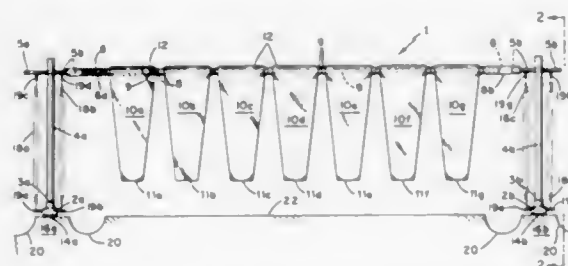
# AIMING APPARATUS FOR BOWLING HAVING PIVOTAL TARGETS

Edward Bolus, 700 North Keyser Ave., Scranton, Pa. 18504, and Anthony Bergamino, 2828 Rock Rd., Newtown Ransom, Pa. 18411

Filed Aug. 3, 1993, Ser. No. 101,478  
 Int. Cl.<sup>6</sup> A63D 5/04; A63B 69/36

U.S. Cl. 473-55

4 Claims



1. A bowling aiming apparatus for use with a bowling alley having a width and being positioned between a pair of bowling alley separators which separate the bowling alley from adjacent bowling alleys, said bowling aiming apparatus, comprising:

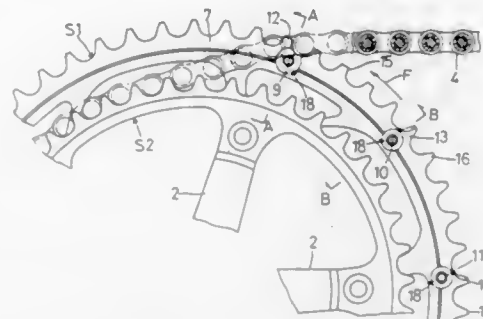
- an elongated member;
- a pair of support structures, each of which being removably attachable to a corresponding bowling alley separator, said elongated member having each end thereof attached to a corresponding support structure, each support structure having a height within a predetermined range of heights wherein each of said structures includes means for varying the height of said elongated member within the predetermined range of heights; and
- a plurality of independently hanging target panels rotatably attached to said elongated member, each of said target panels comprising a planar body having a first side and a second side, each of said target panels having a top end adjacent said elongated member and a bottom end opposite said top end, each of said target panels having a taper intermediate said top and bottom ends wherein the width of said top end is greater than the width of said bottom end, said taper of each target panel facilitating aiming for a specific area of the bowling alley, each of said target panels indicating a corresponding travel path of a bowling ball whereby the bowling ball contacts said first side of and deflects one of said target panels in order to pass under said elongated member and indicate the path of the bowling ball.

## 5,413,534 CHAIN SHIFT AIDING STRUCTURE FOR BICYCLE SPROCKET

Masashi Nagano, Izumi, Japan, assignor to Shimano Inc., Japan  
 Continuation of Ser. No. 964,523, Oct. 19, 1992, abandoned.  
 This application Dec. 13, 1993, Ser. No. 165,537  
 Claims priority, application Japan, Oct. 21, 1991, 3-272170  
 Int. Cl.<sup>6</sup> F16H 9/10

U.S. Cl. 474-78

12 Claims



1. A sprocket assembly for a bicycle comprising:  
 a large sprocket;  
 a small sprocket; and  
 chain support means projecting from a side surface of said large sprocket toward said small sprocket, and including a contact portion defining a contact surface for contacting, without meshing, a lower end of a chain shifted from said small sprocket to said large sprocket;  
 wherein said chain support means is disposed for causing said contact surface to contact said chain engaging said small sprocket and pick up said chain radially outwardly of said large sprocket during a chain shift from said small sprocket to said large sprocket, and wherein said contact surface is arched upwardly relative to the bicycle.

5,413,535

# APPARATUS FOR DAMPING VIBRATIONS

Wolfgang Reik, Bühl, Germany, assignor to Luk Lamellen und Kupplungsbau GmbH, Bühl, Germany

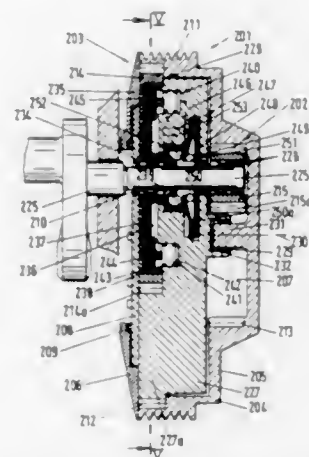
Filed Apr. 18, 1994, Ser. No. 228,655

Claims priority, application Germany, Apr. 20, 1993, 43 12 722.3

Int. Cl.<sup>6</sup> F16F 15/00

U.S. Cl. 474-94

30 Claims



1. Apparatus for absorbing vibrations of a rotary input device which drives at least one endless transmission member and has a circular peripheral portion, comprising:  
 a hollow torque transmitting element having a circular radi-

ally outer portion, said at least one member being trained over said outer portion;  
 said element further having a circular radially inner portion eccentric with reference to, spacedly surrounding and including a part in rolling contact with said peripheral portion; and  
 said element being free to perform pendulum movements relative to said device about a roving axis at said part of said inner portion.

5,413,536

# LOW NOISE ACTIVE TRACKING MECHANISM

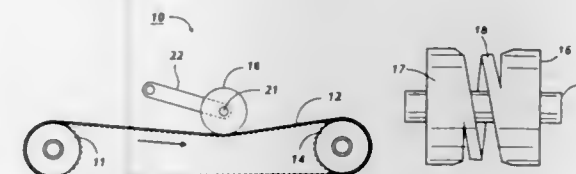
Chee-Chiu J. Wong, Fairport, and Walter J. Sanborn, West Henrietta, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 1, 1993, Ser. No. 143,713

Int. Cl.<sup>6</sup> F16H 7/00

U.S. Cl. 474-101

12 Claims



1. In a belt drive system that includes a belt entrained around spaced apart drive and driven pulleys and a center supported idler biased into the space between the drive and driven pulleys to tension the belt, an improvement that reduces noise generated by the system is characterized by the idler, comprising:

two cylindrical end members; and  
 an integral, helical portion positioned between said two cylindrical end members, said idler being adapted move with the belt to damp or store vibratory energy created by the belt and thereby minimize noise in the belt drive system.

5,413,537

# POSITIVE DRIVE SYSTEM

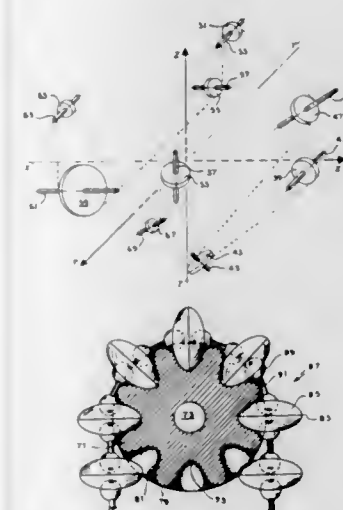
Daniel A. Hume, 1292 Boonesborough Rd., Lot 84, Richmond, Ky. 40475

Filed Jul. 7, 1994, Ser. No. 271,489

Int. Cl.<sup>6</sup> F16H 7/06

U.S. Cl. 474-154

2 Claims



1. A positive drive system having a chain trained around, operatively engaging and rotatably coupling drive and driven

sprockets to transmit positive drive between the drive and driven sprockets, the chain comprising adjacent sets of symmetrical shell halves joined together in fixed relationship, each set of shell halves being operatively connected to immediately adjacent sets by link assemblies, each of which has two aligned spheres fixedly connected to an aligned link, each shell half having a lip, freely receiving one of the spheres and functioning as a limit by complementally receiving a portion of its sphere in common abutting relationship therewith, each of the sprockets having and defining valleys and ridges with sloped surfaces therebetween, each sloped surface defining the surface between which each valley ends and each ridge begins, each the shell halves of each set having lower portions complementally engaging the common valleys of the sprockets and being released therefrom upon drive being transmitted to the chain, the chain, as engaged with the sprockets, allowing dispositions of the sprockets in infinite relative planes of rotations ranging from 0 to 360 degrees.

5,413,538

# POWER TRANSMISSION BELT

Kyoichi Mishima, Hyogo, Japan, assignor to Mitsubishi Belting Ltd., Hyogo, Japan

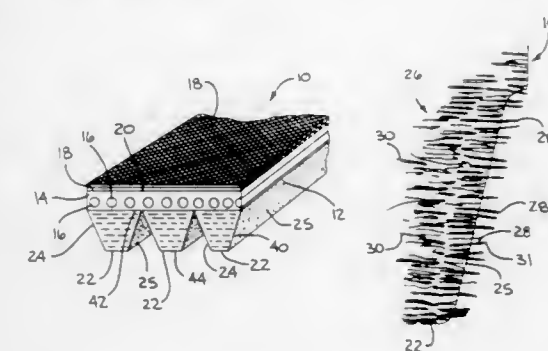
Filed Mar. 4, 1994, Ser. No. 205,993

Claims priority, application Japan, Mar. 4, 1993, 5-070981

Int. Cl.<sup>6</sup> F16G 5/08

U.S. Cl. 474-263

23 Claims



1. A power transmission belt comprising:  
 a belt body having a length and laterally oppositely facing pulley engaging side surfaces;  
 a first plurality of short fibers embedded in the belt body and extending substantially in a lateral direction, said first plurality of short fibers being made from a first material; and  
 a second plurality of short fibers embedded in the belt body and extending substantially in a lateral direction, said second plurality of short fibers being made from a second material,  
 there being a plurality of said short fibers made from said first material that project laterally outwardly from at least one of the pulley engaging side surfaces on the belt body.

5,413,539

**CONTROL SYSTEM FOR CONTROLLING  
ENGAGEMENT OF AN AUTOMATIC TRANSMISSION  
TORQUE CONVERTER CLUTCH**

Allan S. Leonard, Westland; Kenneth G. Walega, Allen Park;  
David M. Garrett, Rochester Hills; Thomas L. Greene, Plym-  
outh; John A. Daubenmier, Canton; Bruce J. Palansky, Livon-  
ia, and Lawrence H. Buch, Farmington Hills, all of Mich.,  
assignors to Ford Motor Company, Dearborn, Mich.

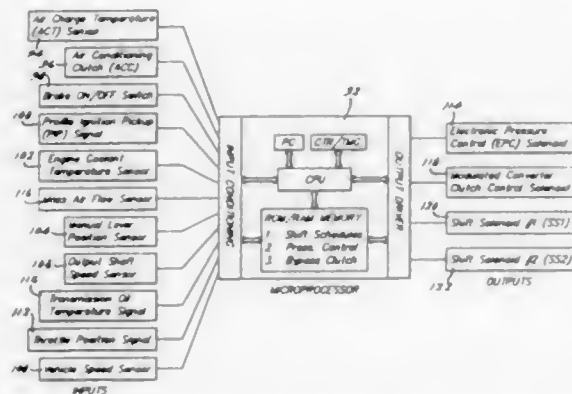
Division of Ser. No. 926,627, Aug. 10, 1992, Pat. No. 5,305,663.

This application Jan. 26, 1994, Ser. No. 187,440

Int. Cl.<sup>6</sup> F16H 61/06

U.S. Cl. 475-63

## 14 Claims



1. In a bypass clutch for a hydrokinetic torque converter for an automatic transmission and engine;

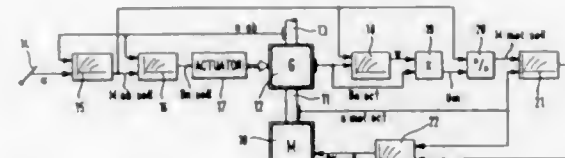
- a clutch member connected to said engine, a converter having a friction surface adapted to cooperate frictionally with said clutch member;
- a fluid pressure operated means for controlling the clutching capacity of said bypass clutch whereby clutch slip may be effected for a variety of engine and transmission conditions;
- electronically operated valve means for controlling the pressure applied to said fluid pressure operated means, said valve means being connected to and being responsive to an electronic processor adapted for control functions in repetitive control loops and having control logic that responds during each control loop to changes in operating conditions of said transmission and engine;
- means for determining a target slip for each set of said operating conditions;
- means for determining the actual slip of said bypass clutch;
- means for determining a desired slip in a clutch slipping mode at the beginning of clutch engagement by multiplying said actual slip during each control loop of said processor by a factor less than unity whereby said desired slip decreases until it equals said target slip, said actual slip thereby being made equal to target slip, and means for establishing a hardlock mode after said actual slip equals target slip whereby the torque flow path through said converter is bypassed.

5,413,540  
TORQUE-SETTING SYSTEM FOR VEHICLE WITH  
CONTINUOUSLY VARIABLE TRANSMISSION (CVT)  
Martin Streib, Vaihingen/Enz, and Rolf Leonhard, Schwieber-  
dingen, both of Germany, assignors to Robert Bosch GmbH,  
Stuttgart, Germany  
Filed Jul. 2, 1993, Ser. No. 86,612  
Claims priority, application Germany, Jul. 21, 1992, 42 23  
967.2

Int. Cl.<sup>6</sup> F16H 59/36, 59/00; B60K 41/14  
U.S. Cl. 477—43 20 Claims  
1. An apparatus for adjusting the output characteristics of a

continuously variable transmission of a vehicle provided with a combustion engine, to a predetermined value, comprising:

- accelerator means (14);
- means (15) for determining a transmission output torque target value ( $M_{ab\ soll}$ ) as a function of the position ( $\alpha$ ) of said accelerator means (14);
- means (18, 19, 20) for calculating an engine torque target value ( $M_{mot\ soll}$ ) as a function of said transmission output torque target value ( $M_{ab\ soll}$ ) and an instantaneous, actual transmission ratio ( $U_{n\ act}$ );
- wherein said engine torque target value ( $M_{mot\ soll}$ ) calculating means is connected to and controls the combustion engine (M); and

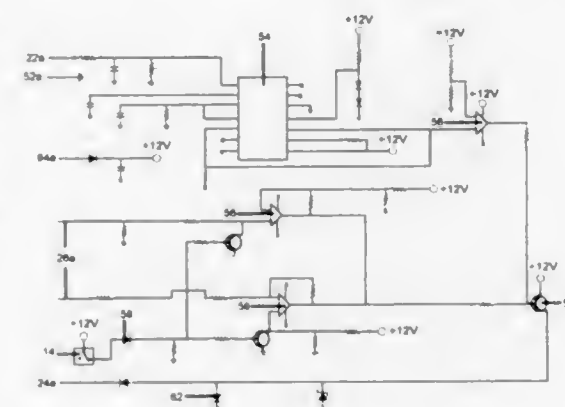


means (16) for calculating a transmission ratio target value ( $U_{n \text{ soll}}$ ) as a function of transmission output speed ( $n_{ab}$ ) and one of the position ( $\alpha$ ) of said accelerator means and said transmission output torque target value ( $M_{ab \text{ soll}}$ ) on the basis of stored values relating transmission output speed ( $n_{ab}$ ) to transmission output torque target value ( $M_{ab \text{ soll}}$ ), and wherein said transmission ratio target value calculating means (16) is connected to and controls the transmission ratio of said transmission (G) and receives an input from at least one of said accelerator means (14) and said transmission output torque target value ( $M_{ab \text{ soll}}$ ) determining means (15).

5,413,541  
SHIFT CONTROL DEVICE RETROFITTED TO INHIBIT  
A DOWNSHIFT TO FIRST GEAR IN AN L-POSITION  
FOR AUTOMOBILE AUTOMATIC TRANSMISSION  
James L. Nasset, 5157 Dumore Dr. SE., Aumsville, Oreg. 97325  
Filed Jan. 21, 1993, Ser. No. 7,327  
Int. Cl.<sup>6</sup> F16H 5/28

U.S. Cl. 477-81

## 14 Claims



1. A shift control device for inhibiting an automatic downshift to a first gear from a second gear in an automatic transmission of a vehicle, the second gear being normally engaged when a plurality of solenoids in the transmission are set in a predetermined energization pattern by a transmission controller provided with the transmission, the downshift to the first gear being normally effected when the transmission controller

sets the solenoids in a different energization pattern, the shift control device comprising:

control means having an output adapted to be connected to at least one of the solenoids to supply power thereto to maintain the solenoids in the predetermined energization pattern, and  
a user operated switch connected to said control means for activating and deactivating the output,  
wherein the solenoids are maintained in the predetermined energization pattern by said control means, when activated by said user operated switch to cause the transmission to remain in the second gear instead of downshifting.

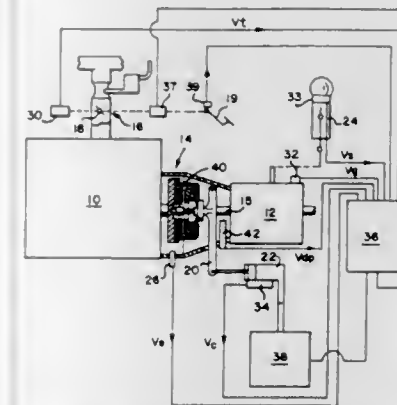
5,413,542  
CLUTCH CONTROL SYSTEM  
Roger P. Jarvis, 87 Lime Avenue, Leamington Spa, Warwick-  
shire CV32 7DG, Great Britain  
PCT No. PCT/GB92/00973, § 371 Date Dec. 8, 1993, § 102(e)  
Date Dec. 8, 1993, PCT Pub. No. WO93/00227, PCT Pub.  
Date Jan. 7, 1993

PCT Filed May 28, 1992, Ser. No. 162,046  
Claims priority, application United Kingdom, Jun. 28, 1991,  
9114005

U.S. Cl. 477—84 Int. Cl.<sup>6</sup> B60K 41/02

U.S. Cl. 477-84

## 9 Claims



1. A motor vehicle clutch control system for a vehicle friction clutch (14) comprising a clutch position sensor (34), a throttle position sensor (30), gear selection means (24), clutch actuation means (22) and control means (36) (38) arranged such that during clutch disengagement for a gear shift initiated by the gear selection means (24) the clutch actuation means (22) holds the clutch (14) in a partially disengaged position until the sensed throttle signal falls below a predetermined throttle value (TL).

5,413,543  
ANKLE, FOOT AND TOES EXERCISING APPARATUS  
Marcello S. Drago, 17557 Rhoda St., Encino, Calif. 91316  
Filed Jul. 23, 1993, Ser. No. 95,849  
Int. Cl.<sup>6</sup> A63B 21/04, 23/08, 23/10

U.S. Cl. 482—49

## 5 Claims

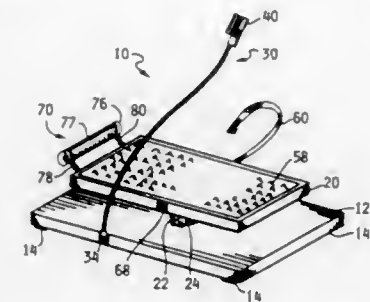
1. An ankle, foot and toes exercising apparatus comprising:

- a) a lower stationary platform having an upper surface, a lower surface, a left edge, a right edge, a front edge and a back edge,
- b) an upper movable platform having an upper surface, a lower surface, a left edge, a right edge and a front edge,
- c) a platform spring attached between said lower stationary platform and said upper movable platform by an attachment means, where when a foot is placed upon said upper movable platform, the ankle and foot can be exercised by allowing the foot to move said upper movable platform, about said platform spring, up or down, radially or in a

combination exercise comprising both an up and down motion and a radial motion, and

d) a toe exercising assembly comprising:

(1) said upper movable platform having spaced apart at its front edge, a first spring bore and a second spring bore, where said bores are bored at a substantially 45-degree angle, and

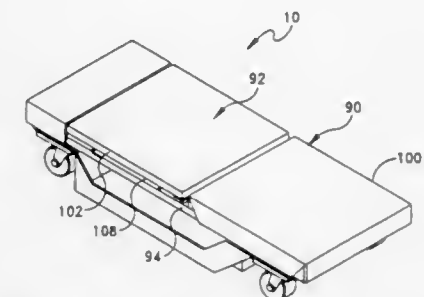


(2) a toe gripping rod having a first spring and a second spring attached and spaced across said gripping rod to allow said first and second springs to be inserted into and attached respectively to the base of said first and second spring bores, where said toe exercising assembly allows said toes to be moved up and down, inward and outward or in a combination exercise comprising both an up and down motion and an inward and outward motion.

5,413,544  
EXERCISING SCOOTER  
Russell D. Fiore, 6 Red Chimney Dr., Lincoln, R.I. 02865  
Filed Mar. 4, 1994, Ser. No. 205,793  
Int. Cl.<sup>6</sup> A63B 22/20

J.S. Cl. 482—68

## 14 Claims



1. A multi-use exercising device for use on a horizontal surface including a frame in turn including an essentially planar supporting surface for supporting a body portion of an exerciser and further defining a lateral plane, said frame having first floor contact means providing multi-directional movement of said supporting surface within said lateral plane including front to rear and side to side movement such that the exerciser body portion may be positioned on said supporting surface while moving said frame in one or more of said directions by exerting force on the horizontal surface with other exerciser body portions which are not supported on said supporting surface such that the device and exerciser are mutually propelled by such exerting force, said frame having second floor contact means entirely separate from said first floor contact means, and said second floor contact means including means for adjusting the resistance to movement of said frame such that the exerciser exerting force needed to move said frame can be progressively increased or decreased and means for maintaining resistance to movement of said frame independent of the position or activity of the exerciser relative to said frame.



5,413,545

# TRAINING DEVICE, ESPECIALLY FOR DOWNHILL SKIERS

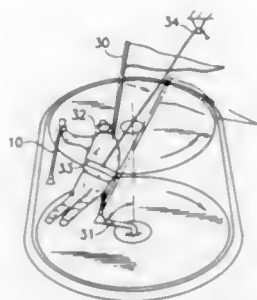
Alexander Bermann, Max-Kahlke-Weg 1, Glückstadt, Germany 25348

Filed Dec. 27, 1993, Ser. No. 174,157

Int. Cl.<sup>6</sup> A63B 69/18, 22/16

U.S. Cl. 482-71

19 Claims



1. A training device for skiers, comprising in combination, at least a pair of circular discs which are rotatably mounted on a support to form support platforms for a skier, driving means operatively axially connected to each said pair of circular discs for rotating them in mutually opposite directions, whereby the skier shifts from one rotating disc to the other by jumping or stepping onto the adjoining oppositely rotating disc to simulate wedeln or parallel downhill ski turns.

5,413,546

# BICEP EXERCISE DEVICE

Vincent F. Basile, 19 Rosen Street, Epping, New South Wales 2121, Australia

Continuation of Ser. No. 791,907, Nov. 13, 1991, abandoned.

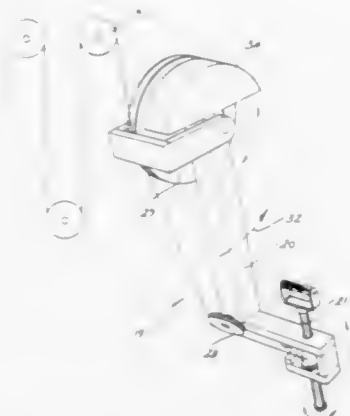
This application Sep. 20, 1993, Ser. No. 124,574

Claims priority, application Australia, Nov. 13, 1990, PK3336

Int. Cl.<sup>6</sup> A63B 21/22

U.S. Cl. 482-99

9 Claims



1. A bicep exercise device comprising:  
a base frame;  
an arm mounted on said base frame for pivoting movement about a first axis;  
said arm further comprising an off-set portion for receiving a rotatable shaft;  
said rotatable shaft, mounted on said off-set portion and extending toward said first axis, said rotatable shaft terminating in a hand grip, said hand grip being generally perpendicular to said shaft;  
first means for imposing a resistive force to rotation of said arm about said first axis;  
second means for imposing a resistive force to rotation of said shaft; and wherein said rotatable shaft is splined and

slides within a splined passage in a hub; and said hub being mechanically linked with said second means.

5,413,547

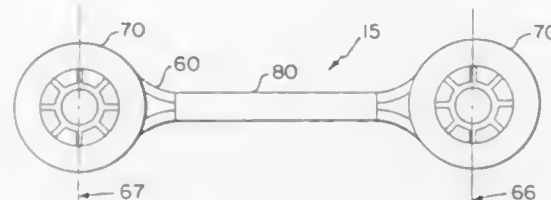
# BIASING MEANS FOR AN EXERCISE DEVICE

Richard W. Cole, Nixa, and Clinton L. Bishop, Springfield, both of Mo., assignors to Dayco Products, Inc., Dayton, Ohio Division of Ser. No. 71,123, Jun. 2, 1993, Pat. No. 5,334,122, which is a division of Ser. No. 792,513, Nov. 13, 1991, Pat. No. 5,242,353. This application May 12, 1994, Ser. No. 241,512

Int. Cl.<sup>6</sup> A63B 21/02

U.S. Cl. 482-121

12 Claims



1. A biasing means for use with an exercising machine having a fixed support member and a movable lever arm pivotally mounted on the support member, said biasing means comprising a first end means adapted to be detachably disposed on the lever arm and a second end means adapted to be detachably disposed on the support member for providing resistance to motion of the lever arm, each said end means having at least one of inside surface means, first side edge means and second side edge means, at least one end member comprising outer supporting surfaces, said end member being placed within at least one of said end means, wherein a portion of said end means is contiguous with at least one of said outer supporting surfaces and is adapted to move thereabout.

5,413,548

# BODY GYM EXERCISER

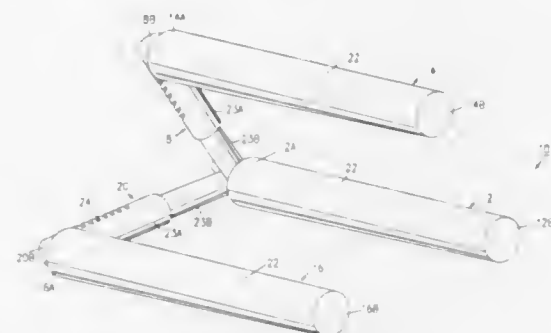
Ned Hoffman, 6009 Auburn Ave., Oakland, Calif. 94618

Filed Oct. 27, 1993, Ser. No. 143,840

Int. Cl.<sup>6</sup> A63B 21/045

U.S. Cl. 482-127

19 Claims



1. A portable exercise device comprising:  
(a) a first bar having a distal end and a proximal end;  
(b) a first arm having a distal end and a proximal end, the proximal end of the first arm being attached to the proximal end of the first bar, such that the first bar and the first arm are disposed substantially at right angles;  
(c) a second arm having a distal end and a proximal end, the proximal end of the second arm being swivably attached to an end of the first bar such that the first bar and the second arm are disposed substantially at right angles;  
(d) a second bar having a distal end and a proximal end, the proximal end of the second bar being attached to the distal end of the first arm such that the second bar is disposed at

substantially right angles to the first arm and such that the second bar is disposed substantially parallel with the first bar;

(e) a third bar having a distal end and a proximal end, the proximal end of the third bar being attached to the distal end of the second arm such that the third bar is disposed at substantially right angles to the second arm and such that the third bar is disposed substantially parallel with the first and second bars; and

(f) torsion means for resisting the swiveling of the second arm with respect to the first bar wherein the first bar, the second bar and the third bar are retained in spaced-apart, parallel relationship with one another solely by the first arm and the second arm.

5,413,549

# DEVICES AND METHODS FOR EFFICIENT INTRA-AORTIC BALLOON PUMPING

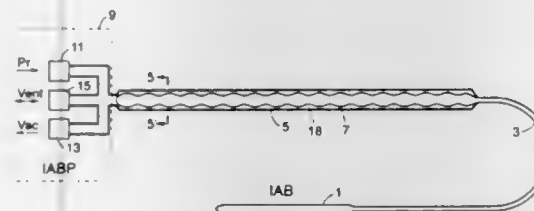
Boris Leschinsky, Waldwick, N.J., assignor to Datascope Investment Corp., Montvale, N.J.

Filed Oct. 7, 1993, Ser. No. 132,965

Int. Cl.<sup>6</sup> A61N 1/362

U.S. Cl. 600-18

16 Claims



1. A reduced volume intra-aortic balloon catheter assembly, comprising:  
an intra-aortic balloon defining a balloon chamber;  
a connecting catheter having a connecting catheter lumen, said connecting catheter lumen being in fluid communication with said balloon chamber;  
an extension catheter having an extension catheter lumen and an extension catheter lumen inner wall, said extension catheter lumen having a proximal end and a distal end, said proximal end being designed for connection to a fluid pressurizing/depressurizing means, said distal end being in fluid communication with said connecting catheter lumen; and  
a safety balloon disposed in said extension catheter lumen, said safety balloon defining a safety balloon chamber and having a working fluid therein, said safety balloon chamber communicating with said connecting catheter lumen, wherein when a drive fluid is introduced between said extension catheter lumen inner wall and said safety balloon, said safety balloon collapses, urging said working fluid contained in said safety balloon chamber into said connecting catheter lumen and from said connecting catheter lumen into said intra-aortic balloon chamber, inflating said intra-aortic balloon.

5,413,550

# ULTRASOUND THERAPY SYSTEM WITH AUTOMATIC DOSE CONTROL

John C. Castel, Topeka, Kans., assignor to PTI, Inc., Topeka, Kans.

Filed Jul. 21, 1993, Ser. No. 95,102

Int. Cl.<sup>6</sup> A61H 1/00

U.S. Cl. 601-2

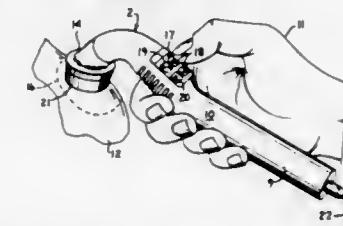
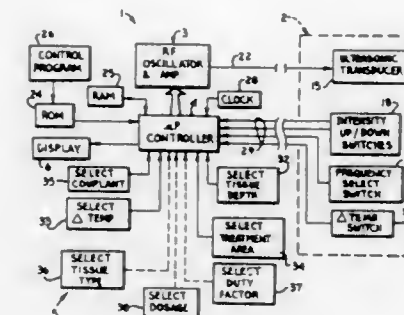
16 Claims

1. A method for automatically controlling by automatic control circuitry a therapeutic ultrasound transducer for ultrasonically treating tissue and comprising the steps of:  
(a) providing means for inputting tissue treatment parameters

into automatic control circuitry operatively connected to a therapeutic ultrasound transducer;

(b) upon tissue treatment parameters being entered, automatically calculating by said control circuitry an ultrasound treatment dosage based on input tissue treatment parameters said treatment dosage including at least two dosage factors which are mathematically related to said dosage;

(c) upon no tissue treatment parameters being entered, automatically calculating by said control circuitry an ultra-



sound treatment dosage based on selected default tissue treatment parameters;

(d) automatically controlling said ultrasound transducer by said control circuitry to maintain the calculated ultrasound treatment dosage;

(e) manually varying a first of said dosage factors; and  
(f) automatically varying a second of said dosage factors to compensate for variation of the first dosage factor to thereby maintain the previously calculated dosage.

5,413,551

# SPHERICAL MASSAGE DEVICE

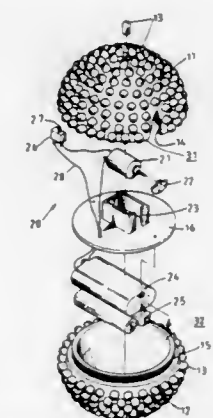
Otto Wu, Room 918, 15 Fu Hsin N. Road, Taipei, Taiwan, Prov. of China

Filed Jan. 3, 1994, Ser. No. 176,843

Int. Cl.<sup>6</sup> A61H 1/00

U.S. Cl. 601-46

5 Claims



1. A spherical massage device adapted to be grasped in the hands of a user comprising a hollow spherical body defining an interior chamber and having a spherical outer surface on which a plurality of arcuate domed projections are uniformly

distributed in closely spaced proximity each to the other and vibration generation means disposed within said interior chamber for imparting oscillatory motion to said projections which are adapted to be contiguously interfaced with the hands of the user, and switch means disposed within said interior chamber for selectively controlling energization and de-energization of said vibration generation means, said switch means including an actuating button extending from said interior chamber to a location internal one of said projections at a position accessible by an appendage of the user's hand to provide said energization and de-energization by displacement of said actuating button responsive to selective displacement of said one projection.

5,413,552

## ARM SLING WITH HUMERAL STABILIZER

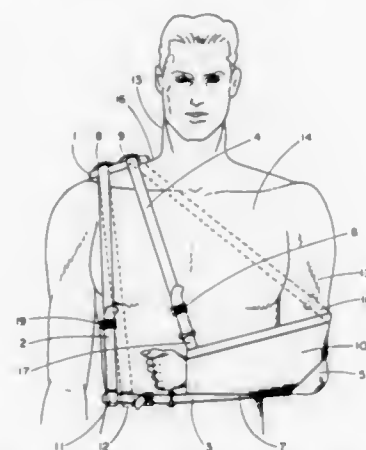
Gloria D. Iwuala, 8918 Winding River, Houston, Tex. 77088

Filed Jun. 6, 1994, Ser. No. 254,521

Int. Cl.<sup>6</sup> A61F 5/40

U.S. Cl. 602—4

2 Claims



1. An improved sling for a patient's injured arm comprising: a pouch adapted to support said injured arm, the rear of said pouch providing an open end adapted to permit the protrusion of the elbow of said injured arm, and the front of said pouch providing an open end adapted to permit the protrusion of the hand and wrist of said injured arm;
- a shoulder anchorage pad which is adapted to rest on top of said patient's shoulder opposite said injured arm, and which provides a plurality of loops through which a plurality of straps are threaded;
- a sling support strap having two connection ends wherein the first end connection is connected to the front of said pouch, is adapted to be draped over said patient's shoulder opposite said injured arm, said sling support strap is threaded through one of said loops in said shoulder anchorage pad, and the second end connection is connected to the rear of said pouch;
- a torso belt which is adapted to be worn around said patient's upper waist or torso, and is attached to said pouch along said pouches' bottom edge; and
- a shoulder anchorage strap having two slidable connection ends wherein the first slidable connection end is slidably connected to said torso belt and slides along a circumferential axis of said torso belt, is adapted to be draped over said patient's shoulder opposite said injured arm, said shoulder anchorage strap is threaded through one of said loops in said padded shoulder anchorage, and the second slidable connection end is slidably connected to said torso belt and slides along a circumferential axis of said torso belt.

5,413,553

## REMEDIAL PROPHYLAXIS FOR CARPAL TUNNEL SYNDROME

John W. Downes, 1816A Ashborough Rd., Marietta, Ga. 30067

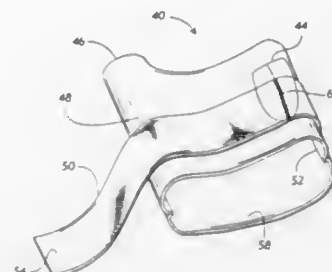
Continuation of Ser. No. 978,875, Nov. 19, 1992, abandoned.

This application May 21, 1993, Ser. No. 66,333

Int. Cl.<sup>6</sup> A61F 5/00; A41D 19/00

U.S. Cl. 602—21

12 Claims



1. Apparatus for remedial prophylaxis of carpal tunnel syndrome comprising a flexible, lightweight glove means having a dorsal side, a palmar side, and a lateral seam for placement over and in proximate contact with a hand, said glove having first and second finger hole means for receiving the fourth finger and thumb, said first and second finger hole means adapted to extend at least partially along the fourth finger and thumb; a single cutout extending between said first and second finger hole means and adapted for receiving the first, second and third fingers; and a tensioning means anchored to said lateral seam of the glove means proximate to the finger hole means which receives the thumb for wrapping over the palmar side of the glove means and securing to the dorsal side of the glove means for holding the first and fifth metacarpal regions of the hand in fixed opposition to each other to provide decompression of the structures of the carpal tunnel.

5,413,554

## HAND SPLINT AND EXERCISER

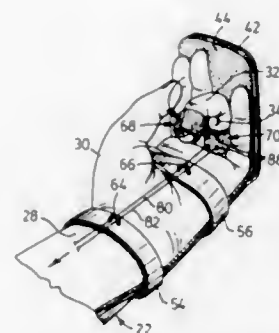
Constance C. Trueman, 585 Indian Road, Mississauga, Ontario, Canada L5H 1R1

Filed Mar. 4, 1994, Ser. No. 210,839

Int. Cl.<sup>6</sup> A61F 5/00; A63B 23/16

U.S. Cl. 602—21

7 Claims



1. A device for use in therapy of the human hand, the device comprising: a combination of a splint and an exerciser, the splint including a generally straight support shaped to receive at least the user's wrist and hand and a finger stop dependent from and angled with respect to said support to maintain the fingers in an angled position with respect to the palm of the hand, straps combining with said support for use to trap the user's wrist and hand in the splint with the fingers against the finger stop, and the exerciser including distal and proximal finger attachments adjustable for attachment

to a damaged finger with the distal attachment positionable adjacent the finger tip and the proximal attachment positionable adjacent the root of the finger, at least one lanyard anchored to the distal attachment and slidably coupled to the proximal attachment so that the user can pull the lanyard whereby the lanyard slides through the proximal attachment and applies a force to the distal attachment to bend the finger in a substantially natural manner.

5,413,556

## PHACOEMULSIFICATION HANDPIECE

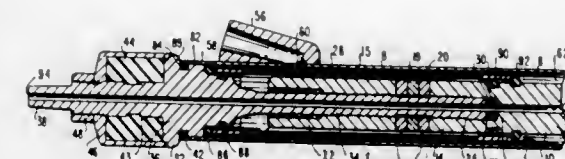
William F. Whittingham, Foothill Ranch, Calif., assignor to Inventive Systems, Inc., Irvine, Calif.

Continuation of Ser. No. 831,460, Feb. 5, 1992, abandoned. This application Aug. 27, 1993, Ser. No. 112,450

Int. Cl.<sup>6</sup> A61B 17/20

U.S. Cl. 604—22

24 Claims



1. A phacoemulsification handpiece device for cutting body tissue from a surgical site and providing for aspiration and irrigation during surgery, said phacoemulsification handpiece device comprising:

cutting means for cutting body tissue;  
drive means, connected to said cutting means, for providing power to said cutting means;  
an irrigation pathway for facilitating the flow of fluid to irrigate an area of body tissue to be cut by said cutting means;  
an aspiration pathway extending through said drive means for facilitating the application of vacuum to the area of body tissue to be cut by said cutting means; and  
an outer shell covering said drive means and defining said irrigation pathway formed by a generally annular space between said outer shell and said drive means, said outer shell being separably attached to said drive means to expose substantially all of said irrigation pathway for facilitating the cleaning of said irrigation pathway and freely rotatable with respect to said drive means such that the sight lines of the surgeon to the surgical site are unimpeded.

5,413,557

## DILATATION CATHETER WITH ECCENTRIC BALLOON

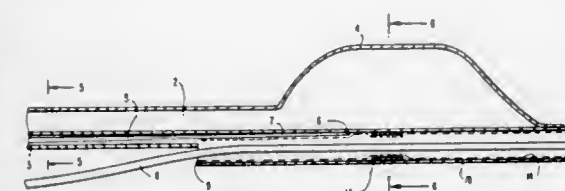
Ronald J. Solar, San Diego, Calif., assignor to Pameda N.V., Netherlands Antilles

Filed Aug. 24, 1993, Ser. No. 111,304

Int. Cl.<sup>6</sup> A61M 29/00

U.S. Cl. 604—96

44 Claims



1. A balloon dilatation catheter which comprises: a catheter shaft defining a first, inflation lumen and a second lumen, each of said first and second lumens having proximal and distal ends, and an inflatable dilatation balloon having proximal and distal ends, wherein the distal end of said first lumen opens into and is in fluid communication with the interior of the dilatation balloon and the second lumen extends longitudinally with the first lumen, the proximal end of the second lumen being adjacent to the proximal end of the first lumen, the distal end of the second lumen being open and distal to the distal end of the first lumen, the section of the second

5,413,555

## LASER DELIVERY SYSTEM

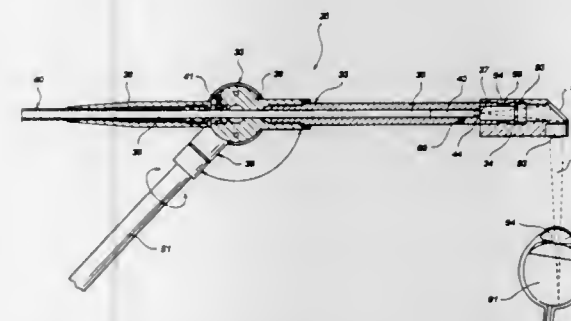
William H. McMahan, P.O. Box 636, 1496 State Hwy. 410, Robertson, Wyo. 82944

Filed Apr. 30, 1993, Ser. No. 56,209

Int. Cl.<sup>6</sup> A61B 17/36

U.S. Cl. 606—4

29 Claims



1. A laser delivery system for use by a user and in connection with a stereomicroscope having a viewing axis, said stereomicroscope having a first side, a second side, a front side, and a back side, the laser delivery system also including a laser generating device producing an output conveyed to the laser delivery system comprising:

a laser projector which generates a treatment beam to impinge on a treatment site, the output of the laser generating device being connected to the laser projector the laser projector comprising:  
an arm selectively attachable at a first end to the stereomicroscope, and selectively attachable at a second end to support the laser projector, the arm being flexible such that the laser projector may be moved in three dimensions and oriented in any desired orientation relative to the treatment site and such that the laser projector can be selectively moved to any one of at least the first side, second side and front side of the stereomicroscope by an action of the user; and  
a pivoting member, the pivoting member being attached to the second end of the arm, the pivoting member having an interior channel therethrough;  
an optical head having an entrance end to receive incoming laser light, and an exit end to direct the treatment beam to the treatment site, the entrance and being coupled to the pivoting member; and  
an optical fiber for transmitting laser light and having a proximal end and distal end, the proximal end being adapted to attach to a laser source the fiber extending through the pivoting member such that the distal end is in proximity to the entrance end of the optical head.



lumen distal to the proximal end of the dilatation balloon being exterior to the dilatation balloon, the distal end of the second lumen being open and distal to the distal end of the dilatation balloon, and the second lumen being sufficiently linear to allow the catheter to be slidably advanced over a guidewire.

5,413,558

# SELECTIVE AORTIC PERFUSION SYSTEM FOR USE DURING CPR

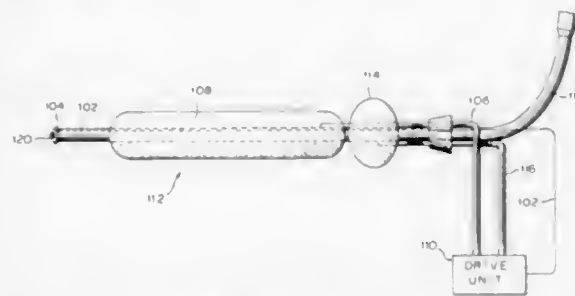
Norman A. Paradis, Brooklyn, N.Y., assignor to New York University, New York, N.Y.

Continuation-in-part of Ser. No. 756,693, Sep. 9, 1991, Pat. No. 5,334,142. This application Oct. 1, 1993, Ser. No. 130,511

Int. Cl.<sup>6</sup> A61M 29/00

U.S. Cl. 604—101

19 Claims



1. A cardiopulmonary resuscitation counterpulsation balloon and occlusion catheter, comprising:

a catheter having first, second and third lumens and first and second balloons on the external side thereof, said catheter being sized and dimensioned to permit placement through the femoral artery with the first and second balloons positioned in the descending aorta or aortic arch;

said second balloon being disposed on said catheter at a position which is closer to the aortic valve than is the position of said first balloon when said catheter is in its intended position in the descending aorta or aortic arch, said first balloon being sized and dimensioned to occlude the descending aorta when the catheter is in use and the first balloon is inflated and said second balloon being sized and dimensioned to cause pumping of fluid in the aorta when the catheter is in use and said second balloon in inflated;

said first lumen passing through the catheter and opening into the aorta at a position closer to the aortic valve than that of said second balloon when in use;

said second lumen communicating with the interior of said first balloon for use in inflating said first balloon;

said third lumen communicating with the interior of said second balloon for use in inflating said second balloon; and unidirectional means, connected to said catheter, for causing said second balloon to inflate from the end thereof closest to said first balloon to the opposite end thereof, when in use, thereby providing unidirectional pumping in the direction away from said first balloon.

5,413,559

# RAPID EXCHANGE TYPE OVER-THE-WIRE CATHETER

Motasim M. Sirhan, 794 W. Knicker Bocker Dr., Sunnyvale, Calif. 94087; Robert F. Kotmel, 436 N. Bayview Dr., Sunnyvale, Calif. 94086, and Susan M. Feltovich, 3480 Granada Ave. #301, Santa Clara, Calif. 95051

Filed Jul. 8, 1993, Ser. No. 88,842

Int. Cl.<sup>6</sup> A61M 25/10, 29/00

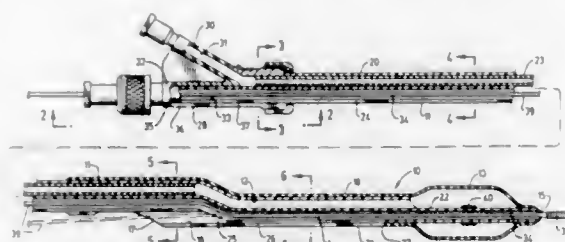
U.S. Cl. 604—102

18 Claims

1. A readily exchangeable dilatation catheter suitable for performing angioplasty procedures within a patient's artery which permits the exchange of a guidewire during an angioplasty procedure without loss of access to the location of the

distal portion of the catheter within the patient's artery, comprising:

a) an elongated catheter shaft having proximal and distal ends, a distal guidewire port in the distal end of the shaft, a proximal guidewire port spaced from the proximal and distal ends of the shaft, an inflation lumen extending from the proximal end of the catheter shaft to a location in a distal section of the catheter shaft, a main guidewire lumen extending from the proximal end of the catheter shaft to the distal guidewire port and a guidewire lumen extension which has a distal end intersecting with and in fluid



communication with the main guidewire lumen, which extends proximally away from the intersection with the main guidewire lumen to the proximal guidewire port and which is offset from a coextensive portion of the main guidewire lumen;

b) an inflatable member on the distal section of the catheter shaft distal to the intersection between the main guidewire lumen and the guidewire lumen extension which has a interior in fluid communication with the inflation lumen; and

c) an adapter on the proximal end of the catheter shaft having a first arm with an inner lumen which is adapted to direct inflation fluid into the inflation lumen.

5,413,560

# METHOD OF RAPID CATHETER EXCHANGE

Ronald J. Solar, San Diego, Calif., assignor to Pameda N.V., Netherlands Antilles

Division of Ser. No. 859,220, Mar. 30, 1992. This application Oct. 26, 1992, Ser. No. 966,693

Int. Cl.<sup>6</sup> A61M 5/178, 29/00; A61F 2/06

U.S. Cl. 604—164

7 Claims



1. A method of exchanging exchangeable members in a corporal channel, which comprises the steps of:

(a) advancing into a patient's body a first exchangeable member having proximal and distal portions through a corporal channel so that the distal portion of said first exchangeable member is at a desired site;

(b) placing an exchange member of a rapid exchange catheter system comprising:

(1) an exchange member having proximal and distal ends, and

(2) a rigid pushing wire having proximal and distal ends, the distal end of the pushing wire being integral with the proximal end of the exchange member, such that said pushing wire is configured to advance the exchange member distally to a desired location wherein the exchange member is positioned concentrically to an exchangeable member,

over the proximal portion of said first exchangeable member and advancing said rapid exchange catheter system dis-

tally so that the distal portion of the exchange member is adjacent to or at the distal portion of the first exchangeable member;

(c) withdrawing said first exchangeable member proximally through said exchange member and removing said first exchangeable member from the body;

(d) advancing a second exchangeable member distally through said corporal channel through said exchange member to the desired site; and

(e) withdrawing said exchange member through said corporal channel to remove the rapid exchange catheter system from the body.

5,413,561

# GUIDING CATHETER WITH SEALING CAP SYSTEM FOR REDUCING BLOOD LOSS WHEN INSERTING GUIDING CATHETERS

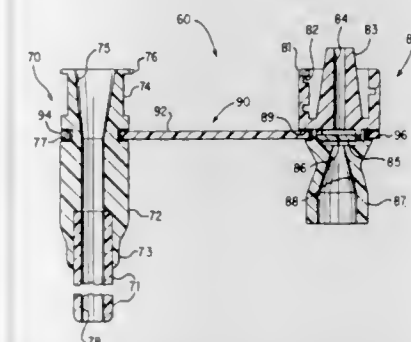
Robert E. Fischell, Dayton, Md., and Tim A. Fischell, Nashville, Tenn., assignors to Cathco, Inc., Dayton, Md.

Filed May 13, 1993, Ser. No. 60,656

Int. Cl.<sup>6</sup> A61M 5/178

U.S. Cl. 604—167

14 Claims



1. A guiding catheter with sealing cap system for percutaneous insertion of the guiding catheter into an introducer sheath at the groin and into the femoral artery of a human subject comprising:

a guiding catheter having a proximal end and a distal end and an elongated, generally cylindrical main body, the guiding catheter having a female Luer lumen situated at its proximal end and the distal end being adapted for placement within the ostium of an artery;

a guide wire adapted to be advanced through the guiding catheter and through the arterial system of a human subject; and,

a sealing cap having a flexible hinge which is attached to the guiding catheter near its proximal end, the cap further having a tapered stopper which can be releasably inserted into the guiding catheter's female Luer lumen and wherein the sealing cap has a tapered entry cone that is adapted to guide the passage of the guide wire through the stopper when the stopper is inserted into the guiding catheter's female Luer lumen.

5,413,562

# STABILIZING FITTING FOR AN INTRAVENOUS CATHETER OR SYRINGE

Jonathan L. Swauger, 28163 Tambora Dr., Canyon Country, Calif. 91351

Filed Jun. 17, 1994, Ser. No. 261,732

Int. Cl.<sup>6</sup> A61M 25/02

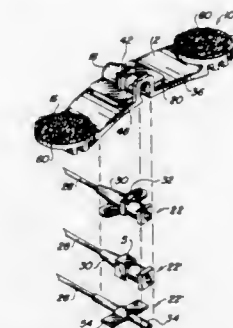
U.S. Cl. 604—179

25 Claims

1. A stabilizing fitting for an intravenous catheter or syringe, comprising:

an elongated base having a first support member at a first end thereof, and a second support member at a second end thereof;

a catheter hub/syringe body retainer disposed between the first and second support members; and



a catheter hub/syringe body wing housing centrally disposed between the first and second support members, and surrounding a portion of the catheter hub/syringe body retainer.

5,413,563

# PRE-FILLED SYRINGE HAVING A PLUNGER, PLUNGER INSERT AND PLUNGER ROD

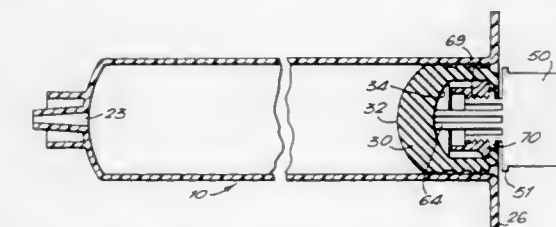
Peter A. Basile, Lawrenceville; Scott C. Brown, Princeton; Fred E. Snyder, Princeton Junction, all of N.J., and Joseph V. Tirrell, Birdsboro, Pa., assignors to Sterling Winthrop Inc., New York, N.Y.

Filed May 6, 1994, Ser. No. 239,087

Int. Cl.<sup>6</sup> A61M 5/00

U.S. Cl. 604—218

18 Claims



1. A syringe designed to be pre-filled and stored ready for injection comprising:

(a) a barrel having an inner surface defining a cylindrical chamber for retaining an injectable fluid therein; a distal end terminating in a tapered tip to which an injection needle can be attached; and a proximal end for receiving a plunger;

(b) a cup-shaped plunger slideably mounted in said barrel and positioned close to the proximal end of the barrel to provide a seal with the inner surface of the barrel, said plunger comprising:

(1) a distal convex face which is to interface with the injectable fluid contained in the barrel;

(2) a proximal face;

(3) an outside wall contiguous with the distal convex face having thereon: distal ring, proximal ring and center ring extending radially outwardly and forming a slideable seal with the inner surface of the barrel;

(4) an inside wall;

(5) a bottom rim which together with the inside wall defines a cavity to receive a plunger insert;

(c) a rigid plunger insert having distal end and proximal end positioned within said cavity comprising: an inside wall having female threads thereon to receive and engage male threads on a plunger rod; a flange located at the proximal end having a diameter larger than the diameter of the bottom rim of the plunger so that said plunger insert is securely held within said cavity; and

(d) a plunger rod having distal and proximal ends, for engaging the plunger comprising:

- (1) a shoulder portion at the distal end of the plunger rod to contact bottom rim of the plunger when plunger rod is inserted in the plunger to limit elongation of the plunger;
- (2) a neck portion, contiguous with the plunger rod tip, having male threads thereon to engage female threads of plunger insert; and
- (3) a plunger rod tip, located at the distal end of the plunger rod projecting in the direction of the plunger, the diameter of which is substantially smaller than the diameter of the plunger, and is designed to contact the proximal inside face of the plunger at the center portion thereof.

5,413,564

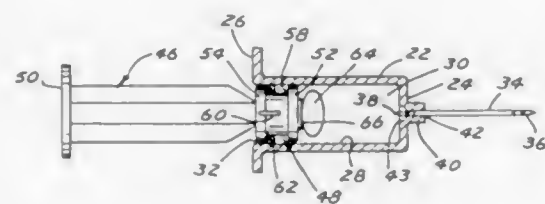
# PREDETERMINED DOSAGE HYPODERMIC SYRINGE SYSTEM

Jules Silver, 7 Ridgewood Rd., Niantic, Conn. 06357, and Louis C. Ziegler, 5 Skyline Dr., Englewood Cliffs, N.J. 07632  
Filed Mar. 2, 1994, Ser. No. 204,950

Int. Cl.<sup>6</sup> A61M 5/00

U.S. Cl. 604—232

18 Claims



1. A hypodermic syringe system for injecting a predetermined amount of a therapeutic fluid into tissue of a living body comprising:

- A) an elongated plunger extending between a proximal end and a distal end and having:
- 1) a piston-like head member on said distal end and
  - 2) a thumb plate on said proximal end;
- B) a one-piece unitary elongated barrel member having a longitudinal axis extending between a distal end and a proximal end and defining a smooth walled cylindrical chamber of uniform diameter for slidably receiving said distal end of said plunger therein, said barrel member including:
- 1) a front wall at said distal end thereof,
  - 2) an outwardly extending rim at said proximal end defining a breech-loading opening through which said distal end of said plunger can extend, and
  - 3) a hub member integral with said front wall mounting a double ended hypodermic needle including a first sharpened end for piercing engagement with the body tissue and a second sharpened end opposite said first end, the tip of said second end extending through the front wall of the barrel member, said needle being in substantial alignment with the longitudinal axis of said barrel member; and
- C) a sealed collapsible needle-penetrable capsule containing a predetermined dose of the therapeutic liquid to be injected, said capsule loosely fitting within the chamber of said barrel member between the head member of said plunger and the tip of the second end of said needle, said capsule being insertable through the breech-loading opening of the barrel prior to insertion of the plunger.

5,413,565

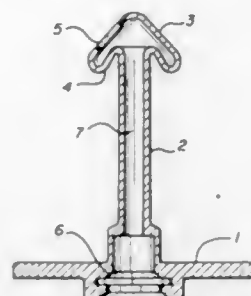
# GASTROSTOMY FEEDING PORT WITH ELASTIC ADJUSTABLE TIP

Lester D. Michels, Eden Prairie, and Frederick K. Reuning, Minnetonka, both of Minn., assignors to Sandoz Nutrition Ltd., Berne, Switzerland

Continuation-in-part of Ser. No. 6,016, Jan. 15, 1993, abandoned. This application Aug. 4, 1993, Ser. No. 101,883  
Int. Cl.<sup>6</sup> A61M 5/00

U.S. Cl. 604—247

14 Claims



1. A gastrostomy feeding port comprising a retaining flange portion, a middle tube portion and a tip portion; said flange portion being attached to and in open communication with the interior of said tube portion; said tip portion being attached to said tube portion opposite said flange portion, and being in open communication with the interior of said tube portion, and being receivable through a pre-established stoma in the stomach of a patient, and being operative for passing a fluid into said stomach, and said tip portion having at its base anchoring means integrally formed therewith and securely connecting said tip portion to said tube portion; said anchoring means being elastically deformable toward said tip portion and engageable with the inner wall of said stomach at various lengths along said tube portion for preventing the inadvertent removal of said feeding port from said stoma.

5,413,566

# LINE CLAMP

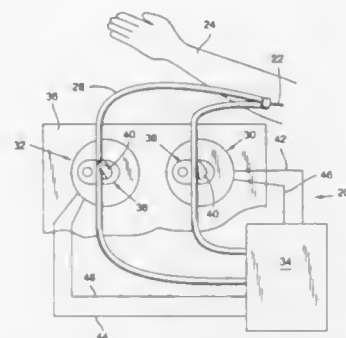
Christophe J. P. Sevrain, Ridgefield, and Carl D. Beckett, Vancouver, both of Wash., assignors to Micropump Corporation, Vancouver, Wash.

Filed Mar. 16, 1993, Ser. No. 33,621

Int. Cl.<sup>6</sup> A61M 5/00

U.S. Cl. 604—248

2 Claims



1. An apparatus for controlling fluid flow through a flexible tube comprising:
- a frame;
  - a tube-receiving member attached to the frame;
  - a rotary actuator supported by the frame and including:
  - an actuator frame;
  - a rotatable portion including a permanent magnet rotatably supported within the actuator frame and having an outer peripheral surface and a drive shaft having first and second

- ond ends, said drive shaft being coupled to the permanent magnet for rotation therewith;
- a stator fixedly supported by the actuator frame so as to be diametrically spaced from the outer peripheral surface of the permanent magnet, the stator having inwardly protruding projections extending toward the outer surface of the permanent magnet; and
- coils wound on the projections of the stator;
- means for supplying current to the coils;
- a tube-occluding cam operably attached to the first end of the drive shaft, said cam being rotatable such that it can occlude a flexible tube retained within the tube-receiving member; and
- a rotation limiting means for limiting the rotation of the permanent magnet having at least one pin connected to the permanent magnet and at least one raceway defined by a fixed surface into which the pin projects, the raceway limiting movement of the pin to movement within the raceway.

5,413,567

# PRIMARY PACKAGING FOR SURFACE-STABILIZED SURGICAL DRESSING

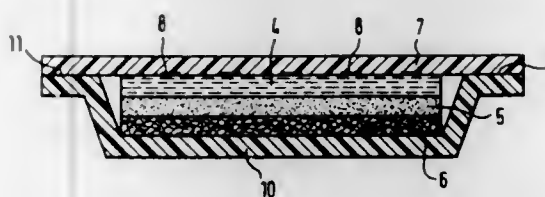
Peter Barth; Hans-Rainer Hoffmann; Walter Müller, all of Neuwed, and Heinrich Kindel, Rengsdorf, all of Germany, assignors to LTS Lohmann Therapie-Systeme GmbH & Co. KG, Neuwed, Germany

Continuation of Ser. No. 684,452, Apr. 11, 1991, abandoned, which is a continuation of Ser. No. 442,324, Nov. 24, 1989, abandoned. This application Feb. 5, 1992, Ser. No. 831,081  
Claims priority, application Germany, Feb. 29, 1988, 38 06 444.8

Int. Cl.<sup>6</sup> A61F 13/02

U.S. Cl. 604—307

16 Claims



1. A primary packaging unit comprising a surface-stabilized bandaging material, a carrier layer, the carrier layer having a skin-remote surface and a skin-side contact surface, the skin-side contact surface being provided with a pressure sensitive adhesive area and a removable packing layer, and an at least one-layer supporting film detachably bonded to the skin-remote surface of the carrier layer at least pointwise, the supporting film being removable from the applied bandaging material, and forming with the packing layer an exterior envelope part of the packaging for surrounding enclosing and thereby protecting the bandaging material to provide both support and protection of the bandaging material.

5,413,568

# REFASTENABLE ADHESIVE FASTENING SYSTEMS FOR INDIVIDUALLY PACKAGED DISPOSABLE ABSORBENT ARTICLES

Jennifer A. Roach; Douglas Toms, both of Cincinnati; Ted L. Blaney, West Chester, and M. Elizabeth P. Chisholm, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 934,147, Aug. 21, 1992, abandoned.

This application Feb. 14, 1994, Ser. No. 194,817

Int. Cl.<sup>6</sup> A61F 13/15, 13/20

U.S. Cl. 604—358

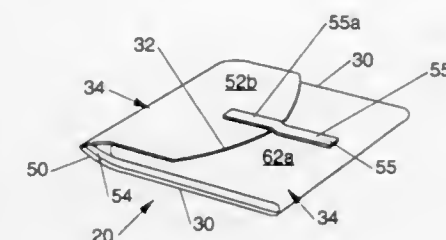
10 Claims

1. An individually packaged absorbent article comprising: an absorbent article having a body-facing side, a garment-facing side, two longitudinal and two lateral side margins;

a package containing said absorbent article, said package having a package body and a package flap; and

an adhesive tape fastening system for fastening said package flap to said package body, said tape fastening system comprising:

- a) a tape tab comprising a first portion affixed to said package flap, and a second portion for releasably fastening said flap to said package body, said second portion comprising a fastening surface having an adhesive thereon; and



- b) a portion of said package body comprising a landing surface to which said fastening surface of said tape is adhered, said portion of said package body comprising a film having a nominal average caliper of between about 0.020 mm and about 0.036 mm, and

wherein said tape fastening system has a Dynamic Shear Strength of greater than about 900 grams force per centimeter when a 10 mm wide sample of said tape tab is applied to said landing surface and said sample and landing surface are pulled in opposite directions at a rate of 508 mm/minute.

5,413,569

# SANITARY NAPKIN

Masamitsu Yamamoto, Kawanoe, Japan, assignor to Uni-Charm Co., Ltd., Ehime, Japan

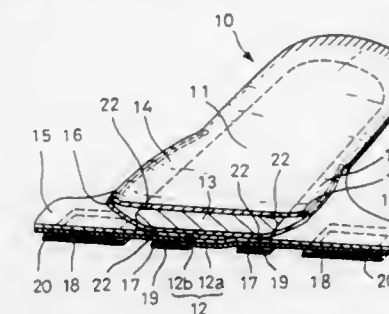
Filed Nov. 15, 1993, Ser. No. 151,426

Claims priority, application Japan, Nov. 17, 1992, 4-079168 U

Int. Cl.<sup>6</sup> A61F 13/15

U.S. Cl. 604—385.2

4 Claims



1. A sanitary napkin comprising
- (a) an absorbent core having a top surface, a bottom surface and two laterally spaced apart side portions,
  - (b) a topsheet comprising a liquid-permeable sheet having a first face and a second face,
    - (1) that completely surrounds said absorbent core,
    - (2) that is in direct face-to-face contact at said second face with both said top and bottom surface of said absorbent core, and
    - (3) that extends laterally outwardly a spaced distance away from said absorbent core side portions so as to form two laterally spaced apart sleeve portions, the second face of said topsheet defining an interior surface of each said sleeve portion, each said sleeve portion defining an open space between the second face of said topsheet and each of said absorbent core side portions,
  - (c) an elastic member attached in a stretched condition to and extending along the interior surface of each of said



- sleeve portions so that each sleeve portion stands up and forms a side barrier,
- (d) a liquid-impermeable backsheet
- (1) that is bonded to a portion of said topsheet that is in direct face-to-face contact with said bottom surface of said absorbent core,
- (2) that has two spaced apart wing portions that are separate from said sleeve portions, each wing portion extending laterally outwardly with respect to each said absorbent core side portion, each wing portion having a top face and a back face, and
- (e) a fastener on said back face of each said wing portion which permits attachment of said wing portion to an outer surface of a crotch portion of an undergarment.

5,413,570

## DIAPERS WITH ELASTICIZED SIDE POCKETS

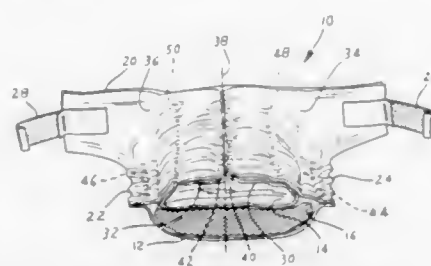
Kenneth M. Enloe, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 310,106, Feb. 13, 1989, which is a continuation of Ser. No. 242,460, Sep. 9, 1988, abandoned, which is a continuation of Ser. No. 85,422, Aug. 13, 1987, Pat. No. 4,846,823, which is a continuation of Ser. No. 786,891, Oct. 11, 1985, Pat. No. 4,704,116, which is a continuation-in-part of Ser. No. 627,164, Jul. 2, 1984, abandoned. This application Apr. 4, 1994, Ser. No. 222,093

Int. Cl.<sup>6</sup> A61F 13/15, 13/20

U.S. Cl. 604—385.2

1 Claim

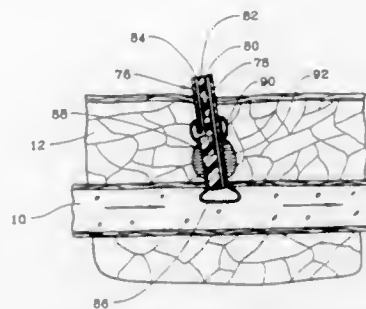


1. An integral absorbent disposable diaper having
- (1) a pair of waist sections at opposite ends of the diaper, which together define a waist opening when the diaper is in use;
- (2) a crotch section disposed longitudinally between the waist sections and laterally between a pair of leg openings, the leg openings being elasticized with elastic members and separated from each other by the crotch section;
- the integral absorbent disposable diaper comprising:
- (1) a liquid impervious backsheet;
- (2) a liquid pervious bodyside liner attached to and essentially coterminous with the backsheet;
- (3) an absorbent body disposed between the liner and the backsheet; and
- (4) a pair of waste containment flaps, each flap having a proximal edge adjacent the liner and an inwardly directed distal edge; each of which flaps
- (i) is spaced inwardly from the elasticized leg openings;
- (ii) is attached to the liner;
- (iii) defines an elasticized waste-containment pocket; and
- (iv) is elasticized with a pair of elastic members which are
- (a) disposed in directions which are laterally generally parallel to the distal edge of the flap and spaced apart, one of the elastic members being disposed closer to the distal edge of the flap and the other elastic member being more distant from the distal edge of the flap; and
- (b) tensioned when applied, the elastic member disposed closer to the distal edge of the flap being applied with less tension than the elastic member disposed more distant from the distal edge of the flap.

5,413,571  
**DEVICE FOR SEALING HEMOSTATIC INCISIONS**  
 Georges Katsaros, Jupille, Belgium; David G. Thomas, Town and Country, and Richard D. Allison, St. Louis, both of Mo., assignors to Sherwood Medical Company, St. Louis, Mo.  
 Filed Jul. 16, 1992, Ser. No. 915,472  
 Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—213

49 Claims



26. A device for sealing an incision formed in the body of a patient wherein the incision extends from the skin of the patient into a blood vessel of the patient, the device comprising:
- a bioabsorbable sealing means having a lumen therein and wherein said sealing means includes an elongate shaft means and inflatable means operatively associated therewith, said shaft means and inflatable means being sized to seal the incision from the flow of body fluids therethrough wherein said shaft means is sized to extend proximally into the incision from a location generally adjacent to the blood vessel and said inflatable means is oriented along said shaft means and is sized to extend in the blood vessel generally adjacent to the incision and being constructed in such a manner so as to be absorbable within the body of the patient after a period of time sufficient for permitting the effective closure of the incision.

5,413,572

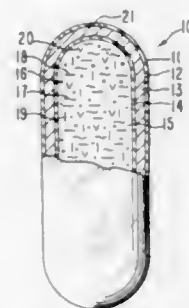
## OSMOTIC DOSAGE SYSTEM FOR LIQUID DRUG DELIVERY

Patrick S. L. Wong, Palo Alto; Felix Theeuwes, Los Altos; Brian L. Barclay, Sunnyvale, and Michael H. Dealey, San Francisco, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 502,705, Apr. 2, 1990, Pat. No. 5,324,280. This application Feb. 18, 1994, Ser. No. 203,135  
 Int. Cl.<sup>6</sup> A61K 9/22

U.S. Cl. 604—892.1

2 Claims



1. An osmotic system for delivering a therapeutic drug formulation to an environment of use, wherein the osmotic system comprises:
- (a) a capsule comprising an internal lumen; said capsule formed of gelatin having a viscosity of 15 to 20 millipoises;
- (b) a dosage amount of a therapeutic drug liquid formulation in the capsule lumen;

- (c) a hydroactivated composition on the outside wall of the capsule;
- (d) a semipermeable composition surrounding the hydroactivated composition; and,
- (e) a passageway that communicates the exterior with the interior of the osmotic system, which passageway is formed by a process selected from the group consisting of drilling, eroding, extracting, dissolving, bursting, and leaching a passageway in the osmotic system.

5,413,573

## DEVICE FOR SURGICAL PROCEDURES

John Koivukangas, Oulu, Finland, assignor to Onsys Oy, Oulu, Finland

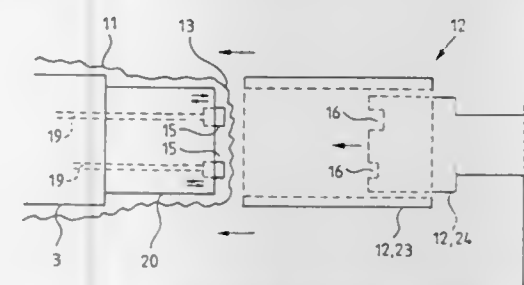
PCT No. PCT/FI92/00162, § 371 Date Nov. 24, 1993, § 102(e) Date Nov. 24, 1993, PCT Pub. No. WO92/20295, PCT Pub. Date Nov. 26, 1992

PCT Filed May 22, 1992, Ser. No. 142,405

Claims priority, application Finland, May 24, 1991, 912520  
 Int. Cl.<sup>6</sup> A61B 17/02

U.S. Cl. 606—1

6 Claims



1. A device for performing surgical procedures comprising: orientation means for guiding movements to perform said surgical procedures;
- a surgical instrument for performing a selected one of said surgical procedures;
- an intermediate piece having two ends, said intermediate piece being engageable with the orientation means at one of said ends and connected to said surgical instrument at the other end;
- means connected to the orientation means for generating at least one signal; and
- identification means carried by the intermediate piece for causing the generating means to generate said at least one signal when said orientation means is engaged with said intermediate piece, said at least one signal identifying said surgical instrument;
- whereby said at least one signal is read to ensure propriety of said surgical instrument to be used for the selected surgical procedure.

5,413,574

## METHOD OF RADIOSURGERY OF THE EYE

Richard J. Fugo, 1507 Plymouth Blvd., Norristown, Pa. 19401  
 Continuation-in-part of Ser. No. 940,448, Sep. 4, 1992. This application Oct. 8, 1993, Ser. No. 134,805

Int. Cl.<sup>6</sup> A61B 17/36  
 U.S. Cl. 606—33

21 Claims

1. A method of surgery on an eye, comprising the steps of: producing with a generator low power radio wave energy; feeding said radio wave energy into an active incising electrode, providing a high impedance contact between a surgical subject and a grounding plate connected to the generator; and
- incising ocular tissue of the surgical subject by means of said radio wave energy transmitted from a tip of said active incising electrode using the low power radio wave energy

and the high impedance contact to prevent said active incising electrode from becoming hot.

5,413,575

## MULTIFUNCTION ELECTROCAUTERY TOOL

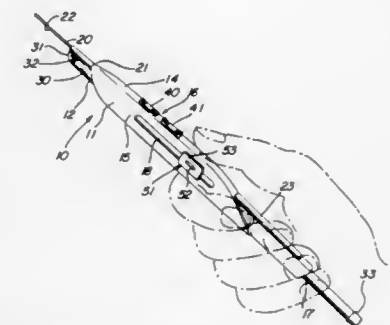
Thomas J. Haenggi, Long Beach, Calif., assignor to Innovative Medical Technologies, Ltd., Long Beach, Calif.

Filed Apr. 19, 1994, Ser. No. 229,693

Int. Cl.<sup>6</sup> A61B 17/39

U.S. Cl. 606—45

22 Claims



1. A multifunction electrocautery tool comprising: an elongated housing;
- an elongated suction tube slidably supported within said housing and defining a suction passage therethrough;
- a slide control coupled to said suction tube and movably supported upon said housing, said slide control defining a control aperture and a control passage coupling said aperture to said interior passage of said suction tube; and
- an electrocautery blade supported upon said housing, said slide control being operable to move said suction tube within said housing and said control aperture being used to alter the suction characteristic of said suction tube, whereby said multifunction electrocautery tool provides combined control of the deployment of suction, tube retraction and aspiration control in a common unit operable in one hand.

5,413,576

## APPARATUS FOR TREATING SPINAL DISORDER

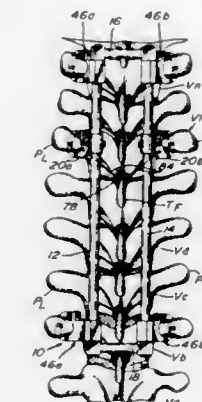
Charles-Hilaire Rivard, 308 Curzon Avenue, St. Lambert, Quebec, Canada J4P 2V5

Filed Feb. 10, 1993, Ser. No. 15,919

Int. Cl.<sup>6</sup> A61B 17/56

U.S. Cl. 606—61

11 Claims



1. An internal brace system comprising: a pair of implantable rods adapted to be on either side of a spinal column coextensive with a portion of the spinal column to be treated; first connecting means for rigidly

connecting said rods together in a spaced-apart parallel arrangement to provide a unitary internal brace structure; pairs of anchor means for engaging a corresponding one of a plurality of selected vertebrae, each of said anchor means of each of said pairs of anchor means being adapted to be disposed on respective transverse processes of the corresponding one of said plurality of selected vertebrae in the portion of the spinal column to be treated; second connecting means for connecting to a respective rod of the internal brace structure on either side of the spinal column; first tie means for extending from each of said anchor means to respective ones of said second connecting means, said first tie means being articulated to allow relative movement of said corresponding one of said anchor means while retaining said anchor means in a predetermined location relative to the internal brace structure and through the selected vertebrae against torsional forces applied through the spinal column.

5,413,577

## ANATOMICAL PRECONTOURED PLATING

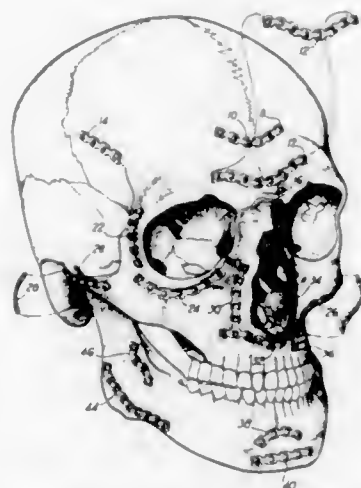
Richard A. Pollock, 5260 Riverview Rd., NW., Atlanta, Ga. 30327

Continuation of Ser. No. 518,221, May 3, 1990, Pat. No. 4,966,599, which is a continuation of Ser. No. 274,699, Nov. 15, 1988, abandoned, which is a continuation of Ser. No. 35,658, Apr. 7, 1987, abandoned. This application Sep. 14, 1990, Ser. No. 582,761

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—69

8 Claims



1. A method of manufacturing an osteosynthesis plate having a top face and a bottom face, comprising the steps of:
  - (a) selecting a craniofacial stabilization site on the human skull which is desired to be stabilized using an osteosynthesis plate;
  - (b) preparing a stamp that has been contoured in three dimensions to fit the structure and shape of craniofacial sites on a plurality of human skulls whose locations on the skulls correspond to the location of the craniofacial stabilization site;
  - (c) providing material for forming the plate; and
  - (d) stamping the material to form an osteosynthesis plate that is contoured in three dimensions to fit the structure and shape of the craniofacial sites on the plurality of human skulls corresponding to the craniofacial stabilization site, by pressing the stamp against the entire top face and bottom face of the plate.

5,413,578

## DEVICE FOR REMOVING A BONE CEMENT TUBE

Amlr Zahedi, Hörsterstrasse 54, D-4400 Münster, Germany  
Continuation of Ser. No. 773,860, Oct. 24, 1991, abandoned.

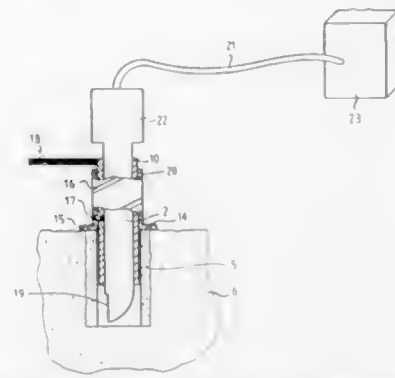
This application Jun. 14, 1993, Ser. No. 75,354

Claims priority, application Germany, Mar. 14, 1989, 8903310 U; Oct. 9, 1989, 39 33 711.1

Int. Cl.<sup>6</sup> A61F 5/00; A61B 17/32

U.S. Cl. 606—86

19 Claims



1. The device for removing a bone cement tube remaining in a bone cavity after removal of a cemented-in endoprosthesis, the removal of the cemented-in endoprosthesis leaving a cavity in the bone cement tube, said device comprising:
  - a) an ultrasonic generator with a sonotrode, including a cylindrical or shaft-shaped guide section for insertion completely into the cavity of the bone cement tube for guiding the ultrasonic generator in the cavity of the bone cement tube so that the ultrasonic generator is kept in the cavity of the bone cement tube, said guide section having a free end comprising the sonotrode for emitting ultrasound when guided in the cavity of the bone cement tube by said guide section thereby facilitating removal of the bone cement tube from the bone cavity.

5,413,579

## SURGICAL SAW GUIDE AND DRILL GUIDE

Guillaume Tom Du Toit, Sandton, South Africa, assignor to Technology Finance Corporation (Proprietary) Limited, Sandton, South Africa

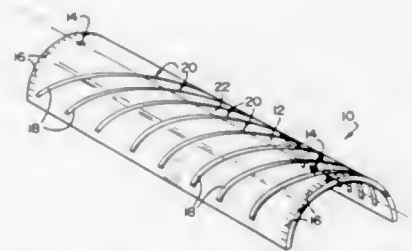
Filed May 10, 1993, Ser. No. 59,639

Claims priority, application South Africa, May 13, 1992, 92/3472

Int. Cl.<sup>6</sup> A61F 5/00

U.S. Cl. 606—87

12 Claims



1. A set of surgical instruments, for use in an osteotomy procedure, the set comprising:
  - a) a saw guide for guiding a saw while it makes an oblique cut in a long bone to divide it into two fragments; and
  - b) a drill guide for guiding a drill bit while it forms a passage in said bone after an initial part of said cut has been made in the bone by the saw;
 said saw guide including a seat formation having a concave side for abutting a long bone to be cut, so that the long bone seats in the seat formation, and a guide formation for

aligning a saw blade relative to a long bone seating in the seat formation and for guiding the saw blade while it initiates the making of the cut in the bone, the saw guide being in the form of a channel having an outer side which is convex and an interior surface which provides the concave side of the seat formation; and  
said drill guide including a bit guide and an anchor connected to the bit guide for insertion into the initial part of the cut in the bone when the initial part of the cut has been made, to align the bit guide relative to the cut, the bit guide defining a guide path for receiving a drill bit and for aligning the drill bit perpendicular to the initial part of the cut while the drill bit forms the passage in the bone.

5,413,580

## CARPAL TUNNEL KNIFE

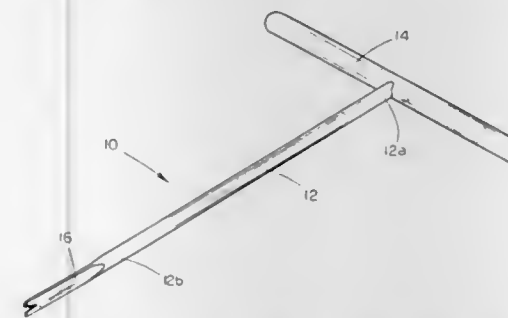
David V. Stephenson, 212 E. 5th St., Valentine, Nebr. 69201

Continuation of Ser. No. 77,241, Jun. 14, 1993, abandoned. This application Mar. 29, 1994, Ser. No. 219,135

Int. Cl.<sup>6</sup> A61B 17/34

U.S. Cl. 606—170

2 Claims



1. A surgical knife for dividing the transverse carpal ligament, comprising:
  - a) an elongated shaft having forward and rearward ends;
  - b) a handle having a longitudinal axis and mounted perpendicularly to the shaft on the rearward end of said shaft;
  - c) said forward end of said shaft having a generally planar blade portion oriented perpendicularly with respect to the longitudinal axis of said handle;
  - d) said blade portion having a cutting edge formed in a forward end thereof, for cutting said transverse carpal ligament;
  - e) said forward end of said blade portion including a pair of forwardly projecting guide fingers separated by a notch extending rearwardly into the forward end of said blade portion, said cutting edge formed within said notch so as to extend between said guide fingers; and
  - f) said notch being generally V-shaped with each leg of the "V" having a cutting edge formed therealong, to thereby form a V-shaped cutting edge.

5,413,581

## METHOD OF USING A BALLOON DILATATION CATHETER AND A GUIDEWIRE

Jean-Jacques Goy, Yverdon, Switzerland, assignor to Schneider (Europe) A.G., Bulach, Switzerland

Continuation of Ser. No. 770,255, Oct. 2, 1991, abandoned. This application Jul. 7, 1993, Ser. No. 88,484

Claims priority, application Switzerland, Oct. 4, 1990, 3204/90

Int. Cl.<sup>6</sup> A61M 29/02, 31/00

U.S. Cl. 606—194

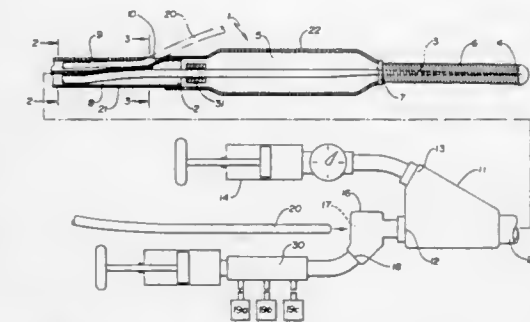
1 Claim

1. A method for dilating a stenosis in each of a pair of branch coronary arteries comprising:
  - a) introducing into a first branch coronary artery a steerable balloon dilatation catheter having a shaft with a distal end and a proximal end and a first lumen extending through the shaft, a balloon with a distal end and a proximal end arranged at the distal end of the shaft, the first lumen being in communication with the balloon, a first guidewire

extending through and fixed within the first lumen and a second lumen extending through a portion of the shaft and having an opening outwards of the shaft before the proximal end of the balloon, the second lumen being adapted to have a second guidewire pass therethrough;

advancing the second guidewire through the second lumen and through the opening into a second branch coronary artery;

inflating the balloon to effect a dilatation of a stenosis in the first branch coronary artery;



- deflating the balloon;
- withdrawing the steerable balloon dilatation catheter from the first branch coronary artery while maintaining the second guidewire in the second branch coronary artery;
- advancing a balloon dilatation catheter over the second guidewire into the second branch coronary artery; and
- inflating the balloon of the balloon dilatation catheter to effect a dilatation of a second stenosis in the second branch coronary artery.

5,413,582

## INFLATABLE TOURNIQUET CUFF AND METHOD OF MAKING SAME

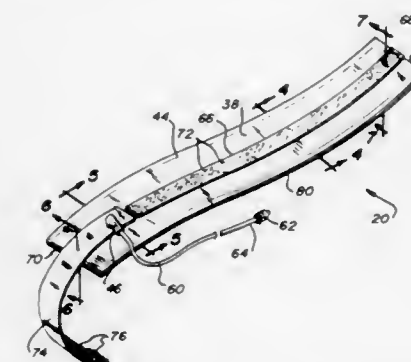
Robert P. Eaton, Conifer, Colo., assignor to Electromedics, Inc., Parker, Colo.

Filed Nov. 3, 1993, Ser. No. 147,140

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—202

4 Claims



1. An inflatable tourniquet cuff comprising:
  - a) an outer sheet having a predetermined thickness;
  - b) an inner sheet attached to said outer sheet to form a first sealed bladder and a second sealed bladder between said outer and inner sheets, said first sealed bladder extending adjacent said second sealed bladder and said inner sheet having a thickness that is less than the thickness of said outer sheet;
  - c) said first sealed bladder including a first opening through which gas may flow to inflate and deflate said first sealed bladder separately from said second sealed bladder;
  - d) said second sealed bladder including a second opening through which gas may flow to inflate and deflate said



second sealed bladder separately from said first sealed bladder; and  
means for releasably securing the first and second bladders about a patient's limb so that the inner sheet is positioned adjacent to the patient's limb.

5,413,583

# FORCE LIMITING ARRANGEMENT FOR NEEDLE HOLDER FOR ENDOSCOPIC SURGERY

Udo Wohlers, Hamburg, Germany, assignor to Ethicon, Inc., Somerville, N.J.

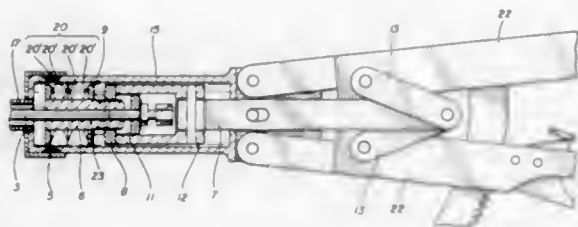
Filed May 4, 1993, Ser. No. 57,236

Claims priority, application Germany, May 21, 1992, 42 16 875.9

Int. Cl.<sup>6</sup> A61B 17/00

U.S. Cl. 606—206

1 Claim



1. An endoscopic instrument containing a pair of jaws connected to a pull rod, said pull rod reciprocal through an elongated tube, said pull rod capable of actuation of said jaws, and a handle connected to said pull rod, said handle containing at least one actuating lever pivotable on said handle for operating said pull rod; and

a mechanism comprising an adjustment element placed between said lever and said pull rod such that the force imparted by said lever on said pull rod is controlled by said adjustment element, and wherein said adjustment element comprises a plurality of cup springs lying one behind the other within said handle, and said pull rod reciprocable within said cup springs.

5,413,584

# "OMEGA"-SHAPED STAPLE FOR SURGICAL, ESPECIALLY ENDOSCOPIC, PURPOSES

Dale Schulze, Hamburg, Germany, assignor to Ethicon, Inc., Somerville, N.J.

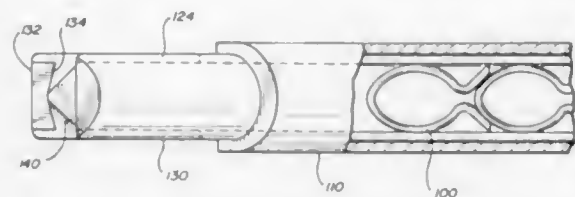
Filed May 7, 1993, Ser. No. 59,147

Claims priority, application Germany, May 11, 1992, 42 15 449.9

Int. Cl.<sup>6</sup> A61B 17/04

U.S. Cl. 606—219

14 Claims



1. In combination:  
a staple for surgical purposes, made from bendable material, which has a base with a pair of ends and a pair of legs projecting from said base respective ends, said base having a tissue contacting surface and said base being shaped with a bend opposite to said tissue contacting surface and opposite an anvil for forming said staples so that the ends of said base are adjacent to one another, such that said base and legs form an essentially Ω-shaped contour; and  
a stapler for forming said staple comprising a housing, said stapler having at least an anvil and a staple former con-

tained within said housing for forming said staple around said anvil, said staple held adjacent said anvil, and said anvil having a staple contacting surface, such that said tissue contacting surface of said anvil is engageable with said staple contacting surface during the forming of said staple.

5,413,585

# SELF LOCKING SUTURE LOCK

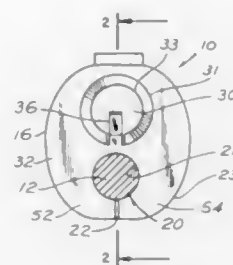
Anthony C. Pagedas, 8401 W. Edgerton, Greendale, Wis. 53129

Filed Dec. 22, 1992, Ser. No. 995,104

Int. Cl.<sup>6</sup> A61B 17/04

U.S. Cl. 606—232

5 Claims



1. A molded plastic one-piece self locking suture lock to be used with surgical suture thread and a suture needle, said self locking suture lock comprising:

a body having a front side, a back side, a first edge, a thread retaining opening, and a stitch lock opening;

said thread retaining opening having a thread opening slightly smaller in diameter than said suture thread and a slot extending outwardly from said thread opening to said first edge;

said stitch lock opening being cone-shaped, having an outer edge, and having a larger diameter on said front side and a smaller diameter on said back side;

said body having an integral tongue connected to said outer edge of the stitch lock opening near said front side and extending diametrically at an angle from said front side toward said back side.

5,413,586

# ANTI-PULMONARY EMBOLISM FILTER AND FITTING KIT

Alain Dibie, Paris; Dominique Musset, Clamart; Philippe Prou, and Gilles Catteau, both of Auneau Cedex, all of France, assignors to Ethnor, Neuilly-sur-Seine Cedex, France

PCT No. PCT/FR92/00224, § 371 Date Sep. 14, 1993, § 102(e) Date Sep. 14, 1993, PCT Pub. No. WO92/16163, PCT Pub. Date Oct. 1, 1992

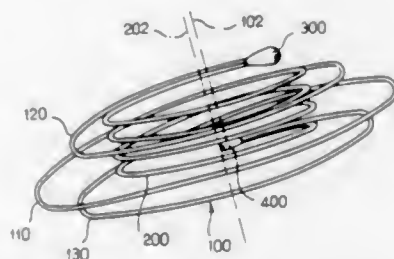
PCT Filed Mar. 12, 1992, Ser. No. 117,131

Claims priority, application France, Mar. 14, 1991, 91 03103; Nov. 19, 1991, 91 14231

Int. Cl.<sup>6</sup> A61M 29/00

U.S. Cl. 606—200

63 Claims



1. Anti-pulmonary embolism filter made of resilient wire having a remanent spring effect shaped into a spiral structure comprising at least one first non-planar spiral continuous with and superimposed on at least one second non-planar spiral, the

first spiral having two lateral turns connected by at least one middle turn having a diameter greater than each of the lateral turns, and the second spiral having turns having diameters no greater than the middle turn of the first spiral, the first and second spirals each having two ends and being joined together at least at one of their respective ends.

5,413,587

# INFRARED HEATING APPARATUS AND METHODS

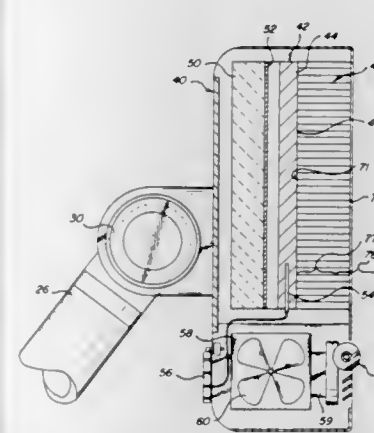
Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098

Filed Nov. 22, 1993, Ser. No. 155,924

Int. Cl.<sup>6</sup> A61N 5/06

U.S. Cl. 607—100

16 Claims



1. A method for heating an object with black body infrared radiation, said method comprising the steps of:

generating black body infrared radiation from a black body radiation source (42,96,158);

transmitting the radiation through a first zone (77) and thereafter through a second zone (78) to heat the object (34) located in the second zone (78);

establishing a continuous and homogenous fluid medium from the black body radiation source (42,96,158) through the first zone (77) and through the second zone (78); and characterized by stagnating flow of the fluid medium in the first zone (77) to limit transmission of heat by convection from the radiation source (42,96,158) and from the first zone (77) to the second zone (78).

5,413,588

# DEVICE AND METHOD FOR ASYMMETRICAL THERMAL THERAPY WITH HELICAL DIPOLE MICROWAVE ANTENNA

Eric N. Rudie, Plymouth; Bruce H. Neilson, Brooklyn Park, and James V. Kauphusman, Champlin, all of Minn., assignors to Urologix, Inc., Minneapolis, Minn.

Filed Mar. 6, 1992, Ser. No. 847,718

Int. Cl.<sup>6</sup> A61N 5/02

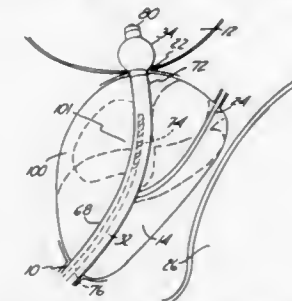
U.S. Cl. 607—101

39 Claims

1. A device for selective-directional microwave thermal therapy comprising:

an intraurethral catheter shaft having an outer surface, a first end, a second end, a first side, a second side, a first lumen and a second lumen, the first lumen being positioned adjacent the first side of the shaft and having a first cross-sectional area, the second lumen being positioned adjacent the second side of the catheter shaft and having a second cross-sectional area greater than the first cross-sectional area of the first lumen, the first lumen communicating with the second lumen at the second end of the shaft; antenna means within the shaft for generating an omnidirectional RF emission, the antenna means located between the first lumen and the second lumen; and absorption means within the shaft between the antenna means and the outer surface of the shaft for absorbing a

first amount of energy emitted by the antenna means on the first side of the shaft, and for absorbing a second



amount of energy, greater than first amount of energy, on the second side of the shaft.

5,413,589

Patent Not Issued For This Number

5,413,590

# SKIN TREATMENT DEVICE

Neville L. Williamson, Wellington, United Kingdom, assignor to Innovative Medical Devices (UK) Ltd., United Kingdom

PCT No. PCT/GB92/01273, § 371 Date May 2, 1994, § 102(e) Date May 2, 1994, PCT Pub. No. WO93/01860, PCT Pub. Date Feb. 4, 1993

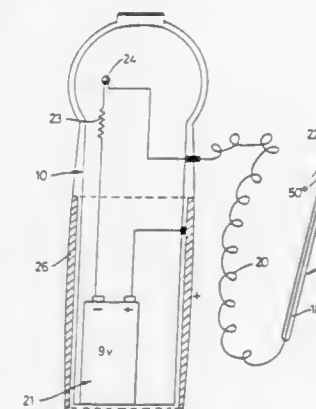
PCT Filed Jul. 13, 1992, Ser. No. 182,059

Claims priority, application United Kingdom, Jul. 17, 1991, 9115391

Int. Cl.<sup>6</sup> A61N 1/04

U.S. Cl. 607—75

13 Claims



1. A skin treatment device comprising a housing (10) containing a low-tension battery-energised D.C. power source (21); an insulated probe (16) carrying a first electrode operatively connected to the negative pole of said source by a flexible lead (20) and having an electrically conductive tip (22) to be applied non-invasively to a point on the subject's skin requiring treatment; and a second electrode (26) operatively connected to the positive pole of said source to be gripped or otherwise contacted by the subject in use characterised in that said tip (22) of the first electrode is conical in shape terminating at an acute point having an included angle of taper within the range of from 45 to 60 degs.

5,413,591

# CURRENT TRUNCATED WAVEFORM DEFIBRILLATOR

Mark W. Knoll, Minnetonka, Minn., assignor to Angeion Corporation, Plymouth, Minn.

Continuation-in-part of Ser. No. 841,544, Feb. 26, 1992, Pat. No. 5,306,291. This application Jul. 22, 1993, Ser. No. 96,009

Int. Cl.<sup>6</sup> A61N 1/362

U.S. Cl. 607—6

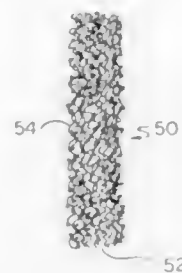
16 Claims

1. A method for operating an implantable device electrically





which are firmly entangled with said at least one core filament, said individual air jet textured yarns being interengaged into a



fabric structure which is constructed and arranged in a tubular configuration and has a lumen for conveying blood there-through.

5,413,599

## MEDICAL VALVE APPARATUS

Kou Imachi, Kamifukuoka; Iwao Fujimasa, and Kazuhiko Atsumi, both of Tokyo, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 342,203, Apr. 24, 1989, abandoned.

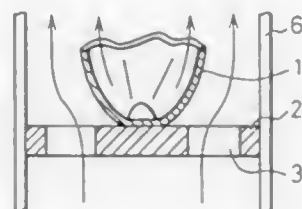
This application Dec. 13, 1993, Ser. No. 165,595

Claims priority, application Japan, Sep. 20, 1988, 63-233741

Int. Cl.<sup>6</sup> A61F 2/24

U.S. Cl. 623—2

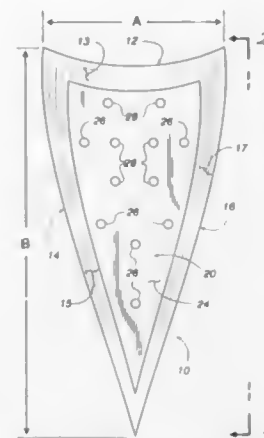
8 Claims



1. A medical valve placed in a tubular duct of at least one of an artificial heart device and an artificial heart-lung device capable of passing a first flow of a liquid but interrupting a second flow which flows in an opposite direction to the first flow, the medical valve comprising:

- a substantially circular valve seat, having a substantially flat surface, provided in the tubular duct, having the valve-seat surface at one side of said valve seat, said valve-seat surface being located at a downstream side of the first flow, said valve seat further having a plurality of small through holes substantially evenly allocated thereupon except for a central part thereof; and
- a flexible flap provided solely at the downstream side of the valve seat and having a surface area slightly smaller than that of the circular valve seat in a manner such that the flexible flap covers all the plurality of small through holes, the flexible flap being fixed to the central part of the valve-seat surface, wherein a circumferential part of the flexible flap moves apart from the valve-seat surface so as to pass the first flow while the circumferential part sealingly adheres to the valve-seat surface so as to interrupt the second flow, wherein the flexible flap is made of a copolymer film which is comprised of polyurethane and polysiloxane and has a thickness of 0.1 to 0.4 mm said copolymer film having at least anti-thrombogenic properties for the passage of blood.

5,413,600  
NASAL-LABIAL IMPLANT  
Harry Mittelman, 23 Heather Dr., Atherton, Calif. 94027  
Filed May 19, 1993, Ser. No. 64,836  
Int. Cl.<sup>6</sup> A61F 2/02  
U.S. Cl. 623—11 9 Claims



1. An implant for the nasal labial groove of the face, comprising: a generally triangular elongated arrowhead-shaped sheet of a body-compatible material, the sheet having a first side and elongated second and third sides defining a peripheral edge comprising respectively first, second and third edges, and the implant having anterior and posterior surfaces; the first side having a concave curvature and forming a base of the implant for location in the nasal labial groove; the elongated second and third sides having a convex curvature and being symmetrical one to the another, a junction of the second and third sides forming a tail of the implant; and the peripheral edge of the sheet being bevelled.

5,413,601

## TUBULAR ORGAN PROSTHESIS

Viktor V. Keshelava, ulitsa Akademika Chelomeya, 4, kv. 20, Moscow, U.S.S.R.

Continuation of Ser. No. 776,341, Nov. 22, 1991, abandoned.

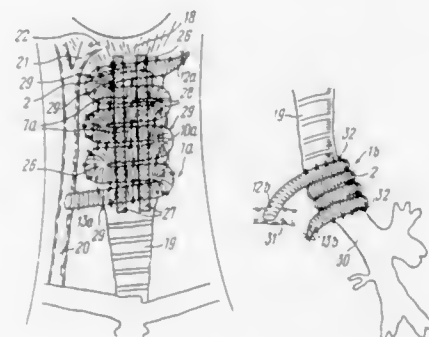
This application Sep. 30, 1993, Ser. No. 128,735

Claims priority, application U.S.S.R., Mar. 26, 1990, 4827536

Int. Cl.<sup>6</sup> A61F 2/04, 2/20

U.S. Cl. 623—12

8 Claims



1. A prosthesis for replacing a portion of a tubular organ of a patient through which blood circulates comprising: a tubular vessel in the form of a coiled spring, coils thereof being formed by coiling said prosthesis into the shape of a coiled spring with said coils touching each other, and having a length substantially equal to a length of the tubular organ to be replaced, wherein a wall of said pros-

thesis of the tubular organ is defined by said coils touching each other and having an outer surface adapted to face surrounding tissues and an inner surface adapted to be covered with epithelial surface defining a cavity having a diameter substantially equal to an inner diameter of the tubular organ, wherein said prosthesis has two free ends, a first of said free ends adapted for connecting with an artery of a vascular system of the patient for filling said prosthesis with blood and a second of said free ends adapted for compressing during filling said vessel with blood, thereby providing a tubular organ prosthesis adapted to be connected to the vascular system of the patient, with said inner surface facilitating the formation of an epithelial surface covering thereon.

5,413,602

## VERTEBRAL BODY SPACER DEVICE

Peter Metz-Stavenhagen, Bad Wildungen, Germany, assignor to Howmedica GmbH, Schoenkirchen, Germany

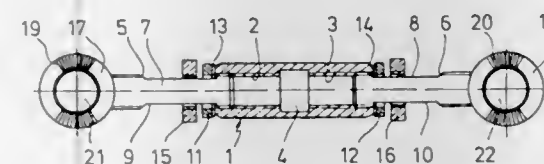
Filed Sep. 29, 1992, Ser. No. 953,164

Claims priority, application Germany, Sep. 30, 1991, 91 12 176.0 U

Int. Cl.<sup>6</sup> A61F 2/44

U.S. Cl. 623—17

22 Claims



1. A spacer device for supporting vertebral bodies, comprising a first substantially plate-shaped supporting member configured to engage a first vertebral body, a second substantially plate-shaped supporting member configured to engage a second vertebral body and an adjustment means including a sleeve having a longitudinal axis and having an internal thread and a pair of bolts having an outer thread cooperating with said sleeve to adjust the supporting members in a predetermined distance with respect to each other, wherein the adjustment means is provided with clamping faces at either end which adjustment faces are aligned with the axis of the sleeve and the bolts or are disposed parallel to said axis, wherein the supporting members are provided with clamping faces extending substantially normally with respect to supporting faces of the supporting member, and wherein a screw connection is provided for each supporting member to press the clamping faces of the adjustment means and the supporting member together in a predetermined position with respect to each other.

5,413,603

## TAPER-LOCKED ACETABULAR SOCKET BEARING

Douglas G. Noiles, New Canaan, and Alfred F. DeCarlo, Jr., Stamford, both of Conn., assignors to Joint Medical Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 838,090, Feb. 19, 1992, Pat. No. 5,282,864. This application Jul. 29, 1993, Ser. No. 99,708

The portion of the term of this patent subsequent to Feb. 1, 2011, has been disclaimed.

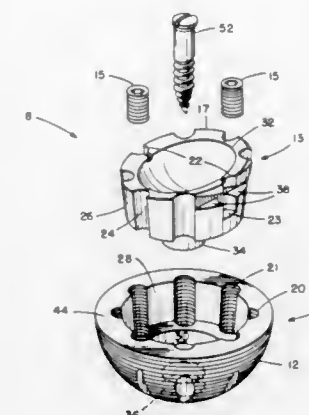
Int. Cl.<sup>6</sup> A61F 2/34

U.S. Cl. 623—18

33 Claims

1. A prosthesis for use in forming an implantable ball and socket joint comprising:
  - (a) a socket bearing having a cavity for receiving the ball of the ball and socket joint, said socket bearing having an external surface at least a portion of which comprises a male taper;
  - (b) a cup for fixation to bone, said cup having a cavity for receiving the socket bearing, said cavity having a surface at least a portion of which comprises a female taper for

locking engagement with the male taper of the socket bearing, and  
(c) means for driving the male taper into the female taper,



dyles and articulating surfaces, during articulation of the prosthetic knee implant between flexion and extension.

5,413,605

# TIBIAL ELEMENT FOR A REPLACEMENT KNEE PROSTHESIS

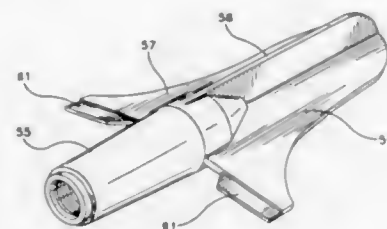
Alan M. Ashby, and Peter Lawes, both of Maidenhead, England, assignors to Howmedica International, Inc., Shannon, Ireland  
Filed Jan. 5, 1993, Ser. No. 754

Claims priority, application United Kingdom, Jan. 21, 1992, 9201231

Int. Cl.<sup>6</sup> A61F 2/38

U.S. Cl. 623—20

10 Claims



1. A tibial element for a replacement knee prosthesis comprising a tibial tray provided with at least one bearing component and a stem which can be attached to said tray by a tapered spigot and socket construction, said stem including at least two radially extending fins said tray having a lower portion including at least two radially extending fins intended for engagement with a proximal subcondylar area of the tibia, and means formed on said fin on said tray are included for engaging and locating said fin on said stem in a predetermined angular position in relation to said fins on the tray.

5,413,606

# INTRAOPERATIVE METHOD OF RESTORING THE SURFACE SMOOTHNESS OF TOTAL KNEE REPLACEMENT COMPONENTS

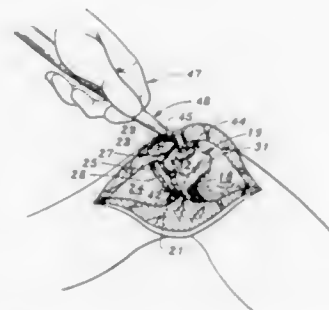
Albert W. Fisk, 1741 Carl Dr., and Thomas S. Fisk, 3077 Winchester Dr., both of Rescue, Calif. 95672

Filed Aug. 9, 1993, Ser. No. 103,148

Int. Cl.<sup>6</sup> A61F 2/38, 2/30

U.S. Cl. 623—20

7 Claims



6. Intraoperative method of restoring the surface smoothness of arthroplastic implants comprising:  
a. surgically exposing the implants;  
b. comparing the roughness of the abraded surfaces of the implants with the comparable surfaces of new implants;  
c. smoothing the abraded surfaces until new surface smoothness is substantially attained; and  
d. surgically completing the arthroplasty.

5,413,607

# KNEE JOINT PROSTHESIS

Eckart Engelbrecht, Hamburg, and Elmar Nieder, Jork, both of Germany, assignors to GMT Gesellschaft für Medizinische Technik mbH, Hamburg, Germany

Continuation of Ser. No. 800,327, Nov. 29, 1991, abandoned.

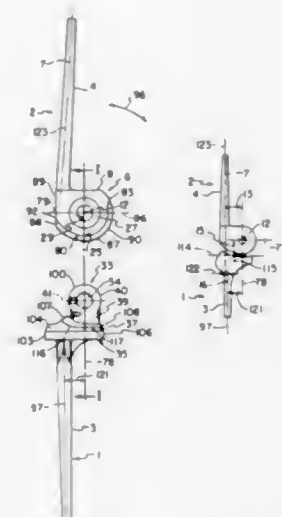
This application Sep. 7, 1993, Ser. No. 117,437

Claims priority, application Germany, Nov. 29, 1990, 40 38 037

Int. Cl.<sup>6</sup> A61F 2/38

U.S. Cl. 623—20

72 Claims



1. A knee joint prosthesis comprising a tibial component having a first shank positioned to be directly secured in a tibia; a femoral component having a second shank for direct implantation in a femur; and a hinge connecting said components for relative angular movement between extended first and flexed second positions about a predetermined axis in a predetermined plane extending substantially at right angles to said predetermined axis, said predetermined axis being fixed against movement relative to both of said shanks longitudinally of said shanks, and the shank of said tibial and femoral components respectively defining second and third longitudinal axes respectively located in second and third planes which are substantially perpendicular to said predetermined plane and, in said first positions, are substantially parallel to one another and to a fourth plane including said predetermined axis, said third and fourth planes being spaced apart a first distance and said second and fourth planes being spaced apart a second distance less than said first distance in the first positions of said components, said hinge including first and second leaves which are respectively movable with said tibial and femoral components, and said leaves being arranged to contact each other at a fifth plane which is spaced apart a third distance from a sixth plane including said predetermined axis and being normal to said fourth plane, said second and third planes being spaced apart a fourth distance less than either of said first and second distances.

5,413,608

# KNEE JOINT ENDOPROSTHESIS FOR REPLACING THE ARTICULAR SURFACES OF THE TIBIA

Arnold Keller, Kaybude, Germany, assignor to Waldemar Link GmbH & Co., Hamburg, Germany

Filed Sep. 17, 1993, Ser. No. 123,438

Claims priority, application Germany, Sep. 24, 1992, 9212879 U

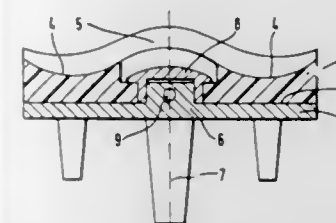
Int. Cl.<sup>6</sup> A61F 2/38

U.S. Cl. 623—20

9 Claims

1. Knee joint endoprosthesis for replacing the articular surfaces of the tibia, the endoprosthesis comprising a bearing part

(1), which is to be anchored on the bone and has an upper bearing surface (2), a plateau (3) which is to be secured on the said bearing part and is rotatable on the bearing surface (2) and a journal about which the plateau rotates, characterized in that the journal (6, 15) projects from the bearing surface (2), the plateau (3) is provided with a bore cooperatively receiving the



journal, the bore having a flange (13), a removable collar configured to engage the journal cooperates with the flange to limit movement of the plateau, the collar (14) has a mounting member which mates with the journal, and a fixing means (9) is provided to releasably secure the collar mounting member and journal together.

5,413,609

# METACARPAL-PHALANGEAL (MCP) JOINT PROSTHESIS

Alexander C. Nicol, Glasgow; Donald C. Marsden, Faringdon, and William A. Souter, Edinburgh, all of United Kingdom, assignors to University of Strathclyde, Glasgow, Scotland

PCT No. PCT/GB91/01078, § 371 Date Mar. 15, 1993, § 102(e)

Date Mar. 15, 1993, PCT Pub. No. WO92/00709, PCT Pub. Date Jan. 23, 1992

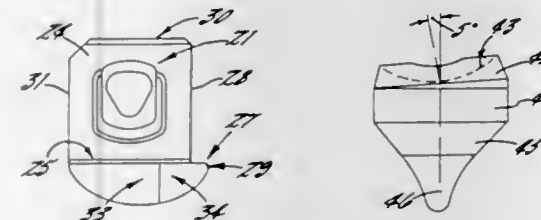
PCT Filed Jul. 3, 1991, Ser. No. 960,382

Claims priority, application United Kingdom, Jul. 7, 1990, 9015030

Int. Cl.<sup>6</sup> A61F 2/42

U.S. Cl. 623—21

5 Claims



1. A metacarpal-phalangeal MCP joint prosthesis for a human or animal body, comprising first (20) and second (40) components each made of bio-compatible material and adapted for secure to respective bones (13,14) of the body in the vicinity of a natural MCP joint (16) after surgical excision of the natural MCP joint (16), the components (20,40) of the prosthesis (12) being unattached to each other and, in use, being held together to form the prosthetic joint by the natural ligaments, tendons and muscles of the body in the vicinity of the MCP natural joint (16),

said first component (20) comprising a stem (21) sized for reception by a metacarpal bone cavity and a bulbous head (22) presenting a substantially-spheroidally curved convex articulation surface (23) which in the sagittal plane has a radius of curvature which changes within the arc length of the surface and in that plane the length of said arc being at least 90°, said bulbous head (22) further comprising a single lateral protrusion (27) extending in the coronal direction and being sized for differentially controlling tension of the collateral ligaments when the prosthetic joint is in the flexed condition, and said second component (40) comprising a stem (41) sized for reception by a phalangeal bone cavity and a head (42)

presenting a concave articulation surface (43), said concave surface (43) forming part of a substantially hollow spheroid and being dimensioned to slide over said convex surface (23) substantially along said 90° arc length in the sagittal plane to provide flexing movement of the prosthetic joint with the instantaneous center of rotation of the joint changing during said flexing movement due to said changes of radius of curvature so as to change the distance between the respective bones (13,14) and thereby allow natural collateral ligament function around the prosthetic joint to aid flexor muscle effect when the joint is extended and extensor muscle effect when the joint is flexed, said concave articulation surface (43) having a curvature which provides only ring-like peripheral contact with the substantially-spheroidally curved convex articulation surface (23) when the joint is in its extended condition and only central contact when the joint is in its flexed condition.

5,413,610

# ARTIFICIAL HIP JOINT

Hirokazu Amino; Yoshinori Shiraiwa, both of Kyoto, Japan, and Ian C. Clarke, Santa Monica, Calif., assignors to Kyocera Corporation, Kyoto, Japan

Continuation of Ser. No. 370,450, Jun. 23, 1989, abandoned,

Continuation-in-part of Ser. No. 136,398, Dec. 22, 1987,

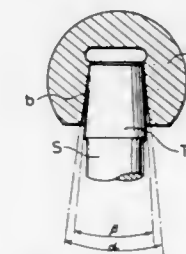
abandoned. This application Mar. 26, 1993, Ser. No. 38,552

Claims priority, application Japan, Dec. 25, 1986, 61-312551

Int. Cl.<sup>6</sup> A61F 2/32

U.S. Cl. 623—23

11 Claims



1. An artificial hip joint comprising:  
a ceramic head having a tapered female cavity, said cavity tapering from an open end inwardly to a base disposed within the head, said cavity being subdivided into approximately two halves, one approximate half being a deeper approximate half located adjacent the base as compared with the open end; and  
a metal stem having a tapered cone so that said tapered engagement occurs only in the deeper approximate half of the tapered female cavity when the ceramic head and the metal stem are fully connected to each other.

5,413,611

# COMPUTERIZED ELECTRONIC PROSTHESIS APPARATUS AND METHOD

Thomas P. Haslam, II, and Michael E. Tompkins, both of Sugar Land, Tex., assignors to MCP Services, Inc., Houston, Tex.

Filed Jul. 21, 1992, Ser. No. 915,618

Int. Cl.<sup>6</sup> A61F 2/72, 2/54

U.S. Cl. 623—25

26 Claims

1. A computerized electronic prosthesis apparatus having selectively configurable operating parameters corresponding to the particular capabilities and requirements of an individual wearer comprising:  
an articulated prosthesis adapted to be worn by a living being as a replacement for an amputated limb and capable of exerting a mechanical force;  
programmable microcomputer means in said prosthesis connected with a power supply and including a microproces-



sor, memory, input/output circuitry for receiving signals and producing an output drive signal and an output vibratory signal, signal processing means, drivers, and controllers;

electrode means on said prosthesis operatively connected with said microcomputer and adapted to contact certain muscles of the remnant portion of the limb to produce an electric command signal responsive to a myoelectric signal created by the wearer contracting and relaxing certain muscles in the remnant portion, the threshold voltage points at which said microcomputer will acknowledge a valid electric command signal while eliminating nuisance activations due to movement and environmental noise selectively configured and stored in said microcomputer memory;

drive means in said prosthesis operatively connected with said microcomputer for causing said prosthesis to exert a mechanical force responsive and proportional to said electric command signal, the speed of said drive means and value of said mechanical force exerted by said prosthesis selectively configured relative to the intensity of the myoelectric signal generated by the wearer and stored in said microcomputer memory;

sensor means on said prosthesis operatively connected with said microcomputer for detecting the mechanical force

signal responsive and proportional thereto, the threshold voltage points at which said microcomputer will acknowledge a valid electric sensor signal selectively configured and stored in said microcomputer memory; and

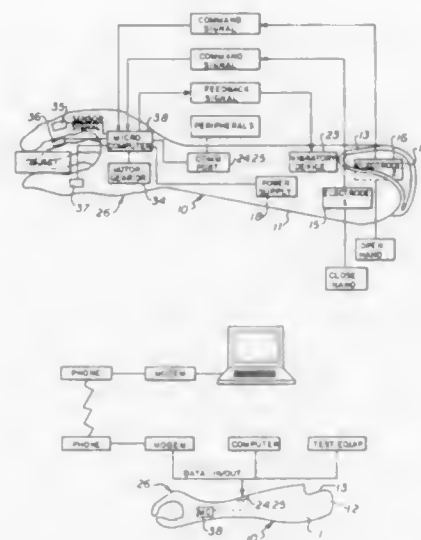
vibratory means on said prosthesis operatively connected with said microcomputer and adapted to engage the remnant portion of the limb adjacent sensory nerve endings in the skin of the remnant portion of the limb and transmit vibrations which stimulate the nerve endings to produce a feedback signal perceptible to the wearer which is responsive to and indicative of the mechanical force exerted, said vibrations having frequency, amplitude, and modulation characteristics, the operating values of which are selectively configured and stored in said microcomputer memory;

upon said microcomputer receiving a valid said electric command signal, said microcomputer producing an output drive signal to operate said drive means to cause said prosthesis to exert a mechanical force relative to the intensity of the myoelectric signal generated by the wearer, and upon said microcomputer receiving a sensor signal exceeding said threshold voltage points, said microcomputer producing an output vibratory signal causing said vibratory means to transmit vibrations which stimulate the nerve endings to produce feedback signals perceptible to the wearer which are indicative of the mechanical force being exerted; and

said command signal, said drive means, said sensor means, and said vibratory means each being selectively adjustable to compensate for changes in muscle strength, sensitivity, usage, and other conditions affecting operability;

a communication port on said prosthesis operatively connected with said microcomputer and adapted to be releasably connected to peripheral devices for exchanging data, monitoring, diagnosing, adjusting, correcting, or setting the operational parameters of said prosthesis; and

a modem adapted for connection to a telephone and said communications port for data communication between said microcomputer in said prosthesis and a local or remote computer, whereby the wearer can call the manufacturer of said prosthesis, connect said modem into the telephone line and said communication port on said prosthesis, and the manufacturer can then communicate directly with said microcomputer in said prosthesis via telephone to perform diagnostic tests, determine where and if there is a problem or a power failure, and correct problems via the telephone by making corrections to the operating parameters of said prosthesis.



exerted by said prosthesis and producing an electric sensor

# 5,413,612 COMPOSITION AND METHOD FOR DYEING HAIR WITH INDOLIC COMPOUNDS IN THE PRESENCE OF A CHLORITE OXIDANT

Gottfried Wenke, Woodridge, Conn., assignor to Clairol Incorporated, New York, N.Y.

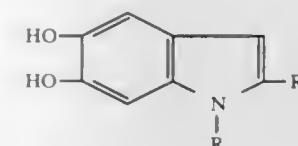
Continuation-in-part of Ser. No. 875,874, Apr. 29, 1992, abandoned. This application Feb. 4, 1993, Ser. No. 13,441

Int. Cl.<sup>6</sup> A61K 7/13

U.S. Cl. 8-423

13 Claims

1. A dye composition comprising an aqueous solution containing from about 0.1% to 5% by weight of sodium chlorite together with from about 0.1% to 3% by weight of a compound selected from the group consisting of 5,6-dihydroxyindoline and an indole which is a melanin precursor represented by the formula:



wherein R is hydrogen, alkyl, hydroxyalkyl or aminoalkyl, the alkyl group containing up to eight carbon atoms, aryl, or substituted aryl containing up to three reaction inert substituents, R1 is hydrogen or alkyl containing up to six carbon atoms and mixtures of said compounds, said composition having a pH effective for dyeing hair without causing oxidative damage to the hair.

# 5,413,613 COMPOSITIONS CONTAINING BENZODIFURANONE COMPOUNDS AND METHODS FOR COLORING HYDROPHOBIC MATERIALS USING THE SAME

Nobuyuki Katsuda, Ibaraki; Shinichi Yabushita, Mishima, and Shuhei Hashizume, Osaka, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan

Filed Nov. 12, 1993, Ser. No. 150,882

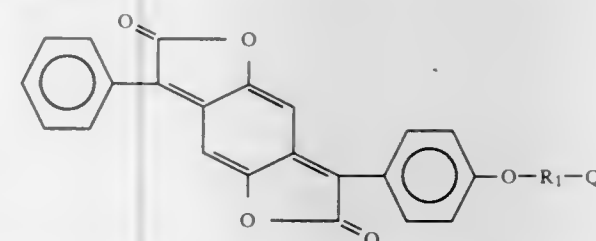
Claims priority, application Japan, Nov. 12, 1992, 4-302165; Jan. 22, 1993, 5-009084

Int. Cl.<sup>6</sup> D06P 1/16; C09B 67/22

U.S. Cl. 8-471

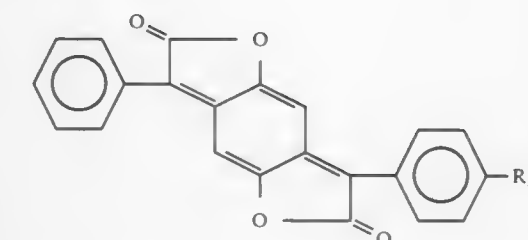
9 Claims

1. A composition comprising at least one member selected from the compound group represented by the following formula (I):



wherein R1 represents a methylene, or a straight chain or branched C<sub>2-6</sub> alkylene group, the latter being optionally substituted with a hydroxy, C<sub>1-4</sub> alkoxy or C<sub>1-4</sub> alkylcarbonyloxy group; and Q represents a heterocyclic ring having 5 or 6 atoms which contains at least one hetero atom selected from the group consisting of O, S and N, and at least one member selected from the compound group represented by the following formula (II):

## CHEMICAL



wherein R2 represents a hydrogen atom, halogen atom, a hydroxy group, or a C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy, C<sub>1-4</sub> alkoxy substituted by C<sub>1-4</sub> alkoxy, C<sub>1-4</sub> alkylcarbonyloxy, C<sub>1-4</sub> alkoxy carbonyl substituted by C<sub>1-4</sub> alkoxy, phenyl substituted by C<sub>1-4</sub> alkoxy, C<sub>1-4</sub> alkoxy substituted by C<sub>1-4</sub> alkoxy carbonyl substituted by C<sub>1-4</sub> alkoxy, or benzoyloxy group, wherein the weight ratio of the at least one member selected from the compound group represented by the formula (I) and the at least one member selected from the compound group represented by the formula (II) is 90:10 to 10:90.

# 5,413,614 MANNICH CONDENSATION PRODUCTS OF POLY(OXYALKYLENE) HYDROXYAROMATIC CARBAMATES AND FUEL COMPOSITIONS CONTAINING THE SAME

Richard E. Cherpeck, Cotati, Calif., assignor to Chevron Chemical Company, San Ramon, Calif.

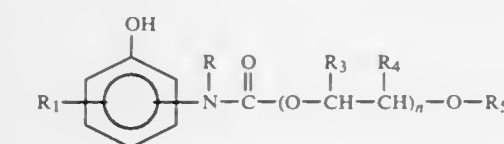
Filed May 2, 1994, Ser. No. 236,432

Int. Cl.<sup>6</sup> C10M 1/18, 1/22

U.S. Cl. 44-387

38 Claims

23. A fuel composition comprising a major amount of hydrocarbons boiling in the gasoline or diesel range and an effective deposit-controlling amount of a composition prepared by the Mannich condensation of a compound of the formula:

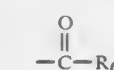


wherein R is hydrogen or lower alkyl having 1 to 6 carbon atoms;

R1 is hydrogen, hydroxy, lower alkyl having 1 to 6 carbon atoms, or lower alkoxy having 1 to 6 carbon atoms;

R3 and R4 are each independently hydrogen or lower alkyl having 1 to 6 carbon atoms;

R5 is hydrogen, alkyl having 1 to 30 carbon atoms, phenyl, aralkyl or alkaryl having 7 to 36 carbon atoms, or an acyl group having the formula:



wherein R6 is alkyl having 1 to 30 carbon atoms, phenyl, or aralkyl or alkaryl having 7 to 36 carbon atoms;

and n is an integer from 5 to 100;

with an aldehyde having the formula HR<sub>2</sub>C(O), wherein R2 is hydrogen or lower alkyl having 1 to 6 carbon atoms, and a nitrogen base selected from ammonia, lower alkylamine having 1 to 6 carbon atoms, a polyamine having 2 to about 12 amine nitrogen atoms and 2 to about 40 carbon atoms and mixtures thereof.

5,413,615

**POLYALKYL HYDROXY AND AMINO AROMATIC CARBAMATES AND FUEL COMPOSITIONS CONTAINING THE SAME**

Richard E. Cherpeck, Cotati, Calif., assignor to Chevron Chemical Company, San Ramon, Calif.

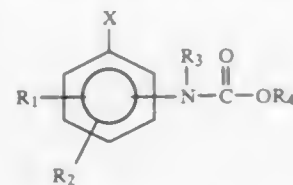
Filed May 2, 1994, Ser. No. 236,434

Int. Cl.<sup>6</sup> C10L 1/18

U.S. Cl. 44—387

37 Claims

1. A compound of the formula:



or a fuel-soluble salt thereof; wherein

X is hydroxy or amino;

R<sub>1</sub> and R<sub>2</sub> are independently hydrogen, hydroxy, lower alkyl having 1 to 6 carbon atoms, lower alkoxy having 1 to 6 carbon atoms, nitro, amino, N-alkylamino wherein the alkyl group contains 1 to 6 carbon atoms, or N,N-dialkylamino wherein each alkyl group independently contains 1 to 6 carbon atoms;

R<sub>3</sub> is hydrogen or lower alkyl having 1 to 6 carbon atoms; and

R<sub>4</sub> is a polyalkyl group having an average molecular weight in the range of about 400 to 5,000.

5,413,616

**METHOD OF IMMOBILIZING CONTAMINANTS IN THE SOIL OR IN MATERIALS SIMILAR TO THE SOIL**

Friedrich Bölsing, Danziger Strasse 5, D-3067 Lindhorst, Germany

Division of Ser. No. 787,701, Nov. 1, 1991, Pat. No. 5,234,485, which is a continuation of Ser. No. 328,253, Mar. 16, 1989, abandoned. This application Aug. 9, 1993, Ser. No. 103,878

Claims priority, application Germany, Sep. 24, 1987, 36 32 365.9

The portion of the term of this patent subsequent to Aug. 10, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C05G 3/04

U.S. Cl. 71—27

7 Claims

1. A method of immobilizing a contaminant contained in contaminated soil comprising mixing the contaminated soil with a reaction partner selected from the group consisting of a soluble sulfide, hydroxide, carbonate and phosphate, and which is capable of chemically interacting therewith to form a water insoluble reaction product, the reaction partner being part of a hydrophobic solid preparation which is obtained by grinding the reaction partner with the educt of a dispersing chemical reaction (DCR) selected from the group consisting of calcium oxide and aluminum alcoholate and mixing it with a hydrophobizing agent selected from the group consisting of about 0.1 to 20% of talc, 0.1 to 5% of a biodegradable natural fatty acid, 0.1 to 5% of a biodegradable long chain paraffin and 0.1 to 5% of a biodegradable alcohol, the mixture of the contaminated material with the hydrophobic solid preparation forming an inert solid.

5,413,617

**PROCESS FOR THE PREPARATION OF SILVER POWDER WITH A CONTROLLED SURFACE AREA BY REDUCTION REACTION**

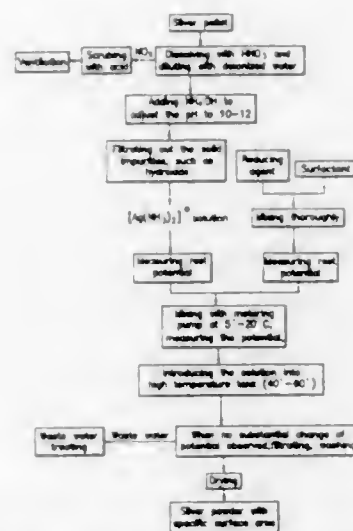
Jing-Chie Lin; Jyuhn-Yih Wu, and Sheng-Long Lee, all of Chung-Li, Taiwan, Prov. of China, assignors to National Science Council, Taipei, Taiwan, Prov. of China

Filed Sep. 13, 1993, Ser. No. 121,356

Int. Cl.<sup>6</sup> B22F 9/24

U.S. Cl. 75—371

7 Claims



1. A process for preparing silver powder with a controlled surface area, comprising the following steps:

(a) providing a 1.5-6 volume % silver ion solution;

(b) providing a mixed solution containing 1 to 10 volume % reducing agents and 3 to 8 volume % surfactants;

(c) introducing the silver ion solution and the mixed solution at a flow rate of 60 to 200 ml/min into a low temperature reaction tank of 5° to 20° C. and stirring to obtain a reaction solution, and holding the reaction solution for 7-60 minutes, and monitoring the rest potential of the reaction solution;

(d) introducing the reaction solution into a high temperature tank of 40° to 60° C.; and

(e) separating precipitated silver powder from the reaction solution after a period during which substantially no change in rest potential is observed.

5,413,618

**METHOD FOR THE PRODUCTION OF A PEAT SUBSTITUTE, INSTALLATION FOR IMPLEMENTING SAID METHOD, DRYING DEVICE, APPLICATION OF SAID METHOD, AND PEAT SUBSTITUTE PRODUCED ACCORDING TO SAID METHOD**

Franz Penningsfeld, Freising, Germany, and Gerhard Baumann, Ittigen, Switzerland, assignors to IUP Institut für Umweltschutz AG, Ittigen, Switzerland

Filed Oct. 1, 1992, Ser. No. 955,269

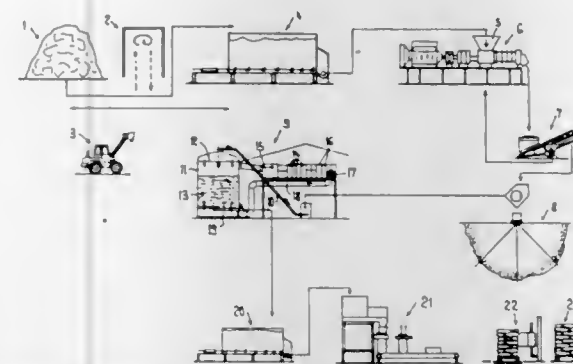
Int. Cl.<sup>6</sup> C10L 5/02

U.S. Cl. 44—490

22 Claims

1. A method for the production of a peat substitute from organic substances, in particular from woody materials, wherein said materials are impregnated with auxiliary substances by crushing, defibrating, triturating and breaking up in a breaking machine under high pressure together with said

auxiliary substances, said impregnation with auxiliary substances conferring upon the product properties which are



similar to those of peat and makes it suitable for the cultivation of plants without composting.

5,413,619

**PARTS CLEANING APPARATUS**

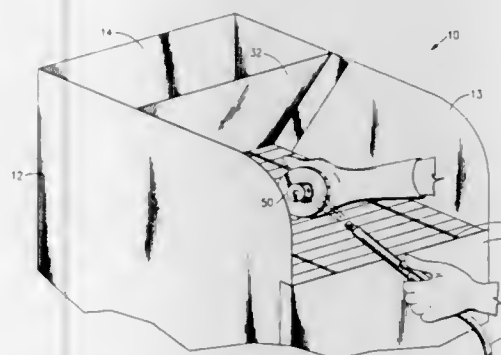
Victor C. Volk, Hot Springs, and James L. Rumburg, Arkadelphia, both of Ark., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Feb. 7, 1994, Ser. No. 192,511

Int. Cl.<sup>6</sup> B01D 46/00

U.S. Cl. 55—327

2 Claims



1. A blow off unit for use in combination with a source of compressed gas to remove adherent coolant and debris from a machined piece comprising:

a front panel having a top portion;

side panels;

a rear panel;

a bottom tray;

an open top;

said side panels and said rear panel being higher than said front panel;

filter means;

support means for supporting said filter means in said unit such that said filter means are located essentially flush

with said top portion of said front panel;

grill means overlying said filter means;

splash shield means located in said unit in a spaced relationship to said rear panel and extending over a portion of said grill means with an upper portion being closest to said front panel whereby said side panels and said splash shield

means coact to define a confined area over said filter means such that compressed gas directed at said machined

piece in said confined area impinges on said piece so as to discharge adherent coolant and debris therefrom while

said compressed gas serially passes through said filter means and between said splash shield means and said rear

panel.

5,413,620

**PROCESS FOR REINFORCING A GLASS FIBER ATTACHMENT SURFACE AND ARTICLE**

David Henry, Saint-Michel s/Orge, France, assignor to Corning Incorporated, Corning, N.Y.

Filed Oct. 1, 1993, Ser. No. 130,737

Claims priority, application France, Oct. 2, 1992, 92 12173

Int. Cl.<sup>6</sup> C03B 32/00

U.S. Cl. 65—406

10 Claims

1. A process for adhesively bonding the surface of a humidity sensitive glass article, said article comprising less than about 50% by weight of silica, to the surface of a component to form a composite article, characterized in that it comprises:

(A) bringing the surface of the humidity sensitive glass article into contact with and thereby coating said surface with an aqueous solution of an acid and a silane; then

(B) bringing the surface of the humidity sensitive glass article into contact with and thereby coating said surface with an alkaline aqueous solution of a silicate selected from the group consisting of sodium silicate, potassium silicate and mixtures thereof; then

(C) drying and hardening the coating applied on the surface of the humidity sensitive glass article as the result of steps (A) and (B), yielding a strengthened surface of the humidity sensitive glass article; then

(D) applying an adhesive composition between the strengthened surface of the humidity sensitive glass article and the surface of the component; and then

(E) bringing the surface of the component into contact with the strengthened surface of the humidity sensitive glass article and thereby adhesively bonding the surface of the component and the strengthened surface together to form a composite article.

8. A composite article manufactured by a process as defined in any one of claims 1 to 7.

5,413,621

**PROCESS FOR COOLING AND PURIFYING HOT, DUST-LADEN FLUE GASES CONTAINING DIOXINS AND OTHER TOXIC SUBSTANCES**

Winfried Högner, Oberhausen, and Hans Piechura, Bochum, both of Germany, assignors to Man Gutehoffnungshütte Aktiengesellschaft, Oberhausen, Germany

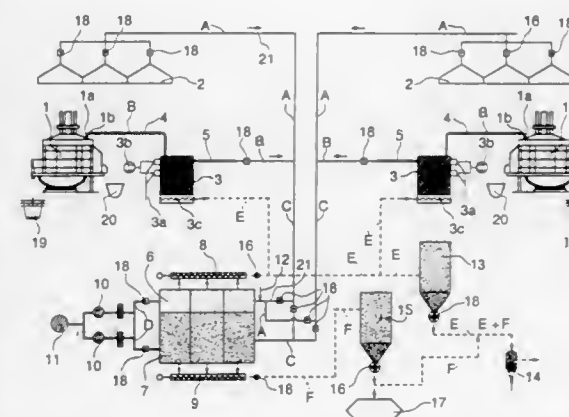
Filed Jun. 25, 1993, Ser. No. 82,591

Claims priority, application Germany, Jun. 27, 1992, 42 21 239.1

Int. Cl.<sup>6</sup> C22B 9/20

U.S. Cl. 75—376

20 Claims



1. A process for treating gases from a melting vessel, the process comprising the steps of:

collecting a first flue gas from the melting vessel during charging of metallic materials into the melting vessel, said first gas containing toxic gases and particles;

transporting said first flue gas along a first path;



mixing said first flue gas with an additive in said first path, said additive absorbing said toxic gases present in said collected first flue gas;  
 filtering out said particles from said first flue gas and also filtering out said additive in said first path, after said additive has absorbed said toxic gas from said first flue gas mixed with said additive, said particles and said additive with said toxic gas absorbed being a contaminated dust;  
 moving said contaminated dust into the melting vessel;  
 melting said contaminated dust in said melting vessel;  
 collecting a second flue gas from the melting vessel during said melting of said contaminated dust, said second flue gas including additional toxic gases, and non-contaminated dust;  
 transporting said second flue gas along a second path;  
 heating said second flue gas in said second path to destroy and decontaminate said additional toxic gases present in said collected second flue gas;  
 filtering said second flue gas in said second path after said heating to remove said non-contaminated dust from said second flue gas.

5,413,622

# METHOD OF MAKING HOT METALS WITH TOTALLY RECYCLED GAS

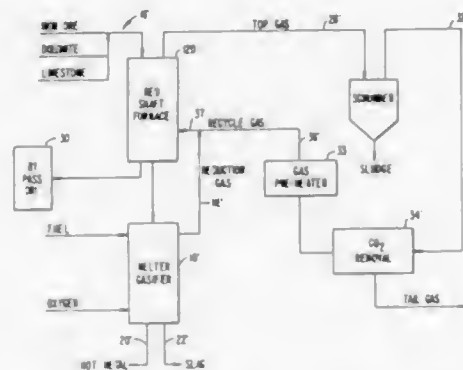
Richard B. Greenwalt, Danville, Calif., assignor to Bechtel Group, Inc., San Francisco, Calif.

Filed Dec. 16, 1993, Ser. No. 168,699

Int. Cl.<sup>6</sup> C21B 13/14

U.S. Cl. 75—446

8 Claims



1. A method of making molten iron utilizing a direct reduction furnace and a melter gasifier comprising providing a melter gasifier which is capable of forming a reduction gas during reaction of coke, oxygen and direct reduced iron; providing a direct reduction furnace which is capable of forming a top gas containing CO<sub>2</sub> during reduction of iron ore, said direct reduction furnace having sufficient capacity to utilize all of the reduction gas produced by the melter gasifier and the top gas produced by said direct reduction furnace after the CO<sub>2</sub> has been removed therefrom for the direct reduction of iron ore; introducing carbonaceous fuel into the melter gasifier; blowing oxygen containing gas into said melter gasifier and combusting said carbonaceous fuel to form at least a first fluidized bed of coke particles from said carbonaceous fuel; reducing iron ore in said reduction furnace to direct reduced iron; producing a top gas in said reduction furnace; flowing said top gas out of said reduction furnace and removing CO<sub>2</sub> from said top gas to form a recycle gas containing all of said top gas remaining after CO<sub>2</sub> removal; introducing at least a portion of said direct reduced iron into said melter gasifier through an entry port in the upper portion thereof; reacting coke, oxygen and direct reduced iron in said melter gas out of combust the major portion of said coke to produce reduction gas, molten iron and a processed slag; flowing reduction gas out of said melter gasifier; combining all of said reduction gas with all of said recycle gas from said reduction furnace to form

a combined gas; directing all of the combined gas to said reduction furnace; reacting said combined reduction gas with iron ore in said reduction furnace to convert the iron ore to direct reduced iron; discharging a portion of the direct reduced iron directly to the melter gasifier for further processing and by-passing a portion of the direct reduced iron coming from said reduction furnace from the melter gasifier for other uses.

5,413,623

# PROCESS AND APPARATUS FOR VACUUM DEGASSING MOLTEN STEEL

Kazuo Oonuki, Teruyoshi Hiraoka, Hiroshi Nagahama; Kazuhisa Fukuda; Akira Nobumoto; Takahiro Isono; Atsumi Yamada, and Hiroki Gofuku, all of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

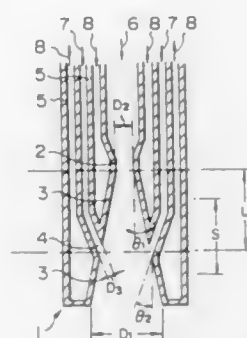
Filed Aug. 25, 1993, Ser. No. 111,413

Claims priority, application Japan, Aug. 26, 1992, 4-227469; Aug. 26, 1992, 4-227633

Int. Cl.<sup>6</sup> C21C 7/00

U.S. Cl. 75—508

35 Claims



1. A process for vacuum degassing molten steel during a vacuum treatment of the molten steel, said process comprising: providing a top blow lance, capable of injecting oxygen or an oxygen-containing gas and of injecting a gaseous fuel, respectively, on the top of a vacuum treatment vessel; and with the lower end of the top blow lance located a distance of 1.0 m or more from the surface of a molten steel bath in the treatment vessel, injecting both the oxygen or oxygen-containing gas and the gaseous fuel in the vacuum treatment vessel under a pressure in the vacuum treatment vessel of not more than 50 Torr during the vacuum treatment of the molten steel to burn the gaseous fuel and thereby heat the molten steel.

5,413,624

# ENHANCEMENT OF BIOLEACH SYSTEMS USING NUTRIENT ADDITIVES

Patricia A. Rusin, and James E. Sharp, both of Tucson, Ariz., assignors to MBX Systems, Inc., Tucson, Ariz.

Continuation-in-part of Ser. No. 127,394, Sep. 27, 1993, which is a continuation-in-part of Ser. No. 23,990, Feb. 26, 1993, Pat. No. 5,248,329, which is a continuation-in-part of Ser. No. 828,056, Jan. 30, 1992, Pat. No. 5,221,327, which is a continuation-in-part of Ser. No. 682,491, Apr. 9, 1991, abandoned, which is a continuation-in-part of Ser. No. 660,312, Feb. 22, 1991, abandoned. This application Feb. 14, 1994, Ser. No. 194,676

Int. Cl.<sup>6</sup> C22B 11/04

U.S. Cl. 75—711

11 Claims

1. A process for recovering heavy metals from sulfide ore having indigenous microorganisms comprising the steps of (a) contacting said ore in the presence of oxygen, with an aqueous nutrient supplement comprising carbohydrates and proteins wherein there is more carbohydrate than protein, and wherein said supplement, when applied to said sulfide ore, supports the growth of said indigenous microorganisms, (b) incubating said ore with said supplement for a period of time sufficient to solubilize said heavy metals, (c) collecting said solubilized ore,

and (d) treating said solubilized ore to extract said heavy metals.

5,413,625

# MIXED ION-EXCHANGED ZEOLITES AND PROCESSES FOR THE USE THEREOF IN GAS SEPARATIONS

Chien C. Chao, Millwood; John D. Sherman, Chappagua; Joseph T. Mullhaupt, Williamsville, all of N.Y., and Cornelius M. Bolinger, Sugarland, Tex., assignors to Praxair, Inc., Danbury, Conn.

Division of Ser. No. 418,428, Oct. 6, 1989, Pat. No. 5,174,979.

This application Dec. 17, 1992, Ser. No. 992,187

Int. Cl.<sup>6</sup> B01D 53/04

U.S. Cl. 95—103

37 Claims

1. A process for selectively adsorbing nitrogen from a gas mixture containing nitrogen and at least one less strongly adsorbed component which comprises contacting the gas mixture with a zone of an adsorbent which is selective for the adsorption of nitrogen, selectively adsorbing nitrogen on the adsorbent and passing the gas mixture less the adsorbed nitrogen out of the zone, wherein the adsorbent comprises a crystalline X-zeolite having a zeolite Si/Al ratio  $\leq 1.5$  and an at least binary ion exchange of the exchangeable ion content with between 5% and 95% lithium and with between 5% and 95% of a second ion selected from the group consisting of calcium, strontium and mixtures thereof, wherein the sum of the lithium and second ion ion exchange is at least 60% of the exchangeable ion content.

5,413,626

# PROCESS FOR THE WET CLEANING OF GASES

Arno Bartsch, Marxen, Germany, assignor to Norddeutsche Affinerie Aktiengesellschaft, Hamburg, Germany

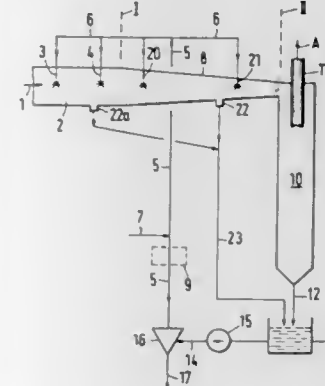
Filed Oct. 19, 1993, Ser. No. 139,184

Claims priority, application Germany, Dec. 23, 1992, 42 43 759.8

Int. Cl.<sup>6</sup> B01D 51/00

U.S. Cl. 95—219

5 Claims



1. A process for the wet cleaning of a gas, comprising the steps of:

- initially passing said gas through a substantially constant cross section prescrubbing line and spraying said gas with a scrubbing liquid at at least one location along said prescrubbing line;
- then passing said gas from said prescrubbing line through a substantially horizontal accelerating line having an entrance flow cross section substantially 1.5 to 8 times larger than an exit flow cross section;
- spraying said gas with additional scrubbing liquid in said accelerating line at at least one location therealong, said gas being sprayed in said accelerating line with larger liquid droplets than in said prescrubbing line;
- discharging said horizontal accelerating line at said exit flow cross section into a cyclone separator and separating

contaminated scrubbing liquid from cleaned gas in said cyclone separator; and  
 (e) separately withdrawing said contaminated scrubbing liquid and cleaned gas from said cyclone separator.

5,413,627

# PROCESS FOR THE SELECTIVE REMOVAL OF INORGANIC AND/OR ORGANIC SULFUR COMPOUNDS

Heiner Landeck, Munich, and Gerhard Ranke, Pöcking, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

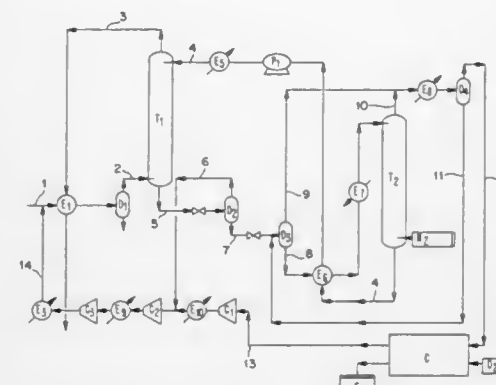
Filed Mar. 1, 1993, Ser. No. 34,798

Claims priority, application Germany, Aug. 29, 1990, 40 27 239.7

Int. Cl.<sup>6</sup> C01B 17/00

U.S. Cl. 95—235

34 Claims



1. In a process for the selective removal of at least one inorganic and/or organic sulfur compound from a crude gas containing also at least one of H<sub>2</sub>, N<sub>2</sub>, Ar, CO<sub>2</sub>, CO, or an aliphatic hydrocarbon by scrubbing with a physical scrubbing agent, the improvement which comprises employing as said scrubbing agent a composition comprising a heterocyclic compound comprising a heterocycle having in the heterocyclic ring a number of ring atoms *n* greater than or equal to 5, with at least two heteroatoms being nitrogen or oxygen, of which at least one heteroatom is a single bonded or double bonded nitrogen and, if singly bonded, organo-substituted, the heteroatoms in rings of an even number of members occupying one of the positions from 1,2 to 1,*n*/2 and, in rings of an uneven number of members, occupying one of the positions from 1,2 up to 1,(*n*-1)/2.

5,413,628

# STABLE INORGANIC ZINC-POWDER RICH COATING COMPOSITION

Ronald R. Savin, 11001 Muirfield Dr., Rancho Mirage, Calif. 92270

Continuation-in-part of Ser. No. 125,430, Sep. 22, 1993, Pat. No. 5,338,348. This application Aug. 9, 1994, Ser. No. 287,913

The portion of the term of this patent subsequent to Aug. 16, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C09D 5/10; C08K 3/08

U.S. Cl. 106—14.44

4 Claims

1. In a coating composition for use in protecting metallic substrates from corrosion, comprising in weight percent, based on the total weight of the composition: from about 7% to 35% of alkyl silicate as a film forming substance; from about 35% to 55% of zinc powder; from about 5% to 25% of zinc flakes; from about 0.2 to 5% of at least one amorphous silica; and up to about 30% particulate ferrophosphate; the improvement wherein the alkyl silicate comprises, in weight percent, based on the weight of the alkyl silicate: from about 5% to 20% of tetraethyl orthosilicate.

5,413,629

**LASER MARKING AND PRINTING INK THEREFOR**  
Toshihiko Yasui, Yokohama; Yoshio Takimoto, deceased, late of Tokyo by Kazumi Takimoto, Takeshi Takimoto, executors; Katsuhiko Kawakami, Shizuoka; Toshiyuki Kiyonari, Hasuda, and Norio Endo, Tokyo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc. and Kirin/Beer Kabushiki Kaisha, both of Tokyo, Japan

Filed Nov. 29, 1993, Ser. No. 158,845

Claims priority, application Japan, Nov. 30, 1992, 4-320086  
Int. Cl.<sup>6</sup> C09D 11/00

U.S. Cl. 106—21 R

23 Claims

1. A laser marking method comprising irradiating laser light on a thermosensitive color-forming layer formed on a substrate, said thermosensitive color-forming layer being formed by printing with a printing ink comprising a leuco dye as a color former and an acidic substance as a color developer, wherein said printing ink further comprises at least one background color formation inhibitor selected from the group consisting of a water-soluble amino acid, an ammonium salt of an inorganic acid, a pH buffer, and water,

wherein said water-soluble amino acid is present in an amount of 2 to 30% by weight based on the total weight of the printing ink;

wherein said inorganic acid ammonium salt is present in an amount of 0.1 to 20% by weight based on the total weight of the printing ink;

wherein said pH buffer is present in an amount of 2 to 30% by weight based on the total weight of the printing ink; and

wherein said water is present in an amount of 2 to 35% by weight based on the total weight of the printing ink.

5,413,630

**COLORANT AND INK COMPOSITIONS**

William M. Schwarz, Webster, and Timothy J. Fuller, West Henrietta, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

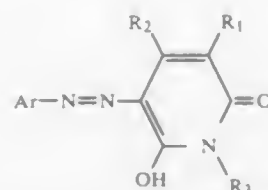
Filed Dec. 13, 1993, Ser. No. 166,373

Int. Cl.<sup>6</sup> C09D 11/02

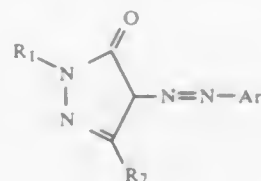
U.S. Cl. 106—22 K

18 Claims

1. An aqueous ink composition which comprises water, a humectant, and a colorant selected from the group consisting of: (a) those of Formula I



wherein R<sub>1</sub> is an electron withdrawing group, R<sub>2</sub> is selected from the group consisting of hydrogen, alkyl, substituted alkyl, aryl, substituted aryl, arylalkyl, and substituted arylalkyl, R<sub>3</sub> is selected from the group consisting of hydrogen, alkyl, substituted alkyl, aryl, substituted aryl, arylalkyl, and substituted arylalkyl; and Ar is selected from the group consisting of aryl, substituted aryl, arylalkyl, and substituted arylalkyl; (b) those of Formula II



wherein R<sub>1</sub> is selected from the group consisting of hydrogen, alkyl, substituted alkyl, aryl, substituted aryl, arylalkyl, and

substituted arylalkyl, R<sub>2</sub> is selected from the group consisting of hydrogen, alkyl, substituted alkyl, aryl, substituted aryl, arylalkyl, and substituted arylalkyl, and Ar is selected from the group consisting of aryl, substituted aryl, arylalkyl, and substituted arylalkyl; (c) dimeric compounds containing two moieties of Formula I; (d) dimeric compounds containing two moieties of Formula II; (e) dimeric compounds containing one moiety of Formula I and one moiety of Formula II; (f) trimeric compounds containing three moieties of Formula I; (g) trimeric compounds containing three moieties of Formula II; (h) trimeric compounds containing two moieties of Formula I and one moiety of Formula II; (i) trimeric compounds containing one moiety of Formula I and two moieties of Formula II; (j) polymeric compounds containing at least four moieties selected from the group consisting of Formula I, Formula II, and mixtures thereof; and (k) mixtures thereof, said ink composition being suitable for use in an ink jet printing process.

5,413,631

**FORMATION OF A CELLULOSE-BASED PREMIX**

Gary E. G. Gray, and Michael C. Quigley, both of Coventry, United Kingdom, assignors to Courtaulds (Holding) Limited, London, England

Filed May 24, 1993, Ser. No. 66,781

Int. Cl.<sup>6</sup> C08L 1/02

U.S. Cl. 106—156

12 Claims

1. A method for forming a cellulose based premix which comprises introducing into a horizontal cylindrical mixing chamber, having a longitudinal axis and axially spaced stirring elements rotating about said axis, shredded cellulosic material and a solution of amine oxide, and in said chamber subjecting said cellulosic material and amine oxide solution to the mixing action of said axially spaced stirring elements rotated about the longitudinal axis of said chamber at a speed of between 40 and 80 revolutions per minute to form a dispersion of cellulose in said amine oxide solution.

5,413,632

**ORGANIC PIGMENTS, PROCESS FOR THEIR PREPARATION AND USE IN PAINTS**

Frank Vermoortele, Lille, and Jean Mayer, Hem, both of France, assignors to Colour Research Company (CORECO) Ltd., Dublin, Ireland

1. PCT No. PCT/BE91/00019, § 371 Date Oct. 19, 1993, § 102(e) Date Oct. 19, 1992, PCT Pub. No. WO91/13943, PCT Pub. Date Sep. 19, 1991

PCT Filed Mar. 14, 1991, Ser. No. 946,447

Claims priority, application Belgium, Mar. 14, 1990, 9000287  
Int. Cl.<sup>6</sup> C09B 67/10

U.S. Cl. 106—493

6 Claims

1. Pigment-based coating composition characterized in that the pigment has been treated with 0.1 to 10% by weight of polyalkyleneimine in relation to the pigment.

5,413,633

**CONCRETE**

Phillip B. Cook, Rufford, and James B. Walker, Keighley, both of United Kingdom, assignors to British Gas plc, London, United Kingdom

1. PCT No. PCT/GB92/01122, § 371 Date Sep. 1, 1993, § 102(e) Date Sep. 1, 1993, PCT Pub. No. WO92/22513, PCT Pub. Date Dec. 23, 1992

PCT Filed Jun. 19, 1992, Ser. No. 108,654

Claims priority, application United Kingdom, Jun. 19, 1991, 9113267

Int. Cl.<sup>6</sup> C04B 18/30

U.S. Cl. 106—672

7 Claims

1. A foamed concrete composition comprising sewage sludge ash and a foam comprising an aerated mixture of soap solution and water.

5,413,634

**CEMENT COMPOSITION**

Edward T. Shawl, Wallingford, and Haven S. Kesling, Jr., Drexel Hill, both of Pa., assignors to Arco Chemical Technology, L.P., Greenville, Del.

Continuation-in-part of Ser. No. 102,866, Aug. 6, 1993, abandoned. This application May 5, 1994, Ser. No. 238,566  
Int. Cl.<sup>6</sup> C04B 24/32

U.S. Cl. 106—696

10 Claims

1. A cement composition comprised of cement and a shrinkage reducing amount of an alkyl ether derivative of an aliphatic polyhydroxy compound having the formula:



wherein Q is C<sub>3</sub>-C<sub>12</sub> aliphatic hydrocarbon group, each R is hydrogen or a C<sub>1</sub>-C<sub>16</sub> alkyl group with the proviso that at least one is C<sub>1</sub>-C<sub>16</sub> alkyl, A is a C<sub>2</sub>-C<sub>4</sub> oxyalkylene group, n is 0-10, and x is 3-5.

5,413,635

**LIME SLUDGE TREATMENT PROCESS**

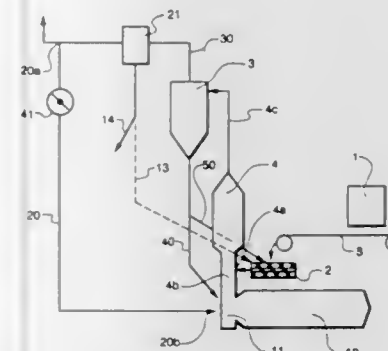
David M. Matweecha, Bethlehem, and Charles R. Euston, Kutztown, both of Pa., assignors to Fuller Company, Bethlehem, Pa.

Filed Dec. 30, 1993, Ser. No. 175,856

Int. Cl.<sup>6</sup> C04B 2/02

U.S. Cl. 106—792

3 Claims



1. A method of heat treating lime sludge (CaCO<sub>3</sub>) to form burnt lime (CaO), comprising (a) introducing lime sludge feed via a feed material inlet to a flash dryer means, wherein said lime sludge is entrained in upwardly moving heated gases, with at least some of said gases being off gases from a lime reburning kiln that is in communication with said flash dryer, to thereby dry said lime sludge, and thereafter (b) introducing the gas entrained dried lime sludge to a separator means, wherein the dried lime sludge is separated from the gas and is thereafter fed to the lime kiln, wherein a portion of the separated gases is recycled to the flash dryer to thereby maintain the gas flow at the feed material inlet of the flash dryer at a velocity.

5,413,636

**ENDLESS ROTARY PROCESSING OF SUBSTRATES IN HEAT AND VAPORS**

Richard K. Smejda, P.O. Box 344, Paterson, N.J. 07544

Filed Jul. 2, 1992, Ser. No. 907,609

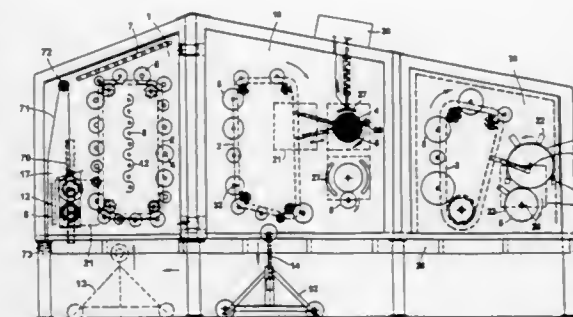
Int. Cl.<sup>6</sup> B05C 11/00, 13/02, 15/00

U.S. Cl. 118—64

4 Claims

1. A system for processing materials and substrates, with applicators, conveyors with surface transport, and chambers filled with vapors, wherein the improvement comprises; one or more workstations selected from the group consisting of applicators, energizers, winders, rewinders, resetters, and processing locations; said one or more workstations comprising; at least one bell-shaped processing chamber containing con-

veyor chains for holding and transporting loaded cores at extremities of the loaded cores; said extremities of the loaded cores being held in locked bearings for said holding and transporting with said extremities ending in star wheels with multiple arms; means to interfere with said loaded cores during rotation of the conveyor chains; and



said means to interfere comprising stationary bars mounted in sequence along a path of said conveyor chains in order to rotate one arm of said star wheel and with it said loaded core for a sector of a circle, with multiple interferences between said stationary bars and said arms of said star wheel causing said loaded core to rotate around a complete circle.

5,413,637

**MASKING METHODS USING A FOAM WEB**

David R. Bastow, Tamworth, England, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

PCT No. PCT/US92/02030, § 371 Date Sep. 28, 1993, § 102(e) Date Sep. 28, 1993, PCT Pub. No. WO92/18252, PCT Pub. Date Oct. 29, 1992

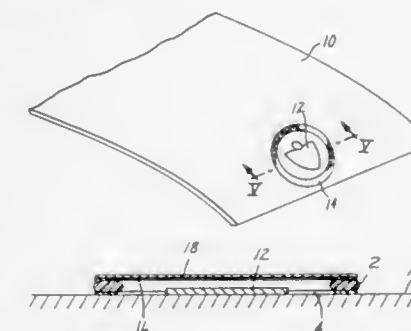
PCT Filed Mar. 13, 1992, Ser. No. 122,494

Claims priority, application United Kingdom, Apr. 19, 1991, 9108385.7

Int. Cl.<sup>6</sup> B32B 1/00, 3/00

U.S. Cl. 118—505

9 Claims



1. A masking element comprising an elongate web of polymeric foam in a closed curve having inner and outer peripheries and upper and lower surfaces, with said upper and lower surfaces being curved in a cross-section taken along a plane transverse to said web; and a layer of adhesive on at least the lower surface of said web for mounting the element on a substrate to mask an area of the substrate adjacent the inner or the outer periphery of the element.



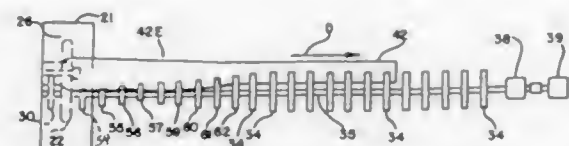
# **5,413,638** **APPARATUS FOR METALIZING INTERNAL SURFACES OF TUBULAR METAL BODIES**

Philip Bernstein, Jr., 309 W. Fullerton Parkway Apt. 7 W., Chicago, Ill. 60614, and James L. Schuppe, 5410 N. 41st St., Milwaukee, Wis. 53209

Continuation-in-part of Ser. No. 592,357, Oct. 3, 1990, abandoned. This application Aug. 21, 1992, Ser. No. 934,037 Int. Cl.<sup>6</sup> B05B 7/16, 13/06

U.S. Cl. 118—620

20 Claims



9. Coating apparatus for coating the inside surface of an elongated tubular body having a longitudinal axis which comprises:

- a plurality of first rollers of a constant outer diameter mounted on a first rotatable shaft having an inlet end and an outlet end;
- a plurality of second rollers of said constant outer diameter mounted on a second rotatable shaft having an inlet end adjacent the inlet end of said first rotatable shaft, and having an outlet end adjacent the outlet end of said first rotatable shaft, with each second roller being spaced from and adjacent to a corresponding first roller in a paired relationship to thereby define a gap of fixed dimension between paired first and second rollers;
- heating means proximate the outlet ends of said first and second shafts for heating an elongated tubular body passing therethrough and causing the tubular body to thermally expand in diameter;
- a plurality of third rollers mounted on a third rotatable shaft having an inlet end proximate said heating means and an outlet end spaced from said heating means;
- a plurality of fourth rollers mounted on a fourth rotatable shaft having an inlet end adjacent said heating means and adjacent the inlet end of said third rotatable shaft, and having an outlet end adjacent the outlet end of said third rotatable shaft, with each fourth roller being spaced from and adjacent to a corresponding third roller of equal diameter in a paired relationship to thereby define a gap between paired third and fourth rollers;
- a nesting groove above the gap between each set of paired rollers and between the adjacent portions of the upper surfaces of each set of paired rollers;
- first motive means for rotating said first and second rotatable shafts and said mounted first and second rollers to thereby rotate an elongated tubular body within the nesting grooves of adjacent pairs of first and second rollers;
- second motive means for rotating said third and fourth rotatable shafts and said mounted third and fourth rollers to thereby rotate an elongated tubular body within the nesting grooves of adjacent pairs of third and fourth rollers;
- axial advancing means for longitudinally advancing a rotating elongated tubular body sequentially along and within the nesting grooves of adjacent pairs of first and second rollers, through said heating means, and sequentially along and within the nesting grooves of adjacent pairs of third and fourth rollers;
- means for internally coating an elongated tubular body passing through said heating means; and,
- adjusting means on said third and fourth rotatable shafts for adjusting a sequence of nesting grooves adjacent the inlet end and along a portion of said third and fourth shafts to compensate for thermal expansion and thermal contraction of a rotating elongated tubular body longitudinally advancing from said heating means into sequential nesting grooves of adjacent pairs of third and fourth rollers to

keep the longitudinal axis as a straight line through the thermally expanded and thermally contracted portions of the tubular body.

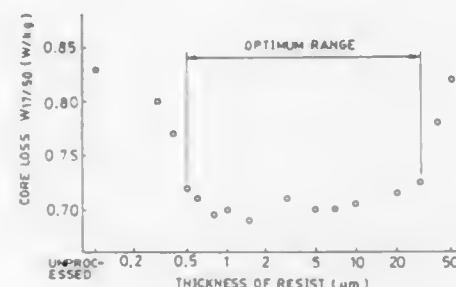
# **5,413,639** **METHOD OF MANUFACTURING LOW-CORE-LOSS GRAIN ORIENTED ELECTRICAL STEEL SHEET**

Kelji Sato, and Bunjiro Fukuda, both of Chiba, Japan, assignors to Kawasaki Steel Corporation, Japan  
Continuation of Ser. No. 908,494, Jun. 30, 1992, abandoned, which is a continuation of Ser. No. 717,814, Jun. 19, 1991, abandoned. This application Jan. 19, 1993, Ser. No. 6,143  
Claims priority, application Japan, Aug. 1, 1990, 2-202366; Aug. 2, 1990, 2-204003

Int. Cl.<sup>6</sup> C21D 8/12

U.S. Cl. 148—111

5 Claims



5. A method of manufacturing a cold-rolled low-core-loss grain oriented electrical steel sheet, comprising: applying an etching resist to a surface of the steel sheet by printing so that thread-like non-application regions continuous or discontinuous in a direction crisscrossing the cold-rolled rolling direction are left uncovered, wherein said etching resist is fixed on the surface by baking, and has a thickness of 0.5–30 μm and wherein the steel sheet is etched to form continuous or discontinuous thread-like grooves in its surface and thereafter removing the resist, in a manner not reducing the space factor of the grooves, in a cold-rolled grain oriented electrical steel sheet having a final thickness of about 0.27 mm or less, said grooves extending in a direction within a range of about 30° from the cold-rolled direction perpendicular to the rolling direction; processing the steel sheet by decarburization annealing; and then processing the steel sheet by final texture annealing; depths of said grooves and roughness of the surface of said sheet satisfying the equation:

$$\log d \geq 0.6 Ra + 0.4$$

where d is groove depth (μm), and Ra is mean surface roughness of the cold-rolled steel sheet.

# **5,413,640** **METHOD OF PRODUCING NON-ORIENTED ELECTROMAGNETIC STEEL STRIP HAVING SUPERIOR MAGNETIC PROPERTIES AND APPEARANCE**

Masahiko Manabe, Chiba; Kazumi Morita, Okayama; Yoshinari Muro; Takahiro Kan, both of Chiba; Yoshiaki Iida, Okayama; Hideo Kobayashi, and Takashi Obara, both of Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Japan  
Continuation of Ser. No. 804,830, Dec. 6, 1991, abandoned. This application Mar. 29, 1993, Ser. No. 39,529

Claims priority, application Japan, Dec. 10, 1990, 2-401048; Oct. 23, 1991, 3-275138

Int. Cl.<sup>6</sup> C21D 9/46

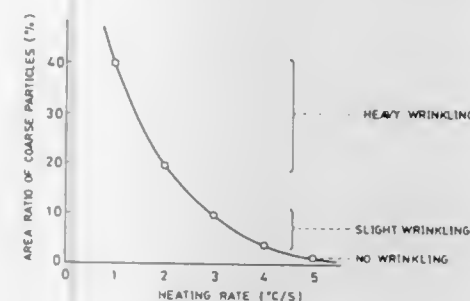
U.S. Cl. 148—111

9 Claims

1. A method of producing a non-oriented electromagnetic

steel strip having superior magnetic properties and appearance, comprising the steps of:

- preparing a slab from a steel which includes components consisting essentially of, by weight, up to about 0.02% of C, up to about 4.0% of Si plus Al or Si alone, up to about 1.0% of Mn, up to about 0.2% of P and the balance substantially Fe;
- hot-rolling said slab to form a hot-rolled strip;
- subjecting said hot-rolled strip to a first cold rolling conducted at a rolling reduction controlled between about 5 and 15% to form a first cold-rolled strip;



subjecting the first cold-rolled strip to a first annealing step; controlling the temperature and duration of said first annealing step to produce a crystal grain size ranging from about 100 to 200 μm after said first annealing, wherein said first cold-rolled strip is heated at a rate of between about 3° C./sec and 7° C./sec and a maximum temperature is maintained for about 5 to 30 seconds;

subjecting the resulting annealed strip to cold rolling to reduce the annealed strip thickness; and

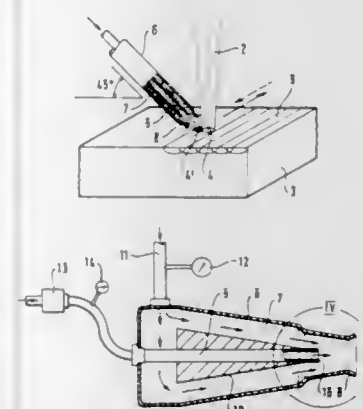
subjecting the resulting cold-rolled strip to final annealing.

# **5,413,641** **LASER NITRIDING AN ELEMENT MADE OF TITANIUM ALLOY BY BLOWING NITROGEN AND INERT GAS** André Coulon, Bessancourt, France, assignor to GEC Alsthom Electromecanique SA, Paris, France

Filed Oct. 8, 1993, Ser. No. 131,946  
Claims priority, application France, Oct. 9, 1992, 92 12020  
Int. Cl.<sup>6</sup> B23K 26/00, 27/00

U.S. Cl. 148—224

3 Claims



1. A method of nitriding an element made of a titanium alloy, in which a laser beam which is movable relative to the element is directed onto the element causing a small amount of surface melting in zone impacted by the laser, nitrogen being blown onto the element in a direction fixed relative to a direction of the laser beam, and an inert gas being blown onto the element, comprising the steps of:

blowing a stream of nitrogen under high pressure immediately behind the zone impacted by the laser beam so that

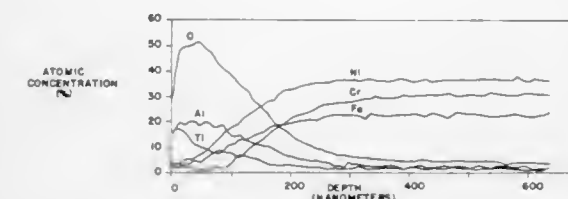
the nitrogen penetrates into the zone once a surface melt in the zone has become semi-solid;

blowing said inert gas around said stream of nitrogen so as to cover and overlap both the zone being impacted by the laser and said semi-solid surface melt.

# **5,413,642** **PROCESSING FOR FORMING CORROSION AND PERMEATION BARRIERS** Donald L. Alger, 3419 W. 144th St., Cleveland, Ohio 44111 Filed Nov. 27, 1992, Ser. No. 982,485 Int. Cl.<sup>6</sup> C23C 8/16, 14/08

U.S. Cl. 148—239

11 Claims



1. A method of forming a specific reactive element oxide on a surface of an alloy material essentially free of contaminants, which alloy material contains specific reactive element atoms selected from the group consisting of: aluminum, titanium, zirconium, tantalum, columbium, silicon, beryllium, manganese, uranium, vanadium, magnesium, thorium, calcium, barium, rare earth elements, and combinations thereof; and atoms whose oxides are less stable than oxides of the specific reactive element atoms, selected from the group consisting of iron, nickel and chromium oxides, the method comprising:

placing at least the surface and contiguous regions of the alloy material in a fluid consisting of a flowing gaseous hydrogen/water vapor atmosphere at an elevated temperature between about 1000° F. to about 2000° F, and containing a concentration of from about 1 ppm to about 500 ppm of water vapor, the gaseous hydrogen/water vapor atmosphere being monitored and controlled in a manner to maintain a set temperature and water vapor concentration within these ranges, such that the gaseous hydrogen/water vapor atmosphere reduces said less stable element oxides at the alloy material surface, and reacts the specific reactive element atoms at the alloy material surface only with oxygen to form a specific reactive element oxide, the forming of the oxide causing a specific reactive element atom concentration gradient between the surface and interior of the alloy material; and

continuing to immerse the alloy material surface in the gaseous hydrogen/water vapor atmosphere at the elevated temperature such that the specific reactive element atom concentration gradient causes the specific reactive atoms in the alloy material interior to diffuse to the surface and react with oxygen until a uniform, lateral growth of specific reactive element oxide barrier layer with less stable element oxides excluded, is formed, the barrier layer being strongly bonded to the alloy material surface.

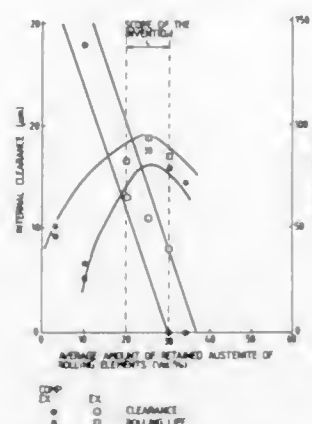
# **5,413,643** **ROLLING BEARING** Yasuo Murakami; Kazuo Sekino, and Nobuaki Mitamura, all of Kanagawa, Japan, assignors to NSK Ltd., Tokyo, Japan Filed May 13, 1994, Ser. No. 242,668 Claims priority, application Japan, May 13, 1993, 5-111950 Int. Cl.<sup>6</sup> C22C 38/18; C21D 9/36

U.S. Cl. 148—319

5 Claims

1. A rolling bearing comprising an inner ring, an outer ring, and rolling elements each composed of an alloy steel which (a) are, after being subjected to one of a carburizing treatment or a carbonitriding treatment then subjected to quench-hardening

and tempering or (b) are subjected to quench-hardening and tempering, wherein the alloy steel contains from 0.10 to 1.00% by weight C, from 0.50 to 3.00% by weight Cr, from 0.15 to 1.00% by weight Si, from 0.2 to 1.50% by weight Mn, and rest





5,413,650

## DUCTILE ULTRA-HIGH STRENGTH ALUMINIUM ALLOY COMPONENTS

Martin R. Jarrett, Southam, and William Dixon, Egremont, both of United Kingdom, assignors to Alcan International Limited, Montreal, Canada

PCT No. PCT/GB91/01286, § 371 Date Mar. 8, 1993, § 102(e) Date Mar. 8, 1993, PCT Pub. No. WO92/02655, PCT Pub. Date Feb. 20, 1992

PCT Filed Jul. 30, 1991, Ser. No. 971,844

Claims priority, application United Kingdom, Jul. 30, 1990, 9016694

Int. Cl.<sup>6</sup> C22F 1/04

U.S. Cl. 148—690

13 Claims



1. A method of producing an extruded aluminum alloy component having improved properties in a specified direction transverse to the extrusion direction, which method comprises providing an extrusion billet of the aluminum alloy, compressing the billet to cause upsetting in to the specified direction, and extruding the upset billet to form the extruded component.

5,413,651

## UNIVERSAL ROLL-FED LABEL CUTTER

Svatoboj Otruba, Ceres, Calif., assignor to B&H Manufacturing Company, Ceres, Calif.

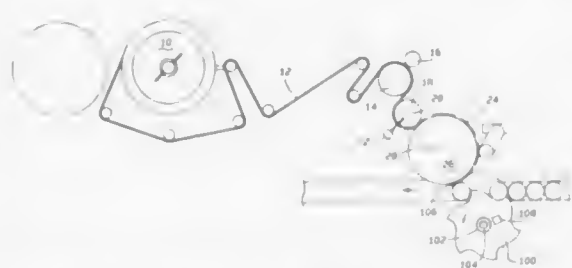
Filed Mar. 23, 1993, Ser. No. 36,059

The portion of the term of this patent subsequent to Jan. 10, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> B26D 5/00; B32B 31/00

U.S. Cl. 156—64

10 Claims



1. A labelling apparatus for feeding a strip of label material from a roll, cutting a plurality of label segments and preparing the label segments for application to a container, the apparatus comprising:

feed roller means for feeding a strip of labels at a controllable rate of speed, said feed roller means including a rotary mounted feed roller having a generally cylindrical shape and having a central axis about which it rotates, and further having first motor means for driving said feed roller, said first motor means including a first servomotor rotatably mounted to said feed roller for rotatably driving said feed roller about said feed roller central axis;

cutter means for cutting label segments from the strip of label material at predetermined length intervals, said cutter means rotating at a controllable rate of speed, said cutter means including a rotary mounted cutter drum having a generally cylindrical shape and having a central axis about which it rotates, and further having second motor means for driving said cutter drum, said second

motor means including a second servomotor rotatably mounted to said cutter drum for rotatably driving said cutter drum about said cutter drum central axis;

vacuum drum means for supporting said label segments after being cut from the strip of label material, said vacuum drum means moving at a higher rate of speed than said feed roller means, said vacuum drum means including a rotary mounted vacuum drum having a generally cylindrical shape and having a central axis about which it rotates, and further having third motor means for driving said vacuum drum, said third motor means including a third servomotor rotatably mounted to said vacuum drum for rotatably driving said vacuum drum about said central axis; and

microprocessor means for controlling the rate at which said feed roller means feeds said strip of labels to said cutter means, and for varying the cutter drum surface speed during distinct intervals of a label cutting cycle, the cutter drum having a lower surface speed during the interval in the cycle in which the cutter drum cuts a label, the cutter drum having a higher surface speed during the interval in the cycle in which the cutter drum transfers a cut label to the vacuum drum.

5,413,652

## PROCESS FOR MANUFACTURING TIRES WITH WHITE SIDEWALL APPLIQUES

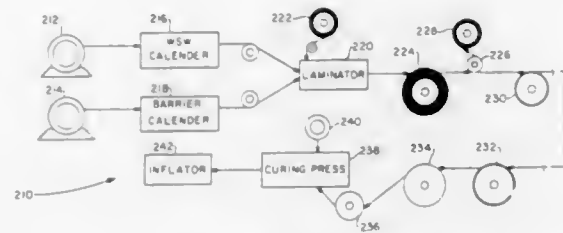
Georg G. A. Bohm, Akron; Arthur E. Oberster, Canton, and James H. C. Yang, Cleveland, all of Ohio, assignors to Bridgestone Corporation, Tokyo, Japan

Division of Ser. No. 807,913, Dec. 16, 1991, Pat. No. 5,296,077, which is a continuation-in-part of Ser. No. 469,705, Jan. 24, 1990, which is a continuation of Ser. No. 223,195, Jul. 8, 1988, abandoned. This application Mar. 21, 1994, Ser. No. 215,941

Int. Cl.<sup>6</sup> B32B 31/02, 31/18, 31/26, 33/00

U.S. Cl. 156—90

5 Claims



1. A method for applying a white sidewall applique to a tire, comprising the steps of:

mixing and calendaring a layer of barrier rubber; mixing and calendaring a layer of white rubber; laminating said layers into a laminate; forming a cylinder of said laminate and cutting said cylinder of laminate into a plurality of bands; and transferring one of said bands to a tire press and vulcanizing said band to a tire while curing said tire.

5,413,653

## APPARATUS AND METHOD FOR FORMING A GREEN TIRE

Kazuaki Kondo, Toyota, and Masaaki Iimura, Fukushima, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Japan

Division of Ser. No. 863,308, Sep. 14, 1992, Pat. No. 5,322,587. This application Sep. 27, 1993, Ser. No. 126,714

Int. Cl.<sup>6</sup> B29D 30/20

U.S. Cl. 156—111

9 Claims

1. A method of forming a green tire, the steps comprising: forming a belt/tread assembly to be applied to a green tire carcass;

5,413,654

## DISPOSABLE GARMENTS AND METHOD FOR ATTACHMENT OF ELASTIC MEMBERS AROUND LEG-HOLES THEREOF

Takamitsu Igaue, Kawano; Hironori Nomura; Hirofumi Obnishi, both of Iyomishima; Yoshinori Matsura, Kanonji; Tohru Sasaki, Kawano; Taiji Shimakawa, Kanonji, and Hiroki Yamamoto, Kagawa, all of Japan, assignors to Uni-Charm Corporation, Ebime, Japan

Division of Ser. No. 756,226, Sep. 9, 1991, Pat. No. 5,342,341.

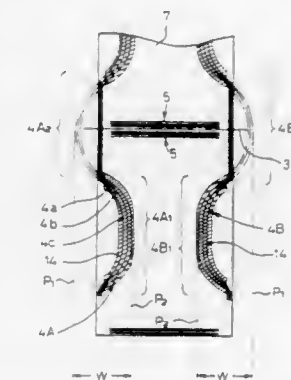
This application Jun. 2, 1994, Ser. No. 253,089

Claims priority, application Japan, Sep. 13, 1990, 2-243417; Apr. 17, 1991, 3-113986

Int. Cl.<sup>6</sup> A61F 13/15

U.S. Cl. 156—161

2 Claims



1. A method for attachment of elastic members to a disposable garment around respective leg-holes, said method comprising steps of:

continuously feeding continuous web used as material of a top- or backsheet;

intermittently applying said continuous web along opposite sides extending longitudinally thereof with adhesive so as to form first and second adhesive zones concavely curved with respect to respective side edges and symmetrically opposed to each other;

feeding first and second threadlike continuous elastic members in their stretched condition, each comprising a plurality of elastic elements toward opposite sides of said continuous web extending longitudinally thereof, respectively, while said first and second threadlike continuous elastic members are supported by groups of parallelly spaced guides provided on first and second traverse means, respectively;

reciprocating said first and second traverse means transversely of said continuous web being fed so that said guides of said first and second traverse means trace said first and second adhesive zones, respectively, spacings of said elastic elements constituting said first and second threadlike continuous elastic members are widened at longitudinally middle portions with respect to longitudinally opposite ends of said first and second adhesive zones and said first and second threadlike continuous elastic members are bonded to said first and second adhesive zones with said elastic elements being arranged in parallel to one another; and

laminating remainder members as essential components of the garment onto said continuous web and then cutting said continuous web transversely together with said first and second threadlike continuous elastic members in respective zones where said first and second threadlike continuous elastic members are not bonded to said continuous web, causing portions of said first and second threadlike continuous elastic members being not bonded to said continuous web to contract under their own stretch stresses.

forming a green tire carcass on a green tire forming means; providing a transferring means including hydraulic support means having

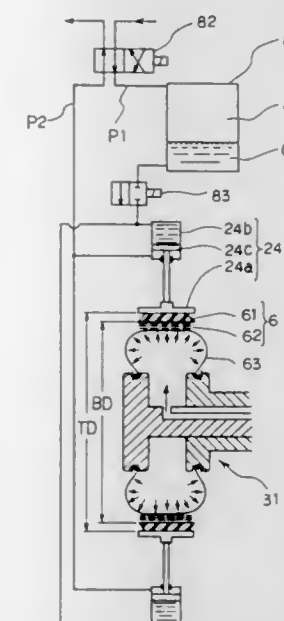
a plurality of supporting segments, each of said segments having a corresponding piston with a piston chamber, said piston chamber being divided into a first chamber and a second chamber, said first chamber being filled with air and said second chamber being filled with a non-compressible fluid;

forcing the non-compressible fluid into said second chamber for causing each of the segments to engage the surface of the belt/tread assembly;

transferring the belt/tread assembly to the green tire forming means using the transferring means;

forming a green tire by inflating the green tire carcass, using the green tire forming means, into engagement with the belt/tread assembly while holding the belt/tread assembly in a substantially fixed radial position with respect to and against a green tire carcass using the hydraulic support means.

5. A green tire forming apparatus comprising: means for forming a belt/tread assembly to be applied to a green tire carcass;



means disposed adjacent to said belt/tread forming means for transferring the belt/tread assembly;

means for forming a green tire by inflating the green tire carcass against the belt/tread assembly;

said transferring means including hydraulic support means for holding the belt/tread assembly in a substantially fixed radial position with respect to and against the green tire carcass as the green tire carcass is inflated by the green tire forming means,

said hydraulic support means further comprising, a plurality of segments for engaging the outer surface of the belt/tread assembly,

each of said segments having a corresponding piston with a piston chamber, said piston chamber being divided into a first chamber and a second chamber, said first chamber being filled with air and said second chamber being filled with a non-compressible fluid; and

hydraulic drive means for causing flow of non-compressible fluid into said second chamber thereby bringing each of said segments into engagement with the belt/tread assembly.

5,413,655

## THERMOPLASTIC COMPOSITIONS AND NONWOVEN WEBS PREPARED THEREFROM

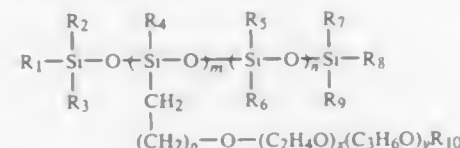
Ronald S. Nohr, Roswell, and John G. MacDonald, Decatur, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Division of Ser. No. 783,438, Oct. 25, 1991, Pat. No. 5,344,862. This application Apr. 6, 1994, Ser. No. 223,800 Int. Cl.<sup>6</sup> D04H 3/16; D01D 5/12; C08K 5/54

U.S. Cl. 156—167 12 Claims

1. A method for preparing a nonwoven web having improved tensile strength characteristics, which method comprises:

- melting a thermoplastic composition which comprises a thermoplastic polyolefin and an additive system comprising a first component and a second component;
- forming fibers by extruding the resulting melt through a die at a shear rate of from about 50 to about 30,000 sec<sup>-1</sup> and a throughput of no more than about 5.4 kg/cm<sup>2</sup>/hour;
- drawing said fibers; and
- collecting said fibers on a moving foraminous surface as a web of entangled fibers; in which:
  - said first component is a polysiloxane polyether having the general formula,



in which:

- R<sub>1</sub>-R<sub>9</sub> are independently selected monovalent C<sub>1</sub>-C<sub>3</sub> alkyl groups;
- R<sub>10</sub> is hydrogen or a monovalent C<sub>1</sub>-C<sub>3</sub> alkyl group;
- m represents an integer of from 1 to about 100;
- n represents an integer of from 0 to about 100;
- the sum of m and n is in the range of from about 4 to about 100;
- p represents an integer of from 0 to about 5;
- x represents an integer of from 4 to about 25;
- y represents an integer of from 0 to about 25;
- the ratio of x to y is equal to or greater than 2;
- said first component has a molecular weight of from about 3,000 to about 18,000; and
- said first component is present in an amount of from about 0.1 to about 3 percent by weight, based on the amount of thermoplastic polyolefin; and
- said second component is a hydrophobic fumed silica, in which the weight ratio of said first component to said second component is in the range of from about 20 to about 70.

5,413,656

## METHOD AND DEVICE FOR EXCHANGING WINDINGS ROLLS

Michael Kühnhold; Wolfgang Fischer, both of Düsseldorf, and Hartmut Droczyński, Dormagen, all of Germany, assignors to Jagenberg Aktiengesellschaft, Düsseldorf, Germany Continuation of Ser. No. 856,070, May 7, 1992, abandoned. This application Dec. 20, 1993, Ser. No. 169,961

Claims priority, application Germany, Sep. 14, 1990, 40 29 180.4

Int. Cl.<sup>6</sup> B31C 13/00

U.S. Cl. 156—184 6 Claims

1. A method of winding a continuous web on a succession of cores comprising the steps of:

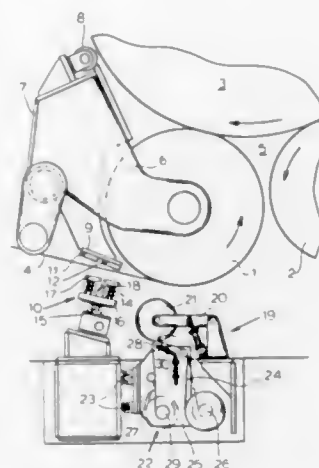
- longitudinally advancing the web looped about a working width of a guide roll to wind it in a winding roll resting on the guide roll;
- interrupting advance of the web and forming at a perforation station a crosswise perforation row in the web across the working width;

(c) longitudinally advancing a carrier tape with a twoface adhesive thereon in a loop about a pressure roller;

(d) thereafter urging the pressure roller toward a transfer roller extending across the working width and spaced from the guide roll and downstream of the perforation station to press and adhere the adhesive to the transfer roller;

(e) pulling the pressure roller away from the transfer roller, detaching thereby the carrier tape from the adhesive on the transfer roller;

(f) thereafter displacing the pressure roller transversely to the longitudinal advance of the web and repeating the steps (d) and (e) at subsequent delivery locations, thereby forming a plurality of adhesive strips spaced from one



another and aligned along said working width on the transfer element;

(g) then swinging the transfer element toward the web to press the plurality of strips against the web for straddling both sides of the perforation row on the web upon resuming an advance of the web, thereby adhering the plurality of strips on the web along the working width;

(h) thereafter withdrawing the transfer roller from the web while longitudinally advancing the web with the plurality of strips adhered thereto toward the first winding roll;

(i) thereafter tearing the web longitudinally apart at the perforation row, forming thereby trailing and leading web ends;

(j) thereafter attaching the trailing web end to the winding roll and the leading end to a core to be wound; and

(k) repeating steps (b) through (j).

5,413,657

## METHOD OF MAKING COMPENSATOR FOR LIQUID CRYSTAL DISPLAY

Teruaki Yamanashi, Hiratsuka; Shinichirou Suzuki, Chigasaki; Yoshio Tsujimoto, Ohta, and Toshikazu Kiyohara, Yokohama, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan

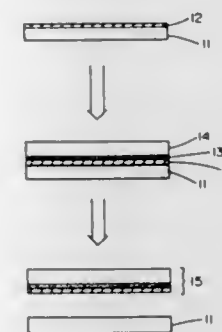
Filed Jun. 3, 1993, Ser. No. 72,324

Claims priority, application Japan, Jun. 3, 1992, 4-184275 Int. Cl.<sup>6</sup> G02F 1/13

U.S. Cl. 156—235 8 Claims

1. A method of making a compensator for a liquid crystal display device, comprising applying a solution containing a liquid crystalline polymer onto an orientation substrate, then allowing the liquid crystalline polymer to be oriented, and thereafter transferring the resulting layer of the liquid crystalline polymer on the orientation substrate onto a light transmit-

ting substrate, said solution containing the liquid crystalline polymer having incorporated therein 0.01% to 10% by weight



of a surface active agent relative to the liquid crystalline polymer.

5,413,658

## FOLDING PLATE ASSEMBLY FOR FABRICATING HONEYCOMB INSULATING MATERIAL

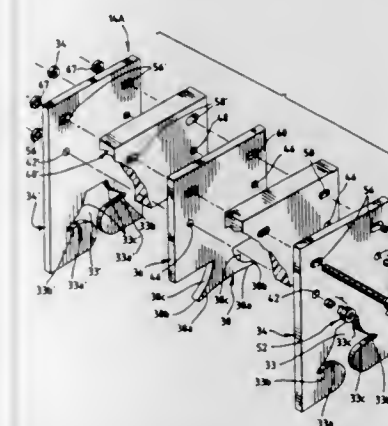
Bryan K. Ruggles, Salt Lake City, and Cary L. Ruggles, Mendon, both of Utah, assignors to Newell Operating Company, Freeport, Ill.

Continuation-in-part of Ser. No. 773,843, Oct. 7, 1991, Pat. No. 5,308,435, and a continuation-in-part of Ser. No. 870,574, Apr. 17, 1992. This application Mar. 31, 1993, Ser. No. 40,869

Int. Cl.<sup>6</sup> B31F 1/00

U.S. Cl. 156—204

16 Claims



1. A folding apparatus for folding a web of sheet material of a given thickness moving along a given path, said web having parallel longitudinal edges and a given fixed consistent width, said folding apparatus comprising three confronting, substantially parallel plates spaced along a given longitudinal axis and forming an overall slot wherein the outer margin of the overall slot is defined by apertures in the outermost plates and the innermost margin of the overall slot is defined by a portion of the plate between the outermost plates, said overall slot including a base portion through which the central portion of the web can pass, and short reversely curved slot portions at the ends of the base portion which join outer end slot portions and through which outer end slot portions the longitudinal edge portions of the web can pass so as to be folded over the central portion of the web, the outermost of said plates respectively having aligned apertures whose margins fall along the outer margins of said overall slot and the plate between said outermost plates constituting an intermediate plate having a projecting tongue with a perimeter which falls along the inner margin of said overall slot.

14. A method of folding a web of sheet material of a given thickness moving along a given path, said web having parallel longitudinal edges and a given fixed consistent width, the method comprising the steps of providing folding apparatus

including three confronting, substantially parallel plates spaced along a given longitudinal axis and forming an overall slot wherein the outer margin of the overall slot is defined by apertures in the outermost plates and the innermost margin of the overall slot is defined by a portion of the plate between the outermost plates, said overall slot having a base portion through which the central portion of the web can pass, and short reversely curved slot portions at the ends of the base portion which join outer end slot portions and through which outer end slot portions the longitudinal edge portions of the web can pass so as to be folded over the central portion of the web, the outermost of said plates respectively having aligned apertures whose margins fall along the outer margins of said overall slot, and the plate between said outermost plates constituting an intermediate plate having a projecting tongue with a perimeter which falls along the inner margin of said overall slot.

5,413,659

## ARRAY OF CONDUCTIVE PATHWAYS

David C. Koskenmaki, St. Paul, and Clyde D. Calhoun, Grant Township, Washington County, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 30, 1993, Ser. No. 129,667

Int. Cl.<sup>6</sup> H01B 7/08; B32B 3/28

U.S. Cl. 156—229

16 Claims



1. A method of making a metal/polymer composite having a plurality of electrically conductive, metal members, said method comprising the steps of:

- providing a plastic substrate with a thin, metal layer deposited on a first major surface thereof, said first major surface of said substrate having a plurality of alternating grooves and ridges spaced along a given first direction, said grooves and ridges extending generally longitudinally along a second direction on said first major surface;
- stretching said plastic substrate in said first direction, whereby said metal layer is separated along each of said alternating grooves and ridges to provide an array of closely spaced, conductive members extending longitudinally in said second direction.

5,413,660

## METHOD FOR IMPARTING IMPROVED ADHESION TO POLYOLEFIN SUBSTRATES

Noel G. Harvey, North Wales; Theodore D. Goldman, Washington Crossing, both of Pa., and Carl M. Hesler, New Egypt, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Oct. 26, 1993, Ser. No. 143,420

Int. Cl.<sup>6</sup> B32B 31/00

U.S. Cl. 156—243

7 Claims

1. In the process for adhering (meth)acrylic films or laminates to polyolefin substrates, the improvement which comprises:

- forming a first blended film or sheet of
  - from about 5 to about 95 parts per 100 parts of the first film or sheet of a multi-stage polymer containing a polymer core as a first stage, wherein the core is formed predominantly from at least one of butadiene or butyl acrylate, and wherein a second-stage polymer is formed



predominantly from methyl methacrylate, and wherein the ratio of first-stage to second-stage polymer is at least 3/2;

- (ii) from about 95 to about 5 parts per 100 parts of the first film or sheet of a segmented polymer having at least one segment of a non-polar polyolefin formed predominately from ethylene or propylene and having at least one polar segment of a polymer formed from at least about 80 weight percent of an alkyl methacrylate, the weight-average molecular weight of all segments being above about 20,000, the ratio of polar segments to non-polar segments being from about 9:1 to about 1:4;
- b) applying the first film or sheet under heat and pressure to a polyolefin sheet or film;
- c) separately or concurrently applying a (meth)acrylic film or laminate to the first film or sheet.

5,413,661

# **METHOD FOR PRODUCING A LAMINATED STRUCTURAL COMPONENT WITH A HARD FOAM REINFORCEMENT**

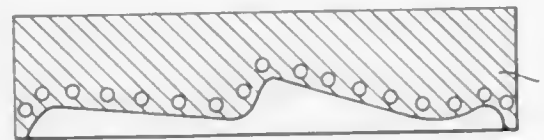
Gerhard Spengler, Frankfurt, and Ernst Spengler, Heusenstamm by Ffm., both of Germany, assignors to R+S Stanztechnik GmbH, Offenbach, Germany

Continuation-in-part of Ser. No. 883,024, May 13, 1992. This application Sep. 9, 1993, Ser. No. 118,963

Int. Cl.<sup>6</sup> B32B 31/00

U.S. Cl. 156—515

15 Claims



1. A method for producing a laminated structural component having impact protection features, in a mold having an upper mold section and a lower mold section, said lower mold section including at least one nesting mold cavity with a respective nesting die in said nesting mold cavity, said structural component including a decorative surface cover layer, an intermediate fiber material layer, and at least one hard foam member, comprising the following steps:

- (a) inserting a premolded hard foam member into said at least one nesting mold cavity,
- (b) heating said intermediate fiber material layer,
- (c) placing said intermediate fiber material layer between said upper and lower mold sections to be adjacent said lower mold section including said nesting mold cavity,
- (d) placing said cover layer between said upper and lower mold sections to be adjacent said upper mold section,
- (e) closing said mold sections and thereby laminating and molding said intermediate fiber material layer together with said cover layer, and
- (f) pressing said nesting die against said hard foam member and thereby laminating and heat bonding said hard foam member to said intermediate fiber material layer, whereby said hard foam member forms an impact absorbing element on a back side of said structural component opposite said decorative surface cover layer.

5,413,662

# **ASSEMBLY OF CORRUGATED PANELS INTO A WEB AND MANUFACTURE OF PALLETS THEREFROM**

Larkin P. Skinner, 111, 3340-B Bee Cave Rd., Austin, Tex. 78746

Filed Mar. 15, 1993, Ser. No. 31,669

Int. Cl.<sup>6</sup> B32B 31/00

U.S. Cl. 156—263

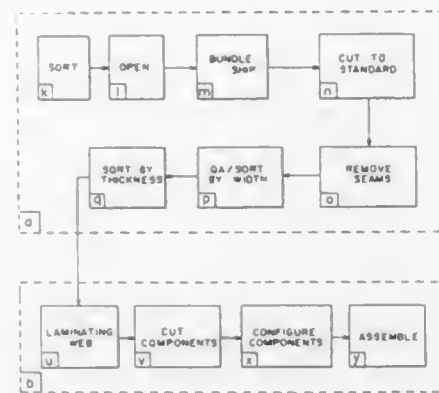
14 Claims

1. A process for making a continuous web from recycled corrugated cardboard comprising the steps of:

- (a) improving quality and minimizing variation of pieces of

corrugated cardboard for a subsequent manufacturing process by

- (i) cutting said pieces of corrugated cardboard into panels of at least one selected standard width,



- (ii) removing irregularities from said standard width panels to leave a plurality of panels of constant width and varying lengths and thicknesses and
  - (iii) sorting said panels by said thickness;
- (b) manufacturing a continuous web from said pieces of corrugated cardboard bonded layer to layer.

5,413,663

# **PLASMA PROCESSING APPARATUS**

Masahiro Shimizu, Kofu; Takayuki Fukasawa, Higashihiroshima; Yuichiro Yamazaki, Tokyo; Motosuke Miyoshi, Tokyo; Haruo Okano, Tokyo, all of Japan, and Katsuya Okumura, Poughkeepsie, N.Y., assignors to Tokyo Electron Limited, Tokyo and Kabushiki Kaisha Toshiba, Kawasaki, both of Japan

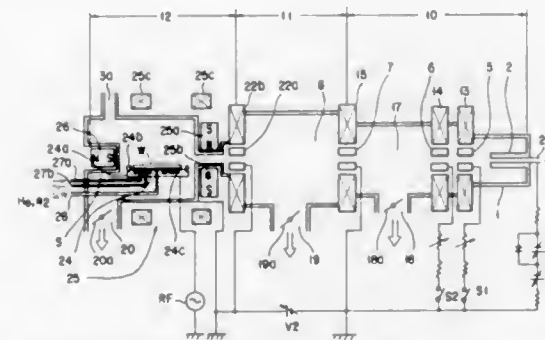
Filed Jun. 11, 1993, Ser. No. 74,539

Claims priority, application Japan, Jun. 11, 1992, 4-175913; Jun. 11, 1992, 4-175914; Jun. 11, 1992, 4-175915; Jun. 11, 1992, 4-175916

Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 156—345

20 Claims



1. An apparatus for processing a main surface of a wafer-like substrate while using process gas plasma, comprising: an electron generating chamber; means for setting the electron generating chamber at a first vacuum pressure; means for introducing discharge gas into the electron generating chamber; means for making the discharge gas into a sub-plasma in the electron generating chamber; a process chamber air-tightly connected to the electron generating chamber; extracting means for drawing electrons out of the sub-plasma; accelerating means for accelerating the electrons thus drawn

out and introducing them, as an electron beam, into the process chamber in a first direction; means for setting the process chamber at a second vacuum pressure lower than the first vacuum pressure; means for introducing process gas into the process chamber, the process gas being excited into a process gas plasma in the process chamber by the electron beam; means for supporting the substrate in the process chamber such that the main surface of the substrate is positioned on a first plane substantially parallel to the first direction; means for forming an entrance magnetic field in the process chamber and upstream from the substrate in the first direction, the entrance magnetic field having, as its main components, lines of magnetic force curved from the first direction such that they diverge toward opposite sides of an extended center line of the electron beam in a plane parallel to the first plane and converge toward the extended center line of the electron beam in a plane perpendicular to the first plane, and these curved lines of magnetic force which serve as main components of the entrance magnetic field being set to have such a radius of curvature that allows the electrons to carry out cyclotron motion while spiraling around each of the lines of magnetic force; magnetic field focusing means arranged in the process chamber and downstream from the substrate in the first direction; and means for forming a parallel magnetic field, whose main components are lines of magnetic force substantially parallel to the first plane, between the means for forming an entrance magnetic field and the magnetic field focusing means.

5,413,664

# **APPARATUS FOR PREPARING A SEMICONDUCTOR DEVICE, PHOTO TREATMENT APPARATUS, PATTERN FORMING APPARATUS AND FABRICATION APPARATUS**

Takayuki Yagi, Machida; Toshiyuki Komatsu, Hiratsuka; Yasue Sato, Kawasaki, and Shinichi Kawate, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

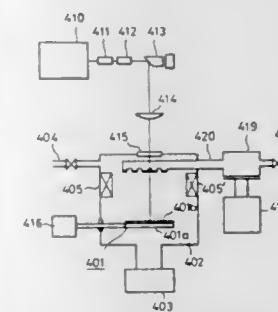
Division of Ser. No. 13,180, Jan. 29, 1993, Pat. No. 5,344,522, which is a continuation of Ser. No. 696,024, May 6, 1991, abandoned. This application Jul. 20, 1994, Ser. No. 275,757

Claims priority, application Japan, May 9, 1990, 2-117644; May 10, 1990, 2-118675; Jun. 19, 1990, 2-158687; Jul. 3, 1990, 2-174443; Nov. 16, 1990, 2-308550

Int. Cl.<sup>6</sup> H01L 21/3065; B44C 1/22; C23F 1/02

U.S. Cl. 156—345

9 Claims



1. An apparatus for preparing a semiconductor device having a loadlock chamber to take in and out a substrate, a cleaning chamber to clean a surface of the substrate, a film forming chamber to deposit a film of a semiconductor, metal or insulator on the cleaned substrate, a latent image chamber provided with a light entering window to form a mask by irradiation of a selective light transmitted through said light entering window to the film deposited on the substrate, an etching chamber to effect on etching of the film and a conveying chamber to convey the substrate, wherein each of said chamber is vacuum sealable, and the

loadlock chamber, the cleaning chamber, the film forming chamber, the latent image chamber and the etching chamber are arranged around the conveying chamber as the center and communicated to the conveying chamber through gate valves individually provided.

5,413,665

# **APPARATUS FOR MOUNTING FILM NEGATIVES**

Ralph R. Gaetano, Bethel Park, Pa., assignor to Think, Inc., Pittsburgh, Pa.

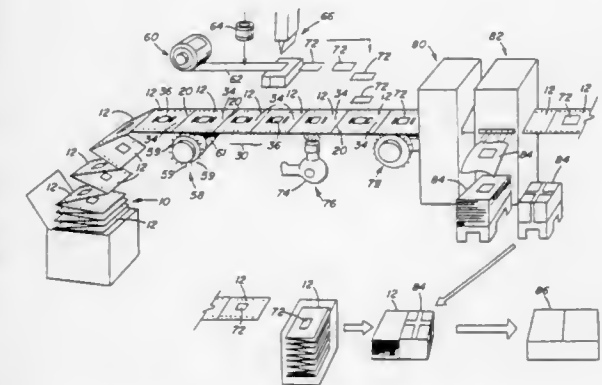
Continuation of Ser. No. 715,498, Jun. 14, 1991. This application Dec. 4, 1992, Ser. No. 985,304

The portion of the term of this patent subsequent to Dec. 21, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> B32B 7/06

U.S. Cl. 156—514

20 Claims



1. Apparatus for mounting film negatives comprising, a roll of film negatives, said roll including a plurality of individual film negatives connected in a preselected sequential order, means for cutting said roll to separate said individual film negatives and feed said cut film negatives in said preselected sequential order, a web of cardstock having a substantially continuous length defined by longitudinal edges and a preselected width uniform along the length of said web, a plurality of transverse score lines extending in spaced parallel relation across the width of said web and spaced equidistant apart to form a plurality of connected card segments, said card segments being separable one from another along said score lines, said card segments having uniform dimensions where each card segment is defined by a top edge and a bottom edge formed by said web longitudinal edges and a leading edge and a trailing edge defined by said transverse score lines, tracks of holes in each card segment positioned closely adjacent and parallel to a selected one of said top and bottom edges, said tracks of holes of adjacent card segments being aligned to form a continuous track of holes at said longitudinal edges of said web for engagement with a tractor feed device for feeding said connected card segments along a feed path, an optical center point positioned on each card segment, alignment means on each card segment for locating said optical center point thereon so that said optical center points of said card segments are located in the same position on said respective card segments, a window of a preselected geometric shape in each card segment, said window having an area less than the area of the film negative positioned over the window with a portion of said card segment around said window receiving the periphery of the film negative,

said window being located on said card segment in a preselected position with respect to said optical center point, means positioned adjacent to each of said windows for non-permanently bonding said individual film negatives separated from one another to said card segments in said preselected position overlying said windows, said individual film negatives maintained in the same sequential order on said card segments as the order of said film negatives in said roll, said card segments releasably receiving said film negatives permitting said individual film negatives to be repeatedly mounted and dismounted from said card segments to allow repositioning of a film negative on said window to select the composition of the film negative visible through said window, and said card segments maintaining said individual film negatives in said preselected order when mounted on said card segments while permitting said film negatives to be individually handled when dismounted from said card segments and then returned to a connected relationship on said card segments.

5,413,666

# BOTTLE-BEARING PLATE WITH A CENTERING DEVICE, IN A LABELING MACHINE

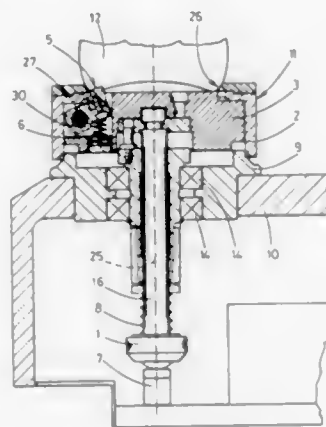
Ireneo Orlandi, S. Giorgio di Mantova, Italy, assignor to Alfa Construzioni Meccaniche S.p.A., Mantova, Italy

Filed Oct. 22, 1993, Ser. No. 141,265

Claims priority, application Italy, Jan. 26, 1993, PR93A0002  
Int. Cl.<sup>6</sup> B65C 9/00

U.S. Cl. 156—566

6 Claims



1. A bottle-bearing plate with centering device for labeling machines, comprising a turntable rotating about its own vertical axis at which peripheral zone a plurality of plates are supported, wherein each plate comprises:

- a support ring (9) fixed to the turntable;
- an internal body (3) which rests on the support ring (9) and which is able to slide vertically and rotate with respect to the support ring (9);
- an external body (2) which surrounds the internal body (3) and which, after a first free vertical-direction sliding-rotating phase of the internal body (3), can be engaged and drawn by the internal body (3) when the internal body (3) continues moving vertically upwardly after the first free sliding-rotating phase;
- a centering ring (4), fixed to the external body (2), an internal surface (26) of which centering ring (4) perfectly recreates a curvature of an external surface of the bottle at a bottle base zone, a centering device (5) being housed in the internal body (3), which centering device (5) inserts into a reference recess (13) made in the bottle base, the upwardly vertical sliding-rotating of the internal body (3) being such as to bring the bottle from a sliding phase on the centering ring (4) to a phase of non-contact between the external

body (2) and the support ring (9) causing rotation of the bottle so that a labeling phase can be carried out.

5,413,667

# PYROELECTRIC INFRARED DETECTOR FABRICATING METHOD

Satoru Fujii, Takatsuki; Ryoichi Takayama, Suita; Yoshihiro Tomita, Osaka; Masayuki Okano, Kobe, and Hideo Torii, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

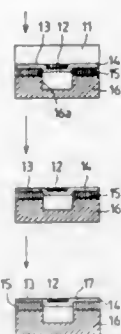
Filed Oct. 13, 1993, Ser. No. 135,415

Claims priority, application Japan, Nov. 4, 1992, 4-294811; Mar. 12, 1993, 5-051944

Int. Cl.<sup>6</sup> H01L 21/306; B44C 1/22

U.S. Cl. 216—20

9 Claims



1. A method of fabricating a pyroelectric infrared detector, comprising the steps of: forming a pyroelectric portion on a given area of a surface of a first substrate; forming a resin film covering the pyroelectric portion and an exposed area of the surface of the first substrate; bonding a second substrate to the resin film, wherein the second substrate includes a recess that extends into only a portion of the second substrate and which faces the resin film and which substantially aligns with the pyroelectric portion; and etching off and removing the first substrate from the pyroelectric portion and the resin film.

5,413,668

# METHOD FOR MAKING MECHANICAL AND MICRO-ELECTROMECHANICAL DEVICES

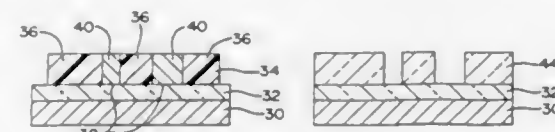
Mohammad Aslam, Okemos, Mich., and Michael A. Tamor, Toledo, Ohio, assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 25, 1993, Ser. No. 140,906

Int. Cl.<sup>6</sup> B44C 1/22

U.S. Cl. 216—2

20 Claims



1. A method for making mechanical and micro-electromechanical devices comprising the steps of: forming a mold having a base and metallic walls defining a molding space therebetween, the base being exposed between the metallic walls and having a nucleating upper surface to nucleate a structural material deposited thereon which does not nucleate on or adhere to the metallic walls; and depositing a structural material onto the nucleating upper surface and filling to a predetermined height to form a strong solid body.

5,413,669

# METAL CVD PROCESS WITH POST-DEPOSITION REMOVAL OF ALLOY PRODUCED BY CVD PROCESS

Toshiaki Fujita, Chiba, Japan, assignor to Applied Materials, Inc., Santa Clara, Calif.

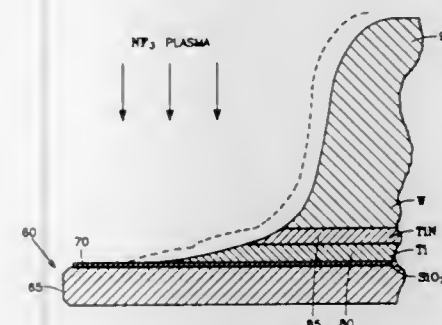
Filed Feb. 7, 1994, Ser. No. 192,686

Int. Cl.<sup>6</sup> B44C 1/22; C23F 1/00

U.S. Cl. 156—643.1

20 Claims

U.S. Cl. 216—37



1. A method of reducing alloy particle contamination in processing a semiconductor workpiece having an underlying layer, a metal adhesion layer on said underlying layer and a metal contact layer overlying said adhesion layer, a peripheral portion of said adhesion layer near an edge of said workpiece being exposed and containing an alloy formed during deposition of said metal contact layer, said method comprising: subjecting said workpiece to an etching agent so as to remove a portion of said metal contact layer and at least a portion of said alloy.

5,413,671

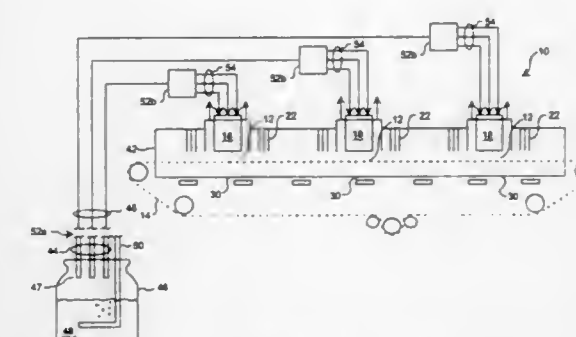
# APPARATUS AND METHOD FOR REMOVING DEPOSITS FROM AN APCVD SYSTEM

Jeffrey M. Ketchum, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Aug. 9, 1993, Ser. No. 103,980

Int. Cl.<sup>6</sup> C23C 16/00

27 Claims



1. A method for removing deposits from an APCVD system comprising: providing an APCVD system having a plurality of chemical reaction chambers, each chamber having deposits formed upon a perforated floor of said chamber and upon and between sets of purging curtains arranged on opposite sides of said reaction chamber; withdrawing vaporized etchant material from an etchant source; and delivering said vaporized etchant material at a controlled flow rate to each said reaction chamber and upon said perforated floor and purging curtains to remove the deposits therefrom.

5,413,672

# METHOD OF ETCHING SENDUST AND METHOD OF PATTERN-ETCHING SENDUST AND CHROMIUM FILMS

John G. Langan, Wescosville; Scott E. Beck, Kutztown, and Brian S. Felker, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jul. 8, 1993, Ser. No. 89,210

Int. Cl.<sup>6</sup> B44C 1/22

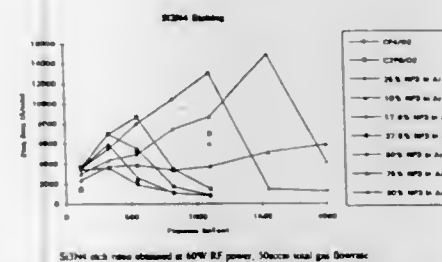
U.S. Cl. 134—1.2

8 Claims

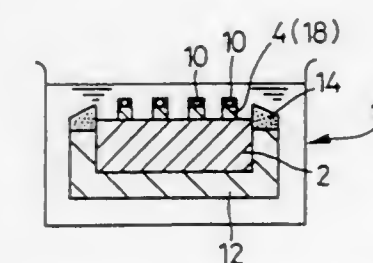
U.S. Cl. 216—87

Int. Cl.<sup>6</sup> B44C 1/22

20 Claims



1. A process for plasma etch-clean removal of films selected from the group consisting of silicon dioxide and silicon nitride which react with fluorine from a surface which comprises contacting said film with a plasma consisting essentially of approximately 10–25% nitrogen trifluoride in a diluent more electropositive than nitrogen trifluoride, at a pressure in the range of approximately 600–1700 mtorr, and a power in the range of approximately 0.4–1.4 W/cm<sup>2</sup>.



1. An etching method for etching a sendust film formed on a substrate, comprising the step of etching the sendust film using a mixture of acid solutions of nitric acid and hydrochloric acid, wherein said mixture is prepared such that a molar ratio of hydrochloric acid to nitric acid is within a range of 1:1 to 1:5.5.



5,413,673

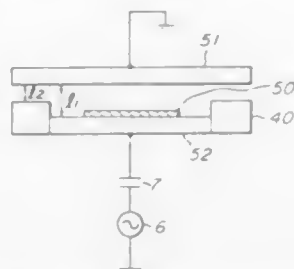
## PLASMA PROCESSING APPARATUS

Hideki Fujimoto, Fuchu, Japan, assignor to Anelva Corporation, Tokyo, Japan

Continuation of Ser. No. 555,362, Jul. 18, 1990, abandoned, which is a continuation of Ser. No. 910,575, Sep. 23, 1986, abandoned. This application Nov. 4, 1991, Ser. No. 785,256 Claims priority, application Japan, Sep. 24, 1985, 60-208751 Int. Cl.<sup>6</sup> C23F 1/02

U.S. Cl. 156—345

11 Claims



1. A plasma processing apparatus, comprising:
  - a chamber;
  - a pair of opposed electrodes each isolated from internal surfaces of said chamber being spaced in parallel from each other along respective horizontal planes, opposed surfaces of said electrodes being separated by a distance transverse to said horizontal planes of said electrodes, a first discharge impedance being effected between the opposed surfaces of said electrodes;
  - means for introducing a reactive gas between said electrodes;
  - means for applying energy across said electrodes to generate plasma from said gas to etch at least one to be processed substrate arranged on the opposed surface of one of said electrodes;
  - a dielectric spacer member contiguously provided at the outer peripheral portion of one of said electrodes to effect, with said one of said electrodes, a combined opposed surface area having the same size as the area of the opposed surface of the other of said pair of electrodes, said dielectric spacer having an opposed surface extending from the plane of the opposed surface of said one of said electrodes toward the opposed surface of said other of said electrodes to effectively form a first zone defined by the space transversely between the opposed surfaces of said one and other electrodes and a second zone defined by the space transversely between the opposed surface of said other electrode and the opposed surface of said spacer member, another transverse distance separating the opposed surfaces of said other electrode and said spacer member being less than said transverse distance between the opposed surfaces of said one and other electrodes so as to surround said at least one to be processed substrate by said spacer member, said another transverse distance being less than or equal to approximately 2.5 mm, a second discharge impedance being effected between said other electrode and said spacer member in said second zone, the difference between said first and second discharge impedances effectively and substantially confining said plasma in said first zone to etch said substrate.

5,413,674

## EVAPORATION FOR SOLIDS CONCENTRATION

Elias G. Ragi, Williamsville, N.Y., assignor to UOP, Des Plaines, Ill.

Filed Dec. 23, 1992, Ser. No. 997,252

Int. Cl.<sup>6</sup> B01D 1/26

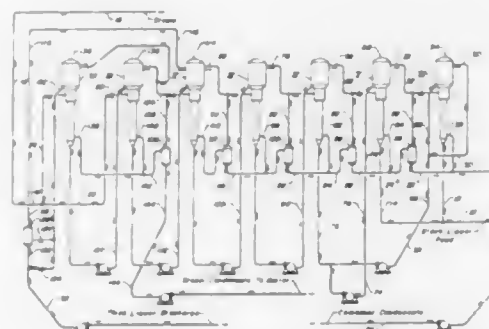
U.S. Cl. 159—47.3

7 Claims

1. A continuous process for evaporating water from a solu-

tion containing solids, said solution comprising a black liquor from the manufacture of paper, said process comprising,

- (a) passing a first black liquor feed into a first vertical thermosyphon heat exchanger that functions as an evaporator for the evaporation of water from the black liquor feed and indirectly heating said first black liquor feed with a first heating medium comprising a first boiled liquid stream by contacting said first black liquor feed with a first heat exchange surface and contacting said first heat exchange medium with a second heat exchange surface in said first heat exchanger to produce an intermediate black liquor containing at least 15 wt % solids and a second boiled stream comprising water evaporated from said first black liquor feed;
- (b) passing said intermediate black liquor to at least one intermediate vertical thermosyphon heat exchanger that functions as an evaporator for the evaporation of water from the intermediate black liquor and indirectly contacting said intermediate black liquor with a second heat



- exchange medium comprising at least one of a third boiled liquid stream and a live steam stream by contacting said intermediate black liquor with a third heat exchange surface comprising a nucleate boiling surface and said second heat exchange medium with a fourth heat exchange surface to produce a second black liquor feed and at least a portion of said first boiled stream which comprises water evaporated from said intermediate black liquor; and,
- (c) passing said second black liquor feed to a third vertical thermosyphon heat exchanger that functions as an evaporator for the evaporation of water from the second black liquor feed and indirectly contacting said second black liquor feed with live steam by contacting said second black liquor feed with a fifth heat exchange surface and said live steam with a sixth heat exchange surface in said third heat exchanger to produce a black liquor product having an increased concentration of solids relative to said first black liquor feed and at least a portion of said third boiled liquid stream which comprises water evaporated from said second black liquor feed

5,413,675

## METHOD OF DEINKING LASER PRINTED WASTEPAPER

George D. Ikononou, Mount Pleasant, S.C., and David K. Lo, Silver Spring, Md., assignors to Westvaco Corporation, New York, N.Y.

Filed May 6, 1993, Ser. No. 57,784

Int. Cl.<sup>6</sup> D21C 5/02

U.S. Cl. 162—5

1 Claim

1. A method for deinking wastepaper printed with heat fused magnetic inks on a continuous basis comprises:
  - (a) providing a feedstock of shredded wastepaper in the form of sheets or strips printed with heat fused magnetic inks to a treatment vessel containing a non-aqueous solvent selected from the group consisting of ketones, cyclic ethers, alicyclics, esters, aromatic hydrocarbons, terpenes, chlorinated hydrocarbons, cyclic amide, cyclic amine and car-

bon disulfide for dissolving the binder component of the ink;

- (b) subjecting the treated feedstock to a source of low frequency ultrasound within the range of from about 16 kHz to 500 MHz to separate the heat fused magnetic ink particles from the wastepaper sheats or strips;
- (c) removing the deinked wastepaper from the treatment vessel;
- (d) collecting the separated ink particles magnetically for recovery and reuse;
- (e) collecting the solvent and binder for recovery and reuse;
- (f) separating and recovering excess solvent from the deinked wastepaper stream, ink particle stream and binder stream;
- (g) recycling the recovered solvent into the treatment vessel after cleaning and reconditioning; and,
- (h) introducing make-up solvent to the treatment vessel as required.

5,413,676

## CELLULOSIC FIBER OF IMPROVED WETTABILITY

Hien V. Nguyen, East Windsor, and Cecilia Vargas, Colonia, both of N.J., assignors to Chicopee, Milltown, N.J.

Continuation of Ser. No. 918,321, Jul. 22, 1992. This application Sep. 30, 1993, Ser. No. 129,821

Int. Cl.<sup>6</sup> D21H 17/63

U.S. Cl. 162—9

9 Claims

1. A cellulosic fiber of improved wettability comprising a cellulosic fiber with discrete crystal domains of inorganic ionic salt attached to the surface of said cellulosic fiber, said inorganic ionic salt being present in an amount which is between 4 and 12% of the fiber weight.

5,413,677

## METHOD FOR PRODUCING CHEMICAL PULP FROM HARDWOOD CHIPS

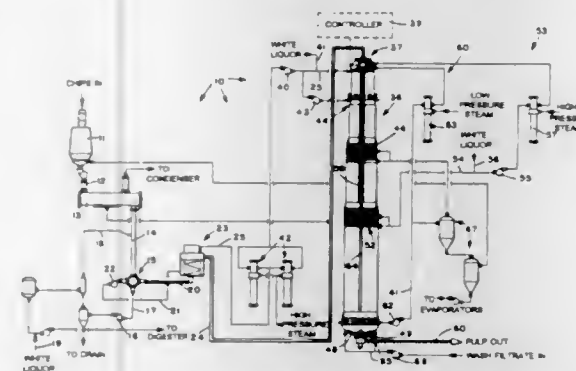
Robert H. Collins, Saratoga, N.Y., assignor to Kamy, Inc., Glens Falls, N.Y.

Filed Apr. 5, 1993, Ser. No. 41,572

Int. Cl.<sup>6</sup> D21C 7/10, 7/14

U.S. Cl. 162—42

16 Claims



1. A method of producing chemical pulp from hardwood chips, using a vertical digester having a top and a bottom and a cooking zone, and a high pressure feeder, comprising the steps of continuously and substantially sequentially:

- (a) steaming the hardwood chips;
- (b) entraining the hardwood chips in alkaline cooking liquor at a relatively cool temperature, so that the liquor will not significantly flash into steam in a high pressure feeder;
- (c) feeding the chips entrained in relatively cool liquor under high pressure to a point external of the top of the digester using the high pressure feeder;
- (d) at said point external of the digester, replacing the relatively cool liquor entraining the chips with relatively hot cooking liquor, at cooking temperature, and recirculating the replaced relatively cool liquor to the high pressure

feeder, so as to thermally isolate the high pressure feeder from the digester;

- (e) feeding the hardwood chips entrained in cooking liquor at cooking temperature directly to the cooking zone at the top of the digester;
- (f) at the top of the digester, separating some liquor from the chips;
- (g) recirculating and reheating the liquor separated from the chips in step (f), to provide a significant part of the cooking liquor in step (d); and
- (h) cooking the chips in the digester in a cooking zone, to ultimately produce chemical hardwood pulp, and removing the hardwood pulp from the bottom of the digester.

5,413,678

## HEATED SCI SOLUTION FOR SELECTIVE ETCHING

Sylvia Hossain, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 14, 1993, Ser. No. 61,787

Int. Cl.<sup>6</sup> B05D 5/00

U.S. Cl. 156—657.1

6 Claims

1. A method of etching silicon nitride from a surface of a semiconductor wafer, comprising:
  - heating  $\text{NH}_4\text{OH}:\text{H}_2\text{O}_2:\text{H}_2\text{O}$  to a predetermined temperature;
  - exposing said surface of said wafer to the heated  $\text{NH}_4\text{OH}:\text{H}_2\text{O}_2:\text{H}_2\text{O}$ ; and
  - drying said substrate.

5,413,679

## METHOD OF PRODUCING A SILICON MEMBRANE USING A SILICON ALLOY ETCH STOP LAYER

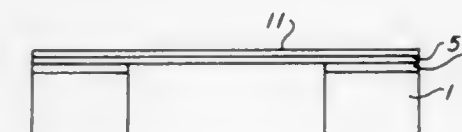
David J. Godbey, Burtonsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 30, 1993, Ser. No. 83,952

Int. Cl.<sup>6</sup> B44C 1/22

U.S. Cl. 216—99

20 Claims



1. A method of producing a membrane, comprising the steps of:

- (a) forming an etch stop layer on an upper surface of a silicon substrate having upper and lower surfaces, the etch stop layer comprising an alloy of silicon and at least one other Group IV element, the etch stop layer having lower and upper surfaces with the lower surface contacting the silicon substrate; and
- (b) removing a portion of the silicon substrate with the upper surface of the etch stop layer exposed, the portion of the silicon substrate being removed extending from the upper surface of the silicon substrate to the lower surface of the silicon substrate.

5,413,680

## MICROBIOLOGICAL DETECTION METHOD FOR FELTS USING IODONITROTETRAZOLIUM

Maureen B. Nunn, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Aug. 2, 1993, Ser. No. 100,755

Int. Cl.<sup>6</sup> D21F 1/32

U.S. Cl. 162—274

8 Claims

1. A method of detecting microbiological fouling of felts

used in paper making machines, the method comprising the steps of: contacting a felt suspected of containing microbiological deposits with iodinitrotetrazolium; and then examining the felt for a predetermined color change in the felt confirming the presence of bacteria on the felt;

and wherein the felt assumes a red color in the presence of at least one million colony forming units of bacteria per gram of dry felt.

5,413,681

# PROCESS FOR THE RECOVERY OF TEREPHTHALIC ACID AND ETHYLENE GLYCOL FROM POLY(ETHYLENE TEREPHTHALATE)

Gerald C. Tustin; Thomas M. Pell, Jr., both of Kingsport; David A. Jenkins, Gray, and Mary T. Jernigan, Kingsport, all of Tenn., assignors to Eastman Chemical Company, Kingsport, Tenn.

Filed Nov. 15, 1993, Ser. No. 151,637  
Int. Cl.<sup>6</sup> B01D 3/00

U.S. Cl. 203—80

23 Claims

1. A process for the recovery of ethylene glycol and terephthalic acid from a resin comprised of poly(ethylene terephthalate), wherein said process is a neutral hydrolysis, the process comprising the steps:

(a) contacting the resin with water at a temperature range of about 200° C. to 280° C. in a reaction vessel at the vapor pressure of water at said temperature range to form a mixture comprised of about 1 to 40 weight percent of the resin;

(b) cooling the mixture to about 70° C. to 100° C., filtering the solids, washing the solids and then drying the solids at a temperature from about 25° C. to 100° C. to provide a solid portion comprised of terephthalic acid and a liquid portion comprised of ethylene glycol;

(c) recovering the ethylene glycol from the liquid portion of the mixture by a two-step distillation, wherein in a first step of the two-step distillation the water and low boiling components are removed at about 0.1 to 6 atmospheres pressure and temperatures of about 100° C. to 170° C., and

wherein in a second step of the two-step distillation high boiling species are removed at about 1 mm Hg to 10 atmospheres pressure and at a temperature range of about 50° C. to 300° C.;

(d) recovering the solid terephthalic acid by heating the solid portion above its dew point with a continuous stream of water vapor at a temperature of about 310° C. to 370° C. and a pressure of about 0.1 atmosphere to 1.2 atmosphere to produce a vapor comprised of water and terephthalic acid;

(e) cooling the vapor containing the terephthalic acid and the water to a temperature below the dew point of the terephthalic acid; and

(f) collecting solid polymer grade terephthalic acid formed therefrom.

16. A process for the recovery of ethylene glycol from a resin comprised of poly(ethylene terephthalate), wherein said process is a neutral hydrolysis, the process comprising the steps:

(a) contacting the resin with water at a temperature range of about 200° C. to about 280° C. in a reaction vessel at the vapor pressure of water at said temperature range to form a mixture comprised of about 1 to 40 weight percent of the resin;

(b) cooling the mixture to about 70° C. to 100° C., filtering the solids, washing the solids and then drying the solids at a temperature of from about 25° C. to about 100° C. to provide a solid portion comprised of terephthalic acid and a liquid portion comprised of ethylene glycol;

(c) recovering the ethylene glycol from the liquid portion of the mixture by a two-step distillation,

wherein in a first step of the two-step distillation the water and low boiling components are removed at about 0.1 to

6 atmospheres pressure and temperatures of about 100° C. to 170° C., and

wherein in a second step of the two-step distillation high boiling species are removed at about 1 mm Hg to 10 atmospheres pressure and at a temperature of about 50° C. to 300° C.;

(d) recovering the terephthalic acid.

5,413,682

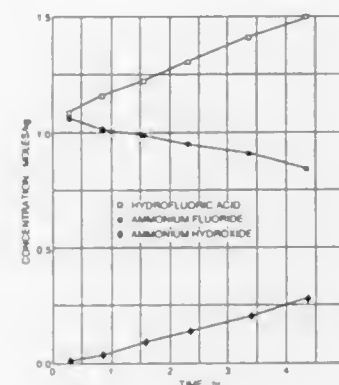
# RECOVERY OF FLUORIDE FROM WASTE SOLUTIONS

Roy F. Thornton; Bang M. Kim, both of Schenectady, N.Y.; Steven J. Babb, and John L. Harmon, both of Wilmington, N.C., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 28, 1994, Ser. No. 218,398  
Int. Cl.<sup>6</sup> B01D 61/44

U.S. Cl. 204—102

5 Claims



SOLUTION CONCENTRATIONS TEST NO. 2

1. A method for treating a waste stream containing ammonium fluoride and ammonium hydroxide from a production line for uranium dioxide comprising the steps of:

feeding the waste stream into an electrochemical cell having an ion-exchange membrane between an anolyte cell and a catholyte cell;

electrolyzing the stream by passing current through the cell to form an enriched concentration of ammonium hydroxide in the catholyte cell and to form hydrofluoric acid in the anolyte cell having at least 5 molar concentration.

5,413,683

# OXYGEN SENSING APPARATUS AND METHOD USING ELECTROCHEMICAL OXYGEN PUMPING ACTION TO PROVIDE REFERENCE GAS

Takao Murase, Konan, and Motohiro Nishiwaki, Nagoya, both of Japan, assignors to NGK Insulators Ltd., Japan

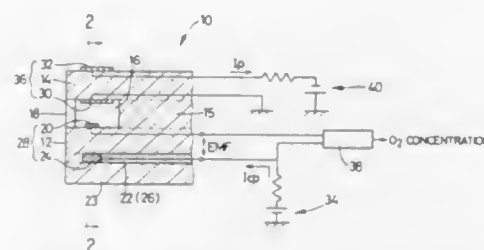
Filed Feb. 22, 1994, Ser. No. 199,638

Claims priority, application Japan, Mar. 25, 1993, 5-091954; Mar. 26, 1993, 5-092067

Int. Cl.<sup>6</sup> G01N 27/26

U.S. Cl. 204—183.16

10 Claims



1. A method of detecting an oxygen concentration of a measurement gas, comprising the steps of:

providing an oxygen sensing apparatus comprising:

(i) a first electrochemical cell including a first oxygen-ion conductive solid electrolyte body, a reference electrode exposed to a reference gas having a high concentration of oxygen, a measuring electrode exposed to the measurement gas, said reference electrode and said measuring electrode are formed on said solid electrolyte body, said first electrochemical cell producing an electromotive force which corresponds to the oxygen concentration of the measurement gas, said electromotive force is induced between the reference electrode and the measuring electrode due to a difference in the oxygen concentration between the measurement gas and the reference gas;

(ii) means for defining a reference-gas chamber formed around said reference electrode, said reference-gas chamber is provided with said reference gas by an oxygen pumping action effected with an amount of current ranging from about 0.1  $\mu$ A to about 31  $\mu$ A applied between said reference electrode and said measuring electrode;

(iii) means for defining a measurement-gas chamber formed around said measuring electrode, the measurement gas is introduced into the measurement-gas chamber; and

(iv) a second electrochemical cell including a second oxygen-ion conductive solid electrolyte body and a pair of electrodes, one of said pair of electrodes is disposed in said measurement-gas chamber while the other of said pair of electrodes is exposed in an external gas space outside the apparatus, said second electrochemical cell performing an oxygen pumping action to feed an oxygen gas from said external gas space into said measurement-gas chamber;

detecting the electromotive force induced between said reference electrode and said measuring electrode of said first electrochemical cell; and

determining an amount of a current to be applied between said pair of electrodes of said second electrochemical cell for effecting the oxygen pumping action to be substantially equal to said current to be applied between said reference electrode and said measuring electrode of said first electrochemical cell, so that said electromotive force is proportional to a natural logarithm of the oxygen concentration of the measurement gas introduced into said measurement-gas chamber.

5,413,684

# METHOD AND APPARATUS FOR REGULATING A DEGREE OF REACTION IN A COATING PROCESS

Erich Bergmann, Mels, Switzerland, assignor to Balzers Aktiengesellschaft, Liechtenstein

Filed Aug. 25, 1993, Ser. No. 111,645

Claims priority, application Switzerland, Aug. 28, 1992, 2689/92

Int. Cl.<sup>6</sup> C23C 14/54

U.S. Cl. 204—192.13

15 Claims

1. A method of negative feedback for controlling a ratio  $\gamma = x:y$  during deposition of a layer of material  $F_xG_y$ , predominated by cathode-sputtering, wherein a first solid material is cathode-sputtered into a vacuum atmosphere, a gas G is introduced in said atmosphere, said first solid material sputtered is reacted with said gas and a reaction product is deposited, comprising the steps of:

generating a first signal which is indicative of said ratio of the deposited layer material at a moment;

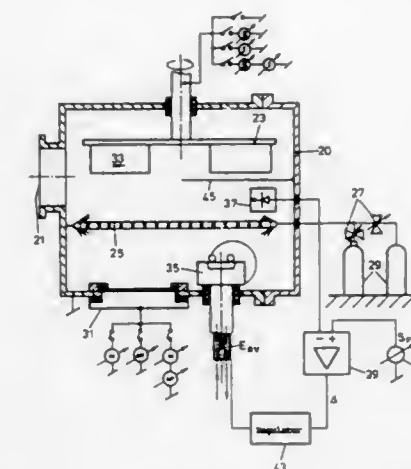
generating a second signal which is indicative of a desired value for said ratio;

generating a difference signal of a difference between said first and said second signals;

evaporating a second solid material into said atmosphere with an adjustable evaporation rate;

reacting said evaporated second solid material with said gas; and

adjusting said evaporation rate controlled by said difference



signal, so as to minimize said difference signal, thereby negative feedback controlling said ratio of the deposited layer material at a moment to accord with said desired value for said ratio.

5,413,685

# ION-SELECTIVE ELECTRODE

Satoshi Ozawa, Mitaka; Yuji Miyahara, Hitachi; Mamoru Taki, Ibaraki; Koutarou Yamashita, Katsuta, and Yoshio Watanabe, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

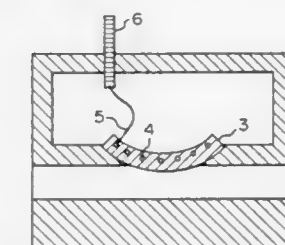
Filed Sep. 29, 1993, Ser. No. 128,236

Claims priority, application Japan, Oct. 2, 1992, 4-264583

Int. Cl.<sup>6</sup> G01N 27/333

U.S. Cl. 204—416

23 Claims



1. A flow-through cell for electrochemical measurement of ion concentration in a sample solution, comprising:

a flow path through which the sample solution flows;

an internal space separated from said flow path;

an ion-sensing membrane having a curved portion projecting through an opening from said internal space into said flow path;

an internal electrode comprising a plurality of metallic wires arranged at least two dimensionally with interspaces therebetween, said internal electrode being deformable, being at least partly buried in said ion-sensing membrane and detecting an electrical potential of said ion-sensing membrane;

an external terminal; and

a lead connecting said internal electrode to said external terminal.



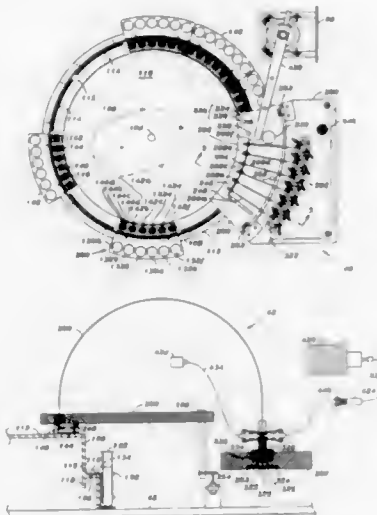
5,413,686  
MULTI-CHANNEL AUTOMATED CAPILLARY  
ELECTROPHORESIS ANALYZER

Gerald L. Klein, Orange, and Gary A. Miller, Yorba Linda, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jul. 17, 1992, Ser. No. 916,308  
Int. Cl.<sup>6</sup> G01N 27/26, 27/447

U.S. Cl. 204—299 R

56 Claims



1. A device for use in capillary electrophoresis comprising: a plurality of capillaries, each capillary having a first end and a second end; a plurality of wells adapted to receive corresponding first ends of the capillaries, each well receiving no more than one capillary end; and a conduit including means for receiving the second ends of the capillaries.

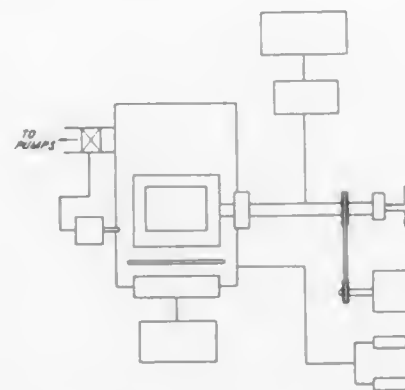
5,413,687  
METHOD FOR METALLIZING FLUOROPOLYMER  
SUBSTRATES

Carlos L. Barton, Brooklyn, and Robert B. McGraw, Westport, both of Conn., assignors to Rogers Corporation, Rogers, Conn.

Filed Nov. 27, 1991, Ser. No. 799,447  
Int. Cl.<sup>6</sup> C23C 14/34

U.S. Cl. 204—192.14

26 Claims



1. A process for depositing a metal layer onto a surface of a fluoropolymer substrate comprising the steps of: placing the fluoropolymer substrate in an atmosphere containing a mixture of ammonia (NH<sub>3</sub>) gas and a noble gas; and bias sputtering a metal layer onto the surface of the fluoropolymer substrate while said fluoropolymer substrate is

present within said atmosphere of said ammonia/noble gas mixture.

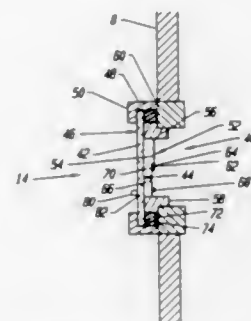
5,413,688  
SHUTTER APPARATUS FOR A COATING CHAMBER  
VIEWPORT

Daniel T. Crowley, Owatonna, Minn., assignor to Viratec Thin Films, Inc., Faribault, Minn.

Filed Feb. 8, 1994, Ser. No. 193,326  
Int. Cl.<sup>6</sup> C23C 14/52

U.S. Cl. 204—298.11

9 Claims



1. A shutter apparatus for a viewport of an evacuable optical coating chamber, said viewport having interior and exterior surfaces, comprising:

- a fixed shutter;
- a movable shutter movably attached to said fixed shutter;
- a bracket for mounting said fixed and movable shutters over the interior surface of said viewport, said viewport adapted to be sealed in a wall of said chamber;
- an actuator movable between first and second positions over the exterior surface of said viewport;
- a magnetic coupling between said actuator and said movable shutter; and

wherein said fixed shutter and said movable shutter shield the interior surface of said viewport when said actuator is in said first position, and said movable shutter is movable to expose at least a portion of the interior surface of said viewport to permit viewing therethrough when said actuator is moved towards said second position.

5,413,689  
CARBON CONTAINING BODY OR MASS USEFUL AS  
CELL COMPONENT

Vittorio de Nora, Nassau, Bahamas, and Jainagesh A. Sekhar, Cincinnati, Ohio, assignors to Moltech Invent S.A., Luxembourg

Filed Jun. 12, 1992, Ser. No. 897,726  
Int. Cl.<sup>6</sup> C25B 11/00, 11/12

U.S. Cl. 204—279

10 Claims

1. A carbon containing body or mass obtained by solidifying a carbon containing paste consisting essentially of a compact mixture of:

- one or more particulate carbonaceous material(s); and
- a non-carbonaceous non-polluting colloidal binder, said binder being a suspension selected from the group consisting of colloidal silica, alumina, yttria, ceria, thoria, zirconia, magnesia, lithia, and hydroxides, acetates and formates thereof, oxides and hydroxides of the other metals, cationic species and mixtures thereof.

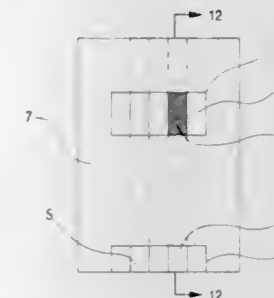
5,413,690  
POTENTIOMETRIC BIOSENSOR AND THE METHOD  
OF ITS USE

Kent M. Kost; Thomas J. Lindsay, both of Fishers, and John F. Price, McCordsville, all of Ind., assignors to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Jul. 23, 1993, Ser. No. 97,331  
Int. Cl.<sup>6</sup> G01N 27/26

U.S. Cl. 204—403

17 Claims



1. A potentiometric biosensor for analysis of an analyte from a fluid sample, comprising:

- a. an indicating electrode;
- b. a reference electrode;
- c. a reagent of known amount overlaying a portion of the surface of the indicating electrode and comprising a redox mediator, the redox mediator being in an amount to react with all of the analyte at the surface of the indicating electrode, thereby causing a measurable change in potential that correlates to the change in proportions of the oxidized and reduced forms of the redox mediator at the surface of the indicating electrode; and
- d. a potentiometer in electrical connection with the indicating and reference electrodes.

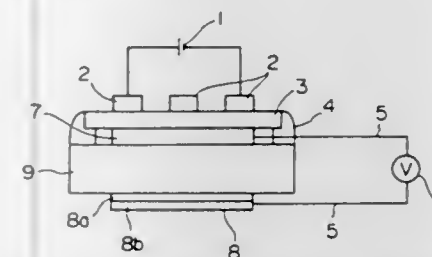
5,413,691  
SOLID ELECTROLYTE GAS-SENSING DEVICE

Kazunari Kaneyasu, Fujisawa, and Takashi Nakahara, Minoo, both of Japan, assignors to Tokuyama Corporation, Yamaguchi, Japan

Filed Dec. 23, 1993, Ser. No. 172,325  
Claims priority, application Japan, Dec. 25, 1992, 4-346946  
Int. Cl.<sup>6</sup> G01N 27/26

U.S. Cl. 204—424

7 Claims



1. A solid electrolyte gas-sensing device comprising a solid electrolyte layer (a) and a reference electrode layer (b) and a working electrode layer (c) with the solid electrolyte layer (a) being an intermediate layer therebetween, said working electrode layer (c) having a mixture layer (d) in the interface between said solid electrolyte layer (a) and said working electrode layer (c), the mixture layer (d) being formed from a metal salt which shows dissociation equilibrium with a gas to be measured and an electron-conducting substance, the mixture layer (d) containing 0.5 to 14% by volume of the electron-conducting substance.

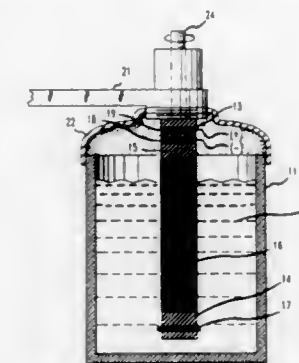
5,413,692  
HYDRODYNAMICALLY MODULATED HULL CELL

Joseph A. Alys, 80 Mountainview Rd., Warren, N.J. 07060, and Igor V. Kadija, 118 Sherwood Rd., Ridgewood, N.J. 07450

Continuation of Ser. No. 550,266, Jul. 9, 1990, Pat. No. 5,228,976. This application Mar. 31, 1993, Ser. No. 40,711

The portion of the term of this patent subsequent to Jul. 20, 2010, has been disclaimed.  
Int. Cl.<sup>6</sup> G01N 27/42

9 Claims



1. An electroplating test cell for determining quality of electroplated deposits simultaneously in a wide range of current densities at a desired total applied current value, comprising:

- a container of non-conducting, non-contaminating material for holding an electrolyte, and
- a measuring instrument which comprises: an elongated cylinder of an electrically non-conducting material suspended within the container, the central axis of the cylinder being substantially parallel to the central axis of the container, said cylinder being adapted to be rotated about its longitudinal central axis, a short metallic anode electrode secured to a lower portion of the cylinder coaxially of the cylinder, an elongated metallic cathode electrode having a cylindrical shape secured to the periphery and extending along a major portion of the cylinder coaxially thereof, a lower edge of the cathode electrode being spaced along the said central axis from an upper edge of the anode electrode by a short electrically non-conducting spacer section, said spacer section having essentially the same diameter as said cathode electrode, the length of said cathode electrode is such that, when immersed in the electrolyte, from 10 to 20 percent of the cathode electrode is exposed above the level of the electrolyte, and means for providing current to the anode electrode and the cathode electrode, respectively, and in which said cathode electrode comprises a metal sleeve embedded peripherally in and coaxially with the cylinder, said sleeve being a refractory metal selected from the group consisting of niobium, tantalum, titanium and aluminum, and a removable test metal panel is securable on the cylinder in electrical contact with the metal sleeve.

5,413,693  
ELECTROCRYSTALLIZATION OF STRONGLY  
ADHERENT BRUSHITE COATINGS ON PROSTHETIC  
ALLOYS

Jody G. Redepinning, 920 Manchester Dr., Lincoln, Nebr. 68528

Continuation of Ser. No. 638,104, Jan. 4, 1991, Pat. No. 5,310,464. This application Jan. 3, 1994, Ser. No. 176,829

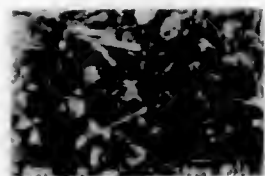
The portion of the term of this patent subsequent to May 10, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> C25D 11/36

5 Claims

1. An electrolytically-induced crystallization method for

coating a conductive substrate with a biologically compatible, bone-emulating salt comprising:

- providing an electrolysis apparatus with a cathode made of a conductive substrate of a conductor which is to be coated with said salt by an electrocrystallization growth process;
- preparing for said apparatus an electrolyte characterized as an aqueous solution containing cations and anions derived from the salt to be crystallized onto the cathode, said



- preparing including initiating a temperature and a pH of the electrolyte that define peak saturation conditions so that when the pH is caused to increase said solution saturates and desired forms of the salt crystallize locally from out said solution and grow on said cathode;
- contacting said cathode with said solution; and
  - passing an electric current through said apparatus and controlling the number of crystal nucleation sites and the rate of crystal growth on the cathode by varying said electric current.

5,413,694

#### METHOD FOR IMPROVING ELECTROMAGNETIC SHIELDING PERFORMANCE OF COMPOSITE MATERIALS BY ELECTROPLATING

David S. Dixon, Old Lyme; Michael D. Obara, Mystic, both of Conn.; James V. Masl, Wilbraham, and William G. Bradley, Springfield, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 30, 1993, Ser. No. 105,316  
Int. Cl.<sup>6</sup> C25D 5/24, 5/00

U.S. Cl. 205—158 10 Claims  
1. A method of improving the electromagnetic (EM) shielding performance of a composite material having filler particles that are at least semi-conductive suspended in a non-conductive resin, comprising the steps of:

- electroplating a conductive material having a surface onto the surface of said composite material to cause said conductive material to electrically connect to a portion of said filler particles; and
- injecting, after said step of electroplating, an exponentially decaying electromagnetic pulse through said composite material with said conductive material electroplated thereon, wherein energy of said pulse is less than that required to cause localized melting of said composite material with said conductive material electroplated thereon.

5,413,695

#### PROCESS FOR PRODUCING LUBE OIL FROM SOLVENT REFINED OILS BY ISOMERIZATION OVER A SILICOALUMINOPHOSPHATE CATALYST

Stephen J. Miller, San Francisco, Calif., assignor to Chevron Research and Technology Company, a Division of Chevron U.S.A. Inc., San Francisco, Calif.

Filed Jan. 6, 1993, Ser. No. 1,007

The portion of the term of this patent subsequent to Aug. 4, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> C10G 73/02, 73/38; C07C 5/22

U.S. Cl. 208—28 18 Claims

1. A process for producing lube oil stock comprising contacting a raffinate having a solvent dewaxed viscosity index of at least 90 and boiling above 350° F. with a catalyst comprising an intermediate pore size silicoaluminophosphate molecular sieve and at least one Group VIII metal under dewaxing conditions so as to produce a product having a viscosity index greater than about 110.

#### 5,413,696 GASOLINE UPGRADING PROCESS

David L. Fletcher, Turnersville; Timothy L. Hilbert, Sewell; Stephen J. McGovern, Mantua; Michel S. Sarli, Haddonfield, and Stuart S. Shih, Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 850,106, Mar. 12, 1992, which is a continuation-in-part of Ser. No. 745,311, Aug. 15, 1991, Pat. No. 5,346,609. This application Jun. 1, 1992, Ser. No. 891,124 The portion of the term of this patent subsequent to May 2, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> C10G 69/02

U.S. Cl. 208—89 5 Claims

1. A process of upgrading a sulfur-containing feed fraction boiling in the gasoline boiling range which comprises: hydrodesulfurizing a catalytically cracked, olefinic, sulfur-containing gasoline feed having a sulfur content of at least 50 ppmw, an olefin content of at least 5 percent and a 95 percent point of at least 325° F. with a hydrodesulfurization catalyst in a hydrodesulfurization zone, operating under a combination of elevated temperature, elevated pressure and an atmosphere comprising hydrogen, to produce an intermediate product comprising a normally liquid fraction which has a reduced sulfur content and a reduced octane number as compared to the feed; contacting at least the gasoline boiling range portion of the intermediate product in a second reaction zone with a catalyst of functionality comprising zeolite beta to convert it to a product comprising a fraction boiling in the gasoline boiling range having a higher octane number than the gasoline boiling range fraction of the intermediate product.

5,413,697

#### GASOLINE UPGRADING PROCESS

David L. Fletcher, Turnersville; Michael S. Sarli, Haddonfield, and Stuart S. Shih, Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 850,106, Mar. 12, 1992, which is a continuation-in-part of Ser. No. 745,311, Aug. 15, 1991, Pat. No. 5,346,609. This application Jul. 15, 1992, Ser. No. 913,326 Int. Cl.<sup>6</sup> C10G 69/02

U.S. Cl. 208—89 20 Claims

1. A process of upgrading a sulfur-containing feed fraction boiling in the gasoline boiling range which comprises: contacting the sulfur-containing feed fraction with a hydrodesulfurization catalyst in a first reaction zone, operating under a combination of elevated temperature, elevated pressure and an atmosphere comprising hydrogen, to produce an intermediate product comprising a normally liquid fraction which has a reduced sulfur content and a reduced octane number as compared to the feed; contacting at least the gasoline boiling range portion of the intermediate product in a second reaction zone with an acidic catalyst comprising a first synthetic porous crystalline material which is an intermediate pore material and a second synthetic porous crystalline material which is characterized by an X-ray diffraction pattern with the following lines

Interplanar d-Spacing (Å)	Relative Intensity, I/I <sub>0</sub> × 100
12.36 ± 0.4	M-VS
11.03 ± 0.2	M-S
8.83 ± 0.14	M-VS
6.18 ± 0.12	M-VS
6.00 ± 0.10	W-M
4.06 ± 0.07	W-S
3.91 ± 0.07	M-VS
3.42 ± 0.06	VS

to convert it to a product comprising a fraction boiling in the gasoline boiling range having a higher octane number than the gasoline boiling range fraction of the intermediate product.

#### 5,413,698 HYDROCARBON UPGRADING PROCESS

David L. Fletcher, Turnersville, N.J.; Mohsen N. Harandi, Langhorne, Pa.; Michael S. Sarli, Haddonfield, and Stuart S. Shih, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 850,106, Mar. 12, 1992, which is a continuation-in-part of Ser. No. 745,311, Aug. 15, 1991. This application Aug. 5, 1992, Ser. No. 925,001

Int. Cl.<sup>6</sup> C10G 69/02

U.S. Cl. 208—89 23 Claims

1. A process of upgrading a catalytically cracked sulfur-containing catalytically cracked feed fraction boiling in the gasoline boiling range having a 95% point of at least about 325° F. which comprises: contacting the catalytically cracked sulfur-containing feed fraction with a hydrodesulfurization catalyst in a first reaction step, operating under a combination of elevated temperature, elevated pressure and an atmosphere comprising hydrogen, to produce an intermediate product comprising a normally liquid fraction which has a reduced sulfur content and a reduced octane number as compared to the feed; and contacting at least the gasoline boiling range portion of the intermediate product in a second reaction step over a first catalyst zone comprising a large pore zeolite material and a second catalyst zone comprising an intermediate pore size zeolite material in the presence of hydrogen to effect long chain paraffin isomerization and back end conversion reactions in the first catalyst zone followed by selective cracking of the converted products in the second catalyst zone to convert it to a product comprising a fraction boiling in the gasoline boiling range having a higher octane number than the gasoline boiling range fraction of the intermediate product.

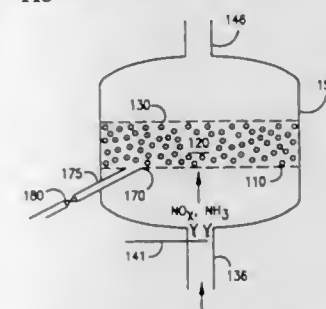
5,413,699

#### FCC PROCESS WITH FINES TOLERANT SCR REACTOR

Tai-Sheng Chou, Pennington, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Oct. 14, 1993, Ser. No. 136,053  
Int. Cl.<sup>6</sup> C10G 11/00

U.S. Cl. 208—113 9 Claims



1. A fluidized catalytic cracking process wherein a nitrogen compound containing heavy feed is catalytically cracked to lighter products comprising:

- contacting said feed with a stream of regenerated cracking catalyst having an average particle size within the range of 60–80 microns in a cracking reactor to produce lighter products and spent catalyst;
- separating products from spent catalyst;
- stripping spent catalyst with steam to produce stripped catalyst;
- regenerating said stripped catalyst in a catalyst regeneration means by contact with an oxygen containing gas to produce regenerated catalyst and flue gas containing NO<sub>x</sub> or NO<sub>x</sub> precursors and entrained catalyst fines;
- recycling to said cracking reactor said regenerated cracking catalyst; catalytically reducing said NO<sub>x</sub> in said flue gas, or NO<sub>x</sub> resulting from combustion of NO<sub>x</sub> precursors in said flue gas, by passing said flue gas and a reducing agent consisting essentially of CO and/or hydrocarbons found in said flue gas from said FCC regenerator and entrained

catalyst fines upflow through a fluidizable bed of particulate DeNO<sub>x</sub> catalyst having a particle size of 0.16 to 0.64 cm at a superficial vapor velocity sufficient to cause expansion, fluidization and particle to particle movement in said bed of DeNO<sub>x</sub> catalyst, and maintain at least a majority of said bed as an expanded, bubbling or turbulent fluidized bed with essentially no transport of DeNO<sub>x</sub> catalyst from the bed, and cause sufficient particle to particle movement to abrade, attrit or elutriate fines deposited on said DeNO<sub>x</sub> catalyst so that there is no net increase in fines loading of said catalyst bed at steady state, to produce a flue gas containing a reduced amount of NO<sub>x</sub> which is discharged.

5,413,700

#### TREATING OXIDIZED STEELS IN LOW-SULFUR REFORMING PROCESSES

John V. Heyse, Crockett, and Bernard F. Mulasky, Fairfax, both of Calif., assignors to Chevron Research and Technology Company, San Francisco, Calif.

Filed Jan. 4, 1993, Ser. No. 286

The portion of the term of this patent subsequent to Apr. 11, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> C10G 35/04; C25F 5/00; C25D 11/00

U.S. Cl. 208—134 28 Claims



1. A method for reforming hydrocarbons comprising (i) treating a reforming reactor system, at least one surface thereof to be exposed to hydrocarbons comprising a metal oxide or metal oxides, by coating at least a portion of the surface of said reforming reactor system comprising the metal oxide(s) with a material more resistant to carburization than said portion prior to coating, reacting said material with the metal oxide on said surfaces and fixating or removing at least a portion of the oxide in said metal oxide from the reactor system, and (ii) reforming hydrocarbons in said reactor system under conditions of low sulfur.

5,413,701

#### PROCESS FOR SWEETENING A SOUR HYDROCARBON FRACTION USING A SUPPORTED METAL CHELATE AND A SOLID BASE

Ralph D. Gillespie, Elgin; Jeffery C. Bricker, Buffalo Grove; Blaise J. Arena, Chicago, and Jennifer S. Holmgren, Bloomington, all of Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 15, 1993, Ser. No. 151,632

The portion of the term of this patent subsequent to Feb. 15, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C10G 27/10

U.S. Cl. 208—189\* 21 Claims

1. A process for sweetening a sour middle distillate hydrocarbon fraction containing mercaptans comprising sequentially contacting the middle distillate hydrocarbon fraction first with a solid base and then, in the presence of an oxidizing agent and a polar compound, with a metal chelate dispersed on a non-basic solid support, said solid base selected from the group consisting of a) alkaline earth metal oxides, b) metal oxide solid solutions having the formula M<sub>a</sub>(II)M<sub>b</sub>(III)O<sub>(a+b)</sub>(OH)<sub>b</sub> where M(II) is a divalent metal selected from the group consisting of magnesium, nickel, zinc, copper, iron, cobalt, calcium, and mixtures thereof, M(III) is a trivalent metal selected from the group consisting of aluminum, chromium, gallium,



scandium, iron, lanthanum, cerium, yttrium, boron, and mixtures thereof, and a/b is between 1 to about 15, and c) layered double hydroxides represented by the formula  $M_2(II)M_2(III)(OH)_{(2a+2b)}(X^{-n})_{(b/n)} \cdot cH_2O$  where  $X^{-}$  is an anion selected from the group consisting of carbonate, nitrate, halide, and mixtures thereof, n is 1 where  $X^{-}$  is a univalent anion and 2 where  $X^{-}$  is a divalent anion, and  $cH_2O$  is water of hydration.

5,413,702

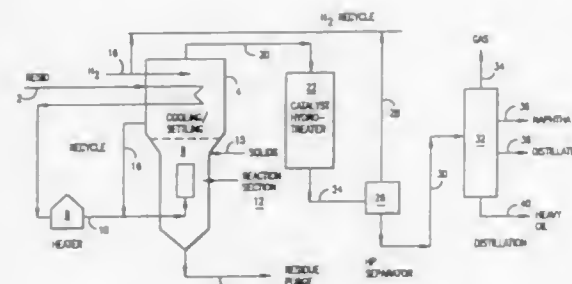
HIGH SEVERITY VISBREAKING OF RESIDUAL OIL  
Tsoung Y. Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Feb. 21, 1992, Ser. No. 838,996

Int. Cl.<sup>6</sup> C10G 65/12, 69/06

U.S. Cl. 208—97

16 Claims

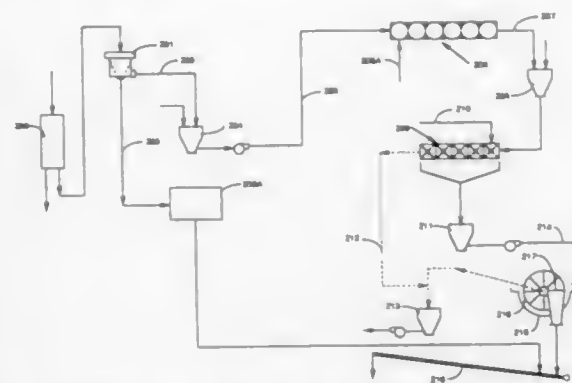


1. A process for heavy hydrocarbon oil conversion which comprises (1) thermally treating heavy hydrocarbon oil feedstock in a reaction zone of a liquid phase, fluidized bed reactor filled with carbonaceous solids under severe visbreaking conditions to form an overflow reaction product, wherein the severity is greater than about 200 seconds, as expressed in equivalent reaction time at 800° F.; (2) separating the solids from said overflow reaction product in a settling zone of said fluidized bed reactor; (3) introducing  $H_2$  at the top of said settling zone; (4) passing said overflow reaction product and  $H_2$  from said settling zone to a hydrotreater to stabilize the overflow reaction product; (5) separating  $H_2$  from the stabilized overflow reaction product and recycling said  $H_2$  to said settling zone of said fluidized bed reactor; and (6) fractionating said stabilized overflow reaction product.

5,413,703

METHOD AND APPARATUS FOR DEWATERING  
Edward H. Greenwald, Sr., 52 Nancy Ln., McMurray, Pa. 15137  
Division of Ser. No. 735,386, Jul. 24, 1991, Pat. No. 5,236,596,  
which is a continuation-in-part of Ser. No. 112,669, Oct. 22,  
1987, abandoned. This application Jul. 22, 1993, Ser. No. 95,862  
Int. Cl.<sup>6</sup> B03D 3/00; B01D 21/00, 21/28; C10L 9/10  
U.S. Cl. 210—205

8 Claims



1. Apparatus for dewatering an aqueous coal slurry, said apparatus including a vessel for an aqueous slurry containing

an aqueous medium and clay contaminated coal particles; said apparatus further comprising,  
a source of peptizing agent;  
means for supplying said peptizing agent to said vessel;  
means for imparting high shear forces to the aqueous slurry containing said peptizing agent in said vessel for imparting dilatency to the coal particles by separating clay contaminants from the coal surface without flocculating the coal particles and for subdividing the clay to clay platelets, said high shear force being applied without the presence of any flocculating agents in said vessel for said coal particles, to peptize the clay platelets;  
sieve means including an aqueous permeable barrier capable of forming thereon a barrier layer of aqueous permeable unflocculated dilatant coal;  
means for transferring the peptized clay and coal from said vessel to said sieve means;  
means for applying a force in the presence of said barrier layer of aqueous permeable unflocculated dilatant coal for dewatering the coal mass by draining aqueous medium along with discrete peptized clay platelets from the coal particles contained in said slurry;  
said means for transferring and said sieve means steps being performed in the absence of any flocculating agents for said coal particles; and  
means for recovering the dewatered coal particles.

5,413,704

PROCESS FOR SWEETENING A SOUR HYDROCARBON  
FRACTION USING A MIXTURE OF A SUPPORTED  
METAL CHELATE AND A SOLID BASE

Ralph D. Gillespie, Elgin; Jeffery C. Bricker, Buffalo Grove;  
Blaise J. Arena, Chicago, and Jennifer S. Holmgren, Bloomington, Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 15, 1993, Ser. No. 151,633

The portion of the term of this patent subsequent to Feb. 15, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C10G 25/00

U.S. Cl. 208—207

21 Claims

1. A process for sweetening a sour middle distillate hydrocarbon fraction containing mercaptans comprising contacting the middle distillate hydrocarbon fraction in the presence of an oxidizing agent and a polar compound with a mixture of a solid base and a metal chelate dispersed on a non-basic solid support, said solid base selected from the group consisting of a) alkaline earth metal oxides, b) metal oxide solid solutions having the formula  $M_2(II)M_2(III)O_{(a+b)}(OH)_b$  where M(II) is a divalent metal selected from the group consisting of magnesium, nickel, zinc, copper, iron, cobalt, calcium, and mixtures thereof, M(III) is a trivalent metal selected from the group consisting of aluminum, chromium, gallium, scandium, iron, lanthanum, cerium, yttrium, boron, and mixtures thereof and a/b is between 1 to about 15, and c) layered double hydroxides represented by the formula  $M_2(II)M_2(III)(OH)_{(2a+2b)}(X^{-n})_{(b/n)} \cdot cH_2O$  where  $X^{-}$  is an anion selected from the group consisting of carbonate, nitrate, halide, and mixtures thereof, n is 1 where  $X^{-}$  is a univalent anion and 2 where  $X^{-}$  is a divalent anion, and  $cH_2O$  is water of hydration.

5,413,705

FILTERLESS DRAIN SEPARATOR

Robert F. Tammera, 56 Gilbert Pl., West Orange, N.J. 07052,  
and Robert J. Dallara, 75 Hawthorne Ter., Leonia, N.J. 07605

Filed Sep. 24, 1992, Ser. No. 950,926

Int. Cl.<sup>6</sup> B01D 21/00

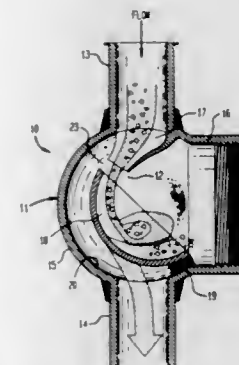
U.S. Cl. 210—94

32 Claims

1. A filterless drain separator comprising:

- A. a housing having:
  - an inlet conduit;
  - an outlet conduit;
  - a spherical inner wall surface disposed between said inlet and outlet conduits;

a vane disposed at said spherical inner wall and adapted to coact with said inlet conduit to direct liquid influx therefrom;  
B. a holding area within said housing, said holding area having:  
a spherical segment member disposed intermediate said inlet and outlet conduits of said housing;  
slot means disposed in said spherical segment member; wherein said spherical segment member is adapted to receive said liquid influx from said vane and urge said liquid influx by centripetal force to said slot means such that solid matter is separated from said liquid influx and detained at said holding area;



positioning means coacting with said spherical segment member and at least one of said housing inner wall surface and said vane to position said spherical segment member to receive said liquid influx from said vane and direct said liquid influx from said holding area to said outlet conduit; and  
C. a cylindrical section connected to said housing and communicating with said holding area, said cylindrical section having:  
closure means removably mounted thereto, wherein said closure means permits access to said holding area; and  
screening means mountable to said closure means.

4. The filterless drain separator according to claim 1, wherein said separator is formed from transparent material.

5,413,706

WASTEWATER TREATMENT APPARATUS WITH AN  
OUTER FILTRATION UNIT AND AN INNER SETTLING  
UNIT

Jan D. Graves, Norwalk, Ohio, assignor to Norwalk Wastewater Equipment Company d/b/a NORWECO, Inc., Norwalk, Ohio

Continuation of Ser. No. 52,740, Apr. 27, 1993, which is a division of Ser. No. 806,743, Dec. 13, 1991, Pat. No. 5,264,120, which is a continuation-in-part of Ser. No. 477,389, Feb. 9, 1990, Pat. No. 5,207,896. This application Aug. 19, 1994, Ser. No. 292,172

Int. Cl.<sup>6</sup> C02F 3/06

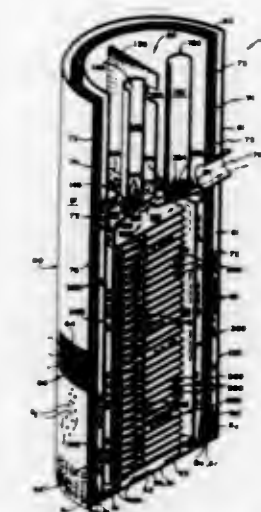
U.S. Cl. 210—110

27 Claims

1. A wastewater treatment outer unit telescopically assembled relative to a wastewater treatment inner unit to define therewith a wastewater treatment mechanism comprising an outer container, said outer container including a bottom wall and a peripheral wall collectively defining a generally upwardly opening chamber having an upper peripheral edge, filter means exteriorly of and spaced from said peripheral wall and defining therebetween a settling zone, control means in said peripheral wall for controlling wastewater flow through said settling zone generally in response to the level of wastewater in said settling zone, means for unitizing said filter means and said outer container, and means for supporting said wastewater treatment inner unit in said outer unit in axially spaced relationship to said bottom wall.

16. A wastewater treatment inner unit telescopically assem-

bled relative to a wastewater treatment outer unit to define therewith a wastewater treatment mechanism comprising an inner container, said inner container including a top wall and a peripheral wall collectively defining a generally downwardly opening chamber having a lower peripheral edge, a plurality of stacked baffle plates within said chamber defining a settling zone, means for unitizing said baffle plates and said top and



peripheral walls wherein said inner unit can be bodily telescopically assembled and disassembled relative to said outer unit, means for supporting said inner unit within and in axially spaced relationship to said wastewater treatment outer unit, means for discharging wastewater from said chamber through said top wall, and means defined by said top wall for directing discharged wastewater in a generally radially outward direction.

5,413,707

AQUARIUM SURFACE SWEEP PREFILTER

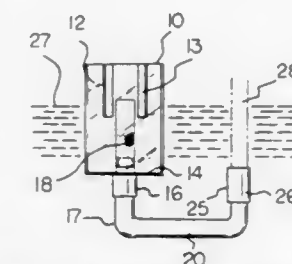
Alexander Y. Shatilov, 5654 Post Rd., Riverdale, N.Y. 10471

Filed Apr. 25, 1994, Ser. No. 231,756

Int. Cl.<sup>6</sup> A01K 63/04

U.S. Cl. 210—169

2 Claims



1. An aquarium surface sweep prefilter comprising:  
a collection chamber including an open cylindrical container having a top end, a cylindrical sidewall, and a base, with a plurality of slots extending downwardly from said top end of said cylindrical container and through said sidewall thereof, the base of said cylindrical container including a central circular opening extending therethrough;  
an open coupling affixed to said base of said cylindrical container and extending downwardly therefrom;  
a U-shaped suction tube having a first vertical section extending through said open coupling and into an interior of said cylindrical container, whereby said cylindrical container is slidably positioned along said first vertical section to permit adjusting of said cylindrical container relative to said first vertical section of said U-shaped suction tube with frictional engagement between said open coupling and an exterior of said first vertical section retaining said

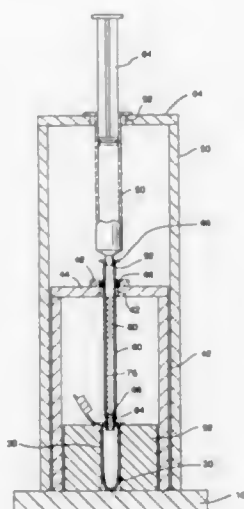
cylindrical container relative to said U-shaped suction tube, said U-shaped suction tube having a horizontal section extending substantially orthogonally from said vertical section and connecting with a second vertical section oriented so as to extend substantially orthogonally from said horizontal section and into a spaced and substantially parallel orientation with said first vertical section of said U-shaped suction tube;

a circular mesh screen coupled to an end of said first vertical section and positioned within said interior of said cylindrical container; and,

coupling member means for securing said second vertical section to a depending filter intake tube.

5,413,708

**PUSH COLUMN CHROMATOGRAPHY APPARATUS**  
William D. Huse, Del Mar; Anthony M. Sorge, La Jolla, and Keith V. Sylvester, San Diego, all of Calif., assignors to Stratagene, La Jolla, Calif.  
Division of Ser. No. 84,533, Jun. 28, 1993, Pat. No. 5,378,360, which is a division of Ser. No. 827,995, Jan. 30, 1992, Pat. No. 5,378,359, which is a continuation of Ser. No. 292,808, Jan. 3, 1989, abandoned. This application Apr. 25, 1994, Ser. No. 232,713  
Int. Cl.<sup>6</sup> B01D 15/08  
U.S. Cl. 210—198.2



1. An apparatus for supporting a chromatography column pressurized by a syringe and for supporting a collection vial at a discharge end of the column, the apparatus comprising:

- a base;
- a vial support coupled to the base and having a chamber therein adapted for receiving and supporting a collection vial;
- a column support including a first hollow cylinder with an open lower end that slidably couples to the vial support on the base and an upper end with a hole therein adapted to support the column; and
- a syringe support including a second hollow cylinder with an open lower end that slidably couples to the column support and an upper end adapted to engage the syringe.

5,413,709  
**SOLID/LIQUID SEPARATION APPARATUS WITH ADJUSTABLE SCREEN**  
Robert M. Webb, Agoura, and Thomas M. Webb, Newbury Park, both of Calif., assignors to T. H. Creears Corporation, Westlake Village, Calif.  
Continuation of Ser. No. 912,546, Jul. 13, 1992, Pat. No. 5,330,643, which is a continuation-in-part of Ser. No. 706,888, May 29, 1991, abandoned. This application Jul. 14, 1994, Ser. No. 275,302  
Int. Cl.<sup>6</sup> B01D 35/00  
U.S. Cl. 210—255



1. A solid/liquid separation apparatus, comprising:

- an outer support frame having spaced side walls;
- a liquid collection chamber between the side walls having an open front face;
- a downwardly-inclined separator screen assembly supported over the open front face of the liquid collection chamber, the assembly having an upper end and a lower end, and the assembly including at least two successive screen sections;
- an inlet passageway at the upper end of said screen assembly for directing the solid/liquid mixture onto the upper end of said screen assembly;
- the successive screen sections comprising a first screen section having a first angle of inclination and a second screen section having a second angle of inclination, the two successive screen sections having a junction between the two screen sections;
- first adjustment means for adjusting the first angle of inclination of the first screen section;
- second adjustment means for adjusting the second angle of inclination of the second screen section; and
- a transition plate extending across the junction between the first and second screen sections for guiding material from the first screen section to the second screen section.

5,413,710

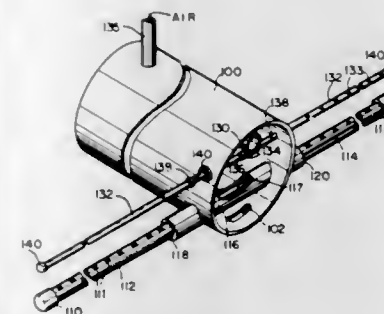
**LATERAL UNDERDRAIN**  
R. Lee Roberts, Boothwyn, and Douglas H. Eden, Wallingford, both of Pa., assignors to Roberts Filter Manufacturing Company, Darby, Pa.  
Filed Nov. 10, 1993, Ser. No. 149,963  
Int. Cl.<sup>6</sup> B01D 24/24  
U.S. Cl. 210—274

13. A low profile underdrain and air grid system comprising:

- a liquid conducting manifold defining a manifold wall and an interior opening having a diameter;
- a plurality of lateral connectors, each of said plurality of lateral connectors extending from a connection point outside the manifold, through the manifold wall, and into the interior opening;
- a plurality of liquid conducting laterals, each of said plurality

of liquid conducting laterals being connected to one of said plurality of lateral connectors;

an air header disposed within the liquid conducting manifold; and

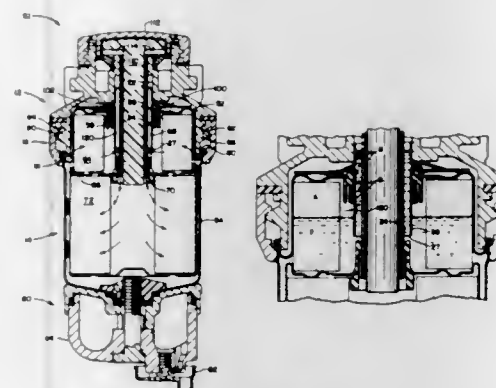


a plurality of air laterals connected to the air header, and extending from the air header through the liquid conducting manifold at points separated from each said connection point,

whereby the air laterals are spaced apart from and outside of the liquid conducting laterals.

5,413,711

**FUEL FILTER WITH INTERNAL VENT**  
Leon P. Janik, Suffield, Conn., assignor to Stanadyne Automotive Corp., Windsor, Conn.  
Continuation of Ser. No. 900,116, Jun. 18, 1992, abandoned. This application Nov. 19, 1993, Ser. No. 155,101  
Int. Cl.<sup>6</sup> B01D 35/01  
U.S. Cl. 210—300

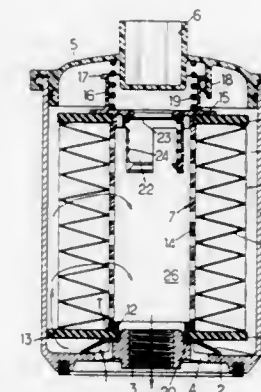


3. A fuel filter assembly comprising:

- base means comprising a base having a fuel inlet, a fuel outlet, a first conduit defining a first passage communicable with said inlet and extending along a first axis, a second conduit having axially opposite first and second open ends and being parallel to said first conduit for defining a second passage communicable with said outlet, said second conduit having orifice means defining a plurality of orifices equidistantly axially spaced from said second open end, said second conduit being devoid of any openings axially located between said orifices and said first open end and between said orifices and said second open end;
- filter cartridge means comprising a housing having an end portion defining a second opening means for receiving said first and second conduits, said cartridge means being mountable on said base means for filtering fuel, said cartridge means comprising primary filter means enclosed in said housing and comprising a primary filter element defining a first chamber communicable with said first passage and a second chamber surrounding said first chamber, said cartridge means comprising secondary filter means comprising a secondary filter element defining a third chamber communicable with said second passage

and first seal means for sealing said second conduit means with said end portion along a seal interface when said cartridge means is mounted to said base means, wherein said orifices are equidistantly axially spaced from said seal means and adjacent thereto such that said second conduit means is devoid of any openings between said seal interface and said orifices and said orifices provide fluid communication between said third chamber and said second passage.

5,413,712  
**FILTER CARTRIDGES FOR LIQUID, AND TO FILTERS FITTED WITH SUCH CARTRIDGES**  
Michel Gewiss, Osse, and Thierry Becker, Maurepas, both of France, assignors to Filtrauto, France  
Filed Jul. 23, 1993, Ser. No. 95,857  
Claims priority, application France, Jul. 23, 1992, 92 09100  
Int. Cl.<sup>6</sup> B01D 27/08, 27/06  
U.S. Cl. 210—450



1. A filter for liquid comprising:

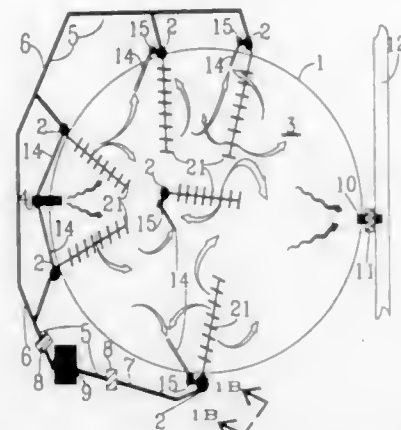
- a filter cartridge including
- a tubular filter element of paper folded in a "zig-zag" accordion type of folding having no centrally perforated rigid tube, and
- two flexible, annular washers firmly secured at either end of said tubular filter element, wherein an inside diameter of one of said two washers is smaller than an inside diameter of said filter element; and
- a housing for receiving said filter cartridge and including
- a cylindrical tank,
- a cover,
- a perforated rigid tube mounted axially on said cover, the outside diameter of said tube being substantially equal to the inside diameter of said filter cartridge, and annular bearing surfaces at either end of said tube against which said two washers of said cartridge automatically come to bear when said cover fitted with said filter cartridge is installed on said tank, one of said annular bearing surfaces of said perforated rigid tube being a terminal axial edge of said perforated rigid tube suitable for bearing against a rim of said one of said two washers projecting radially inwardly from the inside surface of said filter cartridge.

5,413,713  
**METHOD FOR INCREASING THE RATE OF ANAEROBIC BIOREMEDIATION IN A BIOREACTOR**  
Donal F. Day, 2122 General Lee, Baton Rouge, La. 70810, and Elton W. White, 19848 Creekround, Baton Rouge, La. 70816  
Filed Apr. 15, 1992, Ser. No. 868,668  
Int. Cl.<sup>6</sup> C02F 3/28  
U.S. Cl. 210—617

1. A process to increase the anaerobic remediation rate of a liquid pollution stream which comprises:



- (a) introducing said stream into a bioreactor;  
 (b) flowing a portion of said stream from said bioreactor through a passageway, said passageway having a dissolved oxygen level sufficiently reduced to support anaerobic microorganisms, said passageway containing material on whose surface anaerobic microorganisms can become attached or immobilized, at a flow rate to make available sufficient amounts of pollutants from said stream to allow



- more anaerobic microorganisms to be reproduced than there are available attachment or immobilization sites and to cause at least a portion of any attached or immobilized microorganisms from said surface to slough from said surface; and  
 (c) recirculating to said bioreactor said portion of said stream that has flowed through said passageway and said portion of said attached or immobilized microorganisms sloughed from said surface.

5,413,714

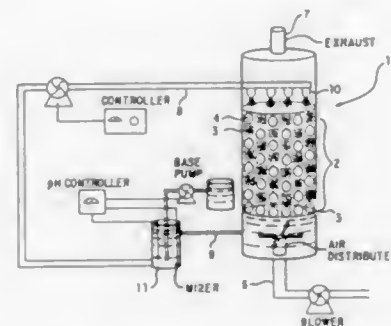
# PROCESS FOR BIOLOGICAL REMEDIATION OF VAPOROUS POLLUTANTS

Louis J. DeFilippi, Palatine; Francis S. Lupton, Evanston, both of Ill., and Mansour Mashayekhi, Huntington, W. Va., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Filed Apr. 16, 1993, Ser. No. 48,993  
 Int. Cl.<sup>6</sup> B01D 53/14; C02F 3/10

U.S. Cl. 210—617

9 Claims



1. A process for remediating vaporous pollutants which comprises passing a vaporous stream containing one or more of pollutants through a bioreactor, said bioreactor comprising a plurality of biologically active bodies, said biologically active body comprising a macroporous substrate and one or more of microorganisms capable of remediating one or more of said pollutants, wherein said substrate is fabricated from a decomposition-resistant material and wherein said substrate is coated with a composition comprising an absorbent, a binder, a suspension aid, and a viscosity enhancer.

5,413,715

# INCINERATOR IMPROVEMENTS

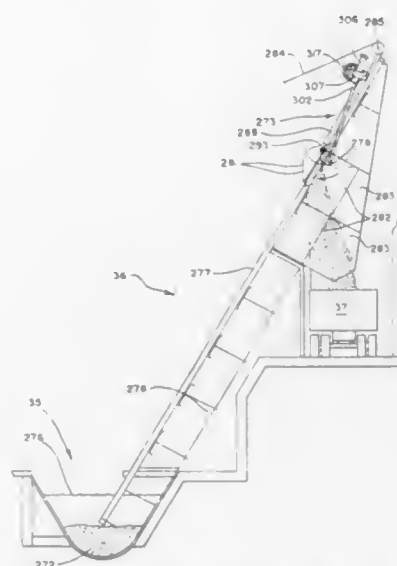
John N. Basic, Sr., 41 W. 202 Whitney Rd., St. Charles, Ill. 60175

Continuation-in-part of Ser. No. 685,630, Apr. 15, 1991, Pat. No. 5,209,169, which is a continuation-in-part of Ser. No. 60,761, Jun. 1, 1987, Pat. No. 5,007,353, which is a continuation-in-part of Ser. No. 659,849, Oct. 9, 1984, Pat. No. 4,706,578, which is a continuation of Ser. No. 362,853, Mar. 29, 1982, Pat. No. 4,475,469, which is a continuation-in-part of Ser. No. 248,054, Mar. 27, 1981, Pat. No. 4,438,705. This application Apr. 6, 1993, Ser. No. 43,283

Int. Cl.<sup>6</sup> B01D 21/04

U.S. Cl. 210—803

96 Claims



13. A method for removing debris from a pit containing water comprising:

- (A) moving a scoop means downward along an elongated track having a first end located in proximity to said pit and a second end located further away and at a higher level than said first end;  
 (B) stopping the downward movement of said scoop means when said scoop means is near the bottom of said pit;  
 (C) independent of the precise location of said scoop means along said track, moving said scoop means, means while in said pit, to a first configuration in which scoop means will retain debris from a second configuration in which said scoop means will retain substantially no debris;  
 (D) while in said first configuration, moving said scoop means upward along said track and out of said pit; and  
 (E) while out of said pit and independently of the precise location of said scoop means along said track, moving said scoop means from said first configuration to said second configuration.

5,413,716

# OIL RECOVERY SYSTEM FOR A VEHICLE MAINTENANCE FACILITY

William T. Osborne, 2444 - 205th St., No. 4, Torrance, Calif. 90501

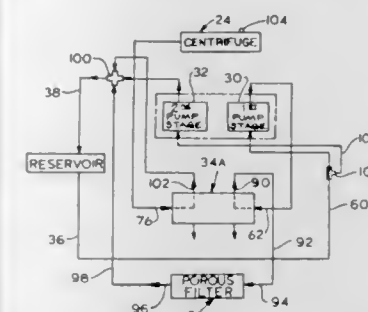
Continuation-in-part of Ser. No. 986,122, Dec. 4, 1992, Pat. No. 5,277,827. This application Dec. 14, 1993, Ser. No. 167,395  
 Int. Cl.<sup>6</sup> B01D 17/038

U.S. Cl. 210—787

5 Claims

4. A method for use by a vehicle maintenance facility that receives quantities of contaminated oil that is contaminated by water and dirt, comprising:  
 directly pouring quantities of contaminated oil into a reservoir of a separation machine from a container used to collect oil drained from vehicles receiving maintenance,

where the separation machine includes a centrifuge, pump, valve, and porous filter;  
 when said reservoir is largely filled, operating said pump to flow oil through said valve and said centrifuge while operating said centrifuge to separate water from the oil and produce cleaned oil, and flowing cleaned oil from said centrifuge directly back to said reservoir, until the quantity of oil which has passed through said centrifuge is a plurality of times greater than the amount of oil in said reservoir, when largely filled;  
 after performing said step of operating said pump to flow oil through said valve and said centrifuge while operating



said centrifuge and flowing cleaned oil from said centrifuge back to said reservoir until the quantity of oil which has passed through said centrifuge is a plurality of times greater than the amount of oil in said reservoir, when largely filled operating said valve to flow oil from said reservoir through said pump and through said porous filter and then back to said reservoir, while leaving said centrifuge substantially unoperated so substantially all oil flowing through said filter does not flow through said centrifuge;  
 after performing said step of operating said valve to flow oil from and back to said reservoir through said filter, removing the filtered oil from said reservoir for reuse.

5,413,717

# METHOD OF RECOVERING MTBE FROM WASTEWATER

George H. Webster, Jr., Orange, Tex., and Donald E. Carrillo, Windsor, Calif., assignors to Texaco Inc., White Plains, N.Y.

Filed Aug. 30, 1993, Ser. No. 113,011

Int. Cl.<sup>6</sup> C02F 1/26; C10L 1/18

U.S. Cl. 210—631

19 Claims

1. A method for treating a contaminated wastewater containing methyl tertiary butyl ether as a contaminant in an amount of 1000 to 43,000 mg/L, the method comprising:  
 contacting the contaminated wastewater with gasoline in a quiescent state at a temperature of 0° C. to 40° C., said gasoline comprising 5000 ppm or less methyl tertiary butyl ether prior to said contacting; thereby forming 2 phases: an upper phase and a lower phase; while  
 providing (i) 0.01 to 0.2 ft<sup>2</sup>/gallon gasoline of relative contacting surface area between the two phases, and (ii) a contacting residence time of 6 hours to 48 hours;  
 thereby yielding a lower phase comprising treated wastewater containing less than 1000 mg/L methyl tertiary butyl ether in the absence of stripping the contaminated wastewater.

5,413,718

# USE OF ADDED WATER TO ACHIEVE 100% INJECTION WEIGHT IN GEOTHERMAL OPERATIONS

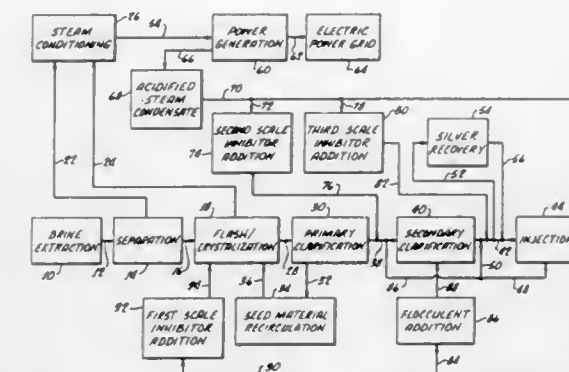
Darrell L. Gallup, Chino, and John L. Featherstone, El Centro, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 717,527, Jun. 19, 1991, and a continuation-in-part of Ser. No. 861,323, Mar. 31, 1992, which is a continuation-in-part of Ser. No. 717,527, Jun. 19, 1991. This application Sep. 30, 1993, Ser. No. 130,114

Int. Cl.<sup>6</sup> C02F 5/08

U.S. Cl. 210—696

22 Claims



1. A method of injecting into the earth a geothermal brine stream remaining after flashing and a surface water comprising sulfate ions and oxygen, comprising:  
 a) removing a geothermal brine which includes alkaline salts, silica, and iron ions from the earth;  
 b) flashing the geothermal brine;  
 c) adding a crystal structure modifier to the resulting liquid brine stream produced in step b) to inhibit deposition of said alkaline salts;  
 d) adding to the liquid brine stream obtained in step c) a sufficient amount of said surface water pretreated to remove a portion of said oxygen and inhibit precipitation of substantial amounts of iron such that the total amount of water in the brine stream is at least 90% of the amount of the brine removed in step a);  
 e) removing a portion of said silica from the combined surface water and brine stream; and  
 f) injecting the combined surface water-brine stream obtained in step e) into the earth.

5,413,719

# FLUORESCENT TRACER IN A WATER TREATMENT PROCESS

Ananthasubra Sivakumar; Jitendra Shah; Narasimha M. Rao, all of Naperville, and Scott S. Budd, Aurora, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Jan. 18, 1994, Ser. No. 182,927

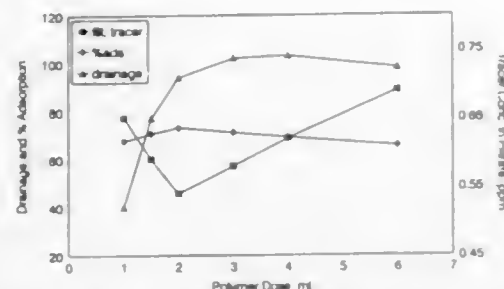
Int. Cl.<sup>6</sup> C02F 1/56

U.S. Cl. 210—708

6 Claims

1. A method for optimizing the dosage of a polyelectrolyte treating agent in a water treatment process, the water treatment process being conducted to produce an aqueous effluent substantially free of contaminants, the method comprising the steps of:  
 adding an effective amount of a polyelectrolyte treating agent to water including contaminants to remove said contaminants in said water treatment process;  
 adding to the water from about 0.001 to about 750,000 parts per million based on the amount of the added polyelectrolyte which is being added to the process of a fluorescent material having an opposite electrical charge as the polyelectrolyte;  
 forming a complex between the fluorescent material and the

polyelectrolyte, which complex does not impede activity or charge neutralization ability of the polyelectrolyte; conducting the water treatment process to obtain the aqueous effluent, which effluent includes the complex;



detecting the amount of fluorescent material in the aqueous effluent; and  
adjusting the amount of the polyelectrolyte added to the water based upon the detected amount of fluorescent material in the aqueous effluent.

5,413,720

#### PROCESS FOR REMOVING PROTEINACEOUS MATERIALS, FATS AND OILS FROM FOOD PROCESSING WASTEWATER AND RECOVERING SAME

Jack G. Miller, 1937 Bramblewood Trail, Pfafftown, N.C. 27040  
Continuation of Ser. No. 955,355, Oct. 1, 1992, abandoned, which is a division of Ser. No. 629,134, Dec. 18, 1990, Pat. No. 5,174,903, which is a continuation-in-part of Ser. No. 564,424, Aug. 7, 1990, abandoned. This application Sep. 19, 1994, Ser. No. 308,202

Int. Cl.<sup>6</sup> C02F 1/56

U.S. Cl. 210—725

6 Claims

1. A process for removing proteinaceous materials, fats and oils from food processing wastewater consisting essentially of
  - (a) acidifying the wastewater below the isoelectric point of the proteinaceous materials;
  - (b) while said wastewater is below the isoelectric point of the proteinaceous materials admixing with said wastewater an amount of a synthetic polymer effective to flocculate said proteinaceous materials, fats and oils in said wastewater;
  - (c) reacting the admixture for a time sufficient to coagulate and flocculate the proteinaceous materials and fats; and
  - (d) separating the reacted admixture from the wastewater.

5,413,721

#### BACKFLUSH FILTER SYSTEM FOR DOWNHOLE PUMPS

Kenneth J. Schmitt, Spring, Tex., assignor to Stren Company, Houston, Tex.

Filed Jul. 30, 1993, Ser. No. 100,612

Int. Cl.<sup>6</sup> B01D 29/66

U.S. Cl. 270—747

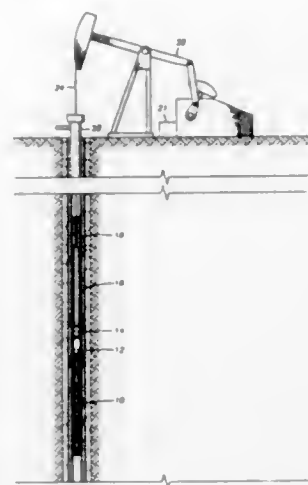
18 Claims

14. A method for filtering particulate matter from well fluid being pumped from an oil well by a downhole pump, comprising

operating a downhole pump to cause well fluid to flow from a lower location in a well bore to a higher location in a well bore,

causing said well fluid to flow through a filter while flowing from said lower location to said higher location so that the filter becomes loaded with particulate matter, creating a differential pressure across the filter, and

causing the well fluid to flow downwardly through the filter, in response to a preselected differential pressure



across the filter acting on an actuator member within said well.

5,413,722

#### BIOCIDAL PROCESS UTILIZING DECYLNONYL- AND DECYLISONONYL DIMETHYLAMMONIUM COMPOUNDS

David W. Eastman, Riverdale; Kenneth J. Iandoli, Hawthorne, and Chuen-Ing J. Tseng, Edison, all of N.J., assignors to Lonza Inc., Fair Lawn, N.J.

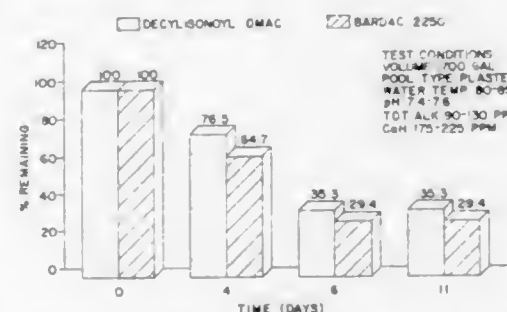
Division of Ser. No. 790,775, Nov. 12, 1991, Pat. No. 5,290,805.

This application Nov. 24, 1993, Ser. No. 157,956

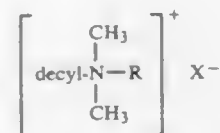
Int. Cl.<sup>6</sup> C02F 1/50; A01N 33/12

U.S. Cl. 210—755

6 Claims

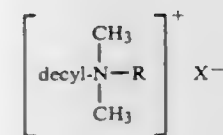


1. A method of controlling bacteria in an aqueous solution which comprises exposing said bacteria to an effective amount of a biocidal quaternary ammonium compound having the structural formula:



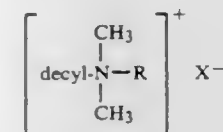
wherein X is chloride, bromide, iodide, or alkyl carboxylate anion having a C<sub>1</sub>–C<sub>18</sub> alkyl radical, and R is n-nonyl or isononyl.

3. A method of controlling algae in an aqueous solution which comprises exposing said algae to an effective amount of a biocidal quaternary ammonium compound having the structural formula:



wherein X is chloride, bromide, iodide, or alkyl carboxylate anion having a C<sub>1</sub>–C<sub>18</sub> alkyl radical, and R is n-nonyl or isononyl.

5. A method of controlling molluscs in an aqueous solution which comprises exposing said molluscs to an effective amount of a biocidal quaternary ammonium compound having the structural formula:



wherein X is chloride, bromide, iodide, or alkyl carboxylate anion having a C<sub>1</sub>–C<sub>18</sub> alkyl radical, and R is n-nonyl or isononyl.

5,413,723

#### USE OF SPECIAL SURFACTANTS TO CONTROL VISCOSITY IN FABRIC SOFTENERS

Marina A. Munteanu, 301 E. 64th St., Apt. 5C, New York, N.Y. 10021; Peter J. Keane, 3336 Boyd St., Boonton, N.J. 07005; Alison Betz, 303 Valley St., Atlantic Highlands, N.J. 07716; Eric P. Guénin, 102 Canterbury Ct., Piscataway, N.J. 08854, and Leslie C. Smith, 29 Grovers Mill Rd., Plainsboro, N.J. 08536

Filed Dec. 17, 1993, Ser. No. 168,198

Int. Cl.<sup>6</sup> D06M 11/00

U.S. Cl. 252—8.6

2 Claims

1. A method for controlling the viscosity of fabric softener compositions to thereby improve shelf life comprising: forming a mixture of a perfume and a surfactant by mixing a perfume and a surfactant at a temperature where each component is in the liquid state, mixing together said mixture and a fabric softener base formulation in sufficient amounts to hereby form a fabric softener composition which avoids gelation, wherein said surfactant is polyoxyethylated ether of cholesterol and cetyl alcohol.

5,413,724

#### FIBER TREATMENT COMPOSITIONS AND METHODS FOR THE PREPARATION THEREOF

Jeffrey A. Kosal, Midland, and Anthony Revis, Freeland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 30, 1993, Ser. No. 176,557

Int. Cl.<sup>6</sup> D06M 11/77; D06C 15/00; B32B 27/36

U.S. Cl. 252—8.6

18 Claims

1. A fiber treatment composition comprising:
  - (A) an allyl ester, vinyl ester, or unsaturated acetate;
  - (B) at least one organohydrogensiloxane;
  - (C) a metal catalyst; and
  - (D) a dispersant selected from the group consisting of:
    - (i) surfactants; and
    - (ii) a solvent selected from the group consisting of methylene chloride, acetonitrile, toluene, xylene, white spirits, and chlorinated hydrocarbons.

5,413,725

#### POUR POINT DEPRESSANTS FOR HIGH MONOUNSATURATED VEGETABLE OILS AND FOR HIGH MONOUNSATURATED VEGETABLE OILS/BIODEGRADABLE BASE AND FLUID MIXTURES

Kasturi Lal, Willoughby; Dennis M. Disbong, South Euclid, and Jeffrey G. Dietz, University Heights, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of Ser. No. 993,178, Dec. 18, 1992,

abandoned. This application Dec. 10, 1993, Ser. No. 165,777

The portion of the term of this patent subsequent to Mar. 21,

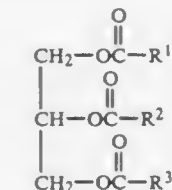
2012, has been disclaimed.

Int. Cl.<sup>6</sup> C10M 141/00

U.S. Cl. 252—18

72 Claims

1. A composition, comprising:
  - (A) at least one vegetable or synthetic triglyceride oil of the formula



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are aliphatic hydrocarbyl groups having at least 60 percent monounsaturated character and containing from about 6 to about 24 carbon atoms and further wherein an oleic acid moiety:linoleic acid moiety is from about 2 up to about 90 and

- (B) at least one pour point depressant.

5,413,726

#### PHOSPHITE ADDUCT OF A TELOMERIZED VEGETABLE OIL FOR LUBRICANT COMPOSITIONS

Phillip S. Landis, Alexandria, Va., assignor to International Lubricants, Inc., Seattle, Wash.

Division of Ser. No. 775,188, Oct. 11, 1991, Pat. No. 5,229,023,

which is a continuation-in-part of Ser. No. 596,820, Oct. 12,

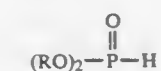
1990, abandoned. This application May 14, 1993, Ser. No. 62,828

Int. Cl.<sup>6</sup> C10M 159/12, 137/00; C07F 9/02

U.S. Cl. 252—49.8

5 Claims

1. A phosphite adduct of a telomerized vegetable oil comprising a mono-, di-, or tri-adduct of the reaction product of a telomerized vegetable oil and:



wherein R is selected from the group consisting of H, C<sub>1-12</sub> alkyl, C<sub>6-12</sub> aryl, C<sub>6-12</sub> alkaryl, C<sub>6-12</sub> aralkyl, and cyclo C<sub>4-8</sub> alkyl.



5,413,727

# THIXOTROPIC AQUEOUS COMPOSITIONS CONTAINING LONG CHAIN SATURATED FATTY ACID STABILIZERS

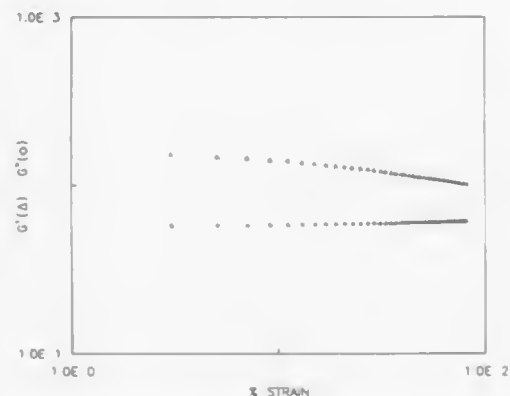
Julien Drapier, Seraing, Belgium, and Nagaraj S. Dixit, Plainsboro, N.J., assignors to Colgate Palmolive Co., Piscataway, N.J.

Continuation-in-part of Ser. No. 679,992, Mar. 29, 1991, Ser. No. 572,312, Aug. 24, 1990, abandoned, Ser. No. 493,003, Mar. 13, 1990, abandoned, Ser. No. 353,712, May 18, 1989, Pat. No. 5,064,553, Ser. No. 313,277, Feb. 21, 1989, abandoned, Ser. No. 328,716, Mar. 27, 1989, abandoned, Ser. No. 527,238, May 21, 1990, Pat. No. 5,098,590, and Ser. No. 708,323, May 30, 1991, abandoned, said Ser. No. 679,992, is a continuation-in-part of Ser. No. 527,689, May 21, 1990, abandoned, which is a continuation of Ser. No. 248,007, Sep. 23, 1988, abandoned, which is a continuation of Ser. No. 894,155, Aug. 7, 1986, Pat. No. 4,801,395, said Ser. No. 572,312, is a continuation of Ser. No. 427,912, Oct. 24, 1989, abandoned, which is a continuation of Ser. No. 204,476, Jun. 9, 1988, abandoned, which is a continuation of Ser. No. 903,924, Sep. 5, 1986, Pat. No. 4,752,409, which is a continuation-in-part of Ser. No. 744,754, Jun. 14, 1985, abandoned, said Ser. No. 313,277, is a continuation-in-part of Ser. No. 87,937, Aug. 21, 1987, abandoned, said Ser. No. 328,716, is a continuation-in-part of Ser. No. 87,937, Aug. 21, 1987, said Ser. No. 527,238, is a continuation of Ser. No. 303,700, Jan. 27, 1989, abandoned, which is a continuation of Ser. No. 152,277, Feb. 4, 1988, abandoned. This application Nov. 8, 1991, Ser. No. 789,578

Int. Cl.<sup>6</sup> C11D 1/04, 3/12, 3/37, 3/04

U.S. Cl. 252—97

7 Claims



1. An automatic dishwashing composition comprising approximately by weight:

- from 15 to 45% of an alkali metal silicate;
- from 2 to 10% of an alkali metal carbonate;
- 0 to 10% of an alkali metal hydroxide;
- 0 to 5% of a non-soap chlorine bleach stable organic anionic detergent active material;
- from 0 to 1.5% of a chlorine bleach stable foam depressant selected from the group consisting of silicones and alkyl or ethoxylated alkyl phosphate esters;
- chlorine bleach compound in an amount sufficient to provide about 0.2 to about 4% of available chlorine;
- 0.1 to 5.0% of at least one inorganic colloid forming clay thixotropic thickener;
- 0.02 to 1.0% of a polyvalent metal salt of a long chain fatty acid having about 8 to about 24 carbon atoms;
- 0 to 22% of a low molecular weight, non-crosslinked polyacrylate polymer; and
- balance being water, wherein said composition is free of abrasives and polishing agents and has a pH of at least 9.5, when the composition is diluted to provided a concentration of 10 grams of the composition in one liter of water and the composition has a thixotropic index of about 2 to about 10.

5,413,728

# PROCESS FOR OPERATING A COMPRESSOR HEAT PUMP OR A COMPRESSOR REFRIGERATION SYSTEM IN WHICH AMMONIA IS USED AS THE REFRIGERANT

Klaus Mall, Wesseling, and Siegfried Kussi, Wermelskirchen, both of Germany, assignors to Rhein Chemie Rheinau GmbH, Mannheim, Germany

Filed Aug. 26, 1993, Ser. No. 111,858

Claims priority, application Germany, Sep. 3, 1992, 42 29 364.2; Dec. 3, 1992, 42 40 733.8

Int. Cl.<sup>6</sup> C09K 5/02; C10M 133/00

U.S. Cl. 252—68

7 Claims

1. A process for operating a compressor heat pump or a compressor refrigeration system using ammonia as the refrigerant and a refrigerant compressor which is lubricated with a lubricant that consists of a substance selected from the group consisting of copolymeric alkylene glycols or mixtures of polyalkylene glycols having in each case ethylene oxide/propylene oxide ratios of about 1:1, wherein an additive is added to said lubricant, said additive consisting of an amine selected from the group consisting of 4,4'-di(2-phenylethyl)diphenylamine and N,N'-di-sec-butyl-p-phenylenediamine and further wherein the amine is added to the lubricant in a quantity of 0.1 to 1% by weight, based on the lubricant.

5,413,729

# COMPOSITION CONTAINING LACTONE AND ESTER FOR REMOVING COATINGS

Kimberley A. Gaul, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 847,376, Mar. 6, 1992, abandoned. This application Nov. 23, 1993, Ser. No. 156,874

Int. Cl.<sup>6</sup> C09D 9/00

U.S. Cl. 252—162

6 Claims

- A composition for removing coatings comprising:
  - about 10 to about 40 percent by weight of a lactone based on the total weight of said composition;
  - about 10 to about 80 percent by weight of an ester based on the total weight of said composition, said ester being other than ethyl acetate and not involving intramolecular condensation of a carboxylic acid moiety and an alcohol moiety; and
  - water in an amount of up to about 50 percent by weight based on the total weight of said composition; wherein said composition is essentially free of sodium hypochlorite and essentially free of carboxylic acid.

5,413,730

# COMPOSITIONS CONTAINING A FLUORINATED ETHER AND USE OF THESE COMPOSITIONS

Pierre Barthelemy, Pietrebais, and Mireille Paulus, Brussels, both of Belgium, assignors to Solvay (Société Anonyme), Brussels, Belgium

Filed Nov. 24, 1993, Ser. No. 156,917

Claims priority, application Belgium, Dec. 3, 1992, 09201063

Int. Cl.<sup>6</sup> C11D 7/30, 7/50; C23G 5/032; C09K 3/00

U.S. Cl. 252—171

11 Claims

1. An azeotropic or pseudoazeotropic composition consisting essentially of a binary mixture of difluoromethoxy-2,2,2-trifluoroethane and methanol, said composition consisting essentially of 0.1 to 7.5 g of methanol per 100 g of difluoromethoxy-2,2,2-trifluoroethane, and having a boiling point of 29.5° ± 0.2° C. at atmospheric pressure.

5,413,731

# AMINOACRYLOYL-CONTAINING TERPOLYMERS

David E. Adler, Dresher; Thomas F. McCallum, III, Philadelphia; Jan E. Shulman, Newtown, and Barry Weinstein, Dresher, all of Pa., assignors to Rohm & Haas Company, Philadelphia, Pa.

Division of Ser. No. 848,802, Mar. 10, 1992, Pat. No. 5,308,532.

This application Mar. 14, 1994, Ser. No. 186,951

Int. Cl.<sup>6</sup> C11D 3/37; C08F 220/60, 220/34

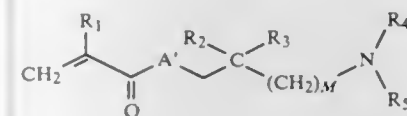
U.S. Cl. 252—174.24

22 Claims

1. A water-soluble terpolymer, consisting essentially of polymerized units of

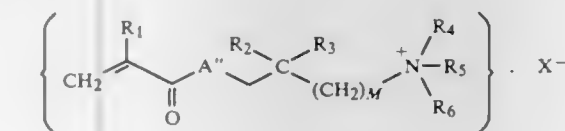
- from about 92 to about 30 percent by weight of one or more monomers selected from the group consisting of C<sub>3</sub>–C<sub>6</sub> monoethylenically unsaturated carboxylic acids and alkali metal and ammonium salts thereof;
- from about 5 to about 50 percent by weight of one or more aminoacryloyl derivatives selected from the group consisting of

i)



wherein:

- R<sub>1</sub> is selected from the group consisting of hydrogen and methyl;  
A' is oxygen;  
R<sub>2</sub> and R<sub>3</sub> are either independently selected from the group consisting of hydrogen, methyl, ethyl, propyl, isopropyl, butyl, t-butyl, and isobutyl; or R<sub>2</sub> and R<sub>3</sub>, together with the carbon to which they are both attached, form a C<sub>3</sub>–C<sub>7</sub> aliphatic ring;  
M is equal to 0, 1, or 2 with the proviso that when M is equal to 0, a C–N bond appears in place of the (CH<sub>2</sub>)<sub>M</sub> group; and  
R<sub>4</sub> and R<sub>5</sub> are either independently selected from the group consisting of hydrogen, methyl, ethyl, propyl, isopropyl, butyl, t-butyl, and isobutyl; or R<sub>4</sub> and R<sub>5</sub>, together with the nitrogen to which they are both attached, form a three to seven membered non-aromatic nitrogen heterocycle; and ii)



wherein:

- R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and M are as defined above;  
A' is oxygen;  
R<sub>6</sub> is selected from the group consisting of hydrogen, methyl, ethyl, propyl, isopropyl, butyl, t-butyl, and isobutyl;  
and X is a counterion selected from the group consisting of halogens, hydroxide, sulfate, hydrosulfate, phosphate, formate and acetate; and  
(c) from about 3 to about 25 percent by weight of one or more monoethylenically unsaturated monomers polymerizable with (a) and (b) selected from the group consisting of C<sub>1</sub>–C<sub>4</sub> alkyl esters of acrylic acid, C<sub>1</sub>–C<sub>4</sub> alkyl esters of methacrylic acid, C<sub>1</sub>–C<sub>4</sub> hydroxyalkyl esters of acrylic acid, C<sub>1</sub>–C<sub>4</sub> hydroxyalkyl esters of methacrylic acid, acrylamide, alkyl substituted acrylamides, N,N-dialkyl substituted acrylamides, styrene, sulfonated styrene, sulfonated alkyl acrylamides, vinylsulfonates, vinylsulfonic acid, allylsulfonic acid, methallylsulfonic acid, vinylphosphonic acid, vinylacetate, allyl alcohols, sulfonated allyl alcohols, acrylonitrile, N-vinylpyrrolidone, N-vinylfor-

mamide, N-vinylimidazole, N-vinylpyridine, and N-vinyl-2-methylimidazoline;

wherein the molar ratio of (a) to (b) is from 2.5:1 to 90:1; and wherein the M<sub>w</sub> of the terpolymer is from about 750 to about 30,000.

16. A cleaning composition comprising the terpolymer of claim 1 in an amount effective to reduce spotting and filming.

5,413,732

# REAGENT COMPOSITIONS FOR ANALYTICAL TESTING

Steven N. Buhl, Cupertino; Bhaskar Bhayani, Fremont; Chi-Sou Yu, Saratoga, and Thuy N. Tang, San Jose, all of Calif., assignors to Abaxis, Inc., Sunnyvale, Calif.

Filed Aug. 19, 1991, Ser. No. 747,179

Int. Cl.<sup>6</sup> C09K 3/00; G01N 31/00

U.S. Cl. 252—182.11

6 Claims

1. A method for forming a plurality of uniform, precisely measured reagent spheres, the method consisting essentially of the steps of:

- forming a homogeneous solution of a reagent; precisely measuring uniform drops of the solution; dispensing the uniform, precisely measured drops into an unagitated cryogenic liquid, whereby the drops are frozen;
- collecting the frozen drops from the cryogenic liquid; and lyophilizing the frozen drops, thereby forming a plurality of reagent spheres having a coefficient of weight variation less than about 3% and which completely dissolve in an aqueous solution in less than about 10 seconds.

5,413,733

# AMIDOOXY PEROXYCARBOXYLIC ACIDS AND SULFONIMINE COMPLEX CATALYSTS

John R. Nicholson, Ramsey, and Richard G. Gary, West New York, both of N.J., assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Jul. 26, 1993, Ser. No. 97,150

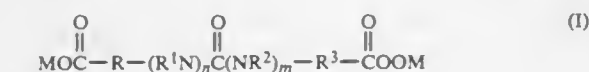
Int. Cl.<sup>6</sup> C01B 15/10; C11D 3/395

U.S. Cl. 252—186.42

10 Claims

1. A method for bleaching a substrate comprising applying to said substrate an effective amount to remove stain of a bleaching composition comprising:

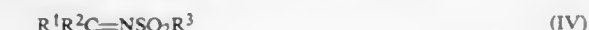
- 1 to 40 wt. % of an amido organic peroxyacid having the Formula I



wherein:

- R is selected from the group consisting of C<sub>1</sub>–C<sub>16</sub> alkyl, C<sub>1</sub>–C<sub>16</sub> cycloalkyl and C<sub>6</sub>–C<sub>12</sub> arylene radicals;  
R<sup>1</sup> is selected from the group consisting of C<sub>1</sub>–C<sub>16</sub> cycloalkyl and C<sub>6</sub>–C<sub>12</sub> aryl radicals;  
R<sup>2</sup> is selected from the group consisting of hydrogen, C<sub>1</sub>–C<sub>16</sub> alkyl, C<sub>1</sub>–C<sub>16</sub> cycloalkyl and C<sub>6</sub>–C<sub>12</sub> aryl radicals and a carbonyl radical that can form a ring together with R when R is arylene;  
R<sup>3</sup> is selected from the group consisting of C<sub>1</sub>–C<sub>16</sub> alkyl, C<sub>5</sub>–C<sub>12</sub> cycloalkyl and C<sub>6</sub>–C<sub>12</sub> arylene radicals; n and m are integers whose sum is 1;  
M is selected from the group consisting of hydrogen, alkali metal, alkaline earth metal, ammonium and alkanolammonium cations and radicals; or  
a salt functional unit thereof;

(b) from about 0.05 to about 10% by weight of an oxygen transfer agent having a structure (IV)



wherein:

$R^1$  may be a substituted or unsubstituted radical selected from the group consisting of hydrogen, phenyl, aryl, heterocyclic ring, alkyl and cycloalkyl radicals;  
 $R^2$  may be a substituted or unsubstituted radical selected from the group consisting of hydrogen, phenyl, aryl, heterocyclic ring, alkyl, cycloalkyl,  $R^1C=NSO_2R^3$ , nitro, halo, cyano, alkoxy, keto, carboxylic and carboalkoxy radicals;  
 $R^3$  may be a substituted or unsubstituted radical selected from the group consisting of phenyl, aryl, heterocyclic ring, alkyl, cycloalkyl, nitro, halo, and cyano radicals;  
 $R^1$  with  $R^2$  and  $R^2$  with  $R^3$  may respectively together form a cycloalkyl, heterocyclic, and aromatic ring system; and

(c) from about 0.5 to about 50 wt. % of a surfactant wherein the composition has a pH of from 7 to 10.

5,413,734

## 4-CYANO-3-FLUOROPHENYL ESTERS

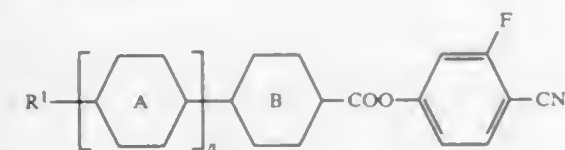
Richard Buchecker, Zurich, and Martin Schadt, Seltisberg, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 57,424, May 18, 1993, abandoned, which is a continuation of Ser. No. 718,487, Jun. 20, 1991, abandoned. This application May 27, 1994, Ser. No. 250,393  
 Claims priority, application Switzerland, Jul. 6, 1990, 2254/90  
 Int. Cl.<sup>6</sup> C09K 19/06, 19/34, 19/30; G02F 1/13

U.S. Cl. 252-299.6

11 Claims

11. An electro-optical cell comprising:  
 (a) two plate means;  
 (b) a compound disposed between the plate means and having the formula



wherein ring A is trans-1,4-cyclohexylene, 1,4-phenylene, pyrimidine-2,5-diyl or trans-1,3-dioxane-2,5-diyl; n is either the integer 0 or 1; ring B is 1,4-phenylene or trans-1,4-cyclohexylene; and  $R^1$  has a maximum of 12 carbon atoms and is 3E-alkenyl or when positioned on a saturated ring,  $R^1$  also can be 1E-alkenyl; with the proviso that when n is 0,  $R^1$  is 3-butenyl or ring B is trans-1,4-cyclohexylene,

(c) means for applying an electrical potential to said plate means.

5,413,735

## LIQUID CRYSTAL COMPOSITION, LIQUID CRYSTAL DEVICE USING THE LIQUID CRYSTAL COMPOSITION, AND DISPLAY METHOD AND APPARATUS USING THE LIQUID CRYSTAL COMPOSITION AND DEVICE

Masataka Yamashita, Masahiro Terada, Shousel Mori, all of Kanagawa, and Kazuharu Katagiri, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 704,600, May 23, 1991, abandoned.

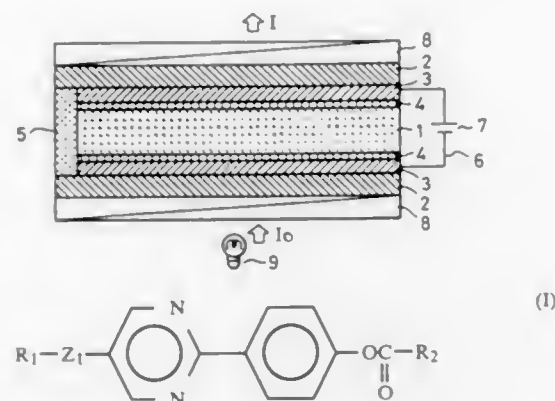
This application Oct. 1, 1993, Ser. No. 130,427  
 Claims priority, application Japan, May 24, 1990, 2-135881; Mar. 5, 1991, 2-038652

Int. Cl.<sup>6</sup> C09K 19/34, 19/12; G02F 1/13

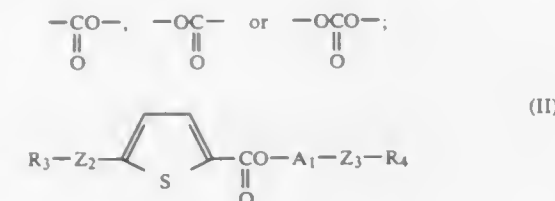
U.S. Cl. 252-299.61

21 Claims

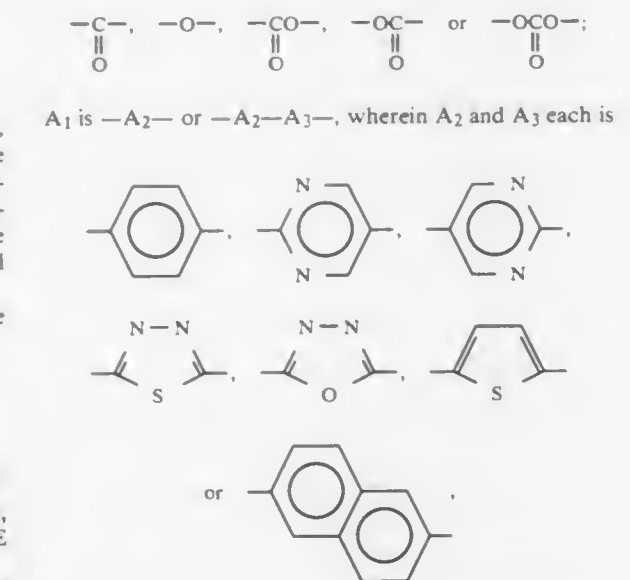
1. A liquid crystal composition comprising, at least one type of liquid crystal compound having formula (I) and at least one type of liquid crystal compound having formula (II):



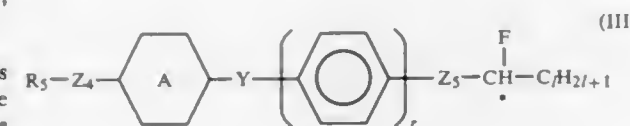
wherein  $R_1$  and  $R_2$  each is an optically inactive straight-chain or branched-chain alkyl group having 1 to 18 carbon atoms which may have an alkoxy group having 1 to 14 carbon atoms;  $Z_1$  is  $-O-$ ,



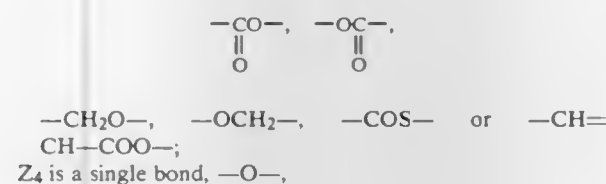
wherein  $R_3$  and  $R_4$  each is straight-chain or branched-chain alkyl group having 1 to 18 carbon atoms which may be substituted with alkoxy group having 1 to 12 carbon atoms or F;  $Z_2$  and  $Z_3$  each is a single bond,



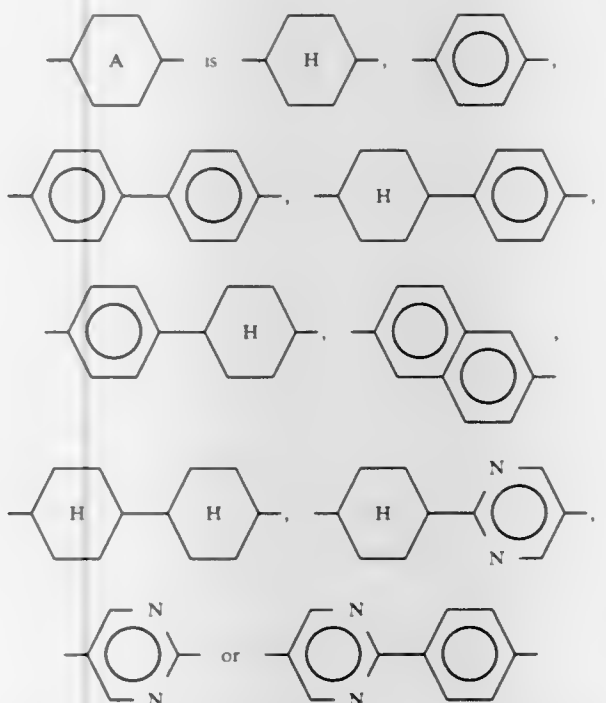
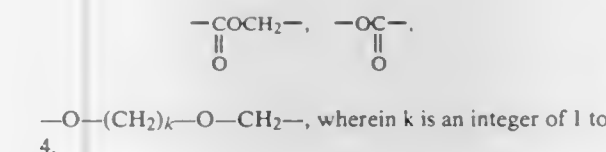
said liquid crystal composition further comprising at least one type of liquid crystal compound having formula (III):



wherein  $R_5$  is a straight-chain or branched-chain alkyl group which has 1 to 18 carbon atoms which may be substituted with alkoxy group having 1 to 13 carbon atoms; Y is a single bond,



$Z_5$  is  $-OCH_2-$ ,



r is 1 or 2 and l is 1 to 12, wherein the weight ratio of the compound of formula (I) to the compound of formula (II) is from 100:1 to 1:100 and the weight ratio of the total amount of the compounds of formulae (I) and (II) to the compound of formula (III) is from 1:30 to 100:1.

5,413,736

PARTICULATE FLUORESCENT MATERIAL OF  $(Y_1-x, EU_x)_{203}$  AND PROCESS OF PREPARING SAME

Yoshihiro Nishisu, and Mikio Kobayashi, both of Tsukuba, Japan, assignors to Director-General of Agency of Industrial Science & Technology, Japan

Filed Feb. 15, 1994, Ser. No. 196,432

Claims priority, application Japan, Mar. 22, 1993, 5-086822

Int. Cl.<sup>6</sup> C09K 11/77

U.S. Cl. 252-301.4 R

4 Claims

1. A process for the production of a fluorescent material comprising the steps of:  
 providing an aqueous solution having a pH of 3 or less and containing a yttrium salt, a europium salt and urea;  
 heating said solution at a temperature of at least 90° C. to precipitate particles, each of said particles consisting of a mixture of  $YOHCO_3$  and  $EuOHCO_3$ , said particles having an average particle diameter of 110-270 nm and such a particle size distribution that more than 99% by weight of said particles have particle diameters of  $D \pm 50$  nm; and  
 calcining said particles at a temperature of at least 600° C. to form spheres, each sphere having the composition  $(Y_{1-x}, Eu_x)_2O_3$  wherein x is 0.001-0.2.

5,413,737

## MIXTURES AND COMPOSITIONS CONTAINING PHENOTHIAZINES

Samuel Evans, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 46,115, Apr. 9, 1993, abandoned, which is a continuation of Ser. No. 956,820, Oct. 5, 1992, abandoned, which is a continuation of Ser. No. 758,937, Sep. 11, 1991, abandoned. This application Apr. 22, 1994, Ser. No. 231,967  
 Claims priority, application Switzerland, Sep. 13, 1990, 2972/90

Int. Cl.<sup>6</sup> C09K 15/26

U.S. Cl. 252-405

16 Claims

1. A mixture containing phenothiazines obtained by reacting a mixture of diphenylamines, wherein the % by weight is based on the total mixture of diphenylamines, comprising

(a) 1 to 5% by weight of diphenylamine,  
 (b) 8 to 18% by weight of 4-tert-butyl-diphenylamine;  
 (c) 21 to 31% by weight of one or more compounds selected from the group consisting of:  
 i) 4-tert-octyldiphenylamine,  
 ii) 4,4'-di-tert-butyl-diphenylamine and  
 iii) 2,4,4'-tris-tert-butyl-diphenylamine;  
 (d) 20 to 31% by weight of one of more compounds selected from the group consisting of:  
 i) 4-tert-butyl-4'-tert-octyldiphenylamine,  
 ii) 2,2'- or 2,4'-di-tert-octyldiphenylamine and  
 iii) 2,4-di-tert-butyl-4'-tert-octyldiphenylamine; and  
 (e) 15 to 29% by weight of the compound  
 i) 4,4'-di-tert-octyldiphenylamine, or the compounds  
 ii) 4,4'-di-tert-octyldiphenylamine and  
 iii) 2,4-di-tert-octyl-4'-tert-butyl-diphenylamine, with 1 to 200 mol % of elemental sulfur, in the presence of 0.25 to 5 mol % of a condensation catalyst selected from the group consisting of iodine, aluminium bromide, aluminium chloride, iron (III) chloride, antimony chloride, copper iodide or sulfur iodide, in the temperature range from 80 to 250° C.

11. A process for the preparation of a mixture containing phenothiazines, which comprises  
 reacting a mixture of diphenylamines, wherein the % by weight is based on the total mixture of diphenylamines, comprising

(a) 1 to 5% by weight of diphenylamine,  
 (b) 8 to 18% by weight of 4-tert-butyl-diphenylamine;  
 (c) 21 to 31% by weight of [c)]one or more compounds selected from the group consisting of:  
 i) 4-tert-octyldiphenylamine,  
 ii) 4,4'-di-tert-butyl-diphenylamine and



- iii) 2,4,4'-tris-tert-butylphenylamine  
(d) 20 to 31% by weight of one of more compounds selected from the group consisting of  
i) 4-tert-butyl-4'-tert-octyldiphenylamine,  
ii) 2,2'- or 2,4'-di-tert-octyldiphenylamine and  
iii) 2,4-di-tert-butyl-4'-tert-octyldiphenylamine; and  
(e) 15 to 29% by weight of the compound  
i) 4,4'-di-tert-octyldiphenylamine, or the compounds  
i) 4,4'-di-tert-octyldiphenylamine and  
ii) 2,4-di-tert-octyl-4'-tert-butylphenylamine,  
with 1 to 200 mol % of elemental sulfur, in the presence of 0.25 to 5 mol % of a condensation catalyst selected from the group consisting of iodine, aluminium bromide, aluminium chloride, iron (III) chloride, antimony chloride, copper iodide or sulfur iodide, in the temperature range from 80 to 250° C.

5,413,738

**GRAPHITE ELECTRODES AND THEIR PRODUCTION**  
Irwin C. Lewis, Strongsville, and Ronald A. Howard, Brook Park, both of Ohio, assignors to UCAR Carbon Technology Corporation, Danbury, Conn.

Filed Oct. 22, 1985, Ser. No. 790,236

Int. Cl.<sup>6</sup> C04B 35/532; C25B 11/12; H01B 1/04

U.S. Cl. 252—502

24 Claims

1. A process for the production of graphite electrodes comprising the steps:

- (a) preparing a carbonaceous pitch containing polymerized and cross-linked aromatic components thereof which have been cross-linked to the extent that the pitch is a poorly graphitizing pitch provided that if the poorly graphitizing pitch is obtained by polymerizing and cross-linking the aromatic components of a tar or a pitch with a cross-linking agent, and the cross-linking agent is at least one Lewis acid, then said Lewis acid is selected from the group consisting of FeCl<sub>3</sub>, SnCl<sub>4</sub>, FeBr<sub>3</sub>, I<sub>2</sub>, ZnCl<sub>2</sub>, SbCl<sub>3</sub>, SbCl<sub>5</sub>, CoCl<sub>2</sub>, BF<sub>3</sub> and combinations thereof; and provided furthermore that if ZnCl<sub>2</sub> is used as the Lewis acid then ZnCl<sub>2</sub> is admixed with the pitch or tar and heated at a temperature of from 100° C. to 300° C. for a period of about 1 to 6 hours;  
(b) mixing the poorly graphitizing pitch of step (a) with a coke filler and forming said mixture into an electrode body; and  
(c) heating said electrode body at a sufficient temperature to produce a graphite electrode body.

5,413,739

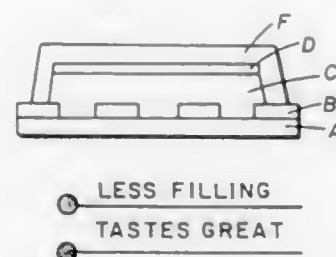
**ELECTROCHROMIC MATERIALS AND DISPLAYS**  
James P. Coleman, 2374 Wesecreek St., Maryland Heights, Mo. 63043

Filed Dec. 22, 1992, Ser. No. 994,813

Int. Cl.<sup>6</sup> H01B 1/22; C08K 3/22; G02F 1/00

U.S. Cl. 252—511

16 Claims



1. A dispersion of electroconductive particles in an essentially ionically isolative matrix of  
(i) a melt processable polymer,  
(ii) polymerizable monomer or oligomer, or  
(iii) a liquid containing dissolved or dispersed melt processable

polymer, polymerizable monomer or oligomer; wherein said particles consist of electrically conductive metal oxide material coated with electrochromic material.

5,413,740

**MATERIALS FOR EYE PROTECTION**

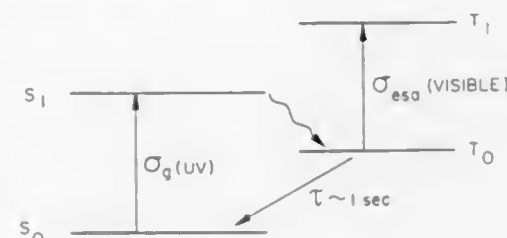
Alexander Lempicki, Boston, Mass., assignor to Trustee of Boston University, Boston, Mass.

Filed Sep. 4, 1991, Ser. No. 754,555

Int. Cl.<sup>6</sup> G02B 5/23

U.S. Cl. 252—586

6 Claims



1. A photochromic material excitable by the ultraviolet components of broad band radiation comprising

- (a) a methylpolysiloxane polymer host material; and  
(b) a photochromic dopant characterized by the following properties:  
(i) an average absorption in the ultraviolet of 50,000 Lmol<sup>-1</sup>cm<sup>-1</sup> in the 300–400 nm region; and,  
(ii) excited state absorption  $\epsilon_e$  of at least 50,000 Lmol<sup>-1</sup>cm<sup>-1</sup> at wavelengths longer than 400 nm.

5,413,741

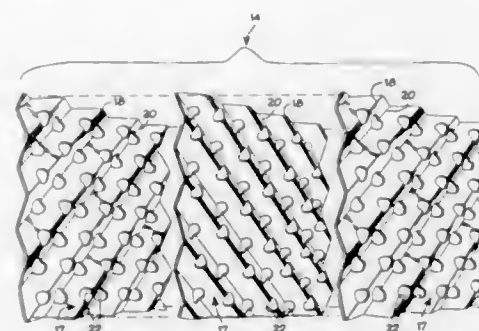
**NESTED PACKING FOR DISTILLATION COLUMN**  
Matthew Buchholz, Wichita, Kans.; Neil Yeoman, Merrick, N.Y., and Frank E. Mattke, Augusta, Kans., assignors to Koch Engineering Company, Inc., Wichita, Kans.

Continuation of Ser. No. 983,969, Dec. 1, 1992, abandoned. This application Mar. 1, 1994, Ser. No. 203,876

Int. Cl.<sup>6</sup> B01F 3/04

U.S. Cl. 261—112.2

6 Claims



1. In combination with an exchange column, a packing element comprising:

- a plurality of adjacent pairs of plates disposed in generally parallel, spaced apart and contacting relationship to define liquid flow channels between the plates to promote distribution of the vapor and liquid streams in the column, each of said plates having corrugations with apex portions, the corrugations of each plate being disposed at an angle to corrugations of an adjacent plate, said plates in each pair of plates having facing sides and opposed sides;  
apertures in at least one plate in each adjacent pair of plates, said apertures being positioned at each intersection of the corrugations of the plates in each said adjacent pair of plates, said apertures in said one plate being sized to re-

ceive the apex portion of the corrugations of the other plate, whereby said apex portions of the corrugations of the other plate extend through the apertures and beyond the opposed side of the one plate and into the flow channel defined in part by said opposed side of the one plate to provide close spacing of the plates and to provide greater hydraulic capacity for the packing element; and additional apertures positioned in said apex portions of the corrugations of the other plate at locations to extend through the apertures and beyond the opposite face of the one plate and thereby receive a portion of the liquid flowing along said opposed side of the one plate and to transfer the liquid through the plates and to the flow channel defined in part by the opposed side of the other plate and to enhance distribution of the liquid in the packing element.

5,413,742

**POST-MIX BEVERAGE APPARATUS INCLUDING HEAT EXCHANGER FOR NON-CARBONATED WATER**

Raimond Gatter, Bretten, Germany, assignor to The Coca-Cola Company, Atlanta, Ga. and Bosch-Siemens Hausgeräte GmbH, Munich, Germany

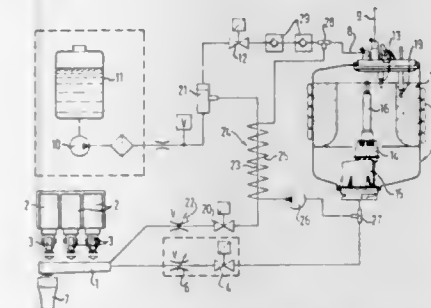
Filed Apr. 28, 1994, Ser. No. 233,965

Claims priority, application Germany, Aug. 28, 1992, 42 28 775.8

Int. Cl.<sup>6</sup> B67D 5/62

U.S. Cl. 261—140.1

11 Claims



1. Apparatus for preparing and dispensing post-mix beverages, comprising:  
a cooled storage tank for holding carbonated water used in preparing post-mix beverages;  
means for supplying fresh water under pressure to the storage tank;  
means for introducing CO<sub>2</sub> into the storage tank;  
branch circuit means coupled to said supplying means and including first water delivery means for selectively delivering fresh water to the storage tank for mixing with CO<sub>2</sub> therein to produce carbonated water and second water delivery means for delivering fresh water to a mixing station when a non-carbonated beverage is desired;  
third water delivery means for delivering carbonated water from the storage tank to said mixing station when a carbonated beverage is desired;  
said second water delivery means including heat exchanger means for cooling the fresh water delivered thereto, said heat exchanger including a first and a second water feed line thermally coupled together, said first water feed line being coupled between said supplying means and said mixing station, and said second water feed line being coupled between said first water delivery means and said third water delivery means for circulating cooled carbonated water in said storage tank through said second water feed line and thereby cooling the fresh water in said first water feed line; and  
concentrate container means for holding and conveying a predetermined amount of at least one drink concentrate to

said mixing station when a carbonated or a non-carbonated beverage is desired.

5,413,743

**METHOD OF MAKING A LAMP ASSEMBLY**

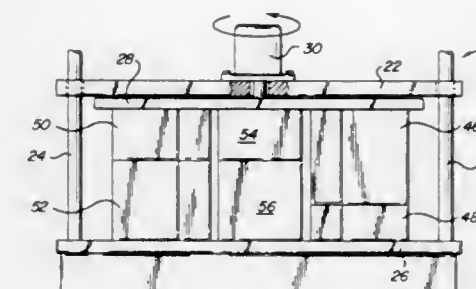
Philip A. Prophet, Alexandria, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed May 20, 1993, Ser. No. 63,795

Int. Cl.<sup>6</sup> B29D 11/00

U.S. Cl. 264—1.7

21 Claims



1. A method of molding a lamp assembly comprising a housing and a lens in a molding machine having first and second matable housing dies and first and second matable lens dies that include one lens die that is matable with one housing die of the first and second matable housing dies comprising the steps of:  
molding a housing in the housing dies and molding a lens in the lens dies when the respective dies are mated,  
retaining the molded housing in the one housing die and retaining the molded lens in the one lens die,  
mating the one housing die and the one lens die while the molded housing and the molded lens are retained therein, the one housing die and the one lens die being configured so that a seal bead cavity is formed at an interface of the one housing die and the one lens die when so mated, and  
molding a seal bead that joins the molded housing to the molded lens at the interface of the dies to provide a lamp assembly.

5,413,744

**PROCESS FOR INDUCTIVE HEATING OF CERAMIC SHAPED PARTS**

Raimund Brückner, Engenhahn; Ullrich Hintzen, Taunusstein-Watzahn; Ernst Lührs, Bad Schwalbach; Hans Rothfuss, Taunusstein, and Albert Ott, Waldems-Würstems, all of Germany, assignors to Didier-Werke AG, Wiesbaden, Germany

Continuation of Ser. No. 924,935, Aug. 5, 1992, abandoned. This application Oct. 13, 1993, Ser. No. 135,581

Claims priority, application Germany, Aug. 5, 1991, 41 25 916.5

Int. Cl.<sup>6</sup> B29C 35/02; C04B 35/64; C01B 31/00

U.S. Cl. 264—25

14 Claims

1. A process for heating a ceramic shaped part, which comprises providing a ceramic shaped part which exhibits a power conversion of 5 to 15 kW per dm<sup>3</sup> of said shaped part and which at ambient temperature has a homogeneously distributed carbon skeleton, and heating said shaped part inductively, beginning at the ambient temperature, at a frequency of 2 to 15 kHz or at a frequency greater than 100 kHz, wherein said carbon skeleton is formed in said shaped part by providing a ceramic shaped part containing a carbonizable material selected from the group consisting of a synthetic resin, pitch, tar, a carbonizable derivative of said resin, pitch or tar, and a mixture thereof, and carbonizing said carbonizable material at 400° to 1000° C. and said shaped part is a wearable steelmaking apparatus component selected from the group consisting of a plug, a sleeve, an immersion nozzle and a slide valve plate for contacting liquid metal.

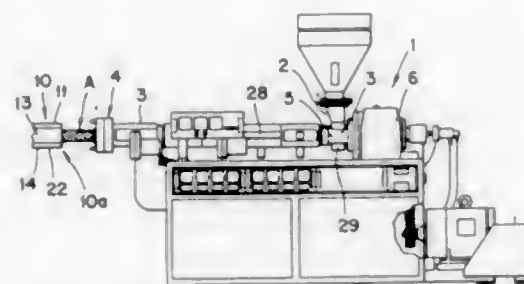
5,413,745

## METHOD AND APPARATUS FOR PRODUCING AN ELONGATED BEAM

Curt Andersson, Torsbovägen 13, 641 96 Katrineholm, Sweden  
Filed Jul. 21, 1992, Ser. No. 915,591Claims priority, application Sweden, Nov. 21, 1989, 8903907  
Int. Cl.<sup>6</sup> B29C 47/38, 47/08

U.S. Cl. 264—68

21 Claims



1. A method of producing an elongated beam from a compressible and compressed material mixture comprising a plastic material and a filling material, comprising the steps of: introducing said material mixture into a first space; compressing the introduced material in the first space; continuously passing the compressed material to a second space, said second space defined on all sides along a longitudinal direction by movable wall parts; subjecting the compressed material in said second space, in the form of a matrix, to nonintermittent continuous movement in a direction away from said first space; and adapting said continuous movement to the speed at which the compressed material leaves said first space.

5,413,746

## METHOD FOR MOLDING SHAPED PRODUCTS AND AN APPARATUS FOR CARRYING OUT SAME

Mikhail V. Birjukov, Balabanovo, nltsa I Maya, 4, kv. 13, Russian Federation, Kaluzhskaya oblast,

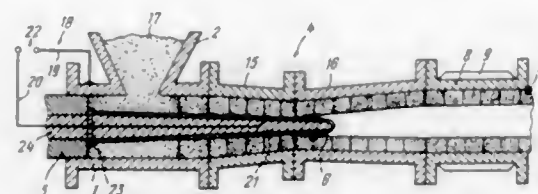
Filed Sep. 3, 1992, Ser. No. 940,004

Claims priority, application Russian Federation, Jun. 10, 1992, 5041121

Int. Cl.<sup>6</sup> B29C 47/00

U.S. Cl. 264—118

26 Claims



1. A method for molding shaped products, comprising the steps of: mixing a filler with a binder to form a resultant mixture, said filler comprising crushed and sorted particles of vegetable origin, said particles of vegetable origin having a size of 0.002 to 10 mm at a moisture content of 4 to 15% said binder being obtained from hemicellulose released from particles of vegetable origin under pressure; feeding the resultant mixture to a briquetting zone to form a briquette, said briquetting zone having an axial passage-way, said resultant mixture being packed in the briquetting zone at a volume ratio of 4:1 to 7:1, with the temperature of the briquetting zone being maintained within a range of 160° to 350° C. whereby to form the briquette; molding said briquette with successively packed briquettes in a molding zone to form a continuous shaped blank under a molding pressure of 2 to 50 Mpa and a temperature in the range of 160° to 350° C.; applying a counterpressure while molding the briquettes,

said counterpressure being applied with a force at least equal to the molding pressure, and heat-treating the continuous shaped blank; cutting products of desired length from the heat-treated continuous shaped blank.

5,413,747

## WATER ABSORBENT FIBRES

Paul J. Akers, Coventry, and William Brunskill, Hinckley, both of United Kingdom, assignors to Courtaulds Fibres (Holdings) Limited, United Kingdom

PCT No. PCT/GB92/00765, § 371 Date Oct. 14, 1993, § 102(e) Date Oct. 14, 1993, PCT Pub. No. WO92/19799, PCT Pub. Date Nov. 12, 1992

PCT Filed Apr. 24, 1992, Ser. No. 133,157

Claims priority, application United Kingdom, Apr. 26, 1991, 9108942

Int. Cl.<sup>6</sup> D01F 1/02

U.S. Cl. 264—211

13 Claims

1. A process for the production of a fibre or filament of a water-absorbent water-insoluble fibrous material having a matrix of a crosslinked copolymer formed from 50 to 95% by weight of ethylenically unsaturated carboxylic monomer in free acid form or in the form of a salt with ammonia, an amine or an alkali metal and 5 to 50% by weight of copolymerisable ethylenically unsaturated monomer, wherein the matrix contains 1 to 10% by weight dispersed solid water-insoluble particles of an inorganic material of particle size below 20 microns which is chemically substantially non-reactive with the matrix copolymer, said inorganic material being selected from the group consisting of inorganic salts and oxides, carbon, mineral clays, glasses and zeolites, the process comprising extruding a dispersion of the solid water-insoluble particles in an aqueous solution of the matrix copolymer in its noncrosslinked state through a spinneret into a gaseous environment to remove the water to form the fibre or filament, and subsequently crosslinking the copolymer.

5,413,748

## METHOD FOR FORMING ENCAPSULATED GLASS

Luis A. A. M. Garza, Condesa, Mexico, assignor to Vidrio Plano De Mexico, S.A., Mexico

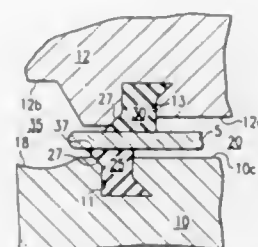
Division of Ser. No. 519,395, May 4, 1990, Pat. No. 5,268,183.

This application Aug. 16, 1993, Ser. No. 106,879

Int. Cl.<sup>6</sup> B29C 45/14

U.S. Cl. 264—135

14 Claims



1. A method for encapsulating a sheet by forming a gasket on a portion of the sheet comprising: positioning a sheet within a chamber defined by facing surfaces of two cooperating mold sections having a seal positioned in at least one of the mold sections to support the sheet, wherein the seal has a facing portion angled outwardly from a horizontal facing surface of a first mold section and towards the peripheral edge of said sheet and wherein at least a portion of the facing portion of the seal, a gasket shaping portion of at least one of the facing surfaces, and the sheet define a gasket forming cavity; closing the cooperating mold sections; placing a gasket forming material into the gasket forming cavity;

opening the cooperating mold sections; and removing the sheet and gasket forming material from the chamber.

5,413,749

## PROCESS OF MAKING BEADS FOR A LIQUID PURIFICATION BED

Kurt M. Geiser, Maplewood, Minn., assignor to Wheelabrator Engineered Systems Inc., New Brighton, Minn.

Filed Jun. 4, 1993, Ser. No. 72,533

Int. Cl.<sup>6</sup> B29C 59/02

U.S. Cl. 264—293

14 Claims

13. A method of making beads for use in a liquid purification bed, the method comprising: providing a supply of plastic beads having smooth surfaces; scarifying the surfaces of the beads; and passing the beads through a roller mill, that has at least one roll with a striated surface, to (1) form grooves in the surfaces of the beads, at least some of the grooves being at least 1 mm in depth and 0.4 to 1 mm in width, and (2) reduce the sphericity of the beads to less than 0.9 by compressing the beads to such an extent that the beads are reduced in thickness by 20–40 percent with each bead having an upper surface with a generally elliptical perimeter, a lower surface with a generally elliptical perimeter, an annular edge surface that extends between the perimeters of the upper and lower surfaces, a diameter of 3 to 6 mm, and a thickness, as measured between the most closely spaced parallel planes between which the bead can fit, of 1.2 to 2.5 mm.

5,413,750

## METHOD OF FABRICATING A PREFORM

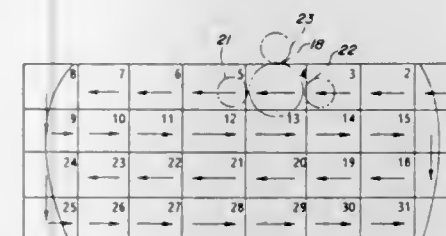
Josh Kelman, Dover, N.H., and Robert Hames, York, Me., assignors to Davidson Textron Inc., Dover, N.H.

Filed Apr. 8, 1992, Ser. No. 865,294

Int. Cl.<sup>6</sup> B27N 3/04; D04H 1/60

U.S. Cl. 264—517

1 Claim



1. A process for forming a preform comprising the steps of: drawing a vacuum through a foraminous screen having a plurality of sections; providing a gantry having a chopped glass fiber spray nozzle and binder spray nozzles wherein said binder spray nozzles include a left, right and top nozzle and said left, right and top nozzles are mounted about said chopped glass fiber spray nozzle; said gantry providing movement of said chopped glass fiber spray nozzle and said binder spray nozzles along a first axis and along a second axis with respect to said screen such that said chopped glass fiber spray nozzle can be aligned with any section of said screen wherein said second axis is a vertical axis; moving said plurality of binder spray nozzles and said chopped glass fiber spray nozzle with said gantry from left to right along said first axis, downwardly along said second axis and from right to left along said first axis, depositing chopped glass fibers from said chopped glass fiber spray nozzle and onto said screen during said step of moving and depositing binder only from said left nozzle and onto said screen when said chopped glass fiber spray nozzle moves from left to right along said first axis, depos-

iting binder only from said right nozzle and onto said screen when said chopped glass fiber spray nozzle moves from right to left along said first axis, and depositing binder only from said upper nozzle and onto said screen when said chopped glass fiber spray nozzle moves downwardly along said second axis; controlling deposition rate of the chopped glass fibers onto the plurality of sections of said screen and binder deposition rate onto said plurality of sections of said screen.

5,413,751

## METHOD FOR MAKING HEAT-DISSIPATING ELEMENTS FOR MICRO-ELECTRONIC DEVICES

Frank J. Polese, 4421 Granger St., San Diego, Calif. 92126; Walter V. Giniel, San Marcos, Calif.; Terrence V. Hermes, San Diego, Calif., and Vladimir Ocheretyansky, Santee, Calif., assignors to Frank J. Polese, San Diego, Calif.

Continuation-in-part of Ser. No. 46,635, Apr. 14, 1993, abandoned. This application May 20, 1993, Ser. No. 64,255

Int. Cl.<sup>6</sup> B22F 3/12

U.S. Cl. 419—23

15 Claims

1. A process, for forming an homogeneous material combining a first metal and at least one second metal having a higher specific gravity and a higher melting point than the first metal, which comprises: selecting a free-flowing mixture of powdered particles of the first and second metals; said mixture comprising nodules grouping particles of the first and second metals breakably bonded together; pressing said mixture within a mold into a compact under pressure sufficient to break apart said bonded particles; and sintering said compact to a temperature sufficient to melt particles of the first metal.

5,413,752

## METHOD FOR MAKING FATIGUE CRACK GROWTH-RESISTANT NICKEL-BASE ARTICLE

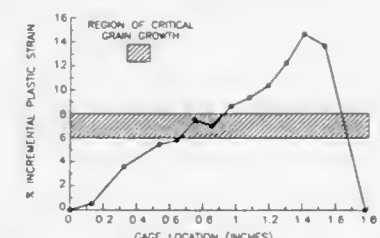
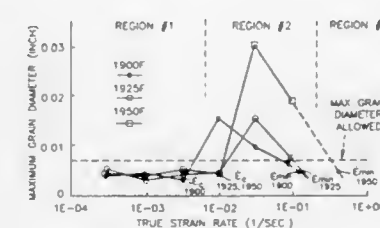
Robert D. Kissinger, Reading; Michael E. Sauby, Cincinnati; Richard G. Menzies, Wyoming, and Allen J. Paxson, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Oct. 7, 1992, Ser. No. 957,113

Int. Cl.<sup>6</sup> B22F 3/00

U.S. Cl. 419—28

20 Claims



1. A method for making an article from a gamma prime precipitation strengthened nickel-base superalloy, comprising the steps of: providing a nickel-base superalloy having a recrystallization temperature, a gamma prime solvus temperature and an incipient melting temperature, and a calculated gamma



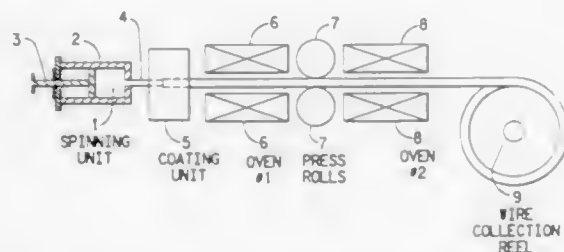
prime content in the range of about 30 to about 65 volume percent;

working said nickel-base superalloy at preselected working conditions, including a working temperature at or near said recrystallization temperature but below said gamma prime solvus temperature, and at a strain rate greater than a predetermined minimum strain rate,  $\epsilon_{min}$ , to provide a worked structure having a precipitate of gamma prime, and a high temperature carbide precipitate comprising MC carbide;

heating said worked structure at a supersolvus solutioning temperature for a duration sufficient to solutionize at least a portion of the gamma prime but not the MC carbide, and to coarsen the grains within said worked structure uniformly to a desired range; and

cooling said worked structure from said supersolvus solutioning temperature to room temperature at a predetermined rate so as to reprecipitate gamma prime within said worked structure.

5,413,753  
**METHOD FOR DISPERSION SPINNING OF SHEATHED ROD-IN-TUBE SUPERCONDUCTING COMPOSITES**  
 George E. Zahr, Glen Mills, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
 Filed Sep. 17, 1993, Ser. No. 123,620  
 Int. Cl.<sup>6</sup> B22F 5/00; H01B 13/00  
 U.S. Cl. 419—36 7 Claims



1. A method of manufacture of composite articles of ceramic bearing a metal coating comprising,

forming at ambient temperature a first mixture of ceramic powder and a first solution consisting of organic binder, solvent, and optional surfactant into an elongated ceramic preform,

coating said preform at ambient temperature with a second mixture of metal and a second solution consisting of organic binder, solvent and optional surfactant that employs a solvent other than a solvent for the binder employed in said first solution to provide a coated ceramic preform, wherein said organic binders are independently selected from the group consisting of cellulose acetate, cellulose acetate butyrate, poly(ethylene oxide), poly(methyl methacrylic acid), poly(methyl methacrylate), methyl cellulose, poly(isobutylene), and poly(propylene carbonate), and

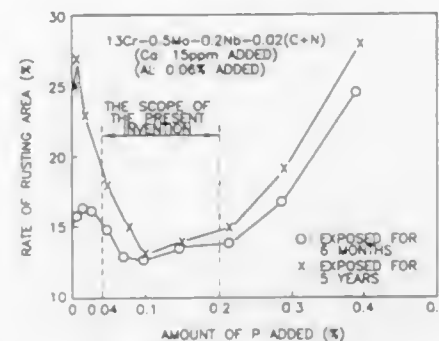
firing said coated ceramic preform to yield a composite article of ceramic bearing a uniform metal coating thereon.

5,413,754  
**FERRITIC STAINLESS STEEL EXHIBITING EXCELLENT ATMOSPHERIC CORROSION RESISTANCE AND CREVICE CORROSION RESISTANCE**

Yoshihiro Yazawa; Satoshi Owada; Fusao Togashi; Keiichi Yoshioka, and Susumu Satoh, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Japan  
 Filed May 13, 1994, Ser. No. 242,181  
 Claims priority, application Japan, May 19, 1993, 5-117401  
 Int. Cl.<sup>6</sup> C22C 38/18

U.S. Cl. 420—41

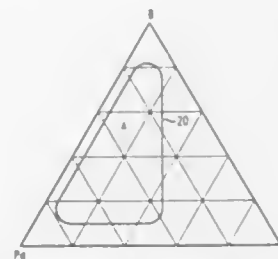
8 Claims



1. A ferritic stainless steel exhibiting excellent atmospheric corrosion resistance and crevice corrosion resistance, said ferritic stainless steel essentially consisting of, in weight percentages,

C: about 0.05% or less  
 Si: about 1.0% or less  
 Cr: about 11% or more and less than about 20%  
 Mn: about 1.0% or less  
 N: about 0.10% or less  
 S: about 0.03% or less  
 Ca: about 5 ppm or more and about 50 ppm or less  
 Al: about 0.5% or less  
 P: more than about 0.04% and about 0.20% or less, and the balance being iron and incidental impurities.

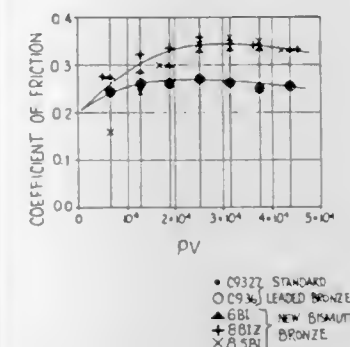
5,413,755  
**ARTICLE COMPRISING AN INTERMETALLIC SUPERCONDUCTING MATERIAL**  
 Robert J. Cava, Bridgewater, N.J., assignor to AT&T Corp., Murray Hill, N.J.  
 Filed Oct. 26, 1993, Ser. No. 143,419  
 Int. Cl.<sup>6</sup> C22C 5/04, 28/00  
 U.S. Cl. 420—416 1 Claim



1. An article comprising a quantity of material that exhibits superconductivity and has a transition temperature  $T_c$  (onset); wherein the material is an intermetallic material consisting essentially of Y, Pd and B, with the amounts of Y, Pd and B selected to lie within region A of the Y-Pd-B compositional space, enclosed by line 20 of FIG. 2 of the accompanying drawings, and the material has  $T_c$  (onset) of 20K or higher.

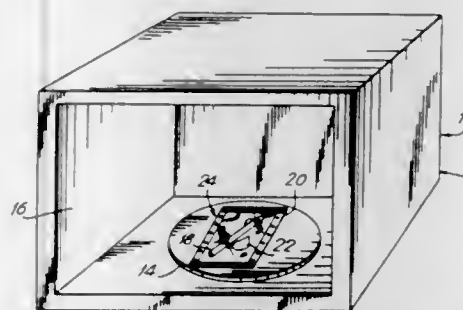
5,413,756  
**LEAD-FREE BEARING BRONZE**  
 Sudhari Sahu, Glendale, Wis., assignor to Magnolia Metal Corporation, Omaha, Nebr.

Filed Jun. 17, 1994, Ser. No. 262,137  
 Int. Cl.<sup>6</sup> C22C 9/02  
 U.S. Cl. 420—472 12 Claims



1. A lead-free copper-tin, low friction, cast bronze alloy consisting essentially of in weight percentage:  
 Sn=7,  
 Bi=5,  
 P=0.10  
 Cu=Balance, substantially

5,413,757  
**METHOD AND APPARATUS FOR STERILIZING ARTICLES**  
 Barry S. Kutner, Wilton, and Daniel A. Latowicki, Newtown, both of Conn., assignors to Flexclave, Inc., Orangeburg, N.Y.  
 Continuation of Ser. No. 274,768, Nov. 22, 1988, Pat. No. 5,039,495, which is a continuation-in-part of Ser. No. 184,246, Apr. 21, 1988, Pat. No. 5,019,344. This application Apr. 29, 1991, Ser. No. 692,736  
 Int. Cl.<sup>6</sup> A61L 2/12  
 U.S. Cl. 422—21 6 Claims



1. A method for sterilizing at least one article by vapor under pressure comprising the steps of:

providing an expandable pouch formed of flexible, vapor-impermeable sheet material, said expandable pouch existing in a collapsed condition in its normal state and having the ability to expand to a visually apparent substantially distended condition;

introducing at least one article to be sterilized into said pouch while said pouch is in said collapsed condition;

introducing a quantity of liquid into said pouch while said pouch is in said collapsed condition, said quantity of liquid being sufficient so that when said pouch is sealed to form a gas-tight assembly and said liquid is vaporized, an overpressure is created within said pouch which will expand said pouch to said visually apparent substantially distended condition;

sealing said pouch to form a gas-tight assembly;

vaporizing said liquid to produce an atmosphere of hot

vapor under pressure in said gas-tight assembly so that said pouch expands from said collapsed condition to said visually apparent substantially distended condition under the effect of said pressure; and

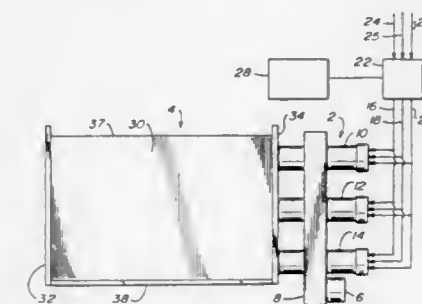
verifying that an atmosphere of hot vapor under pressure exists in said gas-tight assembly by utilizing the expansion of said pouch as an indication thereof;

whereby said at least one article situated within said gas-tight assembly is sterilized under the effect of vapor under pressure.

5,413,758  
**APPARATUS FOR PLASMA STERILIZING WITH PULSED ANTIMICROBIAL AGENT TREATMENT**  
 Ross A. Caputo, Long Grove; Jeffrey Jones, Antioch, both of Ill.; Kern A. Moulton, Sparks, Nev., and Bryant A. Campbell, deceased, late of Los Gatos, Calif. by Louise A. Campbell, legal representative, assignors to Abtox, Inc., Mundelein, Ill.  
 Continuation-in-part of Ser. No. 749,041, Aug. 27, 1991, Pat. No. 5,244,629, which is a continuation-in-part of Ser. No. 576,235, Aug. 31, 1990, Pat. No. 5,084,239. This application May 21, 1993, Ser. No. 65,859  
 The portion of the term of this patent subsequent to Jan. 28, 2009, has been disclaimed.  
 Int. Cl.<sup>6</sup> A61L 2/14 8 Claims

U.S. Cl. 422—22

8 Claims



1. An enclosure adapted for sterilization therein, comprising:

one or more inlet ports;

one or more outlet ports;

a vacuum pump connectable to at least one of said outlet ports of the enclosure for evacuating the enclosure;

an antimicrobial agent source connectable to at least one of said inlet ports of the enclosure for introducing an antimicrobial agent therein;

a plasma generating system including a separate plasma generating chamber for generating plasma therein, said plasma generating system connectable to at least one of said inlet ports of the enclosure for introducing a reactive gas therein; and

means for substantially excluding ultra-violet radiation generated in the plasma generating chamber from said enclosure.

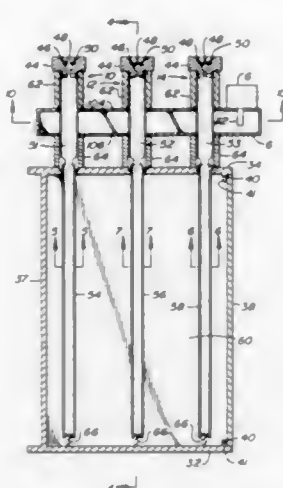
5,413,759  
**PLASMA STERILIZER AND METHOD**  
 Bryant A. Campbell, Late of Los Gatos, Calif. by Louise A. Campbell, legal representative, and Kern A. Moulton, Livermore, Calif., assignors to ABTOX, Inc., Mundelein, Ill.  
 Continuation-in-part of Ser. No. 817,714, Jan. 7, 1992, abandoned, which is a division of Ser. No. 576,292, Aug. 31, 1990, Pat. No. 5,115,166, which is a continuation-in-part of Ser. No. 475,602, Feb. 6, 1990, abandoned, and a continuation-in-part of Ser. No. 321,483, Mar. 8, 1989, abandoned. This application Jun. 7, 1993, Ser. No. 73,653  
 Int. Cl.<sup>6</sup> A61L 2/00 8 Claims

U.S. Cl. 422—23

8 Claims

1. A method for plasma sterilization comprising generating a plasma in a plasma generating chamber, passing said plasma

from said plasma generating chamber via a restriction means and a plasma distribution means to a sterilizing chamber, effecting sterilization in said sterilizing chamber by exposing to the plasma in said sterilizing chamber for a time period sufficient to effect sterilization, wherein



said restriction means and said plasma distribution means provide an indirect passageway which prevents direct impingement of nascent plasma generated in said plasma generating chamber into said sterilizing chamber.

5,413,760

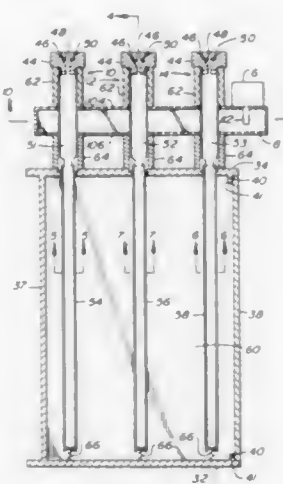
## PLASMA STERILIZER AND METHOD

Bryant A. Campbell, deceased, late of Los Gatos, Calif. by Louise A. Campbell, legal representative, and Kern A. Moulton, Livermore, Calif., assignors to Abtox, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 576,292, Aug. 31, 1990, Pat. No. 5,115,166, which is a continuation-in-part of Ser. No. 321,483, Mar. 8, 1989, abandoned, and a continuation-in-part of Ser. No. 475,602, Feb. 6, 1990, abandoned. This application May 18, 1992, Ser. No. 885,299

The portion of the term of this patent subsequent to May 19, 2007, has been disclaimed.

Int. Cl.<sup>6</sup> A61L 2/74, 9/22; B01J 7/00, 19/12  
U.S. Cl. 422-24 20 Claims



15. A method for plasma sterilizing comprising the steps of: generating a plasma stream from a gas mixture stream, said plasma stream having ionization products that include charged particles and ultra-violet radiation; feeding said plasma stream through a gas distributor to substantially exclude the ultra-violet radiation and to

facilitate the charged particles in the plasma stream to recombine, thereby obtaining a downstream gas free of ultra-violet radiation and having essentially uncharged, highly reactive free radicals, atoms and excited molecules of the gas mixture; and using said downstream gas to effect sterilization.

5,413,761

## PERFORATED DIAGNOSTIC DEVICE

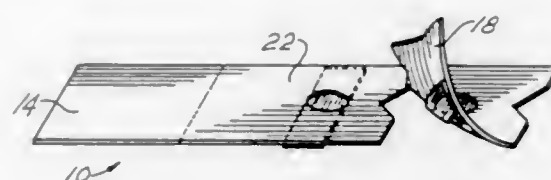
Dolores P. Dulaney, 369 Wayne Dr., Fairborn, Ohio 45324

Filed Jun. 9, 1994, Ser. No. 257,291

Int. Cl.<sup>6</sup> G01N 21/01

U.S. Cl. 422-56

7 Claims



1. A diagnostic strip device for testing for the presence of predetermined constituents in more than one sample of body fluids, comprising:

a spine making up the major portion of said diagnostic device, said spine having a first end and a second, outer end, said spine having a longitudinal axis passing through said first end, and said second, outer end;  
a finger grasping portion defined at said first end;  
a first testing zone located along said longitudinal axis of said spine at said second outer end, said first testing zone having predetermined chemical constituents for the testing of the presence of predetermined constituents in a sample of body fluid;

a second testing zone located along said longitudinal axis of said spine and adjoining said first testing zone and having a predetermined chemical constituents identical to those of said first testing zone, for the testing of the presence of predetermined constituents in another sample of body fluid; and

means defining a line of separation between said first and second zones, said means defining a line of separation bisecting said longitudinal axis of said spine, whereby after use of said first zone, the same may be separated from said second zone, whereupon a second test may be conducted with the use of said second zone and another sample of body fluid.

5,413,762

## DEVICE FOR THE PURIFICATION OF SYNTHETIC OLIGONUCLEOTIDES

Hideyasu Hirano, 20-111, Aobadainami 2-chome, Wakamatsu-ku, Kitakyushu-shi, Fukuoka-ken, Japan, and Takayuki Emura, Fukuoka, Japan, assignors to Hideyasu Hirano and Astec Co., Ltd., both of Fukuoka, Japan

Filed Nov. 29, 1993, Ser. No. 159,073

Claims priority, application Japan, Dec. 4, 1992, 4-325624

Int. Cl.<sup>6</sup> G01N 30/02, 30/88

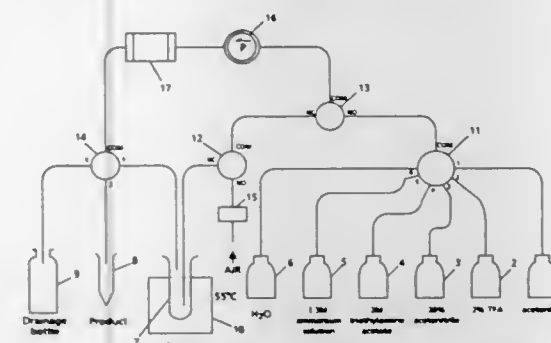
U.S. Cl. 422-70

9 Claims

1. A device for the purification of a synthetic oligonucleotide, comprising:

a plurality of reagent containers for holding reagent solutions therein;  
a sample container for holding said synthetic oligonucleotide therein;  
a column including an inlet and an outlet, said column further including means for purifying said synthetic oligonucleotide passed therethrough;  
a product container for holding therein a product obtained by purification of said synthetic oligonucleotide;

means for selectively delivering a one solution into an inlet of said column for passage therethrough, said one solution selected from the group consisting of said reagent solutions and said synthetic oligonucleotide; and



means for directing a discharging flow of said selected one solution passed through said column to one of said sample container, said product container and a drain.

5,413,763

## METHOD AND APPARATUS FOR REAGENTLESS MEASUREMENT OF THE TOTAL ORGANIC CARBON CONTENT OF AN AQUEOUS SAMPLE

Jeff Jeffers, 209 Garfield, LaPorte, Tex. 77571

Filed Jul. 12, 1993, Ser. No. 90,492

Int. Cl.<sup>6</sup> G01N 33/00

U.S. Cl. 422-80

11 Claims

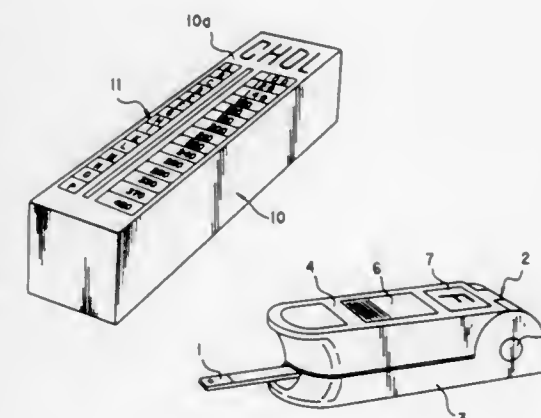


1. A reagentless UV reactor for the oxidation of organic carbon in an aqueous sample, comprising:

a gas-liquid separator;  
said gas-liquid separator having a sample channel through which an aqueous sample can flow and a purge gas channel through which a purge gas can flow;  
said sample channel and said purge gas channel being adjacent to each other and sharing a gas-permeable, liquid-impermeable membrane common wall;  
said sample channel and said purge gas channel each having an inlet at a first end and an outlet at a second end;  
said first end of said purge gas channel being adjacent to said second end of said sample channel so that said sample and said purge gas flow countercurrent;  
said purge gas containing molecular oxygen (O<sub>2</sub>);  
a UV reactor;  
said UV reactor having a sample tube;  
said UV reactor having a UV lamp;  
said UV lamp emitting ionizing radiation at a wavelength which breaks down molecular oxygen (O<sub>2</sub>) into atomic oxygen (O);  
said UV lamp emitting oxidizing radiation at a wavelength which promotes oxidation of organic carbon in said sample;  
said sample tube being at least partially transparent to said ionizing radiation and said oxidizing radiation;  
said sample tube being positioned so that said ionizing radiation and said oxidizing radiation pass therethrough;  
said sample outlet of said gas-liquid separator being connected to said sample inlet of said UV reactor so that said sample flows through said gas-liquid separator and then through said UV reactor.

1. A test carrier analysis system for analyzing a component of a fluid sample comprising:

a plurality of test carriers containing at least one reagent in at least one test layer thereof, in which a reaction of the at least one reagent with a component to be analyzed leads to a detectable change in at least one of said test layers, wherein the detectable change follows a particular relationship, obeying an evaluation curve wherein a parameter of the fluid sample corresponds to the detectable change of the concentration of the component, and wherein the evaluation curve is dependent on a manufacturing batch of the plurality of test carriers;  
evaluation means for evaluating a test carrier which has undergone said detectable change comprising a measurement and digitization circuit for (a) measuring said physically detectable change, (b) generating a measurement signal and (c) converting the measurement signal into an intermediate result independent of the evaluation curve by digitization of the measurement signal into one of a finite number of digital output states;  
display means for displaying the one of the finite number of digital output states in the form of alpha and/or numeric characters; and  
a readable information carrier element associated with each test carrier or with each plurality of test carriers providing a correlation between the alpha and/or numeric characters corresponding to said digital output states and end result values determined in accordance with the evaluation curve, wherein said end result values correspond to a parameter of the component of the fluid sample, said readable information carrier element is specifically made for each test carrier manufacturing batch, and wherein the correlation of the alpha and/or numeric characters to the end result values may be different from batch to batch.





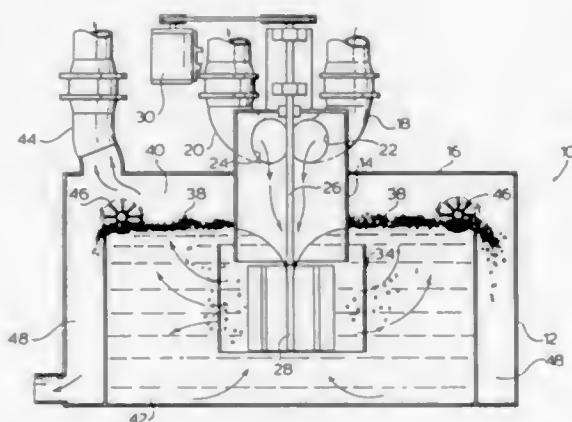
5,413,765

## METHOD AND APPARATUS FOR EFFECTING GAS-LIQUID CONTACT

James W. Smith, Toronto; David T. R. Ellenor, Scarborough, and John N. Harbinson, Aurora, all of Canada, assignors to Apollo Environmental Systems Corp. and University of Toronto Innovations Foundation

Division of Ser. No. 863,720, Apr. 3, 1992, Pat. No. 5,366,698, which is a continuation-in-part of Ser. No. 622,485, Dec. 5, 1990, Pat. No. 5,174,973, which is a continuation-in-part of Ser. No. 582,423, Sep. 14, 1990, abandoned, which is a continuation-in-part of Ser. No. 446,776, Dec. 6, 1989, abandoned. This application Apr. 20, 1994, Ser. No. 230,230 Claims priority, application Canada, Dec. 5, 1989, 2004652; United Kingdom, May 2, 1990, 9002462 The portion of the term of this patent subsequent to May 20, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> B01D 53/78; B01F 5/06, 13/02; B03D 1/16 U.S. Cl. 422—168 38 Claims

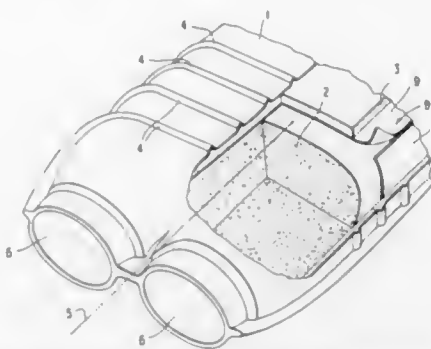


1. A gas-liquid contact apparatus comprising: tank means for holding a liquid phase, inlet gas manifold means for feeding at least one gas stream through an inlet to said tank means, standpipe means communicating with said inlet and extending downwardly within said tank to permit a gas to be fed to a submerged location in the liquid phase, impeller means comprising a plurality of blades located towards the lower end of said standpipe means and mounted to a shaft for rotation about a generally vertical axis, drive means for rotating said shaft, and shroud means surrounding said impeller means and having a plurality of openings extending through the wall of said shroud means, said shroud having a diameter corresponding to about 3:1 to about 1.1:1 times the diameter of the impeller, each of said openings through said shroud means having an equivalent diameter such that the ratio of the equivalent diameter to the diameter of the impeller means is less than about 0.15.

5,413,766  
DEVICE FOR REDUCING EXHAUST GAS CONTAMINANTS, PARTICULARLY FOR MOTOR VEHICLES

Dieter Dattge, Rothenburg, and Walter Stoepler, Herzogenaurach, both of Germany, assignors to Lelstritz AG & Co. Abgastechnik, Fürth/Stadeln, Germany  
PCT No. PCT/DE92/00842, § 371 Date May 11, 1993, § 102(e) Date May 11, 1993, PCT Pub. No. WO93/07366, PCT Pub. Date Apr. 15, 1993

PCT Filed Oct. 5, 1992, Ser. No. 50,307  
Claims priority, application Germany, Oct. 4, 1991, 91 12 336.4  
Int. Cl.<sup>6</sup> F01N 3/28; B01D 53/36  
U.S. Cl. 422—173 17 Claims



1. A device for reducing exhaust gas contaminants comprising: a housing; a catalyst body disposed in the housing with a periphery of the catalyst body being spaced from the housing to form a gap between the catalyst body and the housing; a supporting mat disposed in the gap between the catalyst body and the housing, the supporting mat including heat-resistant fibers and expansion particles, the expansion particles being one selected from the group consisting of hydrated mica and graphite salt, and being converted at an expansion temperature produced by exhaust gases into a substantially irreversible expanded state; and a heating means disposed in the gap between the catalyst body and the housing for heating the supporting mat to the expansion temperature, the heating means being composed of one selected from the group consisting of an exothermal reacting substance and a mixture including an exothermal reacting substance, the exothermal reacting substance and the mixture including the exothermal reacting substance each having an exothermal reaction which is initiated at an initiation temperature which is less than the expansion temperature.

5,413,767

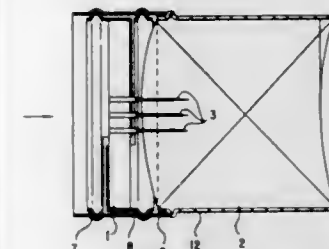
## MECHANICALLY STABILIZED HEATING CATALYST CONFIGURATION

Hans-Jürgen Breuer, Overath; Rolf Brück, and Helmut Swars, both of Bergisch Gladbach, all of Germany, assignors to Emitec Gesellschaft fuer Emissionstechnologie mbH, Lohmar, Germany

Filed Dec. 27, 1993, Ser. No. 175,251  
Claims priority, application Germany, Nov. 8, 1993, 9317050 U

Int. Cl.<sup>6</sup> F01N 3/10 28 Claims  
1. An apparatus for the catalytic combustion of exhaust gases in an exhaust system, comprising: first and second honeycomb bodies through which a fluid can flow in succession, at least one of said honeycomb bodies being heatable and having two electrodes connected thereto between which an electrically conductive path extending through said at least one honeycomb body,

and said honeycomb bodies each having a multiplicity of channels formed therein defining channel walls; and a plurality of support elements end, said support elements extending between said first honeycomb body and said second honeycomb body, said support elements joining



said first and second honeycomb bodies, said support element protruding at least partially into each of said honeycomb bodies, each support element being in contact with said channel walls of said honeycomb bodies, and each support element being disposed along said electrically conductive path.

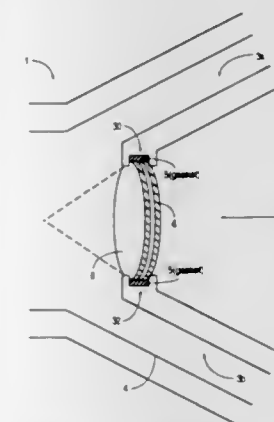
5,413,768

## FLUID DECONTAMINATION APPARATUS HAVING PROTECTED WINDOW

E. Glynn Stanley, Jr., 372 Blue Jay Way, Napa, Calif. 94559  
Filed Jun. 8, 1993, Ser. No. 73,827

The portion of the term of this patent subsequent to Jun. 9, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> B01J 19/08 13 Claims  
U.S. Cl. 422—186.3



1. A fluid decontamination apparatus comprising: a reaction vessel through which fluid flows, said reaction vessel having a substantially planar window substantially transparent to ultraviolet radiation, said window being formed of a material different than a material used to form said reaction vessel; an inlet connected to said reaction vessel through which fluid enters said reaction vessel; an outlet connected to said reaction vessel through which fluid exits said reaction vessel; an ultraviolet radiation source positioned external to said reaction vessel so that said ultraviolet radiation propagates through said window, said ultraviolet radiation being sufficient to promote the oxidation of organic contaminants in said fluid; and a protective layer formed of a material substantially transparent to said ultraviolet radiation and substantially chemically inert, said protective layer being positioned within said vessel and interposed between said window and an inner cavity of said vessel to protect said window from contaminants in said fluid, said protective layer being at least partially held in position with respect to said window

by an anchoring means forming part of said reaction vessel.

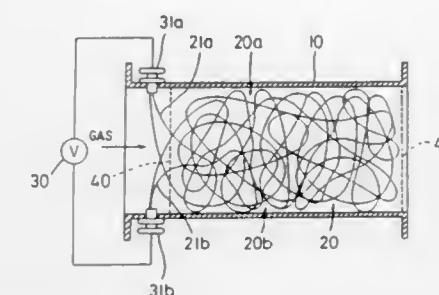
5,413,769

## CLAD FINE WIRE ELECTRODE-TYPE ACTIVATED SPECIES-GENERATING APPARATUS

Sachiko Okazaki, Tokyo; Masahiro Kogoma, Wakou; Masahiro Hirakawa, Ibaraki, and Kazuo Kasai, Suita, all of Japan, assignors to Sumitomo Precision Products Co., Ltd., Amagasaki, Japan

PCT No. PCT/JP91/01396, § 371 Date Aug. 4, 1992, § 102(e) Date Aug. 4, 1992, PCT Pub. No. WO92/06917, PCT Pub. Date Apr. 30, 1992

PCT Filed Oct. 14, 1991, Ser. No. 853,743  
Claims priority, application Japan, Oct. 17, 1990, 2-279621  
Int. Cl.<sup>6</sup> B01J 19/12; C01B 13/11 4 Claims  
U.S. Cl. 422—186.07



1. A clad wire electrode-type activated species-generating apparatus, comprising: a housing defining an enclosed space; and a plurality of wire electrodes randomly entangled among one another within said space to thereby form a discharge region, wherein each of said plurality of wire electrodes is formed of an electrically conductive wire coated with dielectric material and is connected to a voltage supply source, and wherein said plurality of wire electrodes serve as the sole electrodes of said apparatus.

5,413,770

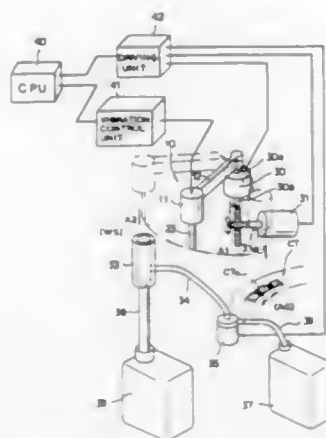
## STIRRING APPARATUS FOR AN AUTOMATIC CHEMICAL ANALYSIS SYSTEM

Soichiro Sakaguchi, and Makoto Ishizaki, both of Nishinasuno, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 12, 1993, Ser. No. 105,066  
Claims priority, application Japan, Aug. 12, 1992, 4-215101  
Int. Cl.<sup>6</sup> B01F 11/00, 11/04 7 Claims  
U.S. Cl. 422—225

1. A stirring apparatus for an automatic chemical analysis system for analyzing a sample in a reaction vessel for obtaining an amount of a specific component of the sample, the automatic chemical analysis system including a stirring apparatus for stirring the sample with a reagent in the reaction vessel, the stirring apparatus comprising: a stirring member having a flexible structure; a support for holding the stirring member suspended perpendicularly therefrom; a moving mechanism for moving the support together with the stirring member between a reaction vessel and a washing pool for washing the stirring member; a washing mechanism including the washing pool for washing the stirring member; a vibrating mechanism for vibrating the stirring member in the washing pool and in the reaction vessel and; a control mechanism operatively connected to said stirring means, said moving mechanism, said washing mechanism and said vibrating mechanism, respectively, for controlling operations thereof,

wherein said stirring member has a width direction parallel to a moving direction of the stirring member moved by the moving mechanism, said stirring member comprises a



piezoelectric vibrator having one of an elongated strip and a plate member having surfaces, and the vibrating means vibrates the stirring member in a direction perpendicular to the surfaces of the stirring member.

5,413,771

## SOX/NOX SORBENT AND PROCESS OF USE

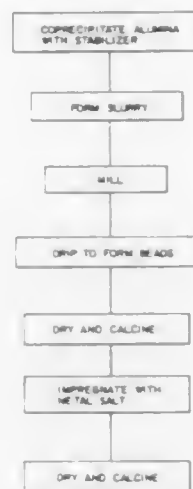
Michael S. Ziebarth, Columbia; Michael J. Hager, Baltimore; Jean W. Beeckman, Columbia, and Stanislaw Plecha, Baltimore, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Division of Ser. No. 690,466, Apr. 24, 1991, Pat. No. 5,180,703. This application Nov. 6, 1992, Ser. No. 955,771

Int. Cl.<sup>6</sup> C01B 21/00, 17/00

U.S. Cl. 423—239.1

6 Claims



1. In the NOXSO process for removal of nitrogen oxides and sulfur oxides from a gas containing them with a sorbent and for the regeneration of said sorbent comprising:

- contacting said gas at a temperature of about 85° C. to about 200° C., with said sorbent to adsorb said nitrogen oxides and sulfur oxides on said sorbent and remove said nitrogen oxides and sulfur oxides from said gas;
- subsequently, withdrawing said nitrogen oxides adsorbed on said sorbent in the form of nitrogen oxides carried away in a hot gas stream; and
- subsequently, withdrawing said sulfur oxides adsorbed on said sorbent;
- subsequently, cooling said sorbent; and
- repeating steps (a), (b), (c) and (d); the improvement

comprising using as the sorbent stabilized spheroidal alumina particles having a surface area of about at least 180 square meters per gram; a compacted bulk density of about 20 to about 45 pounds per cubic foot; an average crush strength of at least 4 pounds, an attrition loss measured by the Air Jet Attrition method of less than 2%; an alumina stabilizer in an amount from an effective amount up to about 30 mole %, wherein said alumina stabilizer is silica; and an active ingredient of a metal selected from the group consisting of alkali metals, alkaline earth metals and mixtures thereof and present in an amount of from about 1 to 20 wt %, said sorbent when subjected to the Sorbent Cycle Stability procedure having its surface area dropping less than 60 M<sup>2</sup>/g from the 20th to the 100th cycle, and said sorbent when subjected to the Hydrothermal Stability procedure maintaining a BET surface area of at least 100 m<sup>2</sup>/g.

5,413,772

## DIAMOND FILM AND SOLID PARTICLE COMPOSITE STRUCTURE AND METHODS FOR FABRICATING SAME

John M. Pinneo, Redwoodcity, Calif., assignor to Crystallume, Menlo Park, Calif.

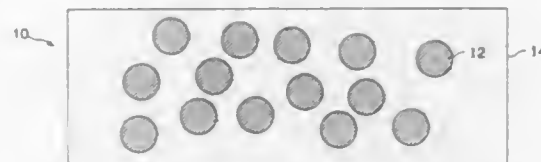
Division of Ser. No. 704,997, May 24, 1991, which is a continuation-in-part of Ser. No. 413,114, Sep. 27, 1989, Pat. No. 5,075,095, which is a continuation of Ser. No. 204,058, Jun. 7, 1988, Pat. No. 4,882,138, which is a continuation of Ser. No. 132,069, Dec. 11, 1987, abandoned. This application Jul. 6, 1992, Ser. No. 889,120

The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

Int. Cl.<sup>6</sup> B01J 3/06

U.S. Cl. 423—446

17 Claims



2. A process for consolidating diamond particles with polycrystalline diamond to form a composition having a desired porosity, including the steps of:

- preforming diamond particles into a preform having a desired shape;
- consolidating said preform by CVD polycrystalline diamond deposition in the presence of microwave energy having a magnitude sufficient to maintain said preform at a temperature between about 600° and 800° for a time sufficient to form said composition.

5,413,773

## METHOD FOR FORMING CARBON FILTERS

Gary G. Tibbetts, Birmingham; Daniel W. Gorkiewicz, Washington, both of Mich., and Robert L. Alig, Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 709,259, Jun. 3, 1991, abandoned, which is a continuation-in-part of Ser. No. 594,540, Oct. 9, 1990, Pat. No. 5,024,818. This application Jun. 28, 1993, Ser. No. 82,530

Int. Cl.<sup>6</sup> D01F 9/127

U.S. Cl. 423—447.3

7 Claims

3. In a method for preparing carbon fibers in a gas phase reaction, the improvement comprising introducing a gaseous mixture comprising a gaseous carbonaceous compound and a

decomposable iron-containing compound into a reactor having an inlet, an outlet and a passageway therebetween defining first and second flow paths in which the first flow path is co-extensive with at least a 50% portion of the second flow path and is encompassed by the second flow path; flowing the mixture in the passageway in the reactor through the first flow path and then through the second flow path; changing the velocity of the mixture from a first velocity in the first flow path to a second velocity in the second flow path where the second

increases effective when a suspension of said gas-filled microvesicles is injected into the bloodstream of a patient.

5,413,775

## HAIRSPRAYS AND ACRYLIC POLYMER COMPOSITIONS FOR USE THEREIN

James C. Hatfield, St. Albans, W. Va.; Steven I. Cochran, Franklin Park, N.J.; David R. Bassett, Charleston, W. Va., and Raymond Rigoletto, Jr., Wanamassa, N.J., assignors to Amerchol Corporation, Edison, N.J.

Filed Sep. 29, 1992, Ser. No. 953,496

Int. Cl.<sup>6</sup> A61K 7/11, 7/075, 9/16; C08F 218/10

U.S. Cl. 424—47

29 Claims

1. An aqueous, anionic polymer composition comprising:

- from about 10 to 60 weight percent of a copolymer of: (a) about 35 to 74 weight percent of an alkyl acrylate selected from the group consisting of methyl acrylate, ethyl acrylate, propyl acrylate, butyl acrylate and mixtures thereof (b) about 25 to 65 weight percent of an alkyl methacrylate selected from the group consisting of methyl methacrylate, ethyl methacrylate, propyl methacrylate, butyl methacrylate and mixtures thereof and (c) about 1 to 15 weight percent of one or more acrylate acids or salts thereof selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, itaconic acid and mixtures thereof, wherein said copolymer has (i) a glass transition temperature onset of from about 10° to 50° C.; (ii) a number average molecular weight of from about 10,000 to 50,000 g/g mole; (iii) a particle size of from greater than 0.1 to about 1 micron;

- from about 0.05 to 0.5 weight percent of a nonionic, alkoxylated phenol surfactant containing an alkyl group having from 6 to 12 carbon atoms; and

- water;

wherein said composition has a Freeze-Thaw Stability Factor of at least 3 and a residual level of said alkyl acrylate of less than 100 ppmw.

5,413,776

## PHARMACEUTICAL PREPARATION FOR PERCUTANEOUS ABSORPTION

Taro Suzuki, Mutsumi Fukuda, and Kunio Yoneto, all of Osaka, Japan, assignors to Sekisui Chemical Co., Ltd., Osaka, Japan. Continuation of Ser. No. 750,803, Aug. 19, 1991, abandoned.

This application Dec. 22, 1992, Ser. No. 64,361

Int. Cl.<sup>6</sup> A61F 13/02

U.S. Cl. 424—448

9 Claims

1. A pharmaceutical preparation for percutaneous absorption of a drug comprising a drug-impermeable substrate having provided thereon an adhesive layer composed of

- a copolymer consisting essentially of 5 to 35 wt % of N-vinyl-2-pyrrolidone and 65 to 95 wt % of an acrylic acid ester, and containing 3 to 30 wt % of a homopolymer of N-vinyl-2-pyrrolidone as a dissolution agent for the drug, and

- 5 to 30 wt % of a hydrophilic drug having a saturation solubility of 6 to 50 wt % in N-vinyl-2-pyrrolidone.

5,413,777

## PULSATILE ONCE-A-DAY DELIVERY SYSTEMS FOR MINOCYCLINE

Nitin V. Sheth, Middletown; Joseph J. Valore, Jr., Montgomery; Keith A. Ellway, Washingtonville; Madurai G. Ganesan, Suffern; Kieran G. Mooney, Warwick, all of N.Y., and Jerry B. Johnson, Upper River Saddle, N.J., assignors to American Cyanamid Company, Wayne, N.J.

Division of Ser. No. 892,383, May 27, 1992, Pat. No. 5,300,304, which is a continuation of Ser. No. 410,708, Sep. 21, 1989, abandoned. This application Jul. 14, 1993, Ser. No. 91,322

Int. Cl.<sup>6</sup> A61K 9/14, 9/16, 9/54, 9/56

U.S. Cl. 424—490

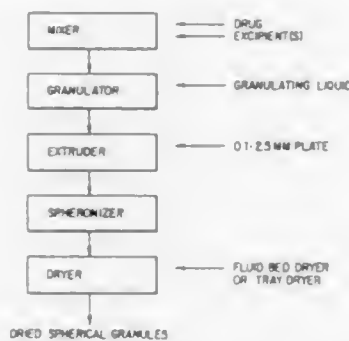
10 Claims

1. A tablet adapted to provide a therapeutically effective



blood concentration level of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof for a sustained period of time of up to about twenty-four hours comprising:

- (I) a multiple delivery vehicle system comprising
- (A) an initial loading therapeutically effective number of quick release granules which comprise
- (a) (i) an effective amount of at least one pharmaceutically acceptable excipient; and
- (ii) an effective antibacterial amount of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof, on or in said quick release granules; and optionally
- (b) a substantially uniform polymer coating, on said quick release granules and which is rapidly and substantially completely erodible in a medium having a pH of less than about 3.9; said quick release granules being adapted to release substantially completely said minocycline in a medium having a pH of less than about 3.9;
- (A-1) an initial loading therapeutically effective amount of finely divided powder comprising
- (a) an effective antibacterial amount of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof; and optionally
- (b) an independent effective amount of at least one pharmaceutically acceptable excipient which may be the same as or different than (I)(A)(a)(i); or
- (A-2) an initial loading therapeutically effective combination of (A) and (A-1); and



(B) a secondary loading therapeutically effective number of pH sensitive polymer coated spherical granules which comprise

- (a) (i) an independent effective amount of at least one pharmaceutically acceptable excipient which may be the same as or different than (I)(A)(a)(i) or (I)(A-1)(b); and
- (ii) an independent effective antibacterial amount of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof, on or in said coated spherical granules; and
- (b) a substantially uniform pH sensitive polymer coating, the polymer of which may be the same as or different than (I)(A)(b), on said coated spherical granules and which is rapidly and substantially completely erodible in a medium having a pH in the range of from about 4.0 to about 7.5; said coated spherical granules thereby being adapted to release substantially completely said minocycline in a medium having pH in the range of from about 4.0 to about 7.5; or
- (II) one or more multi-coated spheronized pharmaceutical single delivery vehicle compositions comprising:
- (A) a core comprised of
- (a) a full or a partial secondary loading therapeutically effective antibacterial amount of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof; or
- (b) at least one granule comprised of

- (i) an effective amount of at least one pharmaceutically acceptable excipient; and
- (ii) a full or a partial secondary loading therapeutically effective antibacterial amount of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof, on or in said granule; having applied thereon
- (B) a substantially uniform pH sensitive polymer coating which is rapidly and substantially completely erodible in a medium having a pH in the range of from about 4.0 to about 7.5; said core thereby being adapted to release substantially completely said minocycline in a medium having a pH in the range of from about 4.0 to about 7.5; having applied thereon
- (C) a quick release coating comprising a full or partial initial loading therapeutically effective antibacterial amount of 7-dimethylamino-6-deoxy-6-demethyltetracycline or a non-toxic acid addition salt thereof; and optionally having applied thereon
- (D)(a) a substantially uniform polymer coating, the polymer of which may be the same as or different than (B), and which is rapidly and substantially completely erodible in a medium having a pH of less than about 3.9;
- (b) a polymer overcoat, the polymer of which may be the same or different than (B) or (D)(a), or
- (c) a combination of (a) and thereon (b) wherein the ratio of quick release granules to pH sensitive polymer granules is 30:70 to 70:30.

5,413,778

**LABELLED MONOCYTE CHEMOATTRACTANT PROTEIN MATERIAL AND MEDICAL USES THEREOF**  
Steven L. Kunkel, Ann Arbor, Mich.; Leon R. Lyle, Webster Groves, Mo., and Robert M. Strieter, Ann Arbor, Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich. and Mallinckrodt Medical, Inc., St. Louis, Mo.  
Filed Oct. 5, 1992, Ser. No. 956,862

Int. Cl.<sup>6</sup> A61K 49/02

U.S. Cl. 424—1.41

25 Claims

1 A method of imaging a target site in an animal body, comprising providing a labelled CC chemokine wherein C stands for cysteine, introducing a detectable amount of said labelled CC chemokine into an animal's body, allowing the labelled CC chemokine to accumulate at a target site of the animal's body, wherein Monocyte Chemoattractant Protein (MCP) receptor molecules are located at said target site, and detecting the accumulated, labelled CC chemokine so as to image said target site.

5,413,779

**COCAINE RECEPTOR BINDING LIGANDS**  
Michael J. Kuhar, Baltimore, Md.; Frank I. Carroll, Durham, N.C.; John W. Boja, Baltimore, Md.; Anita H. Lewin, Chapel Hill, and Philip Abraham, Cary, both of N.C., assignors to Research Triangle Institute, Research Triangle Park, N.C. and The United States of America represented by the Secretary of Health and Human Services, Washington, D.C.  
PCT No. PCT/US91/05553, § 371 Date Mar. 23, 1993, § 102(e) Date Mar. 23, 1993, PCT Pub. No. WO92/02260, PCT Pub. Date Feb. 20, 1992

Continuation-in-part of Ser. No. 564,755, Aug. 9, 1990, Pat. No. 5,128,118. This PCT application Aug. 9, 1991, Ser. No. 972,472 The portion of the term of this patent subsequent to Jul. 7, 2009, has been disclaimed.

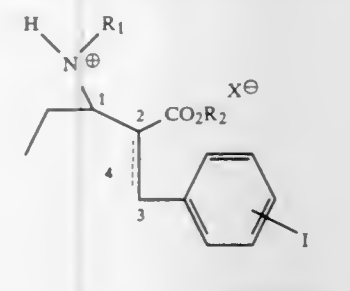
Int. Cl.<sup>6</sup> A61K 49/02; C07D 451/02

U.S. Cl. 424—1.85

17 Claims

1. A compound of the formula below, where the broken line represents an optional chemical bond; the iodo substituent may be at o, m, p, or multisubstituted and is a radioactive isotope;  
 $R_1 = (CH_2)_nCH_3$ ,  $n = 0-6$ ;  $CH_2CR_3 = CR_4R_5$  ( $R_3, R_4, R_5$  are each, independently,  $C_1-C_6$  alkyl);  $(CH_2)_yC_6H_5$  ( $y = 1-6$ );

$R_2 = CH_3, C_2H_5, CH_3(CH_2)_3, (CH_3)_2CH, C_6H_5, C_6H_5CH_2, C_6H_5(CH_2)_z$  ( $z = 1-6$ ); and  
 $X =$  pharmacologically acceptable anion.



5,413,780

**LIQUID SKIN COATING OR PROTECTANT**

Carl A. Huprich, 22333 County Rd. 62 N., Robertsdale, Ala. 36567

Filed Oct. 28, 1993, Ser. No. 142,007

Int. Cl.<sup>6</sup> A61K 9/10, 31/125

U.S. Cl. 424—78.02

1 Claim

1. A liquid, rapidly drying coating or protectant composition comprising tincture of benzoin and polyethylene powder, said composition having improved slip or reduced coefficient of friction in dry form.

5,413,781

**ALKYLMETHYLSILOXANES FOR SKIN CARE**

Patricia Giwa-Agbomeirele; Gary E. Legrow, and Regina M. Malczewski, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

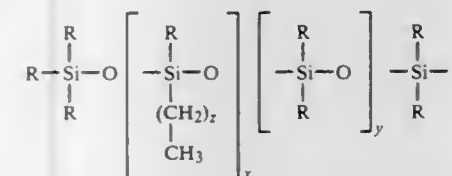
Continuation-in-part of Ser. No. 892,838, Jun. 3, 1992, abandoned, which is a continuation of Ser. No. 642,623, Jan. 17, 1991, abandoned. This application Oct. 4, 1993, Ser. No. 131,347

Int. Cl.<sup>6</sup> A61K 7/48

U.S. Cl. 424—78.03

5 Claims

1. A method of forming a film on the skin as a barrier to reduce transepidermal water loss comprising applying a conditioning formulation to the skin which is a polysiloxane copolymer dissolved in a cyclic siloxane, the copolymer having a viscosity of less than about 350 Centistokes, and having the formula



in which x and y are integers each of which is equal to at least one, x has a value of ten or less, the sum of x and y is from sixty to one hundred, z is an integer having a value of five to seventeen, and R is an alkyl group having from one to thirty carbon atoms, the formulation including 5-10 percent by weight of the copolymer in the cyclic siloxane.

5,413,782

**BINDING PHARMACEUTICALS TO ION EXCHANGE RESINS**

Mark P. Warchol, Ambler, and Zofia J. Chrzan, Sellersville, both of Pa., assignors to Rhone-Poulenc Rorer Pharmaceuticals Inc., Collegeville, Pa.

Continuation of Ser. No. 629,833, Dec. 19, 1990, Pat. No. 5,162,110. This application Nov. 10, 1992, Ser. No. 974,099

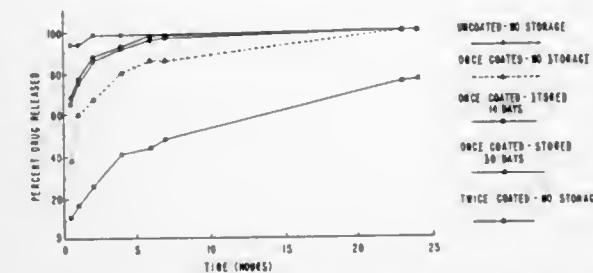
Int. Cl.<sup>6</sup> A61K 31/74, 9/14

U.S. Cl. 424—78.15

13 Claims

1. In a method in which an ionizable pharmaceutical material having a pharmaceutically-active anionic group is bonded to

an anion exchange resin having cationic groups bonded to displacable anions by bringing said material and said resin into contact with each other under conditions such that the pharmaceutically-active anionic group of said material is bonded to



the cationic group of said resin and replaces the anions thereof, the improvement comprising effecting said contact in an environment which is substantially free of carbon dioxide and/or bicarbonate ion.

5,413,783

**INHIBITING PLANT PATHOGENS WITH AN ANTAGONISTIC MICROORGANISM(S)**

Randy J. McLaughlin, Martinsburg, W. Va.; Charles L. Wilson, Frederick, Md., and Edo Chalutz, Rishon le 'Zion, Israel, assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 387,669, Jul. 31, 1989, abandoned, and a continuation-in-part of Ser. No. 177,236, Apr. 4, 1988, abandoned. This application Aug. 18, 1989, Ser. No. 395,681

Int. Cl.<sup>6</sup> C12N 1/16; A01N 63/00

U.S. Cl. 424—93.51

18 Claims

1. A process for inhibiting plant pathogen development on an agricultural commodity comprising:

applying to an agricultural commodity a composition comprising at least one microorganism, which is an antagonist against plant pathogens but is not antibiotic, in an amount effective to inhibit plant pathogen development on said agricultural commodity, wherein said at least one microorganism is a yeast selected from the group consisting of *Pichia guilliermondii* and *Hanseniasporum uvarum*.

5,413,784

**BIOPESTICIDE COMPOSITION AND PROCESS FOR CONTROLLING INSECT PESTS**

James E. Wright, 5006 Oakmont Cir., Harlingen, Tex. 78552, and Laurence D. Chandler, 4003 Royce Rd., Tifton, Ga. 31794

Continuation of Ser. No. 892,488, Jun. 3, 1992, which is a continuation of Ser. No. 638,489, Jan. 9, 1991, abandoned. This application May 10, 1993, Ser. No. 58,795

Int. Cl.<sup>6</sup> A01N 63/04; C12N 1/14

U.S. Cl. 424—93.5

15 Claims

2. A biopesticidal composition comprising an effective amount of a fungus having the identifying characteristics of *Beauveria bassiana* ATCC 74040 and an agriculturally acceptable carrier.

5,413,785

# METHODOLOGY EMPLOYING LACTOBACILLUS GG FOR REDUCTION OF PLASMA ENDOTOXIN LEVELS CIRCULATING IN-VIVO

Amin A. Nanji, Wellesley, Mass., assignor to New England Deaconess Hospital Corp., Boston, Mass.  
Continuation of Ser. No. 9,647, Jan. 27, 1993, abandoned. This application Mar. 3, 1994, Ser. No. 206,031  
Int. Cl.<sup>6</sup> A61K 37/00

U.S. Cl. 424—93.45

8 Claims

1. A therapeutic method for reducing the quantity of endotoxin circulating in the blood plasma of a mammal, said method comprising the steps of:

combining *Lactobacillus* GG with a biocompatible carrier to form a preparation, wherein said *Lactobacillus* GG is able to persist within the gastrointestinal tract of the mammal for not less than 24 hours, is resistant to destruction by the acid pH from the stomach of the mammal, and is able to colonize a mucosal surface within the gastrointestinal tract of the mammal; and

administering said formulated preparation to the gastrointestinal tract of the mammal in an amount effective for causing a resulting reduction in the quantity of endotoxin circulating within the mammal's blood plasma.

5,413,786

# METHOD OF ACCELERATING BLOOD COAGULATION USING A METAL COMPLEX OF OXIDIZED ELLAGIC ACID

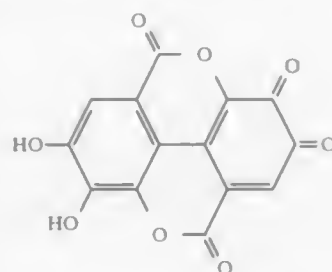
Hideo Anraku, Ibaraki, Japan, assignor to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 728,964, Jul. 12, 1991, abandoned, which is a division of Ser. No. 36,886, Apr. 10, 1987, Pat. No. 5,041,558. This application Oct. 13, 1993, Ser. No. 135,755  
Claims priority, application Japan, Apr. 11, 1986, 61-84455; Apr. 11, 1986, 61-84456; Apr. 11, 1986, 61-84457; Sep. 29, 1986, 61-230478

Int. Cl.<sup>6</sup> A61K 37/48, 31/295; A01N 43/16

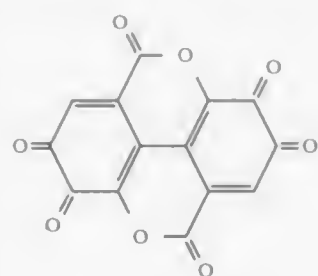
U.S. Cl. 514—185

2 Claims

1. A method of accelerating blood coagulation, comprising contacting blood with an effective amount of metal complex containing a ligand selected from the group consisting of [o-quinone derivative (II)] partially oxidized ellagic acid (IV):



and completely oxidized ellagic acid (V):



5,413,787

# BIOPARYL, A BIOLOGICAL REGULATOR, ACTIVE AGAINST VARIOUS PATHOLOGIES

Mirko Beljanski, 46, Blvd. de Port Royal, 75008 Paris, France  
Filed Jun. 9, 1989, Ser. No. 365,045  
Claims priority, application France, Jul. 19, 1988, 88 09738; European Pat. Off., Apr. 26, 1989, 89401191  
Int. Cl.<sup>6</sup> A61K 35/78

U.S. Cl. 424—115.1

7 Claims

1. A method of obtaining Bioparyl from golden autumn leaves of the *Ginkgo biloba* tree which comprises:

- (1) treating such leaves with water to obtain a water extract; removing the liquid extract from the leaves;
- (2) optionally concentrating the extract by evaporating part of the water;
- (3) subjecting the extract to acid hydrolysis;
- (4) adjusting the pH by partial neutralization retaining an acid pH;
- (5) centrifuging and recovering the supernatant;
- (6) subjecting the supernatant to column chromatography to eliminate undesirable substances by retention on the column, eluting solid material with water;
- (7) collecting eluate containing fractions that fluoresce under ultraviolet light; and
- (8) adjusting the pH to about 7.0 to obtain a water solution of Bioparyl.

5,413,788

# ANTIMICROBIAL COMPOSITIONS

Neil Edwards, Reading; Stephen B. Mitchell, Cardiff, and Allin S. Pratt, Oxon, all of United Kingdom, assignors to Johnson Matthey Public Limited Company, London, England  
Continuation-in-part of Ser. No. 68,365, Jul. 1, 1987, Pat. No. 4,906,466. This application Oct. 19, 1989, Ser. No. 425,221  
Claims priority, application United Kingdom, Jul. 3, 1986, 8616294

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.<sup>6</sup> A61K 6/08, 31/74

U.S. Cl. 424—409

8 Claims

1. A finely divided, particulate antimicrobial composition comprising a sparingly soluble antimicrobial silver compound deposited on a finely divided particulate support consisting essentially of an oxidic material which is stable in water or aqueous environments and is selected from the group consisting of oxides of titanium, magnesium, aluminum, silicon, cerium, zirconium, hafnium, niobium and tantalum, and barium sulphate said support being one which does not form hydrates, and has an extended surface area.

5,413,789

# ANTIMICROBIAL COMPOSITION OF ALUMINOSILICATE COATED SILICA GEL

Zenji Hagiwara, Shiga, and Masao Okubo, Hyogo, both of Japan, assignors to Hagiwara Research Corp. and Japan Electronic Materials Corp., both of Japan  
Division of Ser. No. 662,040, Feb. 28, 1991, Pat. No. 5,244,667. This application May 17, 1993, Ser. No. 61,685  
Int. Cl.<sup>6</sup> A01N 25/26

U.S. Cl. 424—409

4 Claims

1. An antimicrobial polymer composition comprising a polymer and an antimicrobial composition, of wherein said antimicrobial composition is composed of a coat of aluminosilicate on the surface of silica gel, wherein said composition has a pore volume of at least 0.3 cm<sup>3</sup>/g and a specific surface area of at least 100 m<sup>2</sup>/g, wherein said aluminosilicate coat is composed of either partial or complete substituted ion-exchangeable metal (M) in the aluminosilicate solid coating layer represented by the formula xM<sub>2</sub>/nO—Al<sub>2</sub>O<sub>3</sub>—ySiO<sub>2</sub>—zH<sub>2</sub>O, wherein x and y represent the numbers of molecules of the metal oxide and silicon dioxide, respectively, M is an ion-exchangeable metal, n is the atomic valence of M, and z is the number of

molecules of water, wherein said partial or completely substituted ion-exchangeable metal is selected from the group consisting of silver, copper, zinc, mercury, tin, lead, bismuth, cadmium, chromium and mixtures thereof and wherein said polymer is a halogenated or non-halogenated organic polymer.

5,413,790

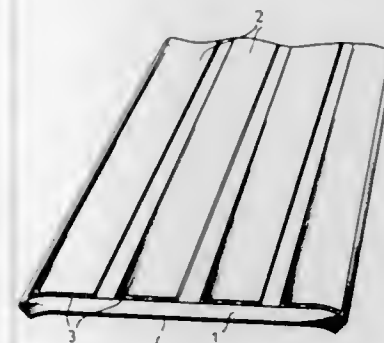
# HEAT-SHRINKABLE MATERIALS, ESPECIALLY FOR CABLE SPLICES AND JUNCTIONS

Heinz Koppe, Castrop Rauxel; Norbert Nicolai, Dorsten, and Winfried Stupp, Hagen, all of Germany, assignors to Stewing GmbH & Co. KG Werk Berlin, Berlin, Germany  
Filed Dec. 3, 1992, Ser. No. 984,923  
Claims priority, application Germany, Dec. 6, 1991, 41 40 273.1

Int. Cl.<sup>6</sup> A01N 25/34

U.S. Cl. 424—411

18 Claims



1. A heat-shrinkable article, comprising: a substrate of a heat-shrinkable material capable of shrinking upon being subjected to a predetermined temperature and formed with an outer surface; and a layer of thermomorphic coating material covering at least a part of said outer surface of said substrate for signalling the attainment of an optimum shrinking temperature thereof by melting at the optimum shrinking temperature, said layer of thermomorphic material being composed of a synthetic resin containing an insecticide or a microbicide or a mixture thereof as a filler, and forming an intimate bond with said substrate, said layer forming a uniform protective cover coating on said substrate upon melting and flowing together of said layer followed by rehardening of said layer.

5,413,791

# COLLAGEN-POLYMER CONJUGATES

Woonza Rhee, Palo Alto; Donald G. Wallace, Menlo Park, both of Calif.; Alan S. Michaels, Boston, Mass.; Ramon A. Burns, Jr., Fremont, Calif.; Louis Fries, Los Altos, Calif.; Frank DeLustro, Belmont, Calif., and Hanne Bentz, Newark, Calif., assignors to Collagen Corporation, Palo Alto, Calif.  
Division of Ser. No. 922,541, Jul. 30, 1992, Pat. No. 5,328,955, which is a continuation-in-part of Ser. No. 433,441, Nov. 14, 1989, Pat. No. 5,162,430, which is a continuation-in-part of Ser. No. 274,071, Nov. 21, 1988, abandoned. This application Feb. 17, 1994, Ser. No. 198,128  
Int. Cl.<sup>6</sup> A61F 2/00, 13/00; A61K 9/14, 9/50

U.S. Cl. 424—422

18 Claims

1. A method of soft tissue augmentation in a mammal: comprising injecting into soft tissue of a mammal a pharmaceutically acceptable, injectable composition comprising: collagen; a polyfunctional, synthetic, hydrophilic, non-immunogenic polymer having reactive groups capable of forming a covalent ether bond in situ with an available lysine side chain present in collagen to form a collagen-polymer conjugate; and

a fluid pharmaceutically acceptable carrier in an amount sufficient to form the injectable composition.

5,413,792

# MUCOADHESIVE POLYSILOXANE PASTE-LIKE BASE AND PREPARATION

Hiroshi Ninomiya, Saitama, and Yosuke Urabe, Kanagawa, both of Japan, assignors to Dow Corning K.K. and Nippon Kayaku Kabushiki Kaisha, both of Tokyo, Japan

Division of Ser. No. 784,084, Nov. 1, 1991, abandoned, which is a continuation of Ser. No. 498,523, Mar. 26, 1990, abandoned.

This application Jan. 3, 1992, Ser. No. 817,257

Int. Cl.<sup>6</sup> A61K 47/34, 47/30, 9/06

U.S. Cl. 424—434

6 Claims

1. A non-aqueous mucoadhesive base comprising: (i) 3 to 95 weight percent of a polyorganosiloxane, wherein the polyorganosiloxane is comprised predominantly of R<sub>2</sub>SiO units and has chain terminating units R'R<sub>2</sub>SiO<sub>4</sub> where each R represents a lower alkyl group, a halogenated alkyl group, an alkenyl group or an aryl group and each R' represents a group R or a hydroxyl group, and the polyorganosiloxane is liquid or a gum at 25° C.; and (ii) 5 to 97 weight percent of a water-soluble polymeric material selected from the group consisting of water soluble polymers and copolymers of acrylic acid, methacrylic acid, acrylamide, cellulose derivatives and salts thereof, carboxymethylchitin, polyvinylpyrrolidone, polyvinyl alcohol, starch derivatives, polyethylene oxide, gelatin, collagen and natural gums; the weight percent being based on the sum of (i) and (ii) and wherein the polysiloxane and water soluble polymeric material are present in a ratio by weight of from 1:9 to 9:1 and wherein the base is capable of adhering to a wet surface.

5,413,793

# MULTIPHASE SUPPOSITORY

Oswald Morton, London, United Kingdom, and Koral Embil, Istanbul, Turkey, assignors to EDKO Trading and Representation Company Limited, Istanbul, Turkey

PCT No. PCT/GB89/01545, § 371 Date Aug. 28, 1991, § 102(e) Date Aug. 28, 1991, PCT Pub. No. WO90/07324, PCT Pub. Date Jul. 12, 1990

Continuation-in-part of Ser. No. 361,322, Jun. 5, 1989, abandoned. This PCT application Dec. 29, 1989, Ser. No. 691,021

Claims priority, application United Kingdom, Dec. 30, 1988, 8830407

Int. Cl.<sup>6</sup> A61K 9/02, 31/695

U.S. Cl. 424—436

7 Claims

1. A multiphase pharmaceutical composition for combatting an anorectal disease comprising a first phase containing a medicament for combatting said disease and a second phase adapted for delayed release of a silicone oil whereby application of said composition at a region affected by said disease deposits said medicament thereon and a layer of silicone oil is formed thereover, so protecting the medicament from erosion by aqueous media, wherein said composition is in the form of a suppository comprising an outer layer containing said medicament in a suppository base surrounding one or more separate phases containing the silicone oil.



5,413,794

PERCUTANEOUS ABSORPTION PROMOTER, A TAPE PLASTER AND A METHOD OF PROMOTING PERCUTANEOUS ABSORPTION  
Eiji Suzuki; Hideaki Okabe, both of Urawa, and Takanori Salto, Misato, all of Japan, assignors to Lintec Corporation, Tokyo, Japan

Filed Sep. 1, 1992, Ser. No. 937,783

Claims priority, application Japan, Jan. 24, 1992, 4-034274  
Int. Cl.<sup>6</sup> A61F 13/00

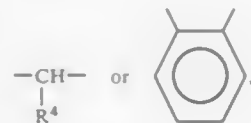
U.S. Cl. 424-449

22 Claims

1. A percutaneous absorption promoter composition which comprises (a) a pharmaceutically active substance and (b) a derivative of amino acid having the formula:



wherein  $R^1$  is an acyl group having 1 to 20 carbon atoms,  $R^2$  is a hydrogen atom or a hydrocarbon group having 1 to 4 carbon atoms and  $R^3$  is



$R^4$  being a hydrogen atom, methyl group, isopropyl group, 2-methylpropyl group or 1-methylpropyl group.

5,413,795

TCMTB ON A SOLID CARRIER IN POWDERED FORM, METHOD OF MANUFACTURE AND METHOD OF USE  
James C. Lee, and Mohan D. Karve, both of Memphis, Tenn., assignors to Buckman Laboratories, International, Inc., Memphis, Tenn.

Filed Aug. 14, 1992, Ser. No. 929,361

Int. Cl.<sup>6</sup> A61K 9/14

U.S. Cl. 424-489

41 Claims

1. A stable powder composition comprising TCMTB adsorbed onto a solid carrier selected from diatomaceous earth, precipitated silica, talc, kaolin, bentonite, and attapulgite or a mixture thereof, wherein the composition is in a powdered form, the solid carrier has acidic or neutral pH, and the composition loses no more than 11-12% by weight of the TCMTB from the solid carrier over 30 days at 50° C.

5,413,796

Patent Not Issued For This Number

5,413,797

CONTROLLED RELEASE ACTH CONTAINING MICROSPHERES

M. Amin Khan, Burlington, and Howard Bernstein, Cambridge, both of Mass., assignors to Alkermes Controlled Therapeutics, Inc., Cambridge, Mass.

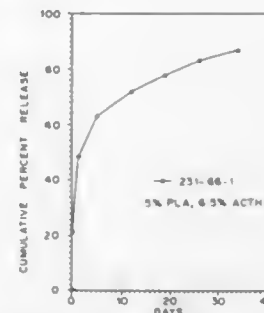
Continuation of Ser. No. 849,754, Mar. 12, 1992, abandoned.

This application Jun. 30, 1994, Ser. No. 268,715

Int. Cl.<sup>6</sup> A61K 9/52, 37/40, 9/50

U.S. Cl. 424-489

12 Claims



1. A polymeric microsphere having a diameter of less than 1000 microns, formed of a biocompatible polymer selected from the group consisting of poly(lactide), poly(lactide-co-glycolide), poly(caprolactone), polycarbonates, polyamides, polyanhydrides, polyamino acids, polyortho esters, polyacetals, polycyanoacrylates, degradable polyurethanes, polyacrylates, polymers of ethylene-vinyl acetate and other acyl substituted cellulose acetates, polysaccharides, non-erodible polyurethanes, polystyrenes, polyvinyl chloride, polyvinyl fluoride, poly(vinyl imidazole), chlorosulphonated polyolefins, polyethylene oxide, copolymers and mixtures thereof and an excipient modulating polymer erosion rate selected from the group consisting of inorganic acids, organic acids, inorganic bases, organic bases, and surfactants in an amount between 0.1 and thirty percent (w/w, polymer), containing adrenocorticotrophic hormone (ACTH) in a concentration of between 0.1% and 50% by weight, wherein the microspheres release the ACTH under physiological conditions over a period of time greater than one day by diffusion and degradation of the polymeric matrix.

5,413,798

PROCESS FOR PREPARING BOVINE PERICARD MATERIALS AND USE THEREOF

Edmund Scholl; Helmut Waldert, both of Melsungen, and Helmut Beyer, Baunatal, all of Germany, assignors to B. Braun Melsungen Aktiengesellschaft, Melsungen, Germany

Continuation of Ser. No. 52,217, Apr. 22, 1993, abandoned,

which is a continuation of Ser. No. 684,675, Apr. 11, 1991,

abandoned. This application Apr. 6, 1994, Ser. No. 223,826

Int. Cl.<sup>6</sup> A61K 33/14, 37/12; A61F 2/28

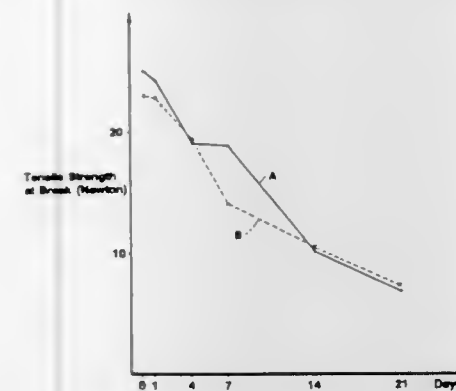
U.S. Cl. 424-715

7 Claims

1. Process for treating bovine pericard tissue to increase resistance to biological degradation which comprises the steps of:

- wet-chemical processing the pericard tissue by a process consisting essentially of:
  - separating from the surface of said tissue any adherent fat and basal membrane,
  - contacting said tissue with an aqueous, alkaline solution of a compound selected from the group consisting of sodium hydroxide, potassium hydroxide, lithium hydroxide and sodium carbonate to swell said tissue and rinsing with water,
  - contacting said swollen tissue with an aqueous sodium chloride solution to control said swelling and rinsing with water,
  - contacting said tissue with a solution of a metal-ion

complexing agent with a pH in excess of 11 and rinsing with water, and  
(v) contacting said tissue with an aqueous buffer solution having a pH of 4.5 to 6.0 and rinsing with water;



(b) drying the pericard tissue; and  
(c) sterilizing the pericard tissue.

5,413,799

METHOD OF MAKING FRUIT-FLAVORED CHEWING WITH PROLONGED FLAVOR INTENSITY

Joo H. Song, Northbrook, and Kevin B. Broderick, Berwyn, both of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Apr. 12, 1994, Ser. No. 226,463

Int. Cl.<sup>6</sup> A23G 3/30

U.S. Cl. 426-3

22 Claims

1. A method of making a free fruit-flavored chewing gum having enhanced long-term flavor, comprising the steps of: selecting a free fruit flavoring agent having a cohesive energy density and a solubility parameter, in S.P.U.'s, defined as the square root of the cohesive energy density; selecting a water-insoluble restrainer having a solubility parameter within about  $\pm 2.0$  S.P.U.'s of the solubility parameter of the free fruit flavoring agent, the solubility parameter of the restrainer defined as

$$\delta = \frac{\rho \Sigma E_i}{MW}$$

preparing a chewing gum mixture including about 5-95% by weight of a bulk sweetener, about 5-95% by weight of a chewing gum base, at least about 7.0% by weight of the restrainer, and about 0.3-10% by weight of the free fruit flavoring agent.

5,413,800

PROCESS FOR THE PREPARATION OF A FOOD PRODUCT

James Bell, Milton Keynes; Robert D. Jones, Bedford, both of United Kingdom; Hans Graber, Hamburg, and Klaus B. Voltinger, Weissenburg-Rehling, both of Germany, assignors to Unilever Patent Holdings B.V., Vlaardingen, Netherlands

Filed Nov. 10, 1993, Ser. No. 149,821

Claims priority, application European Pat. Off., Nov. 11, 1992, 92310283; Nov. 11, 1992, 92310284

Int. Cl.<sup>6</sup> A23L 1/00; H05B 6/00

U.S. Cl. 426-241

11 Claims

1. A process for the rapid total surface heating of a food product comprising exposing the food product to an infra-red heat source having an intensity of from 100 kW/m<sup>2</sup> to 1000 kW/m<sup>2</sup> and a wavelength of from 0.8  $\mu$ m to 2.5  $\mu$ m.

5,413,801  
METHOD AND APPARATUS FOR SERVING CONFECTIONARIES

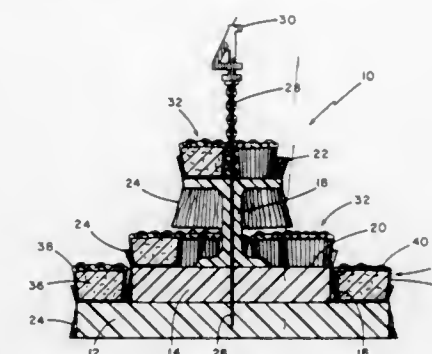
Lillian P. McIlwain, 1830 Middleton Ave., Lisle, Ill. 60532

Filed Apr. 15, 1991, Ser. No. 684,762

Int. Cl.<sup>6</sup> A47G 19/00, 29/00

U.S. Cl. 426-420

8 Claims



1. Apparatus for serving confectioneries comprising:  
a base support member formed from a unitary piece of rigid foam and having an upper surface, a lower surface and a side wall therebetween;  
a second support member formed from a unitary piece of rigid foam and having an upper surface, a lower surface and a side wall therebetween, said second support member being similar in plan to said base support member but having a periphery which is smaller in plan than the periphery of said base support member, said second support member being adapted to be positioned directly on top of said base support member with the lower surface of said second support member in intimate contact with the upper surface of said base support member thereby defining a uniformly dimensioned peripheral ledge at the juncture between said base support member and said second support member; and  
decorative trim means for covering the side walls of said base support member and said second support member, said trim means being adapted to be pinned to said side walls of said support members;  
said ledge configured to receive a plurality of individual cupcakes closely arranged with respect to one another such that said cupcakes and trim means cooperate to simulate an integral tier of cake.  
6. A method for simulating a multi-tiered celebration cake comprising the steps of:  
providing a first support member having a top surface, a bottom surface and a side wall therebetween, said first support member being formed from a unitary piece of rigid foam;  
providing a second support member having a top surface, a bottom surface and a side wall therebetween, said second support member being formed from a unitary piece of rigid foam and being similar in plan to said first support member but having a periphery which is smaller in plan than the periphery of said first support member;  
positioning said second support member on the top surface of said first support member with said lower surface of said second support member in intimate contact with said upper surface of said first support member;  
centering said second support member on said first support member thereby defining a ledge at the juncture between said support members, said ledge having a uniform width and being sized to accept a plurality of cupcakes thereon;  
fixing a strip of decorative trim to the side wall of each support member such that said decorative trim completely covers said side wall; and  
arranging a plurality of individual cupcakes around the ledge defined by the first and second support members

such that said cupcakes and decorative trim cooperate to simulate an integral tier of cake.

5,413,802

**MEAT PRODUCTS CONTAINING GELLING AGENTS**  
Paul J. Baumanis, Marple; Ian T. Norton, Rushden; Charles R. Brown, Bedford, and Jeffrey Underdown, Wellingborough, all of Great Britain, assignors to Thomas J. Lipton Co., Division of Conopco, Inc., Englewood Cliffs, N.J.

Filed Nov. 8, 1993, Ser. No. 148,473

Claims priority, application European Pat. Off., Nov. 9, 1992, 92310223

Int. Cl.<sup>6</sup> A23L 1/0522, 1/0532, 1/314, 1/317

U.S. Cl. 426—574

8 Claims

1. A meat product comprising a meat phase and an aqueous phase, said aqueous phase comprising at least two gelling agents, the first gelling agent being a starch and the second gelling agent being selected from the group consisting of pectin, alginate, agar, furcelleran, gellan, iota-carrageenan, kappa-carrageenan and mixtures thereof, wherein the gelling agents form at least two distinct gelled phases, each of said gelling agents having a gel melting temperature of at least 40° C. and less than 150° C.

5,413,803

**NUTRITIOUS COMPOSITION CONTAINING RAW SOYBEAN MILK AND RAW COWS' MILK**  
Chai-Won Chung, Seoul, Rep. of Korea, assignor to Dr. Chung's Food Co., Ltd., Kyonggi-do, Rep. of Korea

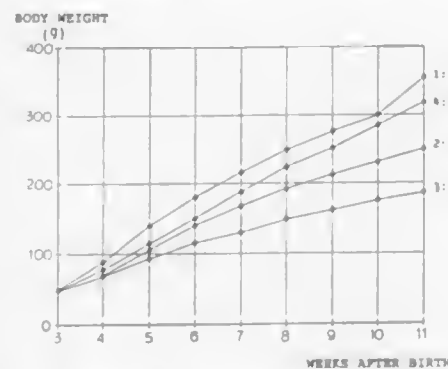
Filed Oct. 25, 1993, Ser. No. 142,815

Claims priority, application Rep. of Korea, May 8, 1993, 93-7903

Int. Cl.<sup>6</sup> A23L 1/29; A23C 9/20

U.S. Cl. 426—598

4 Claims



1. A nutritious composition consisting of raw soybean milk and raw cows' milk in a volume ratio of 2 to 1.

5,413,804

**PROCESS FOR MAKING WHEY-DERIVED FAT SUBSTITUTE PRODUCT AND PRODUCTS THEREOF**  
Kenneth H. Rhodes, Diamond Bar, Calif., assignor to Cacique, Inc., Pasadena, Calif.

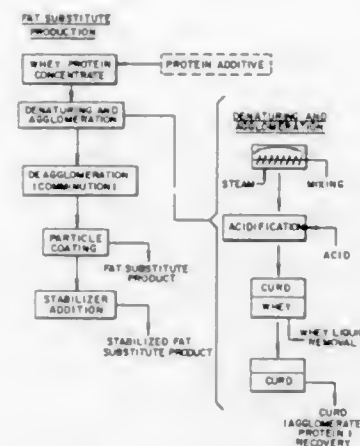
Continuation-in-part of Ser. No. 690,813, Apr. 23, 1991, abandoned. This application Apr. 15, 1992, Ser. No. 867,138  
Int. Cl.<sup>6</sup> A23C 21/00; A23L 1/48

U.S. Cl. 426—583

124 Claims

1. A method of forming a fat-replicating dispersion of protein particles in a continuous aqueous phase which comprises:  
(a) heating and acidifying whey to form (i) a hard curd comprised of agglomerated denatured protein and an aqueous component retained in the curd and (ii) second whey;  
(b) separating said hard curd from said second whey;  
(c) deagglomerating the hard curd to form a fat-replicating dispersion having a substantially smooth emulsion like organoleptic character comprised of (i) a continuous aque-

ous phase of aqueous component released by said curd during deagglomeration and (ii) said denatured whey proteinaceous particles; and



(d) encapsulating said particles with liposomes to form a membrane on said particles.

5,413,805

**LOW OR NO FAT GRANOLA CEREAL MIX AND PROCESS**

Phillip Delpierre, III, Kalamazoo; Pamela J. Stanyon, Battle Creek, and Charles R. Eldred, Bellevue, all of Mich., assignors to Kraft Foods, Inc., Northfield, Ill.

Filed Aug. 31, 1992, Ser. No. 938,186

Int. Cl.<sup>6</sup> A23L 1/18

U.S. Cl. 426—620

9 Claims

1. A granola cereal containing up to 10% fat prepared from a major amount of cereal base which is agglomerated and formed into clusters with a coating syrup which comprises 60% to 85% cereal base and 10% to 30% added sugar, said cereal base comprising from 30% to 50% cereal flakes based upon the weight of the granola cereal product, 5% to 20% rolled grains selected from the group consisting of rolled oats, wheat, barley and combinations thereof, from 0 to 20% cereal flour and from 5% to 20% crisp rice, and from about 1% to about 5% maltodextrin to improve the tackiness of the cereal mixture, said cereal flakes having a particle size wherein a major amount of the flakes after passing through a 1/4 inch screen are retained on a #12 mesh screen while the remainder of the flakes pass the #12 mesh screen, said particle size further improving agglomeration of the clusters, and said 10% to 30% added sugar being present as a coating for the agglomerated clusters of cereal.

5,413,806

**STRIP COATING MACHINE WITH THICKNESS CONTROL**

Curt Braun, Riverside, Calif., assignor to Hunter Engineering Company, Inc., Riverside, Calif.

Filed Feb. 1, 1993, Ser. No. 11,986

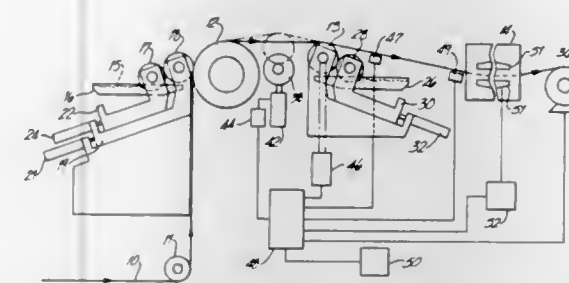
Int. Cl.<sup>6</sup> B05D 1/28; B05C 1/12, 11/00, 13/00

U.S. Cl. 427—9

23 Claims

18. A continuous strip coating machine comprising:  
a top applicator roll for applying a coating to a first face of a strip of material;  
a backup roll for positioning the strip of material against the top applicator roll;  
a bottom applicator roll for applying a coating to a second face of the strip of material after application of a coating to the first face and positioned to contact the strip after the strip leaves the backup roll;  
force measuring means for determining the force between the strip and bottom applicator roll;

means for varying the force between the strip and bottom applicator roll; and



control means coupled to the force measuring means for controlling the means for varying the force between the strip and bottom applicator roll.

5,413,807

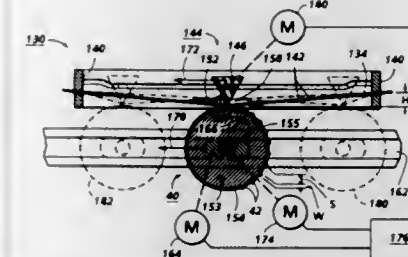
**METHOD OF MANUFACTURING A DONOR ROLL**  
Michael J. Duggan; Ann M. Kazakos, both of Webster, and Daniel R. Gilmore, III, Victor, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 17, 1994, Ser. No. 324,046

Int. Cl.<sup>6</sup> B05D 5/12

U.S. Cl. 427—58

10 Claims



1. A method of manufacturing a donor roll having a plurality of electrodes on the surface thereof for use in developing a latent image, comprising:

providing a substantially cylindrical member; covering at least a portion of the surface of the member tangentially with a screen defining an aperture therein;  
urging a conductive material through at least a portion of the aperture and onto the surface of the member to form at least one of the electrodes; and  
advancing the screen and the surface of the member synchronously to form subsequent electrodes.

5,413,808

**METHOD FOR LONG RANGE PRESERVATION TREATMENT BY LIQUID-AIR INJECTION OF INFRASTRUCTURE MONUMENTS AND OTHER POROUS AND EMBEDDED STEEL STRUCTURES**

Jay S. Wyner, 69 Barkers Point Rd., Sands Point, N.Y. 11050, assignor to Jay S. Wyner, Sands Pt., N.Y.

Continuation-in-part of Ser. No. 375,681, Jul. 5, 1989, abandoned. This application May 3, 1991, Ser. No. 695,528

Int. Cl.<sup>6</sup> B32B 35/00

U.S. Cl. 427—140

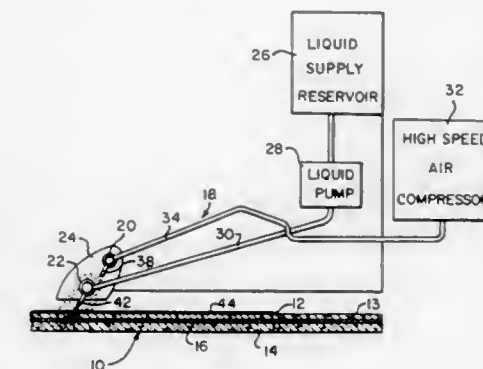
18 Claims

1. The method of preserving porous structures above or below ground, said porous structures including masonry, concrete, brick, stone, marble and wood, as well as those with steel reinforcement members embedded within, without damaging the surfaces of the structures, to prolong the structures' life by an approximate ten-fold increase over present methods against attack by acid rain, erosion, aging or decay, comprising the steps of:

a) applying a liquid preservative material under pressure to

an outer exposed surface of a porous structure at least once; and

b) substantially simultaneously with each said at least one liquid application, directing a pulsating blast of compressed air onto said liquid material acting as a fluid hammer for random masonry construction, directing a continuous air blast for uniform masonry construction, at sufficient velocity and force, with both liquid and air pressure acting together, to penetrate the surface of said porous structure and to inject said liquid preservative in dispersed form deeply into said porous structure so as to coat and waterproof the walls of the interstitial passages existing



between masonry particles in said porous structures with said dispersed fluid material and to prevent said dispersed liquid preservative from stagnating in and blocking said interstitial passages, the incoming rush of air atomizing and forcing said dispersed liquid preservative through said interstitial passages, thus, after treatment, maintaining the breathability of said porous structure by enabling the passage of water vapor and permitting further and continued migration of said liquid preservative for a time to provide even deeper protection against cracks and delamination of said porous structure from internal stresses and environmental and weathering exposure.

5,413,809

**METHOD FOR ACHIEVING RECOAT ADHESION OVER A SILANE TOPCOAT**

Isidor Hazan, Clementon, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 1, 1993, Ser. No. 86,781

Int. Cl.<sup>6</sup> B32B 35/00; B05C 13/00; B05D 3/02, 1/36

U.S. Cl. 427—140

13 Claims

1. A method for in-line or end-of-line repair an automobile or truck during their original manufacture, having a cured basecoat/clearcoat finish in which the clearcoat comprises an organosilane polymer, which method comprises the steps of:

(a) forming a repair basecoat by applying, over said clearcoat, a basecoat composition which is primarily non-silane containing but which comprises a silane curing catalyst;  
(b) forming a repair topcoat by applying wet on wet, over said repair basecoat, a clearcoat composition comprising an organosilane polymer; and  
(c) curing said repair topcoat and basecoat together.

5,413,810

**FABRICATING ELECTROSTATOGRAPHIC IMAGING MEMBERS**

Henry T. Mastalski, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 3, 1994, Ser. No. 176,973

Int. Cl.<sup>6</sup> B05D 1/02

U.S. Cl. 427—171

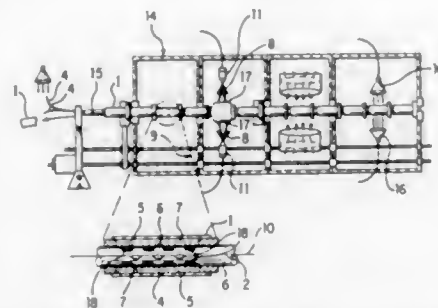
21 Claims

1. A process for fabrication of a seamless belt by application of a coating to an endless substrate, comprising:

(1) elastically stretching an endless substrate over a hollow



- cylindrical elongated support mandrel, said mandrel being formed of porous material;
- (2) applying fluid under pressure through said mandrel to form a layer of fluid between an outer surface of said mandrel and an inner surface of said substrate;
  - (3) manipulating the flow of said fluid to axially displace and to rotate said substrate on the outer surface of said mandrel; and



- (4) manipulating the flow of said fluid to orient a selected portion, less than an entire surface of said substrate, to alter an angle of said portion in relationship to the surface of said mandrel to an angle according to a direction of application of a coating to achieve a coating angle necessary for producing optimal coating results.

5,413,811

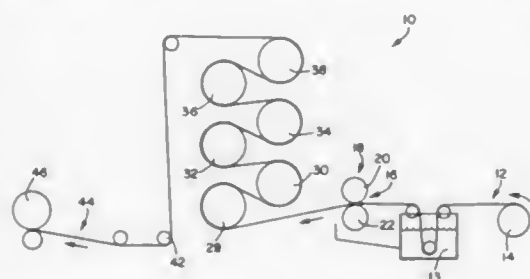
# CHEMICAL AND MECHANICAL SOFTENING PROCESS FOR NONWOVEN WEB

Steven W. Fitting, Acworth; John J. Sayovitz, Marietta; Joel E. Edwards, La Grange, and Gregory T. Sudduth, Lawrenceville, all of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 18, 1994, Ser. No. 210,203  
Int. Cl.<sup>6</sup> B05D 3/12

U.S. Cl. 427—176

13 Claims



1. A method of softening a nonwoven web comprising the steps of:
  - wetting a nonwoven web having a starting, unstretched width and a starting cup crush value, with an aqueous solution of softening chemicals,
  - necking the saturated nonwoven web to a second width of between about 50 and 95 percent of its starting, unstretched width,
  - drying the nonwoven web at a temperature and time sufficient to remove at least 95 percent of the moisture from the nonwoven web,
  - wherein said web has a final cup crush value which is less than 50 percent of said starting cup crush value.

5,413,812

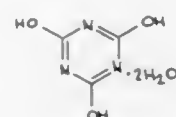
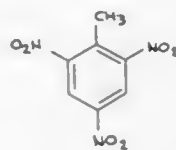
# METHOD FOR FABRICATING NON-DETONABLE EXPLOSIVE SIMULANTS

Randall L. Simpson, and César O. Prunedá, both of Livermore, Calif., assignors to The Regents of the University of California, Oakland, Calif.

Division of Ser. No. 27,366, Mar. 8, 1993. This application Apr. 1, 1994, Ser. No. 221,568  
Int. Cl.<sup>6</sup> B05D 7/00

U.S. Cl. 427—212

17 Claims



1. A method for fabricating an explosive simulant having at least scent and elemental equivalents to an explosive material, comprising the steps of:
  - forming a solution by dissolving a quantity of an explosive material in a solvent;
  - adding a quantity of non-explosive material to the thus formed solution, the quantity of non-explosive material being greater in proportion than the quantity of explosive material; mixing the solution; and removing the solvent from the solution.

5,413,813

# CVD OF SILICON-BASED CERAMIC MATERIALS ON INTERNAL SURFACE OF A REACTOR

Richard Cruse, Kendall Park, N.J.; Veronika Szalai, New Haven, Conn.; Terence Clark, Princeton, N.J.; Stephen Rohman, Kendall Park, N.J., and Robert Mininni, Stockton, N.J., assignors to Enichem S.p.A., Milan, Italy

Filed Nov. 23, 1993, Ser. No. 155,769  
Int. Cl.<sup>6</sup> B05D 7/22; C23C 16/00

U.S. Cl. 427—237

23 Claims

1. In a method for protecting from coking the inner surface of a chemical reactor by decomposing a precursor compound in the vapor phase inside the reactor, in an inert or reducing gas atmosphere to form a thin layer of a ceramic material on the inner surface of the chemical reactor, the improvement comprising said precursor, containing nitrogen, carbon and hydrogen atoms and at least two silicon atoms, wherein at least two silicon atoms are bonded to a single nitrogen atom, with the proviso that when the precursor contains only two or three silicon atoms bonded to a single nitrogen atom, said precursor is selected from compounds containing at least one alkyl group bonded to a silicon atom, said alkyl group having at least two carbon atoms.

5,413,814

# TECHNIQUES FOR COATING ARTICLES TO HAVE THE APPEARANCE OF WOOD, LEATHER OR OTHER NATURALLY OCCURRING MATERIALS

Robert L. Bowen, 42 W. Lynwood Blvd., Hillsdale, Mich. 49242, and Manuel C. Turchan, 42288 Crestview, Northville, Mich. 48167

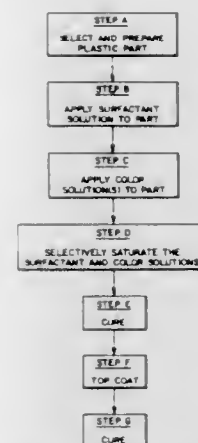
Filed Mar. 15, 1994, Ser. No. 212,904  
Int. Cl.<sup>6</sup> B05D 1/36, 5/00

U.S. Cl. 427—262

47 Claims

1. A method for altering the appearance of an article formed

- of a material to have an appearance of at least one other material, comprising:
- forming a plurality of grooves on a surface of an article, the grooves defining a surface texture on the article;
  - applying a surfactant solution on the surface of the article so that the grooves have a greater amount of surfactant solution than a remaining portion of the surface of the article;



- applying at least one color solution on the surface of the article so that the grooves have a greater amount of a mixture of the surfactant solution and the color solution than the remaining portion of the surface of the article; and saturating the surfactant solution, color solution, and substrate color to achieve a desired concentration throughout the surface texture and obtaining a desired grain, hue or tone, and texture.

5,413,815

# AQUEOUS RELEASE COATING COMPOSITION FOR PRESSURE SENSITIVE ADHESIVES

Martin M. Williams, Harrisburg, and Rodney J. Trahan, Jr., China Grove, both of N.C., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 971,027, Nov. 3, 1992, Pat. No. 5,284,690. This application Aug. 19, 1993, Ser. No. 108,263  
Int. Cl.<sup>6</sup> B05D 3/12

U.S. Cl. 427—289

4 Claims

1. A method of improving the releasability of an article having a backing layer and at least one pressure sensitive adhesive layer, comprising:
  - applying to said backing layer a mixture comprising a polymer having carboxylic acid functionality and an aqueous solution or dispersion of an organic compound having at least one fatty acid ester and at least one quaternary amine, wherein the level of said organic compound is about 0.1% by dry weight to about 50% by dry weight, based on the dry weight of said polymer.

5,413,816

# METHOD OF FORMING AN ALUMINUM PROTECTIVE COATING ON A CARBON-CARBON COMPOSITE

Raymond V. Sara, Strongsville, Ohio, assignor to UCAR Carbon Technology Corporation, Danbury, Conn.

Filed Dec. 24, 1991, Ser. No. 813,027  
Int. Cl.<sup>6</sup> B05D 3/00, 3/02, 5/00, 1/36

U.S. Cl. 427—294

6 Claims

1. A method for forming an aluminum coating over a carbon-carbon composite in situ comprising the steps of:
  - (a) forming a slurry composed of particles of an intermetallic of aluminum and a metal selected from the group consisting of tantalum, titanium and hafnium in a liquid suspending vehicle composed of a resinous adhesive binder which

- provides a source of carbon upon pyrolytic decomposition having a minimum char yield of 3% and an independent source of carbon selected from the group consisting of glassy carbon and graphite in an amount of 1 to 6% by weight of the slurry;
- (b) spreading said aluminum intermetallic, carbon-containing char-yielding slurry over said carbon-carbon composite to form a coating;
  - (c) distributing aluminum in elemental form on the surface of said coating in a concentration of between 0.27 g/in<sup>2</sup> and 0.4 g/in<sup>2</sup>; and
  - (d) reacting said carbon-carbon composite and coating in an evacuated furnace heated to between 850° C. and 1500° C. for a controlled time period to form a dense impermeable aluminum coating chemically bonded to said carbon-carbon composite.

5,413,817

# METHOD FOR ADHERING METAL COATINGS TO POLYPHENYLENE ETHER-POLYSTYRENE ARTICLES

Herbert S. Chao, Schenectady, and Carol L. Fasoldt, Nassau, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 5, 1993, Ser. No. 147,509  
Int. Cl.<sup>6</sup> B05D 3/10

U.S. Cl. 427—306

13 Claims

1. A method for metallizing a resinous substrate comprising a thermoplastic mixture of at least one polyphenylene ether and at least one poly(alkenylaromatic compound), said method comprising the steps of:
  - contacting at least a portion of said surface with aqueous tetravalent cerium in a concentration of at least about 0.1 M,
  - non-electrolytically depositing a metal layer on said surface; and
  - heat treating the metal-coated surface at a temperature in the range of about 50°–80° C. for at least about 10 minutes.

5,413,818

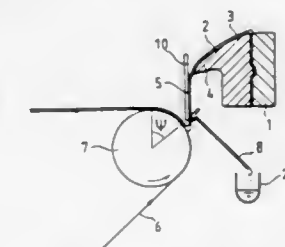
# CURTAIN COATING METHOD AND APPARATUS UTILIZING CHECKING PLATE FOR CONTROLLING LIQUID FLOW

Yasushi Suga; Kiyoshi Kobayashi, and Toshimitsu Sasahara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 714,525, Jun. 13, 1991, abandoned. This application Dec. 15, 1992, Ser. No. 993,803  
Claims priority, application Japan, Jun. 28, 1990, 2-168275  
Int. Cl.<sup>6</sup> B05D 1/30

U.S. Cl. 427—420

14 Claims



1. In a curtain coating method in which a coating liquid freely falling in the form of a film from a hopper is made to collide with a web, along a collision line, continuously running and circumferentially turning around a backup roller to thereby perform coating utilizing a coating plate, the improvement wherein said coating plate has a checking plate which is doglegged in section provided on a forward end of said coating plate and is inserted so that said freely falling coating liquid flows along said checking plate before said freely falling coating liquid reaches said web so as to be coated on said web, said

checking plate comprising first and second projections extending from an end of said coating plate, said first projection extending above an extended line defined by said coating plate and said second projection extending below said extended line.

5,413,819

## SHOTCRETE COMPOSITIONS

Josef F. Drs, Vienna, Austria, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 55,440, Apr. 29, 1993, abandoned, which is a continuation of Ser. No. 862,136, Apr. 2, 1992, abandoned, which is a continuation of Ser. No. 647,104, Jan. 25, 1991, abandoned. This application Nov. 29, 1993, Ser. No. 158,656

Claims priority, application Germany, Jan. 27, 1990, 40 02 412.1

Int. Cl.<sup>6</sup> B05D 1/02; C04B 22/16

U.S. Cl. 427—427

11 Claims

1. A shotcreting process for spraying a substrate with concrete comprising the steps of forming a pumpable concrete mix, pumping said concrete mix to a spray nozzle, adding an accelerator to the concrete mix in the vicinity of the spray nozzle to form sprayable concrete and spraying the sprayable concrete on the substrate, the pumpable concrete mix comprising a stabilizer which is a phosphonic acid derivative capable of forming a chelate with calcium, cement, aggregate and optionally, one or more mineral admixtures.

5,413,820

## REACTIVE IONIZED CLUSTER BEAM DEPOSITION METHOD

Akira Hayashi, Tokyo, Japan, assignor to Tokyo Serofan Co., Ltd., Tokyo, Japan

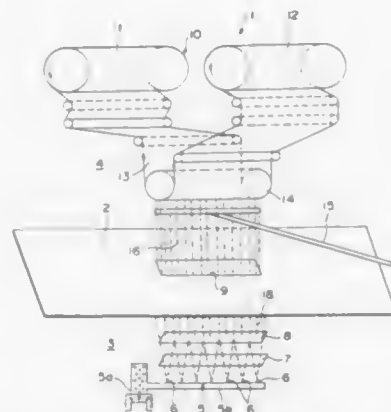
Filed Jul. 28, 1993, Ser. No. 98,512

Claims priority, application Japan, Feb. 26, 1993, 5-038906

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 427—527

13 Claims



1. A method of forming a deposited film on a substrate, comprising the steps of:

- heat-vaporizing a deposition substance in a closed heating crucible;
- injecting a vapor thereof into a first vacuum subregion of a vacuum region;
- ionizing atom clusters of said vapor by means of an electron emitter immediately after the injection, and transforming said ionized clusters into ionized cluster beams by giving said clusters an acceleration energy at an acceleration voltage;
- introducing the ionized cluster beam into a second vacuum subregion of said vacuum region through an opening formed in a wall which separates said vacuum region into said first vacuum subregion where said closed heating crucible and an ionization accelerating unit are located

and said second vacuum subregion where a deposited film forming portion is located;

(e) introducing a reactive gas into said second vacuum subregion; and

(f) causing reaction of said ionized cluster beams with said reactive gas in said second vacuum subregion, and impinging said ionized cluster beam on said substrate at said deposited film forming portion.

5,413,821

## PROCESS FOR DEPOSITING CR-BEARING LAYER

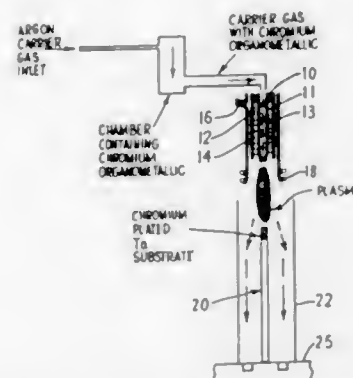
Timothy W. Ellis; Thomas A. Lograsso, both of Ames, Iowa, and Mark A. Eshelman, Kentwood, Mich., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jul. 12, 1994, Ser. No. 273,978

Int. Cl.<sup>6</sup> B05D 3/06

U.S. Cl. 427—576

14 Claims



1. A method of applying a chromium-bearing layer to at least a portion of a substrate, comprising introducing a chromium bearing organometallic compound in a carrier gas to an inductively coupled plasma to thermally decompose said organometallic compound, and communicating the plasma and the substrate to be coated so as to deposit a chromium-bearing layer on the substrate.

5,413,822

## ARTICLE OF PLASTIC MATERIAL AT LEAST A PART OF THE OUTER SURFACE OF WHICH IS DECORATED

Michel Rey, Neuchâtel, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

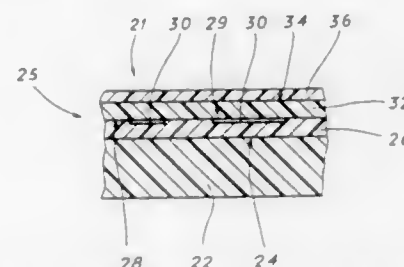
Filed Nov. 22, 1993, Ser. No. 155,212

Claims priority, application France, Nov. 25, 1992, 92 14285

Int. Cl.<sup>6</sup> B32B 3/10; C09K 19/00

U.S. Cl. 428—1

8 Claims



1. An article including a base formed of at least one first elastomer, and a decoration provided on at least one outer surface of said base, said decoration comprising:

- a protective layer;
- a decorative pattern located between said base and said protective layer, said decorative pattern comprising at least one primary design formed by at least one thermochromic ink including liquid crystals;
- a first intermediate layer located between said base and said primary design; and,

a second intermediate layer located between said primary design and said protective layer, each of said first and second intermediate layers being formed of at least one polyamide base copolymer.

5,413,823

## COLLAPSIBLE AND EXPANDABLE ROLL RISER

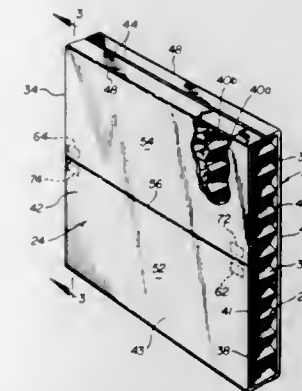
Philip B. Lo Presti, Chicago, and Michael J. Rancich, Mundelein, both of Ill., assignors to Shippers Paper Products Company, Glenview, Ill.

Filed Feb. 2, 1994, Ser. No. 190,553

Int. Cl.<sup>6</sup> B32B 3/04, 3/06

U.S. Cl. 428—12

23 Claims



1. A collapsible and expandable support device capable of attaining collapsed and expanded configurations, comprising: first and second sheet means having interior and exterior surfaces and fold lines for permitting said first and second sheet means to attain collapsed and expanded configurations;

a collapsible and expandable core being collapsible to a collapsed configuration and expandable to an expanded configuration; having end portions thereof fixedly secured to oppositely disposed portions of said interior surfaces of said first and second sheet means at positions intermediate said fold lines; and having oppositely disposed side portions; and

means disposed upon at least one of said interior surfaces of one of said first and second sheet means for releasably engaging at least one of said side portions of said collapsible and expandable core when said collapsible and expandable core is disposed in said expanded configuration so as to maintain said collapsible and expandable support device in said expanded configuration, and for permitting disengagement from said at least one of said side portions of said collapsible and expandable core so as to permit said collapsible and expandable core and said collapsible and expandable support device to attain said collapsed configurations.

5,413,824

## COLLAPSIBLE AND EXPANDABLE ROLL RISER

Donald L. Van Erden, Wildwood, Ill., assignor to Shippers Paper Products Company, Glenview, Ill.

Filed Feb. 8, 1994, Ser. No. 193,454

Int. Cl.<sup>6</sup> B32B 3/04, 3/08, 3/12

U.S. Cl. 428—12

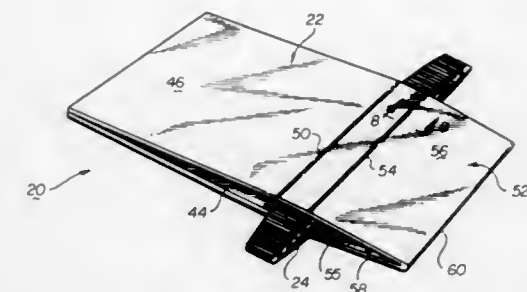
15 Claims

1. A collapsible and expandable support device capable of attaining collapsed and expanded configurations, comprising: a sheet member folded upon itself so as to define two sheet portions connected together at a first end portion thereof by first fold line means, and having two free unattached ends at a second end portion thereof;

a collapsible and expandable core having end portions thereof fixedly secured to oppositely disposed interior surface portions of said two sheet portions at positions intermediate said first and second end portions of said

folded sheet member so as to separate said first end portion, comprising two sheet sections connected together by said first fold line means, from said second end portion comprising two unattached sheet sections; and also having two side portions; and

second and third fold line means for respectively connecting said two sheet sections of said first end portion of said sheet member to said collapsible and expandable core, and said two unattached sheet sections of said second end portion of said sheet member to said collapsible and expandable core, such that when said collapsible and expandable core is collapsed, said first fold line means and said two free unattached ends of said sheet member are



disposed remote from said side portions of said collapsible and expandable core, whereas when said collapsible and expandable core is expanded, said second fold line means permit said two sheet sections and said first fold line means of said first end portion of said sheet member to be folded into engagement with a first one of said two side portions of said collapsible and expandable core, and said third fold line means permit said two unattached sheet sections of said second end portion of said sheet member to be folded into engagement with a second one of said two side portions of said collapsible and expandable core whereby said collapsible and expandable support device is retained in its expanded configuration.

5,413,825

## ARTIFICIAL CHRISTMAS TREE

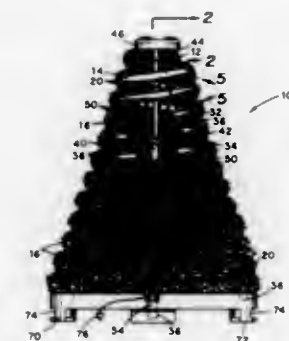
Clarice M. Chaikin, 906 Four Mile Post Rd., Huntsville, Ala. 35802

Filed May 18, 1994, Ser. No. 245,590

Int. Cl.<sup>6</sup> A47G 33/06

U.S. Cl. 428—18

12 Claims



1. A collapsible artificial Christmas tree assembly comprising:

- a base member;
- a mast having a bottom end and a top end, said bottom end being adapted for mounting in upright position on said base member;
- a spiral coil of split plastic tubing having an outer convolution thereof secured to said base member;



a cap member adapted for being removably mounted on the top end of said mast;  
 an inner convolution of said spiral coil being connected; stirrer means securing said convolutions to said cap in spaced-apart relation from one another;  
 said spiral coil carrying decorative material and an electrical wire disposed inside of said split tubing;  
 electrical lamps operably connected to said wire at intervals along said tubing, with bulbs thereof extending radially outwardly through walls of said tubing; and  
 means for coupling said wire to a source of electric current.

5,413,826

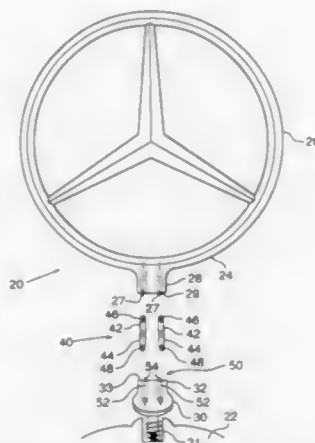
**DETACHABLE MOTOR VEHICLE HOOD ORNAMENT**  
 Guenter Klonikowski, Apt. 404 - 385 Queenston Road, Hamilton, Ontario, Canada L8K 1J1

Filed Jun. 19, 1992, Ser. No. 901,302

Int. Cl.<sup>6</sup> B60R 13/04

U.S. Cl. 428—31

9 Claims



1. A hood ornament for mounting on a vehicle, said hood ornament comprising:  
 a replaceably removable ornament member having an emblem portion and a first stem portion extending therefrom with said first stem portion having an end surface and at least one orifice in said end surface;  
 a base member having a second stem portion, said base member being adapted to be fixedly mounted to said vehicle;  
 at least one interconnecting member affixed to and extending beyond a selected one of said first and second stem portions with each interconnecting member terminating in a first free end portion;  
 at least one receiving means positioned with the other of said stem portions and dimensioned to frictionally engagingly receive said free end portion;  
 said first and second stem portions being securely, yet releasably, connectable one to the other by way of said at least one interconnecting member so as to thereby allow said ornament member to be replaceably removed from said vehicle.

5,413,827

**ALDEHYDE SCAVENGING COMPOSITIONS AND METHODS RELATING THERETO**

Vincent Brodie, III, Wilmington, Del., and Donna L. Visloli, Lower Gwynedd, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 3, 1994, Ser. No. 176,740

The portion of the term of this patent subsequent to Feb. 8, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B29D 22/00

U.S. Cl. 428—35.7

7 Claims

1. A packaging material having an inner surface which

encloses a product and an outer surface, the packaging material comprising:

polyalkylene imine ("PAI") in an amount less than about 16 micrograms per square centimeter and greater than about 1.8 micrograms per square centimeter, wherein the PAI is either exposed at the inner surface of the packaging material or is separated from the inner surface of the packaging material by an aldehyde permeable material, provided that if the aldehyde permeable material comprises a hydrocarbon polyolefin layer, the hydrocarbon polyolefin layer is less than 0.25 mils thick.

5,413,828

**PLASTIC ARTICLE HAVING FLAME RETARDANT PROPERTIES**

Francois De Keyser, Overijse, Belgium, assignor to Monsanto Europe S.A./N.V., St. Louis, Mo.

Filed Feb. 13, 1992, Ser. No. 835,151

Claims priority, application European Pat. Off., Nov. 7, 1991, 91870176

Int. Cl.<sup>6</sup> B29D 22/00; B32B 3/26, 27/00; B27N 9/00

U.S. Cl. 428—36.5

12 Claims

1. A plastic article having flame retardant properties which comprises a core of plastic polymeric material which is coated with a protective, flame retardant layer, characterized in that the flame retardant layer consists essentially of a mixture of a thermoplastic polymeric material selected from the group consisting of a polyolefin and mixtures of polyolefins and a flame retardant, char-forming, intumescent system (FRI system) comprising, as expressed by reference to the FRI system (100%), from 5% to 50% by weight of a flame retardant char-forming, intumescent additive and from 95% to 50% by weight of a catalyst selected from the group consisting of an ammonium phosphate, ammonium polyphosphate and mixtures, thereof.

5,413,829

**SELF-ADHESIVE WALLCOVERINGS**

Kenneth D. Brown, Tyne & Wear, and David A. Williams, Alnwick, both of England, assignors to Forbo-CP Limited, England

PCT No. PCT/GB92/01685, § 371 Date Jul. 21, 1993, § 102(e) Date Jul. 21, 1993, PCT Pub. No. WO93/06301, PCT Pub. Date Apr. 1, 1993

PCT Filed Sep. 14, 1992, Ser. No. 50,091

Claims priority, application United Kingdom, Sep. 13, 1991, 9119655

Int. Cl.<sup>6</sup> D21H 27/20

U.S. Cl. 428—40

28 Claims

1. A package comprising a sealed container in combination with a roll of wallcovering material for application to a wall in strips, said sealed container containing said roll of wallcovering material and said wallcovering material comprising in sequence a pressure sensitive adhesive layer, a hydrophilic substrate layer, a decorative layer and release surface, the adhesive layer of one winding being received on the release surface of the adjacent winding, in which said wallcovering material is such that it will undergo an increase in area from a dry area d to a wet area w of at least 0.1% of d when subjected to a wet expansion test, and wherein said wallcovering material in the package has an area which is such that

$$\mu - y\Delta \leq x \leq \mu + z\Delta$$

where

 $\mu$  is  $(d+w)/2$  $\Delta$  is  $(w-d)/2$  $y$  is in the range  $-0.5$  to  $0.8$  and

$z$  is in the range  $-0.8$  to  $0.95$ , and moisture content in the package is controlled to be above ambient for providing dimensional stability to the wall covering material and the moisture content is thereby controlled.

5,413,830

**DOCUMENT SHEET WITH RECESSED CAVITY AND OBJECT RECEIVED THEREIN**

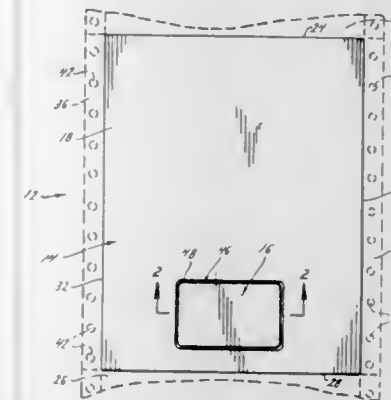
Paul R. Edwards, 235 Greenbriar Estates Dr., St. Louis, Mo. 63122

Filed Mar. 25, 1993, Ser. No. 36,902

Int. Cl.<sup>6</sup> B32B 3/00

U.S. Cl. 428—40

16 Claims



1. A document sheet comprising:

a sheet of paper material having a front surface and a back surface and having a peripheral edge and a first thickness between the front and back surfaces;

an indentation formed by compressing in the sheet front surface, the indentation having an indentation surface recessed a first distance into the sheet thickness from the front surface, the indentation being completely surrounded by a portion of the sheet having the first thickness, said paper sheet is continuous within the peripheral edge; and

an object having a first surface and a second surface and a second thickness that is at least equal to the first distance, the object being received within the indentation and the second surface of the object being removably secured to the indentation surface.

5,413,831

**BELLOWS AND PROCESS FOR PRODUCTION THEREOF**

Takeshi Nemoto, and Teruko Nemoto, both of 19-10, Kotsubo 5-chome, Zushi 249, Japan

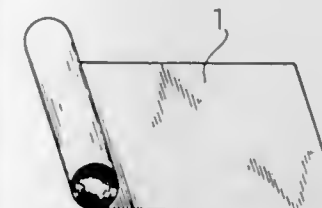
Division of Ser. No. 899,633, Jun. 16, 1992, Pat. No. 5,316,819.

This application Apr. 19, 1993, Ser. No. 49,520

Int. Cl.<sup>6</sup> G12B 1/04; B32B 3/02

U.S. Cl. 428—43

3 Claims



1. A sheet material for forming a bellows comprising:

a plurality of series of pieces of the same configuration of the same size, said plurality of pieces including first, second and third pieces arranged in a manner that said first and second pieces being adjacent to each other with respective mating first sides thereof and said second and third pieces being adjacent to each other with mating second sides opposite to said first sides thereof;

each piece having outer edges adapted to define the external configuration of the bellows and a recessed portion de-

fined by inner edges and defining a configuration of the inner space of the bellows,

a pair of first bridging portions provided to at least partially define a first border between said adjacent first and second pieces for connecting respective first sides of said first and second pieces and a second bridging portion provided to at least partially define a second border between said adjacent second and third pieces for connecting respective second sides opposite to said first sides of said second and third pieces.

5,413,832

**TUFTED PILE FABRIC FORMED FROM SPUN AND FILAMENT SPACE-DYED YARN**

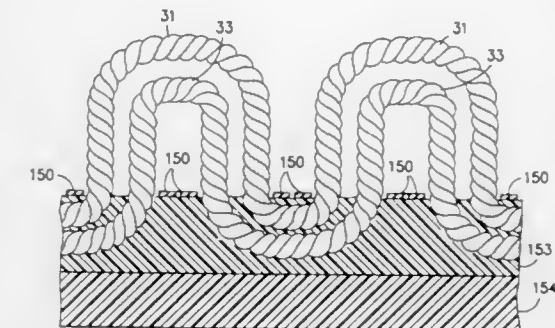
Richard C. Willey, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Jan. 26, 1994, Ser. No. 187,605

Int. Cl.<sup>6</sup> B32B 33/00; D04H 11/00

U.S. Cl. 428—92

6 Claims



1. A pile fabric, comprising:

a tufted pile portion extending from a backing portion, said pile portion including tufts of bulk continuous filament yarn in alternating arrangement with tufts of spun yarn, said tufts of bulk continuous filament yarn including yarn space-dyed with a plurality of colors, said tufts of spun yarn comprising multi-ply spun yarn formed from a plurality of spun singles wherein at least a portion of said plurality of spun singles is space-dyed with a plurality of colors.

5,413,833

**INJECTION MOLDED PLASTIC BOSS DESIGN**

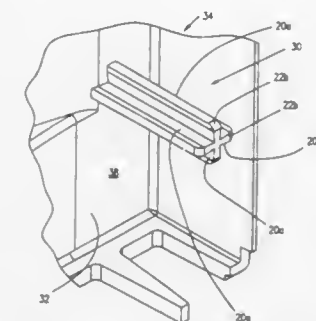
Gilberto Hernandez; Erica J. Scholder, both of Austin, and Doug Thompson, Round Rock, all of Tex., assignors to Dell USA, L.P., Austin, Tex.

Filed May 23, 1994, Ser. No. 247,385

Int. Cl.<sup>6</sup> B32B 3/30

U.S. Cl. 428—119

13 Claims



1. An injection molded plastic part comprising:

a wall portion having opposite first and second sides; and a boss formed on and longitudinally projecting outwardly

from said second side of said wall portion, said boss having, along its length, a cross-section defined by a plurality of webs joined at and laterally extending outwardly from a junction area, each of said webs having an outer side edge portion spaced laterally apart from said junction area, and a pair of opposite side portions that convergently extend from said outer side edge portion laterally to said junction area.

5,413,834

# MITER-FOLDABLE SATURATED PAPER-BASED OVERLAY SYSTEM AND METHOD FOR FABRICATING THE SAME

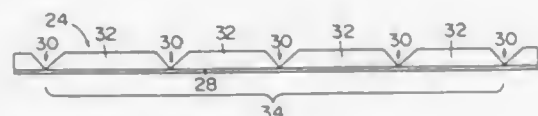
Bruce W. Hunter, Pennsburg, and Harold C. Hleter, Quaker-town, both of Pa., assignors to Specialty Paperboard/Endura, Inc., Brattleboro, Vt.

Filed Mar. 31, 1992, Ser. No. 862,017

Int. Cl.<sup>6</sup> B32B 3/04

U.S. Cl. 428—121

9 Claims



1. An overlay system comprising:
  - a wood substrate having a first side and a second side opposite said first side, said second substrate side having a miter cut operative to permit said substrate to be folded at said miter cut such that said first substrate side is miter-folded so as to present an edge between two non-coplanar surfaces;
  - a saturated paper sheet having a first side coextensive with and adhesively contacting said miter-folded first substrate side, and having a second side opposite said adhered first saturated paper sheet side, said adhered saturated paper sheet directly adhered to said wood substrate prior to miter-cutting so as to permit formation of a miter-folded edge, and thereby being adhered upon miter-folding to said edge between said non-coplanar surfaces of said first side of said miter-folded saturated paper sheet substrate, said saturated paper sheet substrate being saturated prior to adhesion thereof to said first substrate side using a latex saturant comprised of a blend of two components, a first component selected from the group consisting of an acrylic and an ethylene vinyl acetate, and a second component selected from the group consisting of polyvinyl chloride, styrene acrylate, vinyl acetate, and methyl methacrylate, said first and second components having  $T_g$  values which differ by at least 30, and said saturant further comprising a thickener and a release agent, said saturated paper sheet being further hot calendered to a Sheffield smoothness of less than 100 prior to adhering said sheet to said wood substrate, and said second side of said saturated paper sheet substrate thereby presenting a continuous paper surface across said miter-folded edge.

5,413,835

# MAGNETIC RECORDING MEDIUM HAVING AN UNDERLAYER OF LOW MELTING POINT METAL ALLOY IN THE FORM OF SPHERICALLY SHAPED STRUCTURES

Yoshihiro Ikeda, Yokohama, and Shinji Takayama, Tokyo, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 26, 1993, Ser. No. 23,413

Claims priority, application Japan, Mar. 16, 1992, 4-055967

Int. Cl.<sup>6</sup> G11B 5/00; C23C 14/00

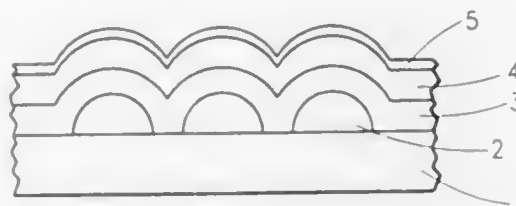
U.S. Cl. 428—141

2 Claims

1. A magnetic recording medium with an intermediate layer

of irregular thickness between a substrate and a magnetic layer to increase the irregularity in the topology of the surface of the magnetic medium, wherein the intermediate layer is selected from the group consisting of:

- a) an alloy whose composition is expressed by  $Zn_{100-x}M_x$  in atomic percentage, where M is at least one element selected from the group consisting of In, Sn, Bi, and Li, and x is in the range of approximately 80 to 90;
- b) an alloy whose composition is expressed by  $Mg_{100-y}L_y$  in atomic percentage, where L is at least one element selected from the group consisting of Pb, In, and Sn, and y is in the range of approximately 80 to 94;



- c) an alloy whose composition by  $Al_xGa_{100-x}$  or  $Al_xSn_{100-x}$  in atomic percentage, where a is in the range of approximately 10 to 35 and b is in the range of approximately 1 to 5;
- d) an alloy whose composition is expressed by  $Bi_{100-c}N_c$  in atomic percentage, where N is selected from the group consisting of Pb, In, and Sn, and c is in the range of approximately 30 to 86; and
- e) an alloy whose composition is expressed by  $T_{100-d}A_d$  in atomic percentage, where T is selected from the group consisting of In and Sn, A is selected from the group consisting of Pb and Sn, T and A are different elements, and d is in the range of approximately 20 to 55.

5,413,836

# FRAME BAR EXTRUSION

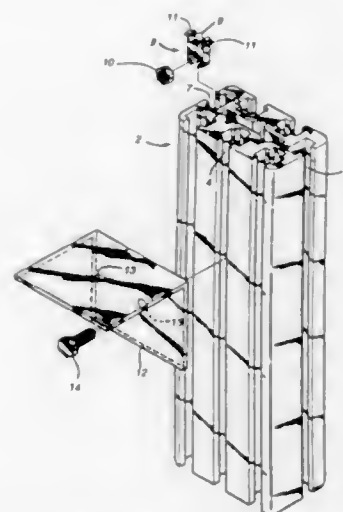
Kin L. Hsieh, No. 9, Alley 17, Lane 26, Jihhsin St., Tu Cheng Hsiang, Taipei Hsien, Taiwan, Prov. of China

Filed Jul. 9, 1993, Ser. No. 89,662

Int. Cl.<sup>6</sup> B32B 3/20; E04H 12/00

U.S. Cl. 428—188

4 Claims



1. A frame comprising:
  - a plurality of extrusions each longitudinally defining at least one channel having a bottom and two side walls, a flange projecting from each side wall toward the other side wall;

a plurality of links each defining a plurality of apertures; a plurality of threaded nuts; and a plurality of threaded bolts wherein each of the links is disposed against the flanges of one of the extrusions, and each of the threaded nuts is receivable in the channel defined in one of the extrusions, and each of the threaded bolts is insertable through one of the apertures defined in one of the links into the slot defined in one of the extrusions, and each of the threaded bolts is engagable with one of the threaded nuts for firmly abutting each of the links against the flanges of one of the extrusions.

5,413,837

# THREE-DIMENSIONAL KNIT FABRIC

Moshe Rock, Andover, and Douglas Lumb, Methuen, both of Mass., assignors to Malden Mills Industries, Inc., Lawrence, Mass.

Continuation of Ser. No. 906,614, Jun. 30, 1992, abandoned.

This application Apr. 4, 1994, Ser. No. 221,659

Int. Cl.<sup>6</sup> B32B 23/02

U.S. Cl. 428—192

20 Claims

1. A three-dimensional knit or woven fabric comprising:
  - a first fabric layer having an outer surface, a second fabric layer having an outer surface, and a yarn interconnecting the two layers, wherein the outer surfaces of each of the first and second layers has a barrier layer applied thereto without the addition of an intermediate adhesive that is both impermeable to liquid water and permeable to water vapor, wherein the fabric has edges therealong that are imperviously sealed to promote air entrapment, to prevent infiltration of water and to retain buoyancy.

5,413,838

# BOTH-SIDE ROUGHENED COPPER FOIL WITH PROTECTION FILM

Keiji Azuma; Kimikazu Katoh, both of Tokyo, and Ryoichi Oguro, Imaichi, all of Japan, assignors to Sumitomo Bakelite Company Limited and Circuit Foil Japan Co., Ltd., both of Tokyo, Japan

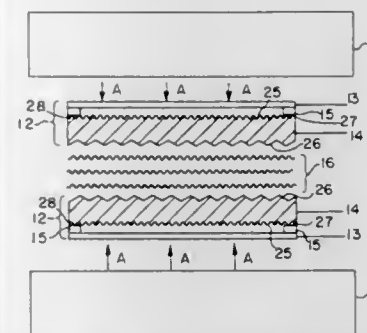
Continuation-in-part of Ser. No. 893,677, Jun. 5, 1992, abandoned. This application Aug. 24, 1993, Ser. No. 111,018

Claims priority, application Japan, Jun. 18, 1991, 3-145704

Int. Cl.<sup>6</sup> B32B 23/02, 3/00, 15/08

U.S. Cl. 428—194

27 Claims



1. A protected copper foil product for lamination to at least one prepreg, comprising:
  - (a) a copper foil having a first roughened side and opposite thereto a second roughened side, the copper foil having two longitudinally extending side edge portions;
  - (b) an organic protection film disposed over the first of said roughened sides of said copper foil, said organic protection film having a melting point equal to or higher than a temperature at lamination of said at least one prepreg; and
  - (c) an adhesive which bonds said organic protection film to said first roughened side of said copper foil only at at least one of said longitudinally extending side edge portions of said first roughened side, said organic protection film not

being adhered by adhesive to portions of said first roughened side located between said two longitudinally extending side edge portions of said first roughened side, said adhesive being selected from the group consisting of a cyanoacrylate, an anaerobic adhesive and an epoxy.

5,413,839

# TRANSFER FILM

Charles E. Chatwin, Horsham, and Karen S. Walker, Maidenhead, both of United Kingdom, assignors to Thomas De La Rue & Company Limited, London, England

PCT No. PCT/GB91/01158, § 371 Date Jan. 12, 1993, § 102(e) Date Jan. 12, 1993

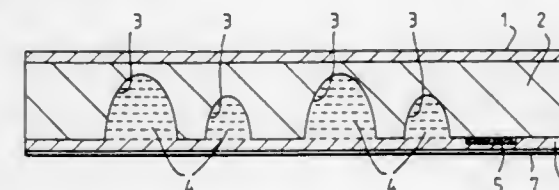
PCT Filed Jul. 12, 1991, Ser. No. 961,713

Claims priority, application United Kingdom, Jul. 12, 1990, 9015319; Jul. 31, 1990, 9016821

Int. Cl.<sup>6</sup> B32B 3/00

U.S. Cl. 428—195

60 Claims



1. A transfer film comprising a pattern defining layer having concavities defining an inverted relief pattern; and a retaining layer overlying and releasably filling the concavities of the pattern defining layer, the pattern defining layer being removable from the retaining layer to leave the parts of the retaining layer filling the concavities defining the relief pattern.

5,413,840

# DECORATIVE LAMINATED SHEET HAVING A FEELING OF COATING AND A PROCESS FOR PRODUCING SAME

Yasuyuki Mizuno, Tokyo, Japan, assignor to Riken Vinyl Industry Co., Ltd., Tokyo, Japan

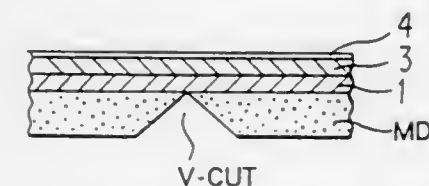
Filed Aug. 24, 1993, Ser. No. 110,945

Claims priority, application Japan, Aug. 27, 1992, 4-228764

Int. Cl.<sup>6</sup> B32B 3/00

U.S. Cl. 428—195

8 Claims



1. A decorative laminated sheet which is produced by successively laminating a thermoplastic resin film having a colored layer or a pattern-printed layer thereon and having an elongation rate of 100 to 300%, a transparent polyester film having an elongation rate of 50 to 150% and a thickness ranging from 6 to 250  $\mu$ m, and a hard coat layer having an elongation rate of 10% or less.

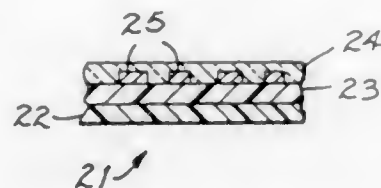


5,413,841

HEAT ACTIVATED TRANSFERS WITH MACHINE  
READABLE INDICIAJohn E. Mahn, Sr., 10455 Deer Trail, Hamilton, Ohio 45030,  
and John E. Mahn, Jr., 6154 Oakhaven Dr., Cincinnati, Ohio  
45238Continuation of Ser. No. 757,687, Sep. 11, 1991, abandoned. This  
application Nov. 8, 1993, Ser. No. 149,006Int. Cl.<sup>6</sup> B32B 3/00

U.S. Cl. 428—195

8 Claims



1. A heat activated transfer comprising a thermoactive adhesive lower layer bonded to a transparent thermoset upper layer; and indicia comprising a sublimation dye heat transferred to said thermoset upper layer wherein said heat activated transfer is heat bonded to a cloth substrate by said thermoactive adhesive.

5,413,842

GREEN SHEETS OF CONTROLLED MICROPOROSITY  
AND METHOD OF PRODUCING SAMECynthia N. Felisberto, State College, Pa.; Stephen A. Milkovich,  
Beacon, and Robert W. Nufer, Hopewell Junction, both of  
N.Y., assignors to International Business Machines Corporation,  
Armonk, N.Y.

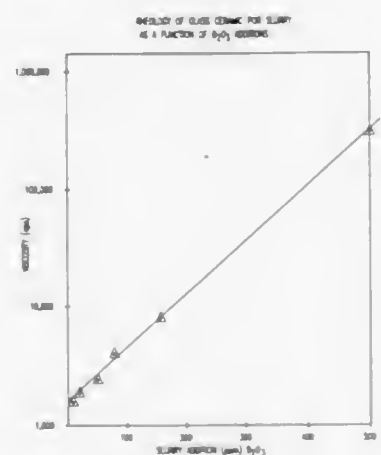
Continuation of Ser. No. 997,807, Dec. 29, 1992, abandoned.

This application Apr. 12, 1994, Ser. No. 226,396

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—209

11 Claims



1. A composition of matter consisting of in parts by weight: Ceramic particulate: 50-75 Polyvinylbutyral: 2-8 Dipropylene Glycol Benzoate: 0.5-5 Methanol: 4-30 Methylisobutyl ketone: 4-30, and an Ionic Species: 1-10,000 ppm, said ionic species being selected from the group consisting of boron and phosphorous compounds in their ionic form, said composition of matter capable of achieving a percent compressibility of greater than 8 percent.

5,413,843

## INKABLE SHEET

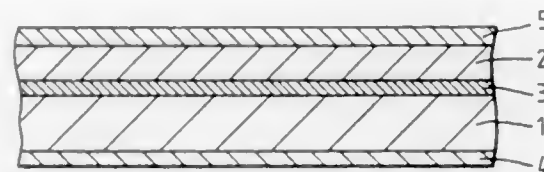
Stephen Mann, Golchester; Roger N. Barker, Clacton on Sea;  
Graham A. Page, Ipswich, and Stephen P. Corr, Chelmsford,  
all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Filed Aug. 6, 1992, Ser. No. 925,191

Claims priority, application United Kingdom, Aug. 15, 1991,  
9117642Int. Cl.<sup>6</sup> B41M 1/30; B32B 3/00

U.S. Cl. 428—211

5 Claims



1. An inkable sheet comprising a substrate having on a surface thereof an ink-absorbent layer comprising hydroxy ethyl cellulose and a hydroxy ethyl cellulose modified to include a hydrophobic group, the surface of the ink-absorbent layer remote from the substrate being such that upon depositing a droplet of distilled water thereon, the absorbent layer exhibits an advancing contact angle not exceeding 100° and has an ink absorption capacity not exceeding 35 grams of water per gram of the ink-absorbent layer.

5,413,844

PROCESS FOR THE PREPARATION OF  
ZINC/DENTIFRICE-COMPATIBLE SILICA  
PARTICULATESJacques Persello, Montluel, France, assignor to Rhone-Poulenc  
Chimie, Courbevoie, France

Filed May 18, 1989, Ser. No. 353,528

Claims priority, application France, Jun. 1, 1988, 88 07279

Int. Cl.<sup>6</sup> B05D 7/00

U.S. Cl. 427—217

13 Claims

1. A process for the preparation of zinc-compatible silica particulates having an effective compatibilizing amount of zinc values chemically bonded to surface area sites thereof, comprising reacting pre-formed silica particles, or silica particles in a stage of the formation thereof, both with a zincate and an acid agent.

5,413,845

LAMINATED MATERIAL WITH GAS BARRIER  
PROPERTIESLars Löfgren, Staffanstorps, and Peter Frisk, Malmö, both of  
Sweden, assignors to Tetra Laval Holdings & Finance S.A.,  
Pully, Switzerland

Continuation of Ser. No. 452,367, Dec. 19, 1989, abandoned.

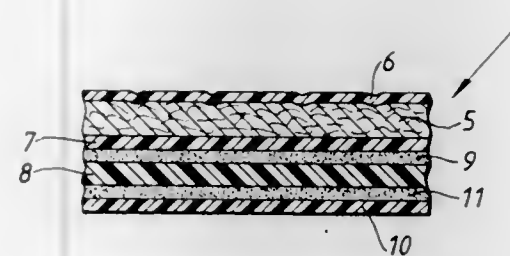
This application Mar. 31, 1992, Ser. No. 860,255

Claims priority, application Sweden, Jan. 11, 1989, 8900081

Int. Cl.<sup>6</sup> B32B 23/08

U.S. Cl. 428—215

16 Claims



1. A laminated material comprising: a base layer of paper or cardboard, and a barrier layer consisting essentially of a mixture of ethylene-vinyl alcohol copolymer and amorphous polyamide.

5,413,847

## PREPREG AND COMPOSITE

Hajime Kishi; Atsushi Ozaki, and Nobuyuki Odagiri, all of Iyo,  
Japan, assignors to Toray Industries, Inc., Nihonba-  
shimurumachi, Japan

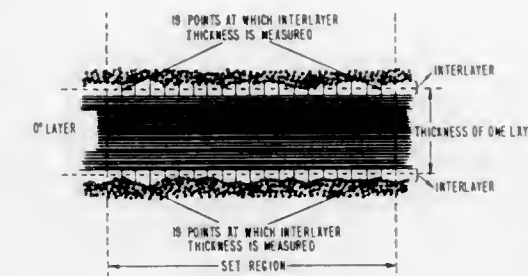
Filed Mar. 30, 1993, Ser. No. 38,102

Claims priority, application Japan, Mar. 30, 1992, 4-106125

Int. Cl.<sup>6</sup> B32B 5/16

U.S. Cl. 428—283

26 Claims



1. A prepreg comprising elements A, B and C, wherein element A is reinforcing fibers; element B is a resin composition including a thermosetting resin and a thermoplastic resin which is soluble in said thermosetting resin, which resin composition being capable of forming a micro-phase separation structure; and element C comprises fine particles which are insoluble in said element B and which do not contain an elastomer component; said element C being localized in a surface of said prepreg.

5,413,848

INSULATING FOAM OF LOW THERMAL  
CONDUCTIVITY AND METHOD OF PREPARATIONHeinz Jaster, and William J. Ward, III, both of Schenectady,  
N.Y., assignors to General Electric Company, Schenectady,  
N.Y.

Division of Ser. No. 172,005, Dec. 22, 1993. This application

Aug. 1, 1994, Ser. No. 283,433

Int. Cl.<sup>6</sup> B32B 3/26

U.S. Cl. 428—305.5

11 Claims

1. An insulating material comprising a resinous foam having cells filled with an inert gas having a thermal conductivity up to 10 milliwatts/m<sup>2</sup>·K., said foam being sealed in a gas-imperious enclosure at a partial pressure of said inert gas in the range of about 20-200 torr and a total pressure no greater than 110% of said partial pressure, said enclosure also containing a reaction product of carbon dioxide with at least one solid reagent capable of reacting with carbon dioxide under ambient conditions.

5,413,849

## COMPOSITE ELASTIC NONWOVEN FABRIC

Jared A. Austin, Greer, and G. Stanley Zimmerman, Jr., Green-  
ville, both of S.C., assignors to Fiberweb North America, Inc.,  
Simpsonville, S.C.

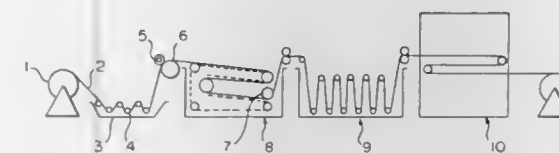
Filed Jun. 7, 1994, Ser. No. 255,003

Int. Cl.<sup>6</sup> D04H 1/58

U.S. Cl. 428—293

31 Claims

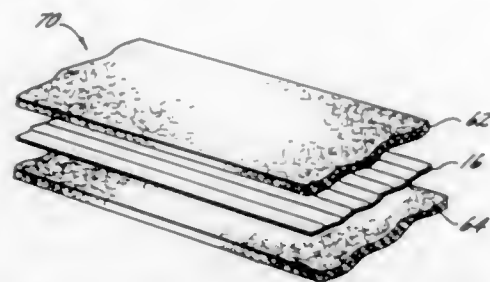
1. A composite elastic nonwoven fabric comprising: a warp of individual elastomeric filaments oriented substantially parallel to one another extending longitudinally in the machine direction; and a fibrous web entangled with said warp of individual elastomeric filaments to form a unitary elastic nonwoven fabric, said fibrous web comprising staple fibers and anchoring fibers, said anchoring fibers being secured to said elastomeric filaments throughout the fabric to keep the fibrous



1. Elasticized artificial leather consisting essentially of a woven material comprising warp threads and weft threads, said woven material being impregnated with a solution of polyurethane and then immersed in a bath containing a solvent and a non-solvent for said polyurethane whereby said polyurethane coagulates to form a layer of a coagulated polyurethane coating on at least one of two sides of said material, said weft threads in said woven material being formed of segmented polyurethane fibers which have been coated with polyamide fibers which are then covered with a fiber selected from the group consisting of cellulose fibers and mixtures of cellulose and polyester fibers.

web attached to the filaments upon stretching and recovery of the elastomeric filaments and to thereby maintain

ceramic material, the coating being substantially uniform and having a morphology which is fine grained and has one or less



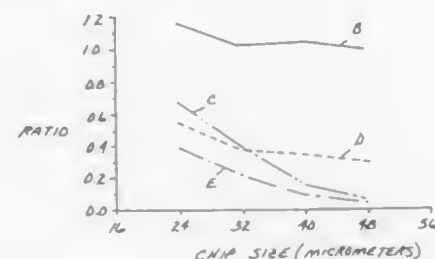
the coherent substantially unitary structure of the composite elastic nonwoven fabric.

5,413,850

**NON-CONDUCTIVE ALUMINUM OXIDE-TITANIUM CARBIDE (Al<sub>2</sub>O<sub>3</sub>-TiC) THIN FILM COMPUTER HEAD SUBSTRATE, METHOD OF MAKING SAME, AND SLIDER ELEMENT INCORPORATING SAME**  
 Vincent W. Nehring, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Continuation of Ser. No. 783,835, Oct. 29, 1991, abandoned.  
 This application Apr. 23, 1993, Ser. No. 52,956  
 Int. Cl.<sup>6</sup> B01D 35/00

U.S. Cl. 428—336

3 Claims



1. A slider element useful as a read/write computer head which includes a body having an air-bearing surface and leading and trailing ends relative to motion of a data track, the body comprising an electrically non-conductive substrate having a volume resistivity of more than about  $10^7$  ohm-cm and a magnetic transducer deposited on at least a portion of said substrate, said substrate consisting essentially of a TiC phase and an Al<sub>2</sub>O<sub>3</sub> phase, said substrate being absent of third-phase thermally-elastically mismatched dispersoid machinability agents, wherein said TiC phase comprises no more than about 18 weight percent of the substrate, and wherein the Al<sub>2</sub>O<sub>3</sub> phase has an average grain size of at least 1.5 micrometer.

5,413,851

COATED FIBERS

Jonathan G. Storer, Inver Grove Heights, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 2, 1990, Ser. No. 487,587

Int. Cl.<sup>6</sup> D02G 3/00

U.S. Cl. 428—361

13 Claims

1. A coated fiber comprising a ceramic, carbon or metal fiber having a coating thereon of a refractory metal or metal-based



visible void per 0.5 square micrometer of area, a visible void being 5 nanometers or greater in size.

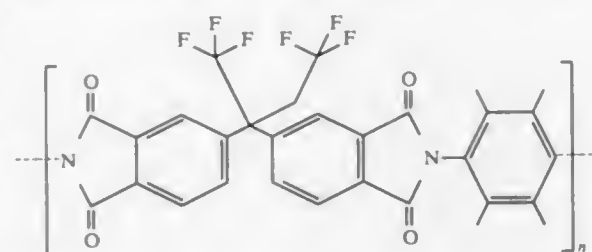
5,413,852

**SIXEFTM-DURENE POLYIMIDE HOLLOW FIBERS**  
 Tai-Shung Chung, Randolph; Edward R. Kafchinski, Winfield, and Rohitkumar H. Vora, Westfield, all of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.  
 Filed Aug. 1, 1991, Ser. No. 738,996  
 Int. Cl.<sup>6</sup> D02G 3/00

U.S. Cl. 428—364

3 Claims

1. An asymmetric hollow fiber for use in separation membranes consisting essentially of a polyimide of the formula



said fiber having a dense outer layer at least about 0.10 micron but less than 3 microns thick and having a separation factor of at least 4.0 for oxygen and nitrogen and an oxygen permeance of at least 50 ppm cc(STP)/(sec cm<sup>2</sup> cm-Hg).

5,413,853

MELAMINE RESIN FOAM

Yasuo Imashiro; Shun Hasegawa, and Takahiko Matsumoto, all of Tokyo, Japan, assignors to Nissinbo Industries, Inc., Tokyo, Japan

Filed Jun. 27, 1994, Ser. No. 265,815

Claims priority, application Japan, Jul. 9, 1993, 5-194115

Int. Cl.<sup>6</sup> C08J 9/224

U.S. Cl. 428—308.4

6 Claims

1. A melamine resin foam comprising a foam body obtained by foaming a resin composition composed mainly of a melamine-formaldehyde condensate and a blowing agent, and hydrophobic component coated on said foam body, wherein said hydrophobic component is a silicone resin or a chloroprene rubber.

5,413,854

**OHP SHEET FOR THERMAL TRANSFER PRINTER**  
 Kazuo Sato, Tokyo, Japan, assignor to Nissinbo Industries, Inc., Tokyo, Japan

Filed Jul. 6, 1994, Ser. No. 268,121

Claims priority, application Japan, Jul. 15, 1993, 5-196750

Int. Cl.<sup>6</sup> B41M 5/00

U.S. Cl. 428—318.4

6 Claims

1. An OHP sheet for a thermal transfer printer which is a transparent plastic sheet having an ink receiving layer on at least one side thereof, the ink receiving layer being a porous layer which contains polymer particles in which the glass

transition temperature is 30°–150° C. and the particle size is 0.05–2 μm, further the ink receiving layer being opaque under normal temperatures and then becoming transparent when the layer is heated to 30°–150° C.

5,413,855

**SHAPED BODIES OF GRANULATED BEADS AND METHOD**

Karl-Heinz Kolaska, Löwenstein, and Gerd Voss, Metzingen, both of Germany, assignors to Storopack Hans Reichenecker GmbH & Co., Weinstadt, Germany

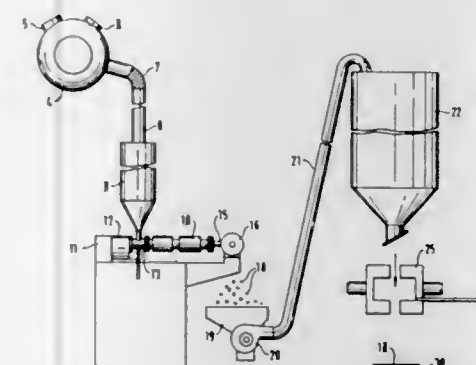
Filed Oct. 26, 1993, Ser. No. 141,654

Claims priority, application Germany, Oct. 30, 1992, 42 36 717.4

Int. Cl.<sup>6</sup> B32B 3/26

U.S. Cl. 428—320.2

6 Claims



1. A shaped body of expanded granulate beads partially joined to one another, comprising:  
 a plurality of granulate beads of biodegradable material, said beads having surface parts such that adjacent ones of said surface parts are adhesively bonded together where joined.

5,413,856

**SUSTAINED RELEASE AGRICULTURAL SUBSTRATE COATED WITH A BLEND OF EPDM AND ASPHALT**

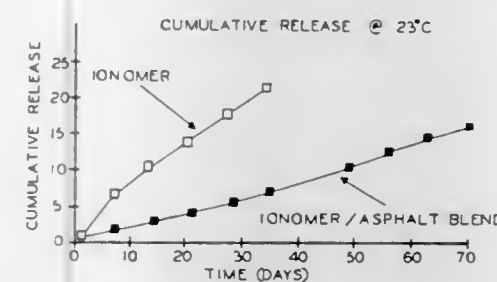
Vijay Swarup, Edmonton; Albert J. Geiger, Fort Saskatchewan, both of Canada; Evelyn N. Drake, Bernardsville, N.J.; Dennis G. Peiffer, Annandale, N.J., and Martin L. Gorbaty, Westfield, N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Aug. 17, 1993, Ser. No. 108,098

Int. Cl.<sup>6</sup> B32B 33/00; A01N 25/00; C05G 5/00

U.S. Cl. 428—334

6 Claims



1. A composite comprising:  
 (a) an agricultural substrate selected from the group consisting of fertilizers, pesticides, fungicides, plant hormones and mixtures thereof; and  
 (b) a coating on the surface of the agricultural substrate, the coating being a blend of a neutralized sulfonated ethylene-propylene diene terpolymer and an asphalt, the ratio neutralized of sulfonated ethylene-propylene diene terpoly-

5,413,857

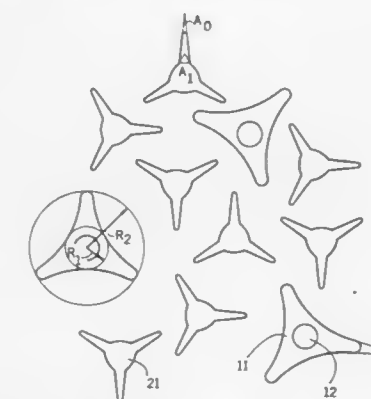
**MIXED CROSS-SECTION CARPET YARN**

Jerry A. Hagen, Anderson, and Wei Li, Salem, both of S.C., assignors to BASF Corporation, Parsippany, N.J.

Continuation-in-part of Ser. No. 989,812, Dec. 10, 1992, abandoned. This application Sep. 28, 1993, Ser. No. 128,454  
 Int. Cl.<sup>6</sup> B32B 19/06, 5/02

U.S. Cl. 428—357

3 Claims



1. A blend of fibers comprising:  
 about 51 to 90% by weight of base fibers (a) which are triangular trilobal fibers having a modification ratio ranging from 2.4 to 3.4; and  
 about 10 to 49% by weight of accent fibers (b) selected from the group consisting of standard trilobal fibers having a modification ratio ranging from 1.7 to 2.4; pointed lobe trilobal fibers having a modification ratio ranging from 2.0 to 2.9; and mixtures thereof;  
 said fibers (a) and (b) having a denier per filament within the range represented by the area enclosed by sides A', B', C', D' and E' of FIG. 2.

5,413,858

**ACRYLIC FIBER AND PROCESS FOR PRODUCTION THEREOF**

Akira Hajikano; Seiji Hayashi; Yoshitaka Imai, all of Otake, and Kunihiko Aoki, Tokyo, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

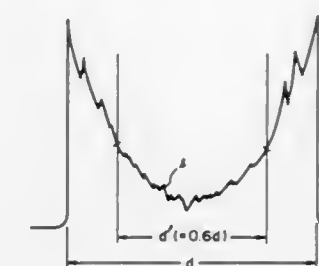
Filed Feb. 25, 1993, Ser. No. 22,267

Claims priority, application Japan, Feb. 25, 1992, 4-037715; Feb. 25, 1992, 4-037716

Int. Cl.<sup>6</sup> D02G 3/00

U.S. Cl. 428—364

1 Claim



1. Acrylic fiber comprising an acrylonitrile-based copolymer comprising 96.0 to 98.5% by weight of acrylonitrile units, 1.0 to 3.5% by weight of acrylamide units and 0.5% by weight or more of methacrylic acid units, the percentage by weight (A) of acrylamide units and the percentage by weight (M) of



methacrylic acid units in the copolymer satisfying the following equations (I) and (II), and adsorbed iodine in an amount of 1% by weight or less based on the weight of the copolymer:

$$X=0.21 \text{ to } 0.23$$

$$M+A^x=1.82 \text{ to } 2.18$$

5,413,859

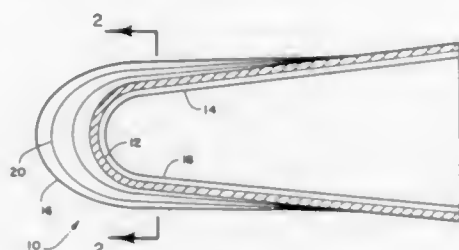
# SUBLIMITABLE CARBON-CARBON STRUCTURE FOR NOSE TIP FOR RE-ENTRY SPACE VEHICLE

William E. Black, and Ebrahim M. Parekh, both of San Diego, Calif., assignors to Lockheed Corporation, Fort Worth, Tex. Filed Oct. 28, 1992, Ser. No. 967,369

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—408

7 Claims



1. A thermally stable nose tip for a re-entry vehicle that is subjected to high heat fluxes, comprising:

a carbon-carbon composite nose tip provided with an interior cavity, wherein the exterior portion of said carbon-carbon composite nose tip contains a refractory metal material which will sublime at heat fluxes of about 100 to 150 kW/cm<sup>2</sup>, thereby releasing thermal energy to the environment; and

the inner portion of said carbon-carbon composite nose tip adjacent to said interior cavity contains a polytetrafluoroethylene material which will sublime at a level of heat flux which is less than the heat flux at which said refractory metal material in the exterior portion of said carbon-carbon composite nose tip sublimates, to release additional thermal energy.

5,413,860

# COATED MATERIAL, THE PREPARATION AND USE THEREOF

Ernst Minder, Sissach, Switzerland, and Walther Hofherr, Kirchzarten-Zarten, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 9, 1993, Ser. No. 89,137

Claims priority, application Switzerland, Jul. 15, 1992, 2227/92

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—411.1

16 Claims

1. A coated material comprising (a) a solid dielectric or semi-conductive substrate which is (b) partially or completely coated on at least one surface with a silicate in which a crystalline charge transfer complex in the form of a network of crystal needles is incorporated.

5,413,861

# SEMICONDUCTOR DEVICE ENCAPSULATED WITH A FLAME RETARDANT EPOXY MOLDING COMPOUND

Anthony A. Gallo, Olean, N.Y., assignor to Dextor Corporation, Olean, N.Y.

(I) Continuation of Ser. No. 810,627, Dec. 19, 1991, abandoned, which is a division of Ser. No. 590,247, Sep. 28, 1990, Pat. No. 5,104,604, which is a continuation-in-part of Ser. No. 418,757, Oct. 5, 1989, Pat. No. 5,041,254, which is a continuation-in-part of Ser. No. 258,547, Oct. 17, 1988, abandoned. This application Feb. 3, 1994, Ser. No. 191,350

Int. Cl.<sup>6</sup> B32B 27/38

U.S. Cl. 428—413

8 Claims

1. A semiconductor device encapsulated by a method comprising the steps of:

(1) heating a thermosetting epoxy molding composition to a liquid state, and

(2) encapsulating a semiconductor device with said thermosetting epoxy molding composition heated to a liquid state, and

(3) cooling said encapsulated semiconductor device, wherein said epoxy molding composition comprises:

(a) about 5-25 percent by weight of epoxy molding composition of an epoxy;

(b) about 4-20 percent by weight of epoxy molding composition of a resin hardener;

(c) an effective amount of a catalyst for the reaction between said epoxy and said hardener in an amount of from about 0.1 to 10% by weight of the combined weight of epoxy and hardener;

(d) an effective amount of a mold release agent for the release of the cured epoxy molding composition from a mold in an amount of between about 0.01 and about 2 percent by weight of epoxy molding composition;

(e) between about 50 and 85 percent by weight of epoxy molding composition of a filler; and

(f) a flame retardant system of:

(1) from about 0.40 to about 0.80% antimony pentoxide by weight of epoxy molding composition;

(2) a reactive organic compound at least about 0.5% of bromine by weight of epoxy molding composition, said reactive organic compound being an individual component or being contained in one or more of said components (a)-(e) of said epoxy molding composition;

(3) from about 0.02 to about 4.0% magnesium aluminum carbonate hydrate by weight of epoxy molding composition.

5,413,862

# MAGNETIC RECORDING MEDIUM HAVING A MAGNETIC LAYER COMPRISING A SPECIFIED POLYURETHANE RESIN AND MAGNETIC PARTICLES

Hiroshi Murata, and Takeshi Yatsuka, both of Ohtsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1993, Ser. No. 54,396

Claims priority, application Japan, Apr. 28, 1992, 4-109841

Int. Cl.<sup>6</sup> G11B 5/00

U.S. Cl. 428—423.1

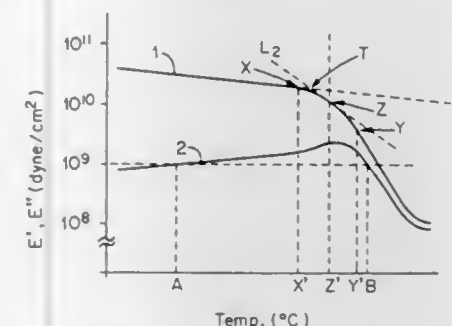
14 Claims

1. A magnetic recording medium comprising a non-magnetic support and a magnetic layer formed thereon, the magnetic layer being formed from a composition containing as its main components ferromagnetic particles and a resinous binder,

wherein the resinous binder contains a polyurethane resin and a curing agent, the polyurethane resin containing as its components a high molecular weight polyol (A) with a molecular weight of 500 or more and an organic diisocyanate (B);

the high molecular weight polyol (A) contains an aromatic polyester diol (A-1) having a metal sulfonate group in an amount of 20 to 600 equivalents/10<sup>6</sup> g and a polyol (A-2) which has no metal sulfonate group and is in a liquid state at 20° C.;

a weight ratio between the aromatic polyol (A-1) and the liquid polyol (A-2) is in the range of 10:1 to 1:4; an urethane group is contained in the polyurethane resin in an amount of 600 to 1500 equivalents/10<sup>6</sup> g, and



the temperature range in which a dynamic loss modulus of the polyurethane resin exceeds 10<sup>9</sup> dyne/cm<sup>2</sup> is 40° C. or more, under the condition that a measurement is conducted at a frequency of 110 Hz and at a temperature within the range of -20° to 100° C.

5,413,863

# RECORDING MEDIUM WITH IMPROVED ADHESION TO GLASS

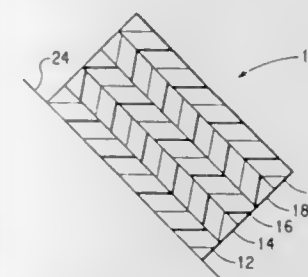
Andrew M. Weber, and Aleksander Beresiewicz, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 4, 1993, Ser. No. 146,817

Int. Cl.<sup>6</sup> B32B 17/06; G03C 1/725

U.S. Cl. 428—428

16 Claims



9. A laminated structure comprising, in order,

(a) a first ply;

(b) a photopolymerizable film imaged to contain a refractive index image, said film comprising, by weight, approximately 25 to 90% binder, 5 to 60% addition polymerizable ethylenically unsaturated monomer, and 0.1 to 10% photoinitiator, said binder comprising a copolymer having the formula:



wherein M is a fluoromonomer, VAc is vinyl acetate, VOH is vinyl alcohol, and VOS is vinyl trimethylsilyl ether; w, x, y and z are weight percents and w is approximately 5 to 30, x is approximately 40 to 80, y is approximately 0 to 20, and z is approximately 2 to 30; with the proviso that said copolymer contains approximately 3 to 23% fluorine by weight; and

(c) a second ply.

5,413,864

# LOW EMISSIVITY FILM

Masami Miyazaki, and Eiichi Ando, both of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

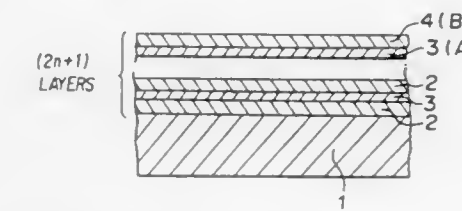
Filed Jul. 5, 1991, Ser. No. 726,263

Claims priority, application Japan, Jul. 5, 1990, 2-176282; Nov. 27, 1990, 2-321273

Int. Cl.<sup>6</sup> B32B 15/04, 7/02

U.S. Cl. 428—432

22 Claims



1. A low emissivity film which comprises:

a substrate; and

a coating of an oxide of zinc or tin and metallic films alternately formed on the substrate in a total of (2n+1) layers where n is an integer being equal to or more than 1, with the layer closest to the substrate being an oxide film, p1 wherein the oxide film (B) formed on the outer side of the metallic film (A) being most apart from the substrate, has an internal stress which is equal to, or less than 1.1 × 10<sup>10</sup> dyne/cm<sup>2</sup> and is doped with at least one dopant selected from the group consisting of Al, Si, B, Ti, Sn, Mg and Cr, said oxide film (B) having a thickness of 200 to 700 Å and said metallic film having a thickness of 50 to 150 Å.

5,413,865

# WATER-REPELLENT METAL OXIDE FILM AND METHOD OF FORMING SAME ON GLASS SUBSTRATE

Ichiro Nakamura, Yokosuka; Seiji Yamazaki, Matsusaka; Osamu Takahashi, Matsusaka; Hiroaki Arai, Matsusaka, and Shigeo Hamaguchi, Matsusaka, all of Japan, assignors to Central Glass Company, Limited, Yamaguchi and Nissan Motor Co., Ltd., Yokohama, both of Japan

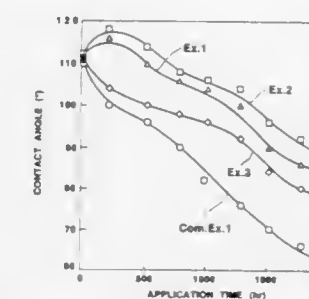
Filed Jan. 29, 1993, Ser. No. 34,760

Claims priority, application Japan, Jan. 31, 1992, 4-016688; May 25, 1992, 4-131270; Jun. 30, 1992, 4-171373

Int. Cl.<sup>6</sup> C03C 17/00

U.S. Cl. 428—432

16 Claims



1. A multilayered film formed on a glass substrate, the film having a first layer of metal oxide having numerous micro-pits and a second layer of metal oxide which is water-repellent, the film being prepared by a method comprising the steps of:

(a) preparing at least two sols respectively from at least one compound so as to disperse therein at least two polymers of said at least one compound, said at least one compound being selected from the group consisting of metal alkoxides and metal acetylacetonates, said at least two polymers having different average molecular weights;

(b) mixing said at least two sols with a solvent so as to prepare a first coating solution;

- (c) applying the first coating solution to the glass substrate so as to form thereon a first sol film;
- (d) heating the glass substrate so as to transform the first sol film into a first metal oxide layer which has a minutely rough surface having numerous micro-pits thereon;
- (e) mixing a silane compound containing a fluorocarbon group with a solvent so as to prepare a second coating solution;
- (f) applying the second coating solution to the first metal oxide layer so as to form thereon a second sol film; and
- (g) heating the glass substrate so as to transform the second sol film into a second metal oxide layer which is water-repellent.

5,413,866

## HIGH PERFORMANCE CARBON FILAMENT STRUCTURES

R. Terry K. Baker, and Nelly M. Rodriguez, both of 86 Lee Rd. 827, Opelika, Ala. 36801

Continuation-in-part of Ser. No. 602,182, Oct. 23, 1990, Pat. No. 5,149,584. This application Sep. 18, 1992, Ser. No. 947,416

Int. Cl.<sup>6</sup> D01F 9/12

U.S. Cl. 423—447.2

32 Claims



1 Carbon filaments characterized as having: (i) a surface area from about 50 m<sup>2</sup>/g to 800 m<sup>2</sup>/g, (ii) an electrical resistivity from about 0.3 μohm.m to 0.8 μohm.m, (iii) a crystallinity from about 5% to about 100%, (iv) a length from about 1 μm to about 100 μm, and (v) a shape which is selected from the group consisting of branched, spiral, and helical.

5,413,867

## PROCESS FOR TREATING CELLULOSIC MATERIALS WITH STABLE AQUEOUS DISPERSIONS CONTAINING SILANES

Wen-Hsuan Chang, Gibsonia, Pa.; John F. Grunewald, Mequon, Wis.; Mark A. Harley, Oakmont, and Edward E. McEntire, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 48,707, Apr. 16, 1993, Pat. No. 5,354,832, which is a continuation of Ser. No. 775,890, Oct. 15, 1991, abandoned. This application May 31, 1994, Ser. No. 251,150

Int. Cl.<sup>6</sup> B32B 9/04

U.S. Cl. 428—447

7 Claims

1. A process for treating a cellulosic substrate which comprises applying thereto a composition comprising a stable aqueous dispersion having a particle size in the range of about 10 to 200 nanometers of silanes selected from the group of silanes having the following structural formulas:



wherein R<sup>1</sup> represents a hydrocarbon group having from about 7 to about 30 carbon atoms containing at least one hydrophobic moiety and at least one neutralized anionic water-solubilizing moiety;

R<sup>2</sup> represents R<sup>1</sup>, H, an alkyl radical having 1 to 20 carbon atoms, an aryl radical having 6 to 18 carbon atoms, an aralkyl radical or all alkaryl radical having from 7 to 20 carbon atoms;

Y represents OR<sup>3</sup>, with R<sup>3</sup> representing H, a lower alkyl

having from 1 to 3 carbon atoms, aryl radicals or alkaryl radicals having from 6 to 10 carbon atoms or



wherein R<sup>4</sup> represents H or a lower alkyl having from 1 to 2 carbon atoms, said dispersions being stable for at least 20 days without externally added surfactant.

5,413,868

## PERPENDICULAR MAGNETIC RECORDING MEDIUM COMPRISING A MAGNETIC THIN FILM OF COBALT, PALLADIUM, CHROMIUM AND OXYGEN

Satoshi Matsubaguchi, and Akira Nahara, both of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

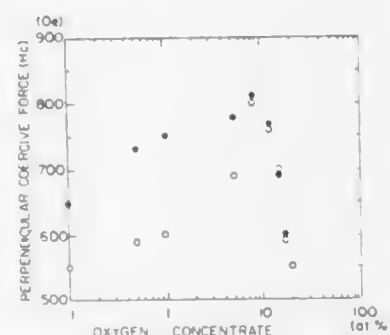
Continuation of Ser. No. 859,886, Mar. 30, 1992, abandoned. This application Sep. 2, 1993, Ser. No. 115,124

Claims priority, application Japan, Mar. 28, 1991, 3-064973; Sep. 17, 1991, 3-236493

Int. Cl.<sup>6</sup> G11B 5/00

U.S. Cl. 428—457

6 Claims



1. A perpendicular magnetic recording medium comprising a nonmagnetic substrate having thereon a magnetic layer, wherein the magnetic layer is a metal thin film comprising mainly a composition represented by the formula: ((Co<sub>100-x</sub>Pd<sub>x</sub>)(100-yCr<sub>y</sub>))<sub>100-z</sub>O<sub>z</sub> wherein 10 ≤ x ≤ 40, 5 ≤ y ≤ 25, 0.5 ≤ z ≤ 15, and x, y and z are atomic percents.

5,413,869

## CEMENTED CARBIDE BODY WITH INCREASED WEAR RESISTANCE

E. Torbjörn Hartzell, Stockholm; Udo K. Fischer, Vällingby, and Jan Akerman, Stockholm, all of Sweden, assignors to Sandvik AB, Sandviken, Sweden

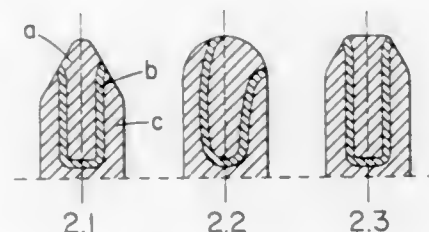
Filed Nov. 13, 1992, Ser. No. 976,381

Claims priority, application Sweden, Nov. 13, 1991, 9103344 The portion of the term of this patent subsequent to Apr. 4, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> B32B 15/04

U.S. Cl. 428—469

4 Claims



1. A cemented carbide button for rock drilling having a

working surface and which button comprises a core and a surface zone surrounding the core whereby both the surface zone and the core contain WC and a binder phase based on at least one of Co, Ni or Fe, the surface zone being free of eta-phase and the core containing eta-phase, the eta-phase core extending to the working surface of the button from the time the button first contacts the rock said eta phase core providing increased wear resistance without crater formation.

5,413,870

## DECORATIVE BATHROOM PANEL INCLUDING EMBEDDED FABRIC

Christopher J. Flood, 812 Southview Dr., Jupiter, Fla. 33458

Filed Jan. 3, 1994, Ser. No. 176,728

Int. Cl.<sup>6</sup> B32B 9/00

U.S. Cl. 428—542.2

5 Claims



1. A decorative wall covering especially useful for areas of high humidity or water vapor to resist mildew, said wall covering including a fabric ornamental appearance, said wall covering comprising:

- a clear plastic sheet of a predetermined length and width said sheet being planar and flat on both sides;
- a first layer of clear polyester resin attached to one side of said plastic sheet;
- a sheet of fabric, said fabric having a print disposed thereon, said fabric attached throughout to said first layer of clear polyester resin;
- a second layer of clear polyester resin attached to one side of said fabric; and
- a pigmented resin polyester layer attached to said second clear polyester resin layer, said pigment color selected to enhance the background of said fabric, thereby forming a laminate that is durable that provides a aesthetic appearance of fabric and can be used in a high humidity environment whereby the panel is attached to a wall surface.

5,413,871

## THERMAL BARRIER COATING SYSTEM FOR TITANIUM ALUMINIDES

Warren A. Nelson, Cincinnati; Jon C. Schaeffer, Milford, and Srinivasan Raghuraman, West Chester, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Feb. 25, 1993, Ser. No. 22,211

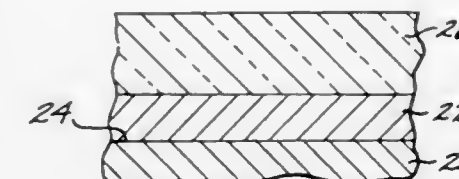
Int. Cl.<sup>6</sup> B22F 7/00

U.S. Cl. 428—552

17 Claims

- 1. An article of manufacture, comprising: a piece of a titanium aluminide; and a thermal barrier coating system overlying at least a portion of the surface of the piece of titanium aluminide, the thermal barrier coating system comprising

a metallic bond coat layer contacting the piece of titanium aluminide, and



a ceramic thermal barrier coating layer overlying the bond coat.

5,413,872

## FILLING MEMBER

Heinz Faigle, Hard, Austria, assignor to Heinz Faigle KG, Hard, Austria

Continuation of Ser. No. 934,972, Aug. 25, 1992, abandoned.

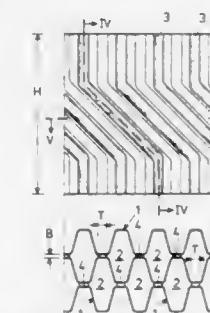
This application Jul. 22, 1994, Ser. No. 278,717

Claims priority, application Austria, Aug. 23, 1991, 1660/91

Int. Cl.<sup>6</sup> B32B 3/28; F28D 5/02

U.S. Cl. 428—603

16 Claims



1. A filling member for use in an installation in which different media are in direct contact with each other for separating liquid droplets from a gaseous flow, said filling member comprising a plurality of undulated panel foils having undulations of amplitude and wavelength and set against each other;

wherein said undulated panels are set against each other, wave crest against wave trough along a length thereof for forming flow ducts;

wherein said flow ducts have at least two redirections in a direction of flow, whereby different pressure conditions are created across a duct cross-section;

wherein respective segments of two adjacent foil panels are connected with each other along a portion of a common length thereof, with a remaining portion of the common length thereof forming a slit connecting adjacent flow ducts, defined by the respective segments, extending substantially transverse to a longitudinal extent of said filling member, and having a cross-section which is a fraction of the duct cross-section and is able to provide a capillary action, whereby liquid droplets, which are thrown against said slit by a centrifugal force generated by the different pressure conditions in a respective one of said adjacent flow ducts, are forced into said slit by the centrifugal force and the capillary action and are retained in said slit by the pressure conditions in another of said adjacent flow ducts.



5,413,873

**MAGNETIC RECORDING MEDIUM HAVING A GLASS OR AMORPHOUS CARBON SUBSTRATE, VANADIUM OR MOLYBDENUM PRECOAT LAYER, CHROMIUM PRIMER LAYER AND COBALT MAGNETIC LAYER**

Makoto Mizukami, Yokosuka, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Continuation of Ser. No. 873,759, Apr. 27, 1992, abandoned.

This application Jul. 26, 1993, Ser. No. 96,850

Claims priority, application Japan, Apr. 26, 1991, 3-125397

Int. Cl.<sup>6</sup> G11B 5/00

U.S. Cl. 428—611

3 Claims



1. A magnetic recording medium comprising:
- a non-magnetic, mirror-surface substrate selected from the group consisting of glass and amorphous carbon, said substrate having a mirror surface which is not texture-treated;
  - a precoat layer consisting of any of V and Mo formed on the non-magnetic mirror-surface substrate, said precoat layer having a thickness of about 30–4,000 Å;
  - a primer layer laminated on the precoat layer, said primer layer being Cr and having a thickness of about 60–4,000 Å; and
  - a magnetic layer laminated on the primer layer, said magnetic layer being selected from the group consisting of CoCrTa, CoCrPt and CoCrTaPt and having a thickness of about 100–2,000 Å.

5,413,874

**ARTICLE HAVING A DECORATIVE AND PROTECTIVE MULTILAYER COATING SIMULATING BRASS**

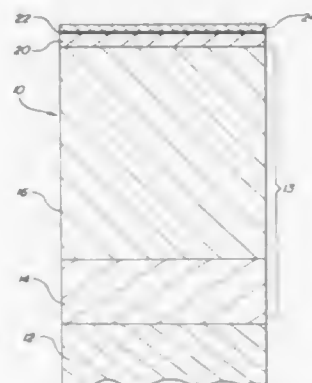
Stephen R. Moysan, III, Douglasville, and Rolin W. Sugg, Reading, both of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.

Filed Jun. 2, 1994, Ser. No. 252,793

Int. Cl.<sup>6</sup> B32B 15/04; C25D 3/56

U.S. Cl. 428—627

8 Claims



1. An article comprising a metallic substrate having disposed on at least a portion of its surface a multi-layer coating simulating brass comprising:
- layer comprised of semi-bright nickel;
  - layer comprised of bright nickel;
  - layer comprised of substantially amorphous nickel-tungsten-boron alloy with at least 0.5 weight percent boron;

layer comprised of zirconium or titanium; and  
a top layer comprised of zirconium or titanium compound.

5,413,875

**COPPER ALLOY SLIDING BEARING WITH HIGH-STRENGTH BACK METAL**

Tadashi Tanaka, Konan; Masaaki Sakamoto, Nagoya; Koichi Yamamoto, Komaki, and Tsukimitsu Higuchi, Gifu, all of Japan, assignors to Daido Metal Company Ltd., Nagoya, Japan

Filed Oct. 14, 1993, Ser. No. 135,987

Claims priority, application Japan, Dec. 25, 1992, 4-346272

Int. Cl.<sup>6</sup> F16C 33/12

U.S. Cl. 428—645

4 Claims

1. A copper alloy sliding bearing of three-layer structure, comprising a steel back metal layer of a high strength or a copper-plated steel back metal layer of a high strength, a copper alloy layer, and an overlay, said steel back metal layer containing 0.15–0.26% by weight of carbon, and said steel back metal layer having a 0.2% yield strength of not less than 440 N/mm<sup>2</sup>, a tensile strength of not more than 624 N/mm<sup>2</sup> and not less than 490 N/mm<sup>2</sup>, and a hardness of 160 to 200 Hv.

5,413,876

**NICKEL ALUMINIDE ALLOYS WITH IMPROVED WELDABILITY**

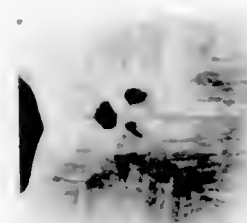
Michael L. Santella, Knoxville, and Gene M. Goodwin, Lenior City, both of Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Filed Nov. 2, 1992, Ser. No. 970,757

Int. Cl.<sup>6</sup> B32B 15/01; C22C 19/05

U.S. Cl. 428—680

10 Claims



1. A weldable nickel aluminate alloy characterized by being substantially resistant to weld hot cracking, comprising a nickel base and, in wt. %, about 6–12% aluminum, about 6.0–12% chromium, up to about 3% molybdenum, up to about 0.5% boron, and zirconium in a concentration of at least 3.17% and sufficient to provide an adequate concentration of Ni—Zr eutectic phase in the alloy for rendering the weld region of the alloy substantially resistant to weld hot cracking.

7. A composite structure comprising at least two nickel aluminate articles welded together with the weld exhibiting essentially no cracks due to weld hot cracking and with the weld comprising a nickel base and, in wt. %, about 6–12% aluminum, about 6.0–12% chromium, up to about 3.0% molybdenum, up to about 0.5% boron, and zirconium in a concentration greater than 2.6%, said weld comprising substantial concentrations of an Ni—Zr eutectic phase.

5,413,877

**COMBINATION THERMAL BARRIER AND WEAR COATING FOR INTERNAL COMBUSTION ENGINES**

Michael J. Griffith, Davis, Calif., assignor to Moller International, Inc., Davis, Calif.

Filed Sep. 22, 1992, Ser. No. 948,326

Int. Cl.<sup>6</sup> B32B 9/00

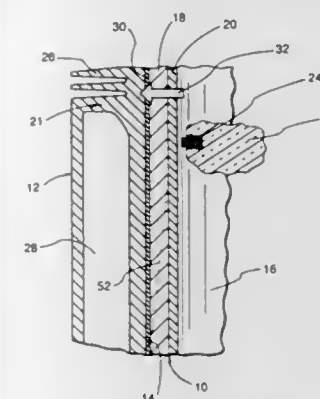
U.S. Cl. 428—698

12 Claims

1. A protective coating for friction-bearing combustion chamber wall surfaces of an internal combustion engine, said protective coating having low thermal expansion coefficient,

good adhesion to the base material, and high strength maintenance at elevated temperatures, comprising:

- a first thermal barrier material layer of ceramic material having a thermal conductivity of greater than 0.0 and less than 10 BTU/ft<sup>2</sup>·h·°F., said first material layer being affixed to said wall surface; and
- a second self-lubricating wear layer of material including a nickel alloy-bonded chromium carbide matrix having



- particles of silver and calcium fluoride-barium fluoride eutectic dispersed within, said eutectic having a coefficient of friction of greater than 0.0 and less than 0.20, said second wear layer being affixed to said first material layer; and
- said first material layer and said second wear layer having similar thermal expansion properties such that they expand and contract jointly.

5,413,878

**SYSTEM AND METHOD FOR NETWORKING ELECTROCHEMICAL DEVICES**

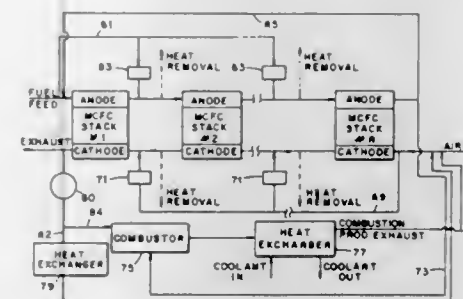
Mark C. Williams; John G. Wimer, both of Morgantown, W. Va., and David H. Archer, Pittsburgh, Pa., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Oct. 28, 1993, Ser. No. 142,563

Int. Cl.<sup>6</sup> H01M 8/04, 8/14, 8/24

U.S. Cl. 429—16

25 Claims



1. An electrochemically active system, comprising:
- a plurality of electrochemical devices each having an ionically conductive membrane, a porous anode disposed in contact with said ionically conductive membrane on one side thereof, a porous cathode disposed in contact with said ionically conductive membrane on a side thereof opposite said one side of said ionically conductive membrane, an anode process-fluid flow chamber disposed in fluid communication with said anode on a surface thereof opposite the surface contacting said ionically conductive membrane, and a cathode process-fluid flow chamber disposed in fluid communication with said cathode on a surface thereof opposite the surface contacting said electrochemical membrane;

means for electrically connecting said plurality of electrochemical devices in series;

a cathode process-fluid communicating means for connecting said cathode process-fluid flow chambers of each of said plurality of electrochemical devices in a serial fluid-flow arrangement through each of said plurality of electrochemical devices;

an anode process fluid communicating means for connecting said anode process-fluid flow chambers of each of said plurality of electrochemical devices in a serial fluid-flow arrangement so that said plurality of electrochemical devices are connected in a networked serial flow arrangement; and

control means coupled with said anode and cathode process-fluid communicating means for separately controlling the process-fluid parameters of each of said plurality of electrochemical devices individually so that the operating efficiency of each of said plurality of electrochemical devices is improved, thereby improving the system efficiency.

15. A method for operating a networked plurality of electrochemically active devices wherein each of said devices includes an ionically conductive membrane, a porous anode disposed in contact with said ionically conductive membrane on one side thereof, a porous cathode disposed in contact with said ionically conductive membrane on a side thereof opposite said one side of said ionically conductive membrane, an anode process-fluid flow chamber disposed in fluid communication with said anode on a surface thereof opposite the surface contacting said ionically conductive membrane, and a cathode process-fluid flow chamber disposed in fluid communication with said cathode on a surface thereof opposite the surface contacting said electrochemical membrane and means for electrically connecting said plurality of electrochemically active devices in series, comprising the steps of:

- flowing a cathode process-fluid through each of said cathode process-fluid flow chambers of each of said plurality of electrochemical devices in a serial fluid-flow arrangement;
- flowing an anode process-fluid through said anode process-fluid flow chambers of each of said plurality of electrochemical devices in a serial fluid-flow arrangement so that said plurality of electrochemical devices are networked in a serial process flow arrangement; and
- separately controlling the process-fluid parameters of each of said plurality of electrochemical devices individually so that the operating efficiency dependent on process fluid parameters of each of said plurality of electrochemical devices is improved, thereby improving the system efficiency.

5,413,879

**INTEGRATED GAS TURBINE SOLID OXIDE FUEL CELL SYSTEM**

William F. Domeracki, Lake Mary, Fla.; Wayne L. Lundberg, Pittsburgh, Pa.; Thomas E. Dowdy, Orlando, Fla., and JoAnn M. Linder, Clifton Park, N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 8, 1994, Ser. No. 193,286

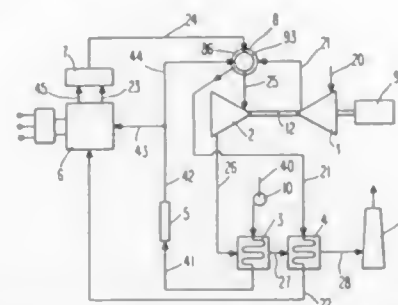
Int. Cl.<sup>6</sup> H01M 8/10

U.S. Cl. 429—30

15 Claims

1. A gas turbine system for generating electrical power, comprising:
- a) a compressor for producing compressed air;
  - b) a solid oxide fuel cell generator having (i) means for receiving said compressed air from said compressor, (ii) means for receiving a first flow of fuel, and (iii) means for reacting at least a first portion of said received first flow of fuel with said compressed air so as to produce electrical power and a hot compressed gas containing oxygen;
  - c) a topping combustor having (i) means for receiving said hot compressed gas from said solid oxide fuel cell generator, (ii) means for receiving a second flow of fuel, and (iii)

means for combusting said second flow fuel in said hot compressed gas so as to produce a further heated compressed gas; and



d) a turbine having (i) a rotor mounted for rotation therein and (ii) means for expanding said further heated compressed gas, thereby producing power in said turbine rotor and an expanded gas.

5,413,880

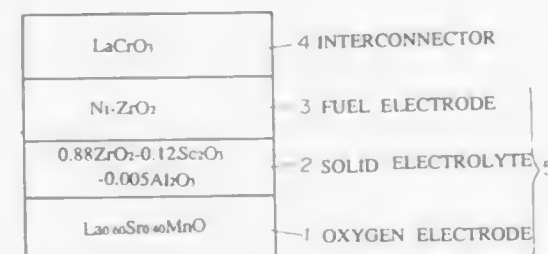
**OXYGEN ION CONDUCTOR AND SOLID FUEL CELL**  
Takao Ishii, Mito; Tsunekazu Iwata, Nakaminato, and Yukimi-  
chi Tajima, Katsuta, all of Japan, assignors to Nippon Tele-  
graph and Telephone Corporation, Tokyo, Japan  
Filed May 14, 1993, Ser. No. 61,109

Claims priority, application Japan, Aug. 12, 1992, 4-215303;  
Dec. 15, 1992, 4-334507

Int. Cl.<sup>6</sup> H01M 8/12; C04B 35/48

U.S. Cl. 429-33

4 Claims



1. An oxygen ion conductor consisting of a material of the formula  $(1-x-y)\text{ZrO}_2-x\text{Sc}_2\text{O}_3-y\text{Al}_2\text{O}_3$  where  $0.87 \leq (1-x-y) \leq 0.91$ ,  $0.085 \leq x \leq 0.125$  and  $0 < y \leq 0.005$ , wherein said material has a high degree of ion conductivity, a stabilized cubic crystal structure at room temperature and above, a high degree of mechanical strength when heat cycled, and only a small change in conductivity at high temperatures over time, and wherein the crystal structure is a stabilized cubic crystal structure in which phase transitions do not occur over the entire temperature range from room temperature to at least the melting point of the material which exceeds at least 800° C.

5,413,881

**ALUMINUM AND SULFUR ELECTROCHEMICAL BATTERIES AND CELLS**

Stuart Licht, Charlton City, and Dharmasena Peramunage, Oxford, both of Mass., assignors to Clark University, Worcester, Mass.

Filed Jan. 4, 1993, Ser. No. 383

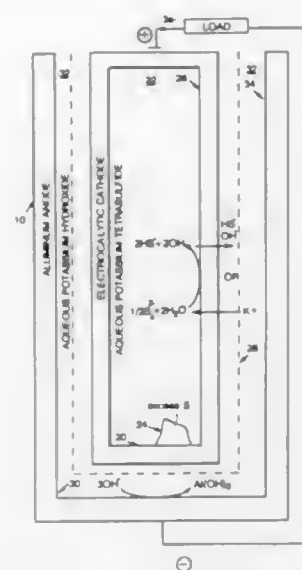
Int. Cl.<sup>6</sup> H01M 4/02

U.S. Cl. 429-105

27 Claims

1. An electrical storage cell comprising two half-cells positioned in electrochemical contact with one another, one of said half-cells comprising an anode comprising aluminum, positioned in contact with a first aqueous, electrically neutral, alkaline solution; and the remaining half-cell comprising, a second aqueous, electrically neutral solution comprising

polysulfide anions, said second aqueous solution containing, when said storage cell is fully charged, at least 0.01 moles per kg reducible sulfur; and



a current transferring electrocatalytic electrode positioned in electron-transferring contact with said second aqueous electrically neutral solution.

5,413,882

**COMPOSITE ELECTRODE**

Hiroshi Uemachi, Yoshiko Sato, Tadashi Sotomura, and Kenichi Takeyama, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

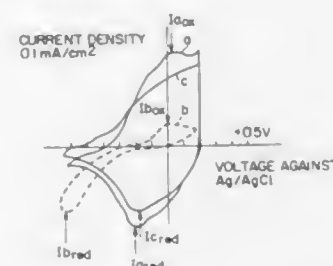
Filed Sep. 24, 1992, Ser. No. 950,476

Claims priority, application Japan, Sep. 24, 1991, 3-243087

Int. Cl.<sup>6</sup> H01M 4/60

U.S. Cl. 429-213

10 Claims



1. A composite electrode consisting essentially of:  
a) at least one organic thiol group-containing compound, said thiol group-containing compound having at least two thiol groups bonded to a heterocyclic ring structure selected from uracil, thiazole, triazine and pyrazine, when under an electrochemical reduction state, wherein said organic thiol group-containing compound is converted to a polymeric material by the formation of disulfide bonds from said thiol groups when under an electrochemical oxidation state and is reversibly depolymerized by reconversion of said disulfide bonds to said thiol groups when again under an electrochemical reduction state; and  
b) at least one electrically conductive polymer selected from the group consisting of polyaniline polyaminoaniline and polydianilobenzene, said electrically conductive polymer comprising a conjugated system of nitrogen and carbon atoms having  $\pi$ -electrons.

5,413,883

**REVERSIBLE ELECTROCHEMICAL ELECTRODE**

Hiroshi Uemachi, Osaka; Tadashi Sotomura, Kashiwara; Kenichi Takeyama, Osaka, and Nobuyoshi Kosbida, Kodaira, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 850,394, Mar. 11, 1992, abandoned.

This application Nov. 1, 1993, Ser. No. 146,401

Claims priority, application Japan, Mar. 11, 1991, 3-044735

Int. Cl.<sup>6</sup> H01M 4/60

U.S. Cl. 429-213

2 Claims

1. A reversible electrochemical electrode comprising a conductive solid material, said conductive solid material comprising at least one compound selected from the group consisting of ion implanted n-doped polyaniline and ion implanted n-doped polypyrrole.

5,413,884

**GRATING FABRICATION USING ELECTRON BEAM LITHOGRAPHY**

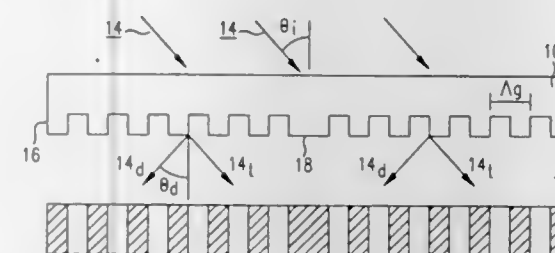
Thomas L. Koch, Holmdel; Frederick W. Ostermayer, Jr., Berkeley Heights; Donald M. Tennant, Freehold, and Jean-Marc Verdiell, Matawan, all of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y.

Filed Dec. 14, 1992, Ser. No. 989,690

Int. Cl.<sup>6</sup> G03F 9/00

U.S. Cl. 430-5

26 Claims



1. A method of fabricating predetermined grating structures in optoelectronic devices, the method comprising the steps of:  
a) providing a photomask including a grating pattern of rectangular grating features formed by a direct-write electron-beam lithography process, said grating pattern comprising any desired number and location of abrupt phase shifts and plurality of grating pitches;  
b) illuminating said photomask with light at a predetermined angle  $\theta_i$  sufficient to form a transmitted beam and a first-order diffracted beam;  
c) exposing a photoresist-covered optoelectronic device substrate, such that the transmitted beam and first-order diffracted beam interfere to form a near-field intensity pattern in said photoresist which replicates said grating pattern; and  
d) developing said photoresist and transferring said grating pattern to the underlying optoelectronic device substrate.

5,413,885

**ORGANIC PHOTOCONDUCTOR FOR AN ELECTROPHOTOGRAPHIC SCREENING PROCESS FOR A CRT**

Pabitra Datta, Cranbury; Nitin V. DeSai, Princeton; Eugene S. Poliniak, Willingboro, N.J.; Ronald N. Friel, Hamilton Square, and Wilber C. Stewart, Highstown, all of N.J., assignors to RCA Thompson Licensing Corp., Princeton, N.J.

Filed Dec. 22, 1993, Ser. No. 168,486

Int. Cl.<sup>6</sup> G03C 5/00

U.S. Cl. 430-28

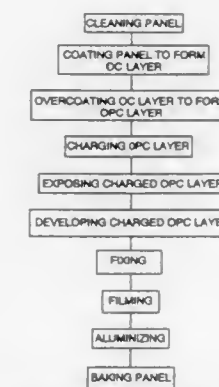
5 Claims

1. In a method of manufacturing a luminescent screen assembly on an interior surface of a faceplate panel for a color CRT comprising the steps of:

coating said surface of said panel to form a volatilizable conductive layer; and

overcoating said conductive layer with a photoconductive solution comprising a suitable resin, an electron donor material, an electron acceptor material, a surfactant and an organic solvent, to form a volatilizable organic photoconductive layer having substantially no spectral sensitivity beyond 550 nm; the improvement wherein

said resin of said photoconductive solution being selected from the group consisting of polystyrene, poly-alpha-methyl styrene, polystyrene-butadiene copolymer, polymethylmethacrylate and esters of polymethacrylic and polyisobutylene, and polypropylene carbonate; said electron donor material being selected from the group consisting of 1,4-di (2,4-methylphenyl)-1,4 diphenyl butatriene (2,4-DMPBT); 1,4-di(2,5-methylphenyl)-1,4 di-



phenyl butatriene (2,5-DMPBT); 1,4-di(3,4-methylphenyl)-1,4 diphenyl butatriene (3,4-DMPBT); 1,4-di(2-methylphenyl)-1,4 diphenyl butatriene (2-DMPBT); 1,4-diphenyl-1,4 diphenylphenyl butatriene (2-DPBT); 1,4-di(4-fluorophenyl)-1,4 diphenyl butatriene (4-DFPBT); 1,4-di(4-bromophenyl)-1,4 diphenyl butatriene (4-DBPBT); 1,4-di(4-chlorophenyl)-1,4 diphenyl butatriene (4-DCPBT); and 1,4-di (4-trifluoromethylphenyl)-1,4 diphenyl butatriene (4-DTFPBT); and

said electron acceptor material being selected from the group consisting of 9-fluorenone (9-F); 3-nitro-9-fluorenone (3-NF); 2,7 dinitro-9-fluorenone (2,7-DNF); 2,4,7-trinitro-9-fluorenone (2,4,7-TNF); 2,4,7-trinitro-9-fluorenylidene malononitrile (2,4,7-TNFMN); anthroquinone (AQ); 2-ethylanthroquinone (2-EAQ); 1-chloroanthroquinone (1-CAQ); 2-methylanthroquinone (2-MAQ) and 2,1-dichloro-1,4 naphthoquinone (2,1-DCAQ).

5,413,886

**TRANSPORT LAYERS CONTAINING TWO OR MORE CHARGE TRANSPORTING MOLECULES**

Damodar M. Pai, Fairport; Huoy-Jen Yuh, Pittsford; John F. Yanus, Webster; Andrew R. Melnyk; Ralph A. Mosher, both of Rochester, and Tsu-Sen Chow, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 25, 1992, Ser. No. 904,291

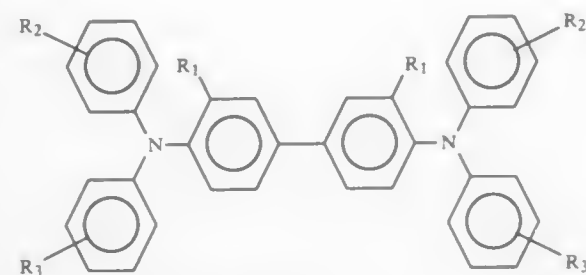
Int. Cl.<sup>6</sup> C08G 5/145

U.S. Cl. 430-58

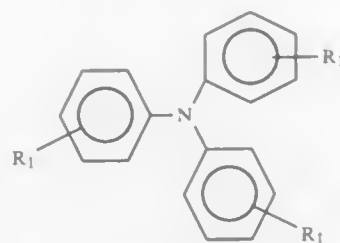
16 Claims

1. An electrophotographic imaging member comprising a charge generating layer and a charge transport layer, said charge transport layer comprising two or more different charge transporting small molecules dissolved or molecularly dispersed in an electrically inactive film forming binder polymer wherein each of said charge transporting small molecules is selected from the group consisting of diamines of the structure:

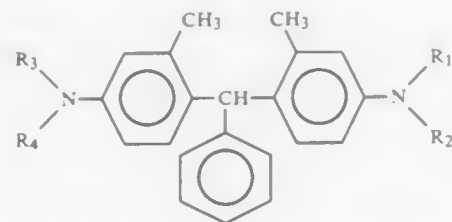




triphenyl amines of the structure:



and triphenyl methanes of the structure:



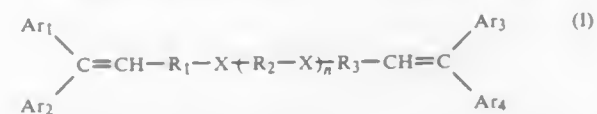
where R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are selected from the group consisting of hydrogen and alkyl groups.

**5,413,887**  
**DISTYRYL COMPOUND AND PHOTSENSITIVE MEMBER COMPRISING THE SAME**  
 Hideaki Ueda, Kawanishi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
 Filed Oct. 16, 1992, Ser. No. 962,093  
 Claims priority, application Japan, Oct. 17, 1991, 3-269282; Oct. 23, 1991, 3-275351; Oct. 12, 1992, 4-272798  
 Int. Cl.<sup>6</sup> G03G 5/047, 5/09  
 U.S. Cl. 430—58

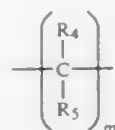


1. A photosensitive member having a photosensitive layer on an electrically conductive substrate, wherein the photosensitive layer comprises: a) a charge generating material and a charge transporting material dispersed in a binder resin or b) a charge generating layer containing a charge generating material and a charge transporting layer containing a charge transporting material;

wherein said charge transporting material comprises a distyryl compound represented by the following formula (I)



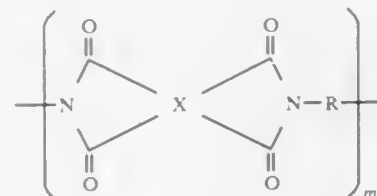
in which Ar<sub>1</sub>, Ar<sub>2</sub>, Ar<sub>3</sub> and Ar<sub>4</sub> represent respectively a hydrogen atom, an alkyl group, an aralkyl group, an aryl group, a biphenyl group or a heterocyclic group, each group may have a substituent; R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> represent respectively an aralkylene group, an arylene group, a biphenylene group or a bivalent heterocyclic group; each of which may have a substituent; X represents —O—, —S— or



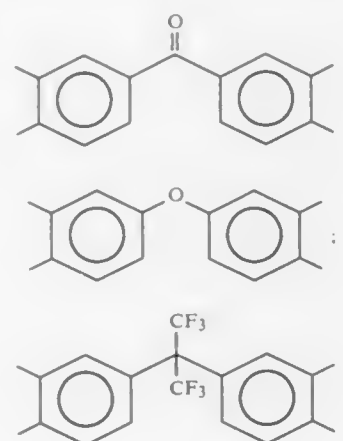
in which R<sub>4</sub> and R<sub>5</sub> represent respectively a hydrogen atom, an alkyl group or an aryl group; each group may have a substituent; m is an integer of 1-5; and n is an integer of 0 or 1.

**5,413,888**  
**TONER WITH POLYIMIDE AND PIGMENT**  
 Guerino G. Sacripante, Oakville; T. Brian McAneney, Burlington, and Gopal K. Puri, Brampton, all of Canada, assignors to Xerox Corporation, Stamford, Conn.  
 Filed Oct. 28, 1993, Ser. No. 144,918  
 Int. Cl.<sup>6</sup> G03G 9/087

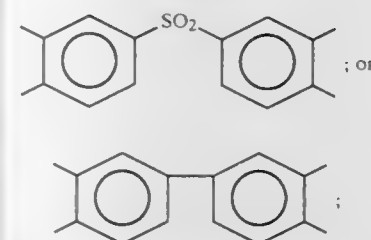
U.S. Cl. 430—106  
 1. A toner composition comprised of pigment, and polyimide of the formula



13 Claims wherein m represents the number of monomer segments present; X is



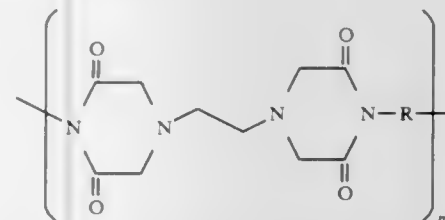
-continued



and R is independently selected from the group consisting of alkyl, oxyalkylene and polyoxyalkylene.

**5,413,889**  
**TONERS CONTAINING PIGMENT AND POLYAMIDE RESIN BINDERS**  
 Guerino G. Sacripante, Oakville, and B. W. Anissa Yeung, Mississauga, both of Canada, assignors to Xerox Corporation, Stamford, Conn.  
 Filed Oct. 28, 1993, Ser. No. 144,956  
 Int. Cl.<sup>6</sup> G03G 9/087

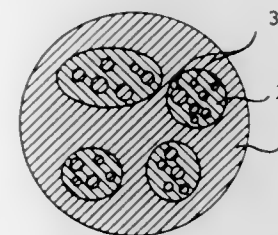
U.S. Cl. 430—106  
 1. A toner composition comprised of pigment, and polyimide of the formula



wherein n represents the number of monomer segments, and is a number of from about 10 to about 1,000; and R is alkylene, oxyalkylene, or polyoxyalkylene.

**5,413,890**  
**TONER AND METHOD FOR PRODUCTION THEREOF**  
 Yoshikuni Mori, Takatsuki, and Mitsuo Kushino, Inagawa, both of Japan, assignors to Nippon Shokubai, Co., Ltd., Osaka, Japan  
 Filed Oct. 28, 1993, Ser. No. 143,844  
 Claims priority, application Japan, Oct. 30, 1992, 4-293288  
 Int. Cl.<sup>6</sup> G03G 9/097

U.S. Cl. 430—110  
 8 Claims



1. A toner comprising toner particles containing at least a coloring agent, a binder resin, and an offset preventing agent; wherein said offset preventing agent is selected from the group consisting of crystalline acrylic ester polymers, crystalline methacrylic ester polymers, and copolymers containing at least one of crystalline acrylic esters and crystalline methacrylic esters, and is present in the form of a plurality of domains in a matrix of said binder resin in each of said toner particles; wherein another portion of said binder resin is present in the

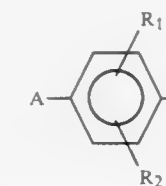
form of a plurality of domains in each of said domains of offset preventing agent; wherein said toner particles therefore assume a sea-island-lake structure; and wherein the weight average molecular weight of said offset preventing agent is in the range of 35,000 to 500,000, and the melting point of said offset preventing agent is in the range of 35° to 120° C.

**5,413,891**  
**ELECTROSTATIC IMAGE DEVELOPING TONER**  
 Yuji Matsuura; Osamu Mukudai; Mitsutoshi Anzai, and Kayoko Watanabe, all of Tsukuba, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan  
 Filed Apr. 13, 1994, Ser. No. 226,861  
 Claims priority, application Japan, Apr. 28, 1993, 5-123154  
 Int. Cl.<sup>6</sup> G03G 9/097

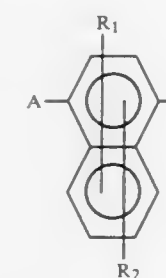
U.S. Cl. 430—110  
 1. An electrostatic image developing toner containing a compound of the following formula (1):



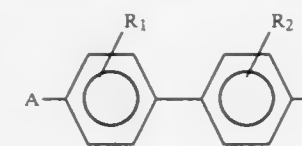
wherein X is a



(wherein A is an electron attractive group, and each of R<sub>1</sub> and R<sub>2</sub> which are independent of each other, is a hydrogen atom, a halogen atom, an alkyl group, a cycloalkyl group, an alkoxy group, an aryl group, an aralkyl group or a hydroxyl group, or R<sub>1</sub> and R<sub>2</sub> together form a ring),



wherein A, R<sub>1</sub> and R<sub>2</sub> are as defined above), or



(wherein A, R<sub>1</sub> and R<sub>2</sub> are as defined above), and Y is a hydrogen atom, an alkyl group or an aryl group.

5,413,892

## ELECTROSTATIC IMAGE DEVELOPING TONER

Yuji Matsuura; Osamu Mukudai; Mitsutoshi Anzai, and Kayoko Watanabe, all of Tsukuba, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

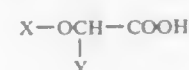
Filed May 18, 1994, Ser. No. 245,542

Claims priority, application Japan, May 24, 1993, 5-142553  
Int. Cl.<sup>6</sup> G03G 9/097

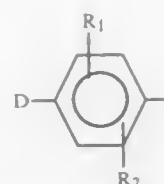
U.S. Cl. 430—110

4 Claims

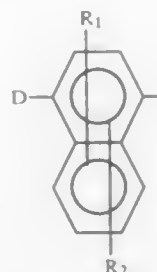
1. An electrostatic image developing toner containing a compound of the following formula (I):



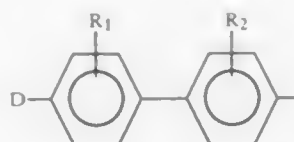
wherein X is



(wherein D is a hydrogen atom or an electron donating group, and each of R<sub>1</sub> and R<sub>2</sub> which are independent of each other, is a hydrogen atom, an alkyl group, a cycloalkyl group, an alkoxy group, an aryl group, an aralkyl group, a hydroxyl group, an amino group, a dialkylamino group, a diarylamino group, a diaralkylamino group, a halogen atom, a halogen-substituted alkyl group, a halogen-substituted aryl group, a cyano group, a formyl group, a carboxyl group, a carbamoyl group, an N-substituted carbamoyl group, an alkoxy carbonyl group, an acyloxy group, an acyl group, an aryloxy carbonyl group, a nitro group, a sulfonic acid group, an alkylsulfonyl group, a substituted sulfonyl group, a sulfamoyl group, an N-substituted sulfamoyl group or a substituted sulfinyl group, provided that when D is a hydrogen atom, R<sub>1</sub> and R<sub>2</sub> are not simultaneously hydrogen atoms and at least one substituent other than a hydrogen atom is substituted at the 2-position, or R<sub>1</sub> and R<sub>2</sub> together form a ring),



(wherein D, R<sub>1</sub> and R<sub>2</sub> are as defined above, provided that when D is a hydrogen atom, R<sub>1</sub> and R<sub>2</sub> are not simultaneously hydrogen atoms and at least one substituent other than a hydrogen atom is substituted at the 2-position, and R<sub>1</sub> and R<sub>2</sub> do not form a ring), or



(wherein D, R<sub>1</sub> and R<sub>2</sub> are as defined above, provided that when D is a hydrogen atom, R<sub>1</sub> and R<sub>2</sub> are not simultaneously hydrogen atoms and at least one substituent other than a hydrogen atom is substituted at the 3-position, and R<sub>1</sub> and R<sub>2</sub> do

not form a ring), and Y is a hydrogen atom, an alkyl group or an aryl group.

5,413,893

## OPTICAL INFORMATION RECORDING MEDIUM

Harumichi Tsukada, Kanagawa; Etsuji Akimoto, and Masahiro Tsumura, both of Hyogo, all of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 799,886, Dec. 2, 1991, abandoned, which is a continuation of Ser. No. 511,189, Apr. 19, 1990, abandoned.

This application Apr. 12, 1993, Ser. No. 45,121

Claims priority, application Japan, Apr. 28, 1989, 1-111317  
Int. Cl.<sup>6</sup> G03C 1/73, 5/60

U.S. Cl. 430—152

10 Claims

1. A method of writing information on a writable optical disk comprising:

- subjecting to ultraviolet radiation a writable optical disk which has a recording layer comprising a thin film of a thermoplastic resin and a compound which generates compressed gas molecules when exposed to said ultraviolet radiation; and
- subsequently subjecting said optical disk to the thermal energy of an incident laser beam condensed to a diameter of no greater than 1  $\mu\text{m}$ .

5,413,894

## HIGH ORTHO-ORTHO BONDED NOVOLAK BINDER RESINS AND THEIR USE IN RADIATION-SENSITIVE COMPOSITIONS

Joseph J. Sizensky, Seekonk, Mass.; Thomas R. Sarubbi, Providence, and Medbat A. Toukhy, Barrington, both of R.I., assignors to OCG Microelectronic Materials, Inc., West Paterson, N.J.

Filed May 7, 1993, Ser. No. 57,999

Int. Cl.<sup>6</sup> G03F 7/023

U.S. Cl. 430—165

15 Claims

2. A coated substrate comprising a substrate coated with a film of a radiation-sensitive composition comprising an admixture of at least one photoactive o-quinonediazide compound and a novolak resin composition having a weight average molecular weight from 3,000 to 40,000, having ortho-ortho bonding of between 55% to 70% of the methylene bonds between the phenolic moieties in the novolak, a time to clear of at least 20 seconds per micron and prepared by a process comprising the steps of:

- reacting a first phenolic monomer comprising a major portion of at least one trifunctional phenolic monomer with a first aldehyde source in the absence of a catalyst at a reaction temperature from about 100° C. to about 200° C. and at a reaction pressure of about 2 to about 15 atmospheres to form a phenolic oligomer having a weight average molecular weight from about 500 to about 2,000, having ortho-ortho bonding of about 55% to about 75% of the methylene bonds between the phenolic moieties, and having a time to clear of less than 125 seconds per micron; wherein the mole ratio of said first aldehyde source to said first phenolic monomer is from about 0.3:1.0 to about 0.55:1.0; and
- then reacting said oligomer with a second aldehyde source and an optional second phenolic source at a temperature from about 80° C. to about 150° C. to form a phenolic novolak having a weight average molecular weight of 3,000 to 40,000; having ortho-ortho bonding of between 55% and 70% of the methylene bonds between the phenolic moieties, and having a time to clear of at least 20 seconds per micron; wherein the mole ratio of said second aldehyde source to total said phenolic moieties is less than about 0.8:1.0 and wherein the amount of said o-quinonediazide compound being about 5% to about 40% by weight and the amount of said novolak resin being about 60 to 95% by weight, based on the total solid content of said radiation-sensitive composition.

5,413,895

POSITIVE RESIST COMPOSITION COMPRISING A QUINONE DIAZIDE SULFONIC ACID ESTER, A NOVOLAK RESIN AND A POLYPHENOL COMPOUND.  
Jun Tomioka, Hyogo; Koji Kuwana, Osaka; Hirotsoshi Nakaniishi, Osaka; Yasunori Uetani, Osaka, and Ayako Ida, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 18, 1992, Ser. No. 931,316

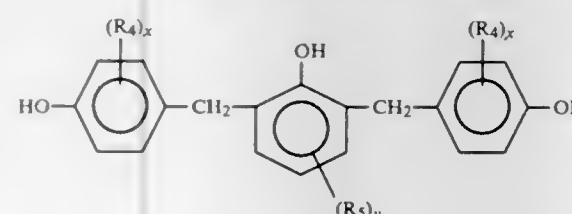
Claims priority, application Japan, Aug. 21, 1991, 3-209357;  
Jul. 6, 1992, 4-178137

Int. Cl.<sup>6</sup> G03F 7/023, 7/30

U.S. Cl. 430—191

9 Claims

- A positive resist composition comprising in admixture:
  - an alkali-soluble resin containing a novolak resin obtained by condensing a phenol compound and a carbonyl compound, wherein the molecular weight range of said novolak resin does not exceed 20 area % of components <900 MW, excluding unreacted phenol compounds, as determined by the GPC pattern of said novolak resin, compared to polystyrene standards;
  - a quinonediazide compound; and
  - a polyphenol compound of the formula:



wherein R<sub>4</sub> and R<sub>5</sub> are independently a hydrogen atom or an alkyl group, and x and y are independently an integer of 1 to 3 and wherein a weight ratio of said polyphenol compound (Ib) to said alkali-soluble resin is from 3:10 to 5:10.

5,413,897

## SILVER HALIDE PHOTOGRAPHIC MATERIAL

Ludo L. Van Rompuy, Destelbergen; Jean-Marie O. Dewancle, Drongen; Jos A. Vaes, Betekom, and Marcel J. Monbaliu, Mortsel, all of Belgium, assignors to AGFA-Gevaert, N.V., Mortsel, Belgium

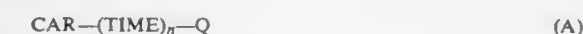
Continuation of Ser. No. 921,088, Jul. 29, 1992, Pat. No. 5,324,622. This application May 4, 1994, Ser. No. 238,047  
Claims priority, application European Pat. Off., Aug. 13, 1991, 91202061

The portion of the term of this patent subsequent to Jun. 28, 2011, has been disclaimed.  
Int. Cl.<sup>6</sup> G03C 5/54, 1/10

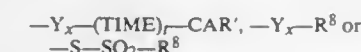
U.S. Cl. 430—230

6 Claims

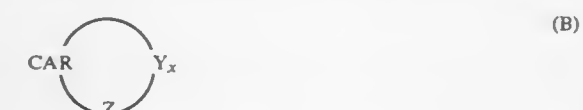
- A photographic material comprising on a support (i) photosensitive silver halide particles, (ii) substantially light insensitive silver salt particles having a speed at least a factor 10 less than said photosensitive silver halide particles under the same conditions of exposure and development of said photosensitive silver halide particles, and (iii) a releasing compound capable of image-wise releasing under the conditions for image-wise development of said photosensitive silver halide to silver a chemical sensitizer, said chemical sensitizer rendering said substantially light insensitive silver salt particles developable and corresponding to one of the following formulas (A) or (B):



wherein CAR represents a carrier moiety that upon reaction with either the reduced or oxidized form of a developing agent or upon reaction with silver ions is capable of releasing under the conditions for development of the photosensitive silver halide the moiety  $-(\text{TIME})_n-\text{Q}$ , TIME represents a timing group which releases Q subsequent to the release of  $-(\text{TIME})_n-\text{Q}$  from CAR and Q represents



wherein n represents 0 or 1, x represents an integer from 2 to 20, Y represents S, Se or Te, t is 0 or 1, and CAR' has one of the significance given for CAR and may be the same as CAR but may also differ from CAR provided that both CAR and CAR' react in the same manner and R<sup>8</sup> represents an alkyl, alkylaryl, aryl or acyl group that may be substituted;



wherein Y and x have the same meaning as defined in formula (A), and Z represents the necessary atoms to form together with Y<sub>x</sub> and CAR a ring.

- A photographic material according to claim 1 additionally comprising a layer of physical development nuclei.

5,413,898

## METHOD OF FORMING A PATTERN ON A SUBSTRATE HAVING A STEP CHANGE IN HEIGHT

Hak Kim, Seoul, and Woo-sung Han, Suwon, both of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Dec. 10, 1993, Ser. No. 164,885

Claims priority, application Rep. of Korea, Dec. 10, 1992, 92-23805; Mar. 4, 1993, 93-3210

Int. Cl.<sup>6</sup> G03C 5/00

U.S. Cl. 430—325

20 Claims

- A method for forming a pattern on uneven surfaces comprising the steps of: forming a photoresist layer on a substrate having a step change in height;

5,413,896

I-RAY SENSITIVE POSITIVE RESIST COMPOSITION  
Toru Kajita; Toshiyuki Ota; Yoshiji Yumoto, and Takao Miura, all of Yokkaichi, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1992, Ser. No. 821,806

Claims priority, application Japan, Jan. 24, 1991, 3-022603;  
Jan. 24, 1991, 3-022604

The portion of the term of this patent subsequent to May 28, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> G03F 7/023, 7/30

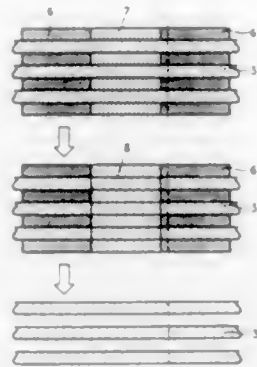
U.S. Cl. 430—192

6 Claims

- An i-ray sensitive positive resist composition which comprises an alkali-soluble novolak resin obtained by subjecting a phenolic mixture to polycondensation together with an aldehyde, and an i-ray sensitive amount of a 1,2-quinonediazide compound in admixture with said alkali-soluble novolak resin, said phenolic mixture containing 5 to 90 mol % of 2,3-xyleneol, 5 to 50 mol % of 3,4-xyleneol and 5 to 90 mol % of m-cresol, based on the total molar weight of 2,3-xyleneol, 3,4-xyleneol and m-cresol, said composition have sensitivity to i-ray.



forming a pattern in said photoresist layer by firstly exposing said photoresist layer using a first mask; uniformly reducing a thickness of said photoresist layer remaining after said step of forming a pattern in said photoresist layer, by secondly exposing a portion of said



substrate having said step change using a second mask, said second mask having a pattern selected from one of a grating pattern and a checkerboard pattern; and developing said firstly and secondly exposed portions of said photoresist layer, said step of developing forming a pattern of said first mask in said photoresist.

5,413,899

# LIGHT-SENSITIVE MIXTURE CONTAINING AN O-NAPHTHOQUINONEDIAZIDE-SULFONIC ACID ESTER AND RECORDING MATERIAL PRODUCED THEREWITH WHEREIN THE O-NAPHTHOQUINONE DIAZIDES ARE PARTIAL ESTERS

Siegfried Scheler, Wiesbaden-Naurod; Andreas Elsaesser, Idstein; Gerhard Buhr, Koenigstein; Klaus Bergmann, Mainz-Bretzenheim, and Wolfgang Zahn, Eltville, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 974,999, Nov. 12, 1992, abandoned.

This application Jun. 6, 1994, Ser. No. 254,500

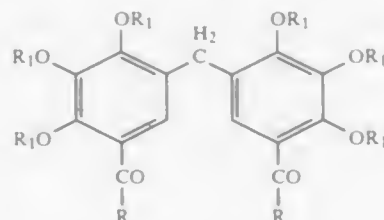
Claims priority, application Germany, Nov. 13, 1991, 41 37 325.1

Int. Cl.<sup>6</sup> G03F 7/021, 7/30

U.S. Cl. 430—326

23 Claims

1. A light-sensitive mixture comprising a polymeric binder that is insoluble in water but soluble or at least swellable in aqueous-alkaline solutions, and a 1,2-naphthoquinone-2-diazide-sulfonic acid ester of the formula I



in which

each R is independently hydrogen or an alkyl or aryl radical and

each R<sub>1</sub> is independently hydrogen or a 1,2-naphthoquinone-2-diazide-4-sulfonyl, 1,2-naphthoquinone-2-diazide-5-sulfonyl, or 7-methoxy-1,2-naphthoquinone-2-diazide-4-sulfonyl radical,

wherein the number of the identical or different naphthoquinone-diazide-sulfonyl radicals, defined as R<sub>1</sub>, in the molecule is 1 to 5, with the proviso that if each R is methyl, then no more than four of the R<sub>1</sub>'s are 1,2-naphthoquinone-2-diazide-5-sulfonyl

## 5,413,900 SILVER HALIDE PHOTOGRAPHIC MATERIAL AND A MANUFACTURING METHOD THEREFOR

Minoru Yokota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 14, 1994, Ser. No. 181,411

Claims priority, application Japan, Jan. 18, 1993, 5-005822; Jan. 19, 1993, 5-006785

Int. Cl.<sup>6</sup> G03C 1/76; G11B 5/845, 5/852

U.S. Cl. 430—495

13 Claims

1. A process for manufacturing a silver halide photographic material including a support, a silver halide emulsion layer on at least one side of the support, and at least one optically transparent magnetic recording layer, comprising the steps of a) applying a coating solution having a magnetic substance dispersed therein onto the support, to form a magnetic recording layer, and b) drying the support while passing the support through an orienting magnetic field to orient the magnetic substance contained in the coating solution in a fixed direction, the orientation of the magnetic substance commencing while the magnetic recording layer contains between 5% to 70% residual solvent.

5,413,901

## RADIOGRAPHIC FILM PACKAGE FOR NON-DESTRUCTIVE TESTING PURPOSES

Raymond Florens, Edegem; Hubert Vandenaabee, Mortsel, and Paul Wouters, O.L.V. Waver, all of Belgium, assignors to AgfaGevaert, N.V., Mortsel, Belgium

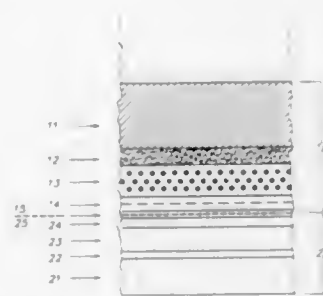
Filed Nov. 16, 1993, Ser. No. 152,744

Claims priority, application European Pat. Off., Nov. 25, 1992, 92203639

Int. Cl.<sup>6</sup> G03C 1/46

U.S. Cl. 430—502

8 Claims



1. A radiographic film package for non-destructive testing purposes, comprising a radiographic film sheet which is composed of a film support coated at both sides with one or more silver halide emulsion layer(s) and one or more non-light sensitive protective antistress coating(s) thereover, and a wrapper around said film sheet which is light-opaque and air-tight, and which comprises a heat-sealable thermoplastic layer at the inner side of the wrapper, a polyethylene terephthalate layer at the outer side of the wrapper and a layer of aluminum located between said polyethylene terephthalate layer and said heat-sealable thermoplastic layer, at least one antistatic layer coating provided between the said thermoplastic layer of said wrapper and the emulsion layer(s) of said film sheet, said film package being free of a lead film or foil, to provide a film package for non-destructive testing purposes including with low energy X-ray exposure.

5,413,902

## COLOR LIGHT-SENSITIVE MATERIAL

Hiroshi Hara, Takanori Hioki, and Keiichi Adachi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 815,871, Jan. 3, 1992, abandoned,

which is a continuation of Ser. No. 486,990, Mar. 1, 1990,

abandoned. This application Dec. 2, 1992, Ser. No. 985,227

Claims priority, application Japan, Mar. 3, 1989, 1-51568; Mar. 13, 1989, 1-60526

The portion of the term of this patent subsequent to Oct. 13, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> G03C 1/46, 8/10

U.S. Cl. 430—503

30 Claims

1. A color light-sensitive silver halide material comprising a blue-sensitive layer, a green-sensitive layer and a red-sensitive layer or a green-to-yellow-sensitive layer, a red-sensitive layer and an infrared-sensitive layer provided on a support, each layer comprising a combination of at least a light-sensitive silver halide, a binder and a dye-providing compound, wherein at least one layer thereof has spectral sensitization peaks in at least two wavelength regions, said peaks in said at least two wavelength regions being at least 50 nm away from each other and at least one spectral sensitization peak thereof exists in the region of wavelength of 700 nm or above, with the proviso that when said blue-sensitive layer has said at least two spectral sensitization peaks, said blue-sensitive layer is spectrally sensitized with a blue region spectral sensitizing dye.

5,413,903

## ELEMENT HAVING A TRANSPARENT MAGNETIC RECORDING LAYER CONTAINING BARIUM FERRITE PARTICLES

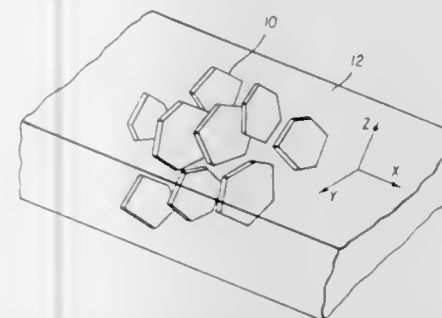
Frederick J. Jeffers, Escondido, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 12, 1993, Ser. No. 135,227

Int. Cl.<sup>6</sup> G03C 1/76, 3/00; B05D 3/14

U.S. Cl. 430—523

10 Claims



6. A silver halide photographic element comprising a substrate having thereon at least one light-sensitive silver halide emulsion layer and a transparent magnetic recording layer on the substrate, the transparent magnetic recording layer having barium ferrite platelet particles in a transparent binder, the barium ferrite platelet particles being aligned such that the easy axis of the particles is parallel to the substrate.

5,413,904

## HIGH CHLORIDE [100] TABULAR GRAIN EMULSIONS IMPROVED EMULSIONS AND IMPROVED PRECIPITATION PROCESSES

Yun C. Chang, Rochester, and Pierre-Henri Jezequel, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 215,072, Mar. 18, 1994,

abandoned. This application Jun. 3, 1994, Ser. No. 253,532

Int. Cl.<sup>6</sup> G03C 1/015

U.S. Cl. 430—569

3 Claims

1. A process of precipitating a photographic emulsion containing a dispersing medium and grains comprised of iodide

and at least 50 mole percent chloride with tabular grains having {100} major faces accounting for greater than 50 percent of total grain projected area, comprised of the steps of

(1) separately introducing soluble silver and halide salts into a reaction vessel containing at least a portion of the dispersing medium so that nucleation occurs while the dispersing medium is maintained at a pCl in the range of from 0.5 to 3.5 and

(2) following step (1) completing grain growth under conditions that maintain the {100} major faces of the tabular grains,



wherein,

(3) precipitation is conducted in the absence of an aromatic grain growth stabilizer containing a nitrogen atom having a resonance stabilized  $\pi$  electron pair and

(4) during step (1) iodide ion is withheld from the reaction vessel until after the soluble silver and halide salts have reacted in the reaction vessel to form grain nuclei and thereafter iodide ion is introduced into the dispersing medium Within the reaction vessel after at least 0.01 percent and before 3 percent of total silver forming the grains has been introduced.

5,413,905

## PHOTOGRAPHIC SENSITIVITY INCREASING ALKYNYLAMINE COMPOUNDS AND PHOTOGRAPHIC ELEMENTS

Roger Lok, Carl R. Preddy, and John W. Harder, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 16, 1993, Ser. No. 169,833

Int. Cl.<sup>6</sup> G03C 1/005, 1/08

U.S. Cl. 430—600

18 Claims

1. A negative or reversal photographic element comprising a silver halide emulsion and an alkynylamine compound having the structure



wherein

R<sup>3</sup> represents a hydrogen atom, aliphatic, carbocyclic, or heterocyclic group, which may be substituted or unsubstituted; and

Y represents a nitrogen containing heterocyclic moiety having substituted thereon, a water solubilizing group.

5,413,906

## METHOD OF DETERMINING POLYMERASE ACTIVITY

Josef Eberle, Munich; Rudolf Seibl, Penzburg; Christoph Kessler, Dorfen, and Bernhard König, Berg, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

PCT No. PCT/EP91/01016, § 371 Date Mar. 19, 1993, § 102(e) Date Mar. 19, 1993, PCT Pub. No. WO92/04467, PCT Pub. Date Mar. 19, 1992

PCT Filed May 31, 1991, Ser. No. 974,595

Claims priority, application Germany, Aug. 31, 1990, 40 27 616.3

Int. Cl.<sup>6</sup> C12Q 1/68, 1/70; C12P 19/34

U.S. Cl. 435—5 14 Claims

1. Method for detecting polymerase activity in a sample comprising the steps of:

- combining a sample suspected of containing a polymerase with a template nucleic acid and mononucleoside triphosphates to form an incubation mixture, wherein said mononucleoside triphosphates include a detectable mononucleoside triphosphate and a separate immobilizable mononucleoside triphosphate, wherein said immobilizable mononucleoside triphosphate is now used as a detectable label,
- incubating said incubation mixture to incorporate the detectable mononucleoside triphosphate and the immobilizable mononucleoside triphosphate into a newly formed nucleic acid,
- contacting said incubation mixture with a solid phase which selectively binds the immobilizable mononucleoside triphosphate and the newly formed nucleic acid in which the immobilizable mononucleoside triphosphate is incorporated,
- separating said newly formed nucleic acid from any unincorporated detectable mononucleoside triphosphate, and
- detecting the detectable mononucleoside triphosphate incorporated into the newly formed nucleic acid as a measure of the polymerase activity.

5,413,907

## DIAGNOSIS FOR MALIGNANT HYPERTHERMIA

Ronald G. Worton; David H. MacLennan, both of Toronto, and Beverley A. Britt, Etobicoke, all of Canada, assignors to The University of Toronto Innovations Foundation; HSC Research and Development Limited Partnership and The Toronto Hospital, all of Toronto, Canada

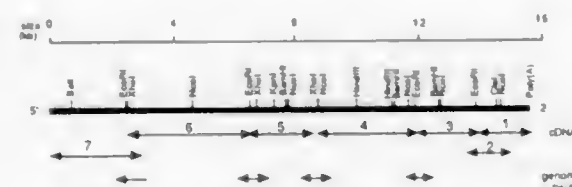
PCT No. PCT/CA90/00312, § 371 Date Apr. 13, 1992, § 102(e) Date Apr. 13, 1992, PCT Pub. No. WO91/04328, PCT Pub. Date Apr. 4, 1991

PCT Filed Sep. 21, 1990, Ser. No. 842,396

Claims priority, application Canada, Sep. 25, 1989, 612726

Int. Cl.<sup>6</sup> C12Q 1/68; C07H 21/04

U.S. Cl. 435—6 4 Claims



1. Isolated DNA encoding for human ryanodine receptor, comprising said DNA having the following characteristics;

- said DNA encoding for a protein having 5032 amino acids and a molecular weight of approximately 563,000 daltons, wherein said protein has the amino acid sequence of FIGS. 2A to 2A-12,
- said DNA having length of approximately 15.3 kb;
- said DNA being isolated from chromosome 19 of humans; and
- said DNA having the restriction map of FIG. 1.

5,413,908

## METHOD OF CHARACTERIZING GENOMIC DNA BY REFERENCE TO A GENETIC VARIABLE

Alec J. Jeffreys, Leicester, England, assignor to Lister Institute of Preventive Medicine, Middlesex, England

Continuation of Ser. No. 228,523, Aug. 4, 1988, abandoned, which is a division of Ser. No. 783,790, Oct. 3, 1985, abandoned. This application Jul. 29, 1992, Ser. No. 921,375

Claims priority, application United Kingdom, Nov. 12, 1984, 8428491; Mar. 6, 1985, 8505744; Jul. 24, 1985, 8518755; Sep. 6, 1985, 8522135

Int. Cl.<sup>6</sup> C12Q 1/68

U.S. Cl. 435—6 6 Claims

1. A method of characterizing a test sample of genomic DNA by reference to a genetic variation by probing said DNA with a polynucleotide probe, which method comprises the steps of fragmenting said sample DNA with at least one restriction endonuclease, hybridizing said probe to corresponding DNA fragments, and detecting hybridized fragments of said DNA, wherein said probe consists essentially of:

- a detectable marker; and
- a polynucleotide consisting of the general formula

$H(J\text{core}.K)_nL$  (i)  
in which:

(a)  $(J\text{core}.K)_n$  is a tandem repeating unit wherein:  
"n" is from 3 to 10,000;  
"core" represents a sequence having 6–16 consecutive nucleotides, selected from within any of the following sequences read 5'→3':

GGAGGTGGGCAGGAXG (2)

AGAGGTGGGCAGGTGG (3)

GGAGGYGGGCAGGAGG (4)

$T(C)_mGGAGGAXGG(G)_pC$  (5A)

$T(C)_mGGAGGA(A)_qGGGC$  (5B)

in which X is A or G, Y is C or T, T is T or U, m is 0, 1 or 2, p is 0 or 1, q is 0 or 1; and

"J" and "K" together represent 0 to 15 additional nucleotides within the repeating unit; provided that "core" and "J" and "K" do not necessarily have the same sequence or same length in each  $(J\text{core}.K)$  repeating unit;

(b) "H" and "L" each represent additional nucleotides flanking the tandem repeating unit; and

(c) core sequences in all n repeating units have 70–100% sequence similarity with the core sequence as defined with respect to formulae (2)–(5B) above;

or a polynucleotide of complementary sequence to the above; said probe being capable of hybridizing with corresponding DNA fragments from more than one minisatellite region or hypervariable locus, thereby characterizing said genomic DNA by reference to the genetic variation at more than one such region or locus.

2. A method of characterizing a test sample of genomic DNA by reference to a genetic variation by probing said DNA with a polynucleotide probe, which method comprises the steps of fragmenting said sample DNA with at least one restriction endonuclease, hybridizing said probe to corresponding DNA fragments, and detecting hybridized fragments of said DNA, wherein said probe consists essentially of a detectable marker and from 3 to 10,000 tandem repeats of a repeat unit sequence consisting of one of:

A  
GGAGGTGGGCAGGAGA

(ii) aGGGCGGGAGG

(iii) aGAGGTGGGCAGGtGG

C

gGGAGGTGGGCAGGAGG

- TGGGCGtGG
- GTGGGCAGGAAG
- TGGGCAG
- GGTGGGCAGGtGG
- aGGGCA
- AGGcaGGtAGGtGG

or a sequence complementary thereto of identical length; said probe being capable of hybridizing with corresponding DNA fragments from more than one minisatellite region or hypervariable locus, thereby characterizing said genomic DNA by reference to the genetic variation at more than one such region or locus.

5,413,909

## METHOD FOR PROFILING NUCLEIC ACIDS OF UNKNOWN SEQUENCE USING ARBITRARY OLIGONUCLEOTIDE PRIMERS

Brant J. Bassam; Gustavo Caetano-Anolles, and Peter M. Gresshoff, all of Knoxville, Tenn., assignors to The University of Tennessee Research Corp., Knoxville, Tenn.

Continuation of Ser. No. 573,627, Aug. 24, 1990, abandoned.

This application Jan. 19, 1993, Ser. No. 6,380

Int. Cl.<sup>6</sup> C12Q 1/68

U.S. Cl. 435—6 20 Claims



1. A method for generating a pattern characteristic of at least one nucleic acid of unspecified sequence in a sample, which method comprises:

- treating said nucleic acid with at least one oligonucleotide primer having an arbitrary sequence and of 5 to 25 nucleotides in length, the amount of primer being in excess over the amount of said nucleic acid, the amounts being in mass and allowing said primer to anneal to multiple sites on each strand of said nucleic acid, each site being substantially complementary to the nucleotides of which said primer is constituted, thus forming a multiplicity of a set of primed templates,
- treating said primed templates with a nucleic acid polymerase, thereby generating a multiplicity of extension strands, the extension strands comprising the primer in combination with a sequence of nucleotides that is substantially complementary to the templates, and extending along the template strands to either the 5' end of the template strands or the next primed site on the template, the number of extension strands thereby corresponding substantially to the number of primed sites,
- denaturing the extension strands from the template strands, thereby generating corresponding single-stranded extension strands and templates,
- allowing said primer to anneal to the extension strands and to the template strands,
- repeating steps (a), (b), (c) and (d) until there are generated nucleic acid fragments which are characteristic and unique for said nucleic acid of unspecified sequence,
- separating said fragments, and
- determining the characteristic pattern of fragments generated from said sequence of nucleic acid in the sample.

5,413,910

## MEASURING NON-DYSTROPHIN PROTEINS AND DIAGNOSING MUSCULAR DYSTROPHY

Kevin P. Campbell; James M. Ervasti; Kay Ohlendieck, all of Iowa City, Iowa; Mitchell G. Gaver, Cockeysville, Md., and Steven D. Kahl, Iowa City, Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa

Continuation of Ser. No. 527,583, May 23, 1990, Pat. No. 5,187,063. This application Oct. 7, 1992, Ser. No. 958,015

The portion of the term of this patent subsequent to Feb. 16, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> G01N 33/567

U.S. Cl. 435—721 7 Claims

1. A method for identifying a substantial reduction in the amount of a component of a mammalian dystrophin-glycoprotein complex from an experimental mammalian muscle tissue sample, relative to a standard muscle tissue sample, the method comprising:

- combining the experimental sample, previously treated to render the non-dystrophin components available for antibody binding, with a substantially pure polyclonal antibody preparation which specifically binds to a non-dystrophin component consisting essentially of a glycoprotein having a molecular weight of about 156 kDa;
- detecting and characterizing the extent of the binding of the polyclonal antibodies to the non-dystrophin component having a molecular weight of about 156 kDa; and
- comparing the extent of binding to the sample with the extent of binding to a standard muscle tissue sample treated as described in steps a) and b).

5,413,911

## DETERMINATION OF TRICYCLIC ANTIDEPRESSANT DRUGS IN THE PRESENCE OF INTERFERING SUBSTANCES

Maciej Adamczyk, Gurnee; Jeffrey R. Fisbpaugh, Chicago; Charles A. Harrington, Lake Villa; Daryl E. Hartter, Mundelein, and Robert E. Hruska, Libertyville, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Dec. 14, 1990, Ser. No. 627,282

Int. Cl.<sup>6</sup> G01N 33/53, 30/02

U.S. Cl. 435—7.1 14 Claims

1. An immunoassay method for determining the amount of a tricyclic antidepressant drug in a biological test sample, wherein said tricyclic antidepressant drug does not contain a sulfur moiety and wherein said biological test sample contains a sulfur-containing compound having a chemical structure which is similar to said tricyclic antidepressant drug and is immunologically crossreactive with an antibody capable of specifically binding to said tricyclic antidepressant drug or an analogue thereof, said method comprising the steps of:

- forming a pretreatment solution by contacting said biological test sample with an oxidative reagent which modifies the chemical structure of said sulfur-containing compound by selectively oxidizing the sulfur moiety of said sulfur-containing compound without modifying the chemical structure of said tricyclic antidepressant drug, whereby crossreactive binding of said antibody to said modified sulfur-containing compound is substantially reduced;
- contacting said pretreatment solution with (i) a labeled reagent comprising said tricyclic antidepressant drug or analogue thereof labeled with a fluorescent moiety, and (ii) said antibody to form a reaction solution wherein said labeled reagent produces a measurable fluorescence polarization response when specifically bound to said antibody;
- measuring the fluorescent polarization response; and
- correlating the measured fluorescent polarization response to the amount of said tricyclic antidepressant drug present in said biological test sample.



5,413,912

**PEPTIDE FOR DETECTING ANTIBODIES TO A 260 KD *T. CRUZI* ANTIGEN**Steven G. Reed, 2843-122nd Pl. NE., Bellevue, Wash. 98005  
Division of Ser. No. 836,642, Feb. 14, 1992, Pat. No. 5,304,371.

This application Dec. 17, 1993, Ser. No. 169,563

Int. Cl.<sup>6</sup> G01N 33/569

U.S. Cl. 435—7.22

13 Claims

1. A method for detecting antibodies to a 260 Kd antigen present in *Trypanosoma cruzi* comprising:

- obtaining an antibody-containing sample from an individual;
- contacting the sample with a peptide that is a major antigenic epitope of the 260 Kd *T. cruzi* antigen, comprising the amino acid sequence Ala Glu Pro Lys Xaa Ala Glu Pro Lys Xaa Ala Glu Pro Lys Xaa (SEQ ID NO:3), wherein Xaa is Pro or Set and when Xaa in position 5 is Ser, Xaa in position 10 is Pro and Xaa in position 15 is Ser, or when Xaa in position 5 is Pro, Xaa in position 10 is Ser and Xaa in position 15 is Pro; and
- detecting the presence of antibodies bound to the peptide.

5,413,913

**ERYTHROCYTE AGGLUTINATION ASSAY**

Carmel J. Hillyard, Brisbane; Dennis B. Rylatt, Rosalie; Bruce E. Kemp, Kew, and Peter G. Bundesen, Fig Tree Pocket, all of Australia, assignors to Agen Biomedical, Ltd., Acadia Ridge, Australia

Continuation of Ser. No. 770,845, Oct. 4, 1991, abandoned, which is a continuation of Ser. No. 324,500, Mar. 16, 1989, Pat. No. 5,086,002, which is a continuation-in-part of Ser. No. 143,343, Jan. 13, 1988, Pat. No. 4,894,347, which is a continuation-in-part of Ser. No. 111,313, Oct. 22, 1987, abandoned. This application Feb. 3, 1994, Ser. No. 191,064

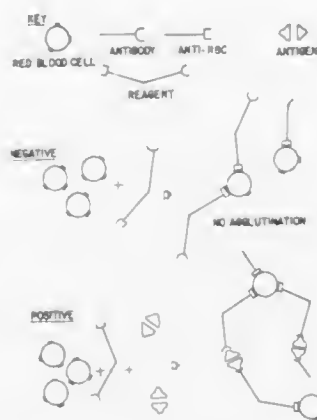
Claims priority, application Australia, Sep. 7, 1987, P14400; Oct. 22, 1987, P15018

The portion of the term of this patent subsequent to Feb. 4, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> G01N 33/555

U.S. Cl. 435—7.25

10 Claims



1. An agglutination reagent which comprises a conjugate comprising at least one erythrocyte binding molecule conjugated to at least one analyte specific binding molecule, wherein said conjugate

- does not cause significant agglutination in the absence of analyte,
- does not substantially alter the binding characteristics of said erythrocyte binding molecule or said analyte binding molecule, and
- does not lyse erythrocytes, and wherein said erythrocyte binding molecule is a univalent specific binding fragment of a non-univalent monoclonal anti-erythrocyte antibody and wherein neither said univalent fragment nor said

non-univalent antibody causes significant agglutination of erythrocytes in the absence of analyte.

2. The reagent of claim 1 wherein the erythrocyte binding molecule specifically binds glycophorin.

5,413,914

**YEAST ASSAY TO IDENTIFY INHIBITORS OF DIBASIC AMINO ACID PROCESSING ENDOPROTEASES**

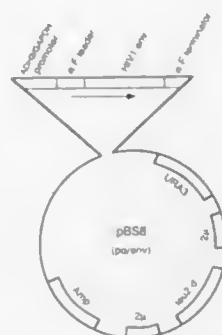
Alex Franzusoff, Boulder, Colo., assignor to The Regents of the University of Colorado, Boulder, Colo.

Filed Jul. 7, 1993, Ser. No. 88,322

Int. Cl.<sup>6</sup> C12Q 1/37, 1/00; C12N 9/60

U.S. Cl. 435—23

49 Claims



1. A method to identify a compound that inhibits proteolytic cleavage by a dibasic amino acid processing endoprotease, said method comprising:

- contacting a yeast strain containing a precursor protein having a dibasic amino acid processing site with a putative inhibitory compound under conditions in which, in the absence of said compound, said yeast strain is capable of effecting cleavage of said precursor protein into cleavage products; and
- assaying for production of at least one of said cleavage products, wherein production of a reduced amount of said at least one of said cleavage products in the presence of said putative inhibitory compound compared to in the absence of said putative inhibitory compound indicates that said compound is able to inhibit proteolytic cleavage by said endoprotease.

5,413,915

**METHOD AND SENSOR FOR DETECTING TOXIC CHEMICAL EXPOSURE EFFECTS AND METABOLIC ACTIVATION OF CARCINOGENIC CHEMICAL AGENTS**

George D. Case, Portland, Oreg., and Paul J. Bekowies, Staten Island, N.Y., assignors to Resource Technologies Group, Inc., Morgantown, W. Va.

Continuation-in-part of Ser. No. 217,862, Jul. 12, 1988, abandoned. This application Jul. 12, 1991, Ser. No. 729,365

Int. Cl.<sup>6</sup> C12Q 1/26; C01N 21/00

U.S. Cl. 435—25

17 Claims

1. A method of determining metabolic activation of a potentially toxic or carcinogenic substance as an indication of its potential toxic or carcinogenic activity, which comprises the steps of:

- contacting molecules of said substance with an in vitro mixture contained in dispersed condition in a film layer of a hydrophilic film-forming agent at pH between 5 and 9 in the presence of moisture absorbed by said hydrophilic film, said mixture comprising cytochrome P450 complexes comprising cytochrome P450 oxidases, molecules of NADPH, and reductase complexes selected from a group consisting of cytochrome P450 reductase complexes and ferredoxin complexes, to thereby effect metabolic activation of said substance having toxic or carcinogenic activity; and
- colorimetrically detecting said metabolic activation of

said substance by means of a change in color of a chemically reduced precursor form of a low redox potential dye relatively stable against spontaneous oxidation in air, which is convertible to a different color by oxidative events associated with said metabolic activation.

5,413,916

**COLORIMETRIC TOXICITY TEST**

Robert Anglin, Loveland, Colo., assignor to Hach Company, Loveland, Colo.

Filed Dec. 29, 1993, Ser. No. 175,136

Int. Cl.<sup>6</sup> C12Q 1/00; C12N 1/00

U.S. Cl. 435—29

6 Claims

1. A method for determining the toxicity of an environmental sample to bacteria, the method comprising the steps of:

- providing a bacterial culture;
- adding resazurin to said sample;
- adding glutaraldehyde to said sample;
- adding a portion of said bacterial culture to said sample;
- measuring light absorbance through the sample and comparing said absorbance to light absorbance through a blank.

5,413,917

**METHOD OF DETERMINING SOURCES OF ACETYL-COA UNDER NONSTEADY-STATE CONDITIONS**

Craig R. Malloy; F. Mark H. Jeffrey, and A. Dean Sherry, all of Dallas, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Jul. 18, 1990, Ser. No. 555,270

Int. Cl.<sup>6</sup> C12Q 1/00, 1/02, 1/04

U.S. Cl. 435—35

30 Claims

1. A method of determining substrate utilization, comprising: preparing at least one <sup>13</sup>C-carbon-labelled compound wherein the <sup>13</sup>C labelled

- compound or a <sup>13</sup>C labelled fragment of the compound enters the citric acid cycle;
- subjecting a cell or tissue having an active citric acid cycle to the <sup>13</sup>C-carbon-labelled compound; and
- measuring a carbon enrichment pattern in at least one citric acid cycle compound or a substance which preserves isotopic distribution in carbons 3, 4 and 5 of  $\alpha$ -ketoglutarate to determine substrate utilization, said measuring being made prior to attaining metabolic or isotopic steady state.

5,413,918

**GENE AND METHOD FOR PRODUCTION OF A 40-45-KDA IGA BINDING PROTEIN**

Ervin Faulmann, Holland, Ohio, assignor to Medical College of Ohio, Toledo, Ohio

Continuation of Ser. No. 677,209, Mar. 29, 1991, abandoned.

This application Aug. 18, 1993, Ser. No. 108,828

Int. Cl.<sup>6</sup> C12P 21/06; C12N 1/20, 15/00; C07H 17/00

U.S. Cl. 435—69.1

13 Claims

13. A process for preparing a recombinant polypeptide wherein said process comprises transforming an appropriate host with a polynucleotide sequence coding for a polypeptide which binds with IgA, wherein said polypeptide is an approximately 40 to 45 kDa protein expressed by a Group B streptococcus, said process further comprising isolating and purifying said recombinant polypeptide expressed by said transformed host.

5,413,919

**METHOD FOR PREPARING FROM CULTURED CELLS A THROMBOPLASTIC REAGENT SUITABLE FOR USE IN THE PROTHROMBIN TIME TEST**

Ray F. Ebert, Derwood, and Rafael P. Valdes-Camin, Germantown, both of Md., assignors to Akzo N.V., Arnhem, Netherlands

Continuation of Ser. No. 904,423, Jun. 26, 1992, abandoned, which is a continuation-in-part of Ser. No. 781,511, Oct. 22, 1991, abandoned. This application Jun. 21, 1994, Ser. No. 263,410

Int. Cl.<sup>6</sup> C12P 21/02, 1/00; C12Q 1/56

U.S. Cl. 435—70.3

9 Claims

1. A method for preparing a human thromboplastin reagent from cultured non-recombinant human cells comprising the steps of washing the cultured human cells with an isotonic aqueous salt solution, said cells produce an amount of tissue factor sufficient to produce a one-stage prothrombin time in plasma of about 10 to about 15 seconds, lysing the cells, isolating membranous material from the lysed cells as a pellet and resuspending the isolated membranous material in an aqueous diluent having approximately physiologic ionic strength within the range of about 0.1 to 0.25, said diluent comprises polyethylene glycol in an amount of from about 0.5 to 2.5% by weight, NaCl at a concentration of about 50 to 150 mM, Ca-gluconate at a concentration of about 10 to 5 mM, Na<sub>2</sub> in a concentration of about 0.01 to about 0.1% by weight, bovine serum albumin at a concentration of about 0.1 to 10 mg/mL, and imidazole at a concentration of about 5 to 75 mM, and wherein the diluent has a pH range of about 6.8 to 7.8, whereby a thromboplastin reagent capable of producing a one-stage prothrombin time in plasma of about 10 to about 15 seconds is obtained.

5,413,920

**METHOD FOR ENHANCED PRODUCTION AND RECOVERY OF PHOSPHATE STARVATION INDUCIBLE GENE PRODUCTS**

Barry L. Wanner, West Lafayette, Ind.; Ki-Sung Lee, Daejeon, Rep. of Korea, and William W. Metcalf, West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Continuation of Ser. No. 865,089, Apr. 8, 1992, abandoned. This application Feb. 7, 1994, Ser. No. 192,776

Int. Cl.<sup>6</sup> C12P 21/00, 1/04; C12N 9/88

U.S. Cl. 435—71.2

19 Claims

1. A method for enhanced production and recovery of phosphate starvation inducible gene product, comprising: culturing an *Escherichia coli* or *Enterobacter aerogenes* bacterium having C-P lyase activity on an organic phosphate, a phosphite, or a mixture thereof as the predominant phosphorus source for growth to result in enhanced production of the gene product; and recovering and purifying the gene product.

5,413,921

**METHOD OF THE PRODUCTION OF (S)-GAMMA-HALOGENATED- $\gamma$ -HYDROXYBUTYRIC ACID ESTERS**

Norimasa Onishi; Megumi Shimaoka; Ikuro Kira, and Masakazu Nakazawa, all of Kawasaki, Japan, assignors to Ajinomoto Co., Ltd., Tokyo, Japan

Filed May 25, 1993, Ser. No. 66,239

Claims priority, application Japan, May 28, 1992, 4-137111

Int. Cl.<sup>6</sup> C12P 7/62, 41/00

U.S. Cl. 435—135

21 Claims

1. A method of producing (S)- $\gamma$ -halogenated- $\beta$ -hydroxybutyric acid esters, comprising the steps of: subjecting a  $\gamma$ -halogenated-acetoacetic acid ester to a culture of at least one microorganism selected from the group consisting of *Stemphylium astragali*, *Stemphylium lati*, *Stemphylium sarciniforme*, *Stemphylium trifolii*, *Alternaria ste-*

viae, *Alternaria solani*, *Alternaria kikuchiana*, *Alternaria mali*, *Alternaria maritima*, *Alternaria porri*, *Alternaria bataticola*, *Corynespora cassicola*, and *Corynespora sesameum*, and capable of asymmetrically reducing said  $\gamma$ -halogenated-acetoacetic acid ester to an (S)- $\gamma$ -halogenated- $\beta$ -hydroxybutyric acid ester, or to cells recovered from said culture in order to reduce said  $\gamma$ -halogenated-acetoacetic acid ester to the (S)- $\gamma$ -halogenated- $\beta$ -hydroxybutyric acid ester; and recovering said (S)- $\gamma$ -halogenated- $\beta$ -hydroxybutyric acid ester.

5,413,922

# PROCESS FOR PRODUCING OPTICALLY ACTIVE 1,3-BUTANEDIOL BY REDUCTION OF 4-HYDROXY-2-BUTANONE

Akinobu Matsuyama; Teruyuki Nikaido, and Yoshinori Kobayashi, all of Niigata, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 964,264, Oct. 21, 1992, which is a division of Ser. No. 449,929, Dec. 7, 1989, Pat. No. 5,219,757. This application Apr. 30, 1993, Ser. No. 54,276

Claims priority, application Japan, Apr. 27, 1988, 63-105024; Apr. 27, 1988, 63-105025; Apr. 27, 1988, 63-105026; Sep. 8, 1988, 63-225078; Oct. 7, 1988, 63-253019

The portion of the term of this patent subsequent to Jun. 15, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C12P 7/18

U.S. Cl. 435—158

13 Claims

1. A process for producing optically active 1,3 butandiol, which comprises treating 4-hydroxy-2-butanone with a microorganism, capable of asymmetrically reducing 4-hydroxy-2-butanone into either (R)-1,3-butanediol or (S)-1,3-butanediol, said microorganism being selected from the group consisting of:

*Ambrosiozyma cecitricosa*  
*Bacillus cereus*  
*Bacillus subtilis*  
*Candida cariosilignicola*  
*Candida arborea*  
*Candida kefyr* (Beijerinck)  
*Candida krusei* (Castellani)  
*Candida succiphila*  
*Candida utilis*  
*Citrobacter freundii*  
*Corynebacterium michiganense*  
*Hansenula polymorpha*  
*Hansenula minuta*  
*Hansenula subpelliculosa*  
*Hansenula fabianii*  
*Hansenula wickerhamii*  
*Hansenula wingei*  
*Issatchenkia scutulata* var. *scutulata*  
*Issatchenkia scutulata*  
*Kluyveromyces drosophilarius*  
*Kluyveromyces lactis*  
*Pichia cellobiosa*  
*Pichia heidii*  
*Pichia lindneri*  
*Pichia opuntiae* var. *thermotolerans*  
*Pichia pastoris*  
*Pichia trehalophila*  
*Protaminobacter ruber*  
*Pseudomonas diminuta*  
*Pseudomonas fluorescens*  
*Pseudomonas putida*  
*Stephanosascus ciferrii*  
*Rhodotorula rubra*  
*Selenotilla peltata*  
*Schizosaccharomyces pombe*  
*Xanthomonas maltophilia*  
*Brevibacterium iodinum*  
*Candida rugosa*

*Candida parapsilosis*  
*Geotrichum candidum*  
*Geotrichum rectangulatum*  
*Geotrichum klebahnii*  
*Geotrichum fermentans*  
*Geotrichum capitatum*  
*Geotrichum eriane*  
*Klebsiella pneumoniae*  
*Lodderomyces elongisporus*  
*Saccharomycopsis lipolytica*  
*Trichosporon cutaneum* and  
*Trichosporon capitatum*  
and (2) collecting the (R)-1,3-butanediol or (S)-1,3-butanediol thus formed.

5,413,923

# HOMOLOGOUS RECOMBINATION FOR UNIVERSAL DONOR CELLS AND CHIMERIC MAMMALIAN HOSTS

Raju Kuchelapati, Darien, Conn.; Beverly H. Koller, Carrboro, and Oliver Smithies, Chapel Hill, both of N.C., assignors to Cell Genesys, Inc., Foster City, Calif. and Univ. of North Carolina at Chapel Hill, Chapel Hill, N.C.

Continuation-in-part of Ser. No. 611,020, Nov. 9, 1990, which is a continuation-in-part of Ser. No. 431,872, Nov. 6, 1989, abandoned, and Ser. No. 385,651, Jul. 25, 1989, abandoned. This application Dec. 11, 1992, Ser. No. 990,879

Claims priority, application WIPO, Jul. 25, 1990, PCT/US90/04178

Int. Cl.<sup>6</sup> C12N 15/00, 5/00

U.S. Cl. 435—172.3

12 Claims

1. A method for producing a genetically engineered human epithelial cell lacking functional Class I major histocompatibility (MHC) antigens as a result of introduction of a lesion at each of the  $\beta_2$ -microglobulin loci by transformation of said human cell with at least one DNA construct comprising a sequence homologous with at least a portion of said locus and said lesion and integration of said construct at said loci, said method comprising:

transforming a host cell with said DNA construct, wherein said construct comprises a marker gene for selection of host cells comprising said DNA;  
screening selected cells comprising said construct for homologous integration;  
transforming cells having homologous integration with said construct; and selecting cells lacking  $\beta_2$ -microglobulin on the surface by the absence of  $\beta_2$ -microglobulin.

5,413,924

# PREPARATION OF WAX BEADS CONTAINING A REAGENT FOR RELEASE BY HEATING

Kenneth M. Kosak, and Matthew K. Kosak, both of 3194 S. 4400 W., West Valley City, Utah 84120

Continuation-in-part of Ser. No. 835,758, Feb. 14, 1992, abandoned. This application Aug. 27, 1992, Ser. No. 936,357

Int. Cl.<sup>6</sup> C12N 11/02, 11/04; G01N 33/544; C12Q 1/68

U.S. Cl. 435—177

19 Claims

1. A method for producing a heat-releasable in-vitro reagent composition comprising the steps of:

(1) injecting an aqueous solution containing a reagent into essentially the center of a bead of molten wax which has a melting temperature greater than 30° C.; and  
(2) cooling said bead of molten wax with injected reagent therein to solidify the wax and form a bead of wax with the reagent entrapped within said bead, such that said bead is essentially water insoluble and water impermeable.

11. A method for producing a heat-releasable in vitro reagent composition comprising the steps of:

(1) dropping droplets of an aqueous solution containing a reagent through a molten layer of wax having a melting temperature greater than 30° C. whereby the droplets are coated with said wax as the droplets pass through the layer of molten wax; and

(2) passing the wax-coated droplets from step (1) to a cooling zone where the wax is solidified to form beads of wax with said reagent entrapped within said beads, such that said beads are essentially water insoluble and water impermeable.

5,413,925

# CARTRIDGE FOR FERMENTATION OF SUGAR-CONTAINING BEVERAGES

Jean Lemonnier, le Vesinet, France, assignor to Millipore S. A., Saint Quentin-En-Yvelines, France

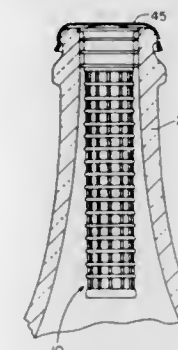
Filed Jan. 19, 1993, Ser. No. 5,710

Claims priority, application France, Jan. 21, 1992, 92 00591

Int. Cl.<sup>6</sup> C12N 11/04, 11/08; C12G 1/06

U.S. Cl. 435—183

12 Claims



1. A cartridge for fermentation comprising a perforated body, one or more microporous elements for retaining yeasts which cause the fermentation of a sugar-containing beverage, said microporous element being a microporous hollow fiber which is arranged inside said body and filled with said yeasts.

5,413,926

# THERMOSTABLE DNA POLYMERASE FROM THERMUS THERMOPHILUS HB-8

Tairo Oshima, Machida; Hitoshi Sakashita, Ohtsu; Hakuji Matsumoto, Ohtsu, and Yoshihiko Maekawa, Tsuruga, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 398,178, Aug. 24, 1989, Pat. No. 5,192,674. This application Jun. 5, 1992, Ser. No. 894,085

Claims priority, application Japan, Aug. 26, 1988, 63-213330

The portion of the term of this patent subsequent to Mar. 9, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C12N 9/12

U.S. Cl. 435—194

9 Claims

1. A DNA polymerase with excellent thermostability derived from *Thermus thermophilus*, wherein said DNA polymerase retains at least about 60% of its activity when placed at pH 8.0 for 2 hours at 85° C.

5,413,927

# FELINE IMMUNODEFICIENCY VIRUS ISOLATE NCSU<sub>1</sub>

Wayne A. F. Tompkins, and Mary B. Tompkins, both of Apex, N.C., assignors to North Carolina State University, Raleigh, N.C.

Continuation-in-part of Ser. No. 752,424, Sep. 3, 1991, abandoned. This application Aug. 12, 1993, Ser. No. 105,710

Int. Cl.<sup>6</sup> C12N 5/06, 7/00, 7/02, 15/49

U.S. Cl. 435—239

2 Claims

1. An isolated feline immunodeficiency virus (FIV) which is NCSU<sub>1</sub>, having the assigned ATCC deposit number VR2333.

5,413,928

# PROCESS FOR EXTRACTING ENHANCED AMOUNTS OF PLANT SECONDARY METABOLITES WITH LIMITED LOSS OF PLANT VIABILITY

Pamela J. Weathers, Stow; Ronald D. Cheetham, Holden, and Alexander Dilorio, Worcester, all of Mass., assignors to Worcester Polytechnic Institute, Worcester, Mass.

Filed Jun. 21, 1991, Ser. No. 719,183

Int. Cl.<sup>6</sup> C12N 5/00, 5/02; C12P 17/02

U.S. Cl. 435—240.4

12 Claims

1. A process for extracting enhanced amounts of a plant secondary metabolite from plant tissue with limited loss of plant tissue viability, comprising the steps of:

a. permeabilizing a differentiated cultured plant tissue membrane to effect partial release of a plant secondary metabolite from the plant tissue;  
b. separating the secondary metabolite from the plant tissue surroundings; and  
c. depermeabilizing the plant tissue membrane to substantially inhibit secondary metabolite release, thereby preserving plant viability and permitting additional secondary metabolite synthesis,  
whereby the plant secondary metabolite is separated from the plant tissue with limited loss of plant tissue viability.

5,413,929

# PROCESS FOR PRODUCING PLANTLETS WHEREBY THE FORMATION OF A CELL MASS IS INDUCED

Keiichirou Ishizaki, and Noboru Onishi, both of Kitsueregawa, Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1991, Ser. No. 689,949

Claims priority, application Japan, Sep. 30, 1989, 1-255440

Int. Cl.<sup>6</sup> C12N 5/00, 5/02

U.S. Cl. 435—240.46

7 Claims

1. A process for producing a plantlet which comprises culturing a root as an explant in a liquid induction medium comprising inorganic salts, a carbon source and an auxin, wherein the concentration of said auxin is in a range from 0.1 to 5 mg./liter, to induce the formation of a cell mass, and culturing the resultant cell mass in a redifferentiation medium, comprising inorganic salts and a carbon source, to produce a plantlet.

5,413,930

# METHOD FOR REGENERATION OF CONIFEROUS PLANTS BY SOMATIC EMBRYOGENESIS

Michael R. Becwar; Emily E. Chesick; Lewis W. Handley, III, all of Charleston, and Mark R. Rutter, Goose Creek, all of S.C., assignors to Westvaco Corporation, New York, N.Y.

Filed Oct. 21, 1993, Ser. No. 138,994

Int. Cl.<sup>6</sup> C12N 5/00

U.S. Cl. 435—240.49

32 Claims

1. A method for reproducing plants selected from the group consisting of *Pinus taeda*, *Pinus serotina*, *Pinus palustris*, *Pinus elliottii*, *Pinus rigida*, and hybrids thereof, by somatic embryogenesis which comprises:

(a) placing a suitable explant selected from the group consisting of immature zygotic embryos and megagametophytes containing immature zygotic embryo on culture initiation medium containing a sufficient amount of nutrients, 0.1 to 5.0 mg/l of auxin, 0.1 to 1.0 mg/l of cytokinin, about 30.0 g/l of sucrose, and a level of gelling agent selected from the group consisting of 2.5 to 4.5 g/l of agar, 0.5 to 1.5 g/l of gellan gum, 3.0 to 5.0 g/l of agarose, and 1.5 to 3.0 g/l of AGARGEL, for 2 to 14 weeks under suitable environmental conditions to grow a culture containing embryogenic tissue;  
(b) transferring the embryogenic tissue culture to culture maintenance medium containing a sufficient amount of nutrients, 0.1 to 5.0 mg/l of auxin, 0.1 to 1.0 mg/l of cytokinin, about 30.0 g/l of sucrose, and a level of gelling agent selected from the group consisting of 6.0 to 9.0 g/l of



agar, 1.75 to 3.50 g/l of gellan gum, 60.0 to 8.0 g/l of agarose, and 3.5 to 5.0 g/l of AGARGEL, for a sufficient time under suitable environmental conditions to develop a mass of embryogenic tissue having a minimum weight of at least 100 mg;

- (c) transferring at least 100 mg of the mass of embryogenic tissue to embryo development medium containing a sufficient amount of nutrients, 5.0 to 33.0 mg/l of abscisic acid, a level of gelling agent selected from the group consisting of 6.0 to 12.0 g/l of agar, 1.75 to 4.00 g/l of gellan gum, 6.0 to 8.0 g/l of agarose, and 3.5 to 6.0 g/l of AGARGEL, and 20.0 to 70.0 g/l of a sugar selected from the group consisting of glucose, maltose, sucrose, and combinations thereof, for a sufficient time under suitable environmental conditions to develop stage 3 somatic embryos;
- (d) separating the stage 3 somatic embryos from the development medium and partially drying the embryos by exposing the embryos to an atmosphere having a high relative humidity for sufficient time to permit the embryos to lose about 25% to 75% of their pre-dried weight;
- (e) transferring the partially dried somatic embryos to germination medium containing a sufficient amount of nutrients, a level of gelling agent selected from the group consisting of 6.0 to 9.0 g/l of agar, 1.75 to 3.50 g/l of gellan gum, 6.0 to 8.0 g/l of agarose, and 3.5 to 5.0 g/l of AGARGEL, and 20.0 to 40.0 g/l of a sugar selected from the group consisting of glucose, maltose, sucrose, and combinations thereof for a sufficient time under suitable environmental conditions to germinate the partially dried embryos;
- (f) converting the germinated embryos into acclimatized plants; and
- (g) field planting the acclimatized plants.

5,413,931

#### EHRLICHIA SPECIES FROM A PATIENT SUFFERING FROM EHRLICHIOSIS

Jacqueline E. Dawson, Atlanta, and Burt Anderson, Tucker, both of Ga., assignors to United States of America, Washington, D.C.

Continuation of Ser. No. 687,526, Apr. 18, 1991, abandoned. This application Nov. 5, 1993, Ser. No. 147,891

Int. Cl.<sup>6</sup> C12N 1/00, 1/20, 5/00

U.S. Cl. 435—252.1

4 Claims

1. *Ehrlichia chaffeensis*, wherein the *Ehrlichia chaffeensis* is the microorganism that is contained in an *Ehrlichia chaffeensis* infected cell line deposited with the American type Culture Collection (ATCC) under accession number CRL 10679.

5,413,932

#### FERMENTATION OF MICROORGANISMS HAVING ICE NUCLEATION ACTIVITY USING A TEMPERATURE CHANGE

Richard J. Lawless, Jr., Rochester, and Richard J. LaDuca, Pittsford, both of N.Y., assignors to Genencor International, Inc., Rochester, N.Y.

Continuation of Ser. No. 924,271, Aug. 3, 1992, abandoned, which is a continuation of Ser. No. 21,949, Mar. 5, 1987, Pat. No. 5,153,134. This application Sep. 1, 1993, Ser. No. 115,929

Int. Cl.<sup>6</sup> C12N 1/20

U.S. Cl. 435—253.3

2 Claims

1. A whole cell fermentation mixture consisting of *Pseudomonas syringae* ATCC 53543 having ice nucleating activity of  $2.0 \times 10^{12}$  nuclei/g of dry cells.

5,413,933

#### MICROORGANISMS AND METHODS FOR DEGRADING PLANT CELL WALLS AND COMPLEX HYDROCARBONS

Miriam Polne-Fuller, Santa Barbara, Calif., assignor to The Regents of the University of California, Oakland, Calif.

Continuation of Ser. No. 43,219, Apr. 27, 1987, Pat. No. 5,501,365. This application Jun. 24, 1991, Ser. No. 719,841

The portion of the term of this patent subsequent to Sep. 24, 2008, has been disclaimed.

Int. Cl.<sup>6</sup> C12N 9/14, 1/10, 1/22, 1/26

U.S. Cl. 435—262

2 Claims

1. A method of degrading a complex hydrocarbon comprising contacting the complex hydrocarbon with a biologically pure culture of a marine amoeba for a time and under conditions sufficient to degrade the complex hydrocarbon, wherein said amoeba is a mutant of the multinucleated marine amoeba ATCC 40319 retaining the ability of ATCC 40319 to degrade hydrocarbon and halogen-substituted hydrocarbon chains.

5,413,934

#### COMPOST CONTAINER

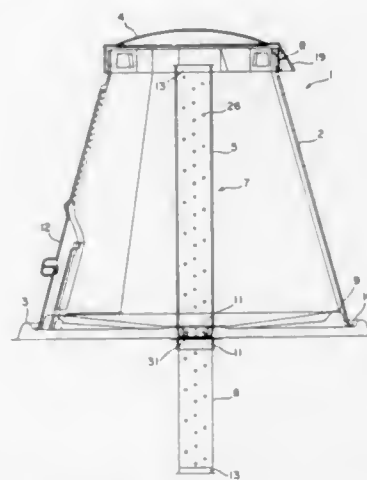
Joergen Fischer, Soelystgade 31, DK-8000 Aarhus C, Denmark

Filed Oct. 13, 1993, Ser. No. 134,898

Int. Cl.<sup>6</sup> C12M 1/10

U.S. Cl. 435—312

10 Claims



1. A compost container for composting organic waste above ground which comprises:
- a perforated base plate which includes a perforated mounting ring in a center thereof,
  - a frustoconical enclosure means which is rotatably positioned on said base plate, said enclosure means defining a bottom edge along a lower portion thereof, an extraction opening in said lower portion thereof, and a top edge along an upper portion thereof defining a feeding opening, said enclosure means defining ventilation openings in said upper portion thereof,
  - a lid means for covering said extraction opening of said enclosure means,
  - a cover means for covering said feeding opening of said enclosure means, said cover means defining a ventilation opening, and
  - a perforated pipe containing granulated material extending from the ground below the compost container upwardly through said perforated mounting ring and within the enclosure means thereabove.

5,413,935

#### PROCESS FOR SELECTING AN ENANTIOMER OF A HYDROXY LACTONE USING PSEUDOMONAS LIPASE

Ramesh N. Patel, Bridgewater; Clyde G. McNamee, Lawrenceville, and Laszlo J. Szarka, East Brunswick, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation of Ser. No. 690,456, Apr. 24, 1991, abandoned.

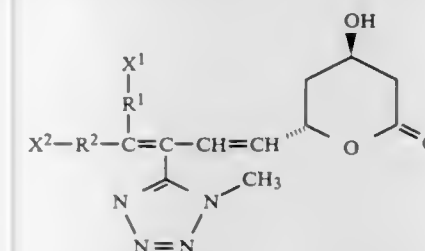
This application Mar. 24, 1993, Ser. No. 106,182

Int. Cl.<sup>6</sup> C12P 41/00

U.S. Cl. 435—280

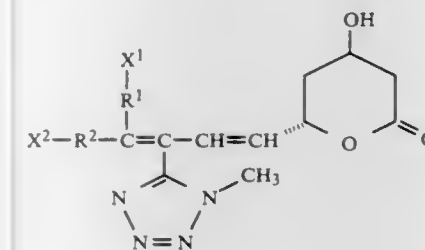
13 Claims

1. A process for selectively preparing a product of the formula

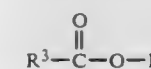


wherein X<sup>1</sup> and X<sup>2</sup> are each independently halogen and R<sup>1</sup> and R<sup>2</sup> are each independently alkyl, cycloalkyl, aralkyl or aryl; and wherein the process comprises the steps of:

(a) reacting a racemic mixture of a compound of the formula



with an acylating agent of the formula



wherein R is alkyl or alkenyl and R<sup>3</sup> is alkyl, cycloalkyl, aryl or aralkyl using a *Pseudomonas lipase* or a *Pseudomonas* microorganism as a catalyst and

(b) recovering the product from the reaction mixture.

5,413,936

#### ROTARY BIOFILTER

Richard Rupert, 1615 E. Monte Cristo Ave., Phoenix, Ariz. 85022

Filed Nov. 29, 1993, Ser. No. 157,978

Int. Cl.<sup>6</sup> C12M 1/16, 1/10, 1/04; C14C 1/00

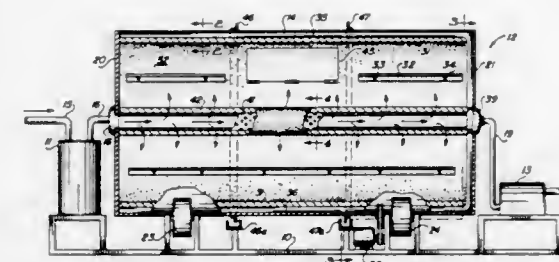
U.S. Cl. 435—299

13 Claims

1. A rotary biofilter for removing and destroying volatile organic compounds and inorganic toxins from gases, said biofilter comprising:

- (a) a vessel having
  - (i) a cylindrical outer wall defining a horizontal, longitudinal axis of rotation;
  - (ii) a first, closed end and a second, closed end;
  - (iii) an axial dispersion pipe positioned approximately along said axis and having an open end extending to the exterior of the vessel through said first closed end for supplying said gases to the interior of said vessel,

- (iv) a porous lining about the interior of said cylindrical outer wall, and
  - (v) perforated collection pipes located between said lining and said outer wall, said collection pipes being coupled through said second closed end for removing treated gases from said vessel;
- (b) a quantity of biofilter material substantially filling the volume of said vessel between said axial dispersion pipe and said lining;



- (c) a humidifier connected to the open end of said axial dispersion pipe for increasing the moisture content of gases entering said vessel; and
- (d) a pump exterior to said vessel and coupled to either said dispersion pipe or said collection pipes for forcing gases into said dispersion pipe, through said biofilter material, and into said collection pipes.

5,413,937

#### DNA CONSTRUCTS CONTAINING SEGMENTS FROM TOMATO POLYGALACTURONASE AND PECTIN ESTERASE GENES

Ian G. Bridges, Slater, Iowa; Donald Grierson, Loughbrough, and Wolfgang Schuch, Crowthorne, both of England, assignors to Zeneca Limited, London, England

Continuation of Ser. No. 621,714, Dec. 5, 1990, Pat. No. 5,296,376, which is a continuation-in-part of Ser. No. 119,614, Nov. 12, 1987. This application Dec. 7, 1993, Ser. No. 162,275

Claims priority, application United Kingdom, Nov. 11, 1986, 86262879; Nov. 30, 1989, 8927048

Int. Cl.<sup>6</sup> C12N 15/82

U.S. Cl. 435—320.1

1 Claim

1. A construct having a structure selected from the group consisting of pJR36S, pJR56S, pJR76S, pJR26S, pJR46S, pJR66S, pJR86S, pJR101S, pJR111S, pJR102S and pJR112S.

5,413,938

#### REAGENT FOR MEASURING IMMATURE LEUKOCYTES

Yukio Tsujino, Kobe; Takashi Morikawa, and Yukio Hamaguchi, Both of Akashi, all of Japan, assignors to Tao Medical Electronics Co., Ltd., Hyogo, Japan

Filed Mar. 17, 1994, Ser. No. 214,248

Claims priority, application Japan, Mar. 19, 1993, 5-60037

Int. Cl.<sup>6</sup> G01N 33/52, 33/49

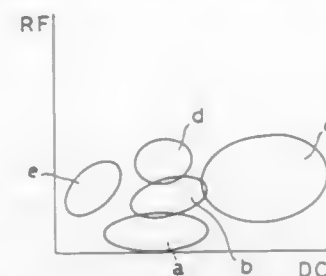
U.S. Cl. 436—63

14 Claims

14. A method for measuring immature leukocytes from a blood sample which comprises

- contacting said blood sample with a reagent comprising
  - (a) a polyoxyethylene-based nonionic surfactant having the general formula (I) in an amount sufficient to fix cytoplasm and all membranes of immature leukocytes; wherein R<sub>1</sub> is an alkyl, alkenyl, or alkynyl group having 10 to 25 carbon atoms; and R<sub>2</sub> is —O—, (C<sub>6</sub>H<sub>4</sub>)—O—, or —COO—; and n is an integer of 10 to 40;
  - (b) a solubilizing agent in an amount sufficient to damage cell membranes of blood cells other than immature leukocytes;
  - (c) an amino acid in an amount sufficient to stabilize said

cytoplasm and cell membranes of said immature leukocytes; and  
(d) an aqueous medium; said reagent being capable of



adjusting the pH to a range of 5.0 to 9.0, the osmolarity to the range of 150 to 600 in Osm/kg and the electric conductivity to the range of 6.0 to 9.0 mS/cm; and measuring said immature leukocytes.

5,413,939

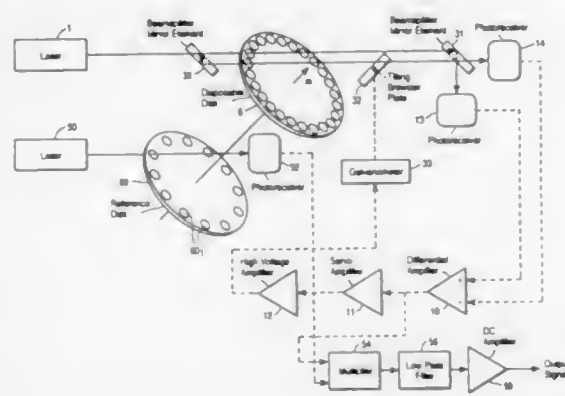
# SOLID-PHASE BINDING ASSAY SYSTEM FOR INTERFEROMETRICALLY MEASURING ANALYTES BOUND TO AN ACTIVE RECEPTOR

Eric K. Gustafson, Palo Alto; Jimmy D. Allen, Cupertino, and Michael E. Cobb, San Jose, all of Calif., assignors to First Medical, Inc., Mountain View, Calif.

Filed Jun. 29, 1993, Ser. No. 86,345  
Int. Cl.<sup>6</sup> G01N 33/543; G01J 1/20

U.S. Cl. 436—518

17 Claims



17. A method of measuring an analyte in a sample, comprising:

contacting the sample with an optically transparent substrate comprising (a) an active region having a substance immobilized thereon which specifically binds the analyte and (b) an inactive region which does not bind the analyte in the sample;

providing an interferometer having at least two beams travelling along respective beam paths;

inserting the substrate into at least one of the beam paths so as to intercept at least one of the beams;

moving the substrate relative to the interferometer to phase modulate light in the interferometer due to passage of the at least one of the beams through the active region and the inactive region;

measuring a phase change in the at least one of the beams transmitted through the active region due to the analyte specifically binding thereto and through the inactive region due to any non-specific binding to the inactive region;

controlling the interferometer by modifying at least one of the beam paths so as to maintain a desired phase difference between the two beam paths;

generating an output signal indicative of the amount of

analyte bound to the active region based on the measured phase change; and  
correlating the output signal to the amount of the analyte in the sample.

5,413,940

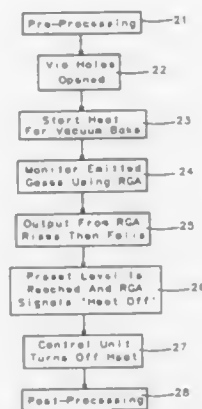
# PROCESS OF TREATING SOG LAYER USING END-POINT DETECTOR FOR OUTGASSING

Chung-An Lin; Ting-Hwang Lin, and Ying-Chen Chao, all of Hsin-Chu, Taiwan, Prov. of China, assignors to Taiwan Semiconductor Manufacturing Company, Hsinchu, Taiwan, Prov. of China

Filed Oct. 11, 1994, Ser. No. 320,895  
Int. Cl.<sup>6</sup> H01L 21/316, 21/3213

U.S. Cl. 437—7

20 Claims



1. A method for optimizing the length of time for which a layer of a spin-on-glass is outgassed comprising:  
providing a vacuum chamber in which to heat said layer of spin-on-glass;  
providing means for heating and cooling said layer of spin-on-glass;  
providing a residual gas analyzer that shares the same atmosphere inside said vacuum chamber as said spin-on-glass; heating said layer of spin-on-glass for a period of time so as to cause the release of gases trapped on its surface and within its body thereby causing outgassing of the spin-on-glass layer;

dynamically measuring the partial pressures of said released gases inside said vacuum chamber by means of said residual gas analyzer; and

automatically terminating said outgas heat treatment as soon as the partial pressures of said released gases, as measured by said residual gas analyzer, falls below some level.

5,413,941

# OPTICAL END POINT DETECTION METHODS IN SEMICONDUCTOR PLANARIZING POLISHING PROCESSES

Daniel A. Koos, and Scott Meikle, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Jan. 6, 1994, Ser. No. 178,663

Int. Cl.<sup>6</sup> G01D 21/00

U.S. Cl. 437—8

8 Claims

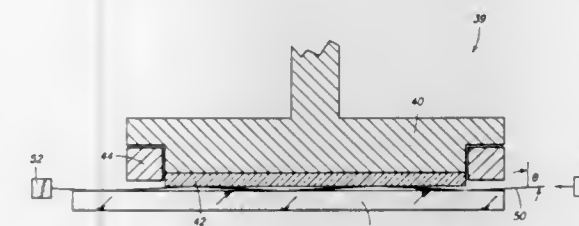
1. A semiconductor processing method of detecting polishing end point from a polishing planarization process, the method comprising the following sequential steps:

a) impinging laser light onto an area of an outermost surface of a semiconductor substrate at an angle of incidence of at least 75° from a line normal relative to the substrate, the impinged laser light predominantly reflecting off the area as opposed to transmitting therethrough;

b) measuring intensity of the step "a" light reflected off of the area;

c) polishing the substrate outermost surface;

d) repeating step "a" then step "b"; and  
e) comparing a prior measured step "b" intensity of reflected light with a later measured step "b" intensity of reflected light to determine a change in degree of planarity of the semiconductor substrate outermost surface as a result of polishing; and



the method further comprising reflecting the reflected light back onto the substrate outermost surface at the angle of incidence multiple times with a mirror, and wherein step "b" comprises measuring the intensity of the multiple reflected light.

5,413,942

# MONOLITHIC ELECTRONIC STRUCTURES

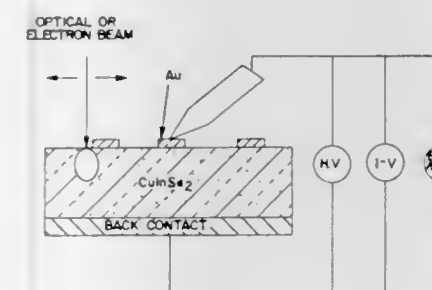
David Cahen; Abram Jakubowicz; Geula Dagan, and Konstantin Gartsman, all of Rehovot, Israel, assignors to Yeda Research and Development Co. Ltd., Rehovot, Israel

Continuation-in-part of Ser. No. 489,816, Mar. 9, 1990, abandoned. This application Jun. 16, 1992, Ser. No. 899,548  
Claims priority, application Israel, Mar. 14, 1989, 089617

Int. Cl.<sup>6</sup> H01L 21/26

U.S. Cl. 437—16

19 Claims



1. A process for the production of a monolithic electronic single-element structure or multi-element structure from a semionic material, which comprises:

a) establishing a location in a semionic body;  
b) applying an electric field to said location in said semionic body;

c) maintaining said semionic body including said location at a temperature sufficiently low to preclude melting or decomposition of the semionic body while said electric field is being applied; and

d) controlling the electric field as to magnitude and time so that no decomposition and macroscopic melting of the material occurs while creating doping profiles sufficiently sharp to define at least one homojunction and thus create an electronic device element in the semionic material in said location thereof.

5,413,943

# SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

Atsushi Murakoshi, Kawasaki; Ichiro Mizushima, Yokohama; Masaharu Watanabe, Kawasaki, and Masahiko Yoshiki, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

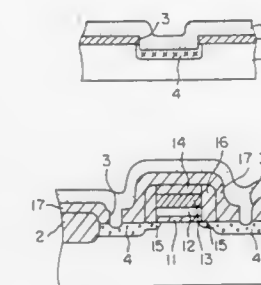
Filed Dec. 28, 1992, Ser. No. 997,363

Claims priority, application Japan, Dec. 27, 1991, 3-346544; Dec. 9, 1992, 4-329401

Int. Cl.<sup>6</sup> H01L 21/265

U.S. Cl. 437—20

8 Claims



1. A method of manufacturing a semiconductor device comprising the steps of:

forming an impurity layer including boron ions in a silicon layer such that at least part of the boron ions in the impurity layer are in the form of icosahedron clusters each having 12 boron atoms;

forming a functioning portion using the formed impurity layer; and

annealing the impurity layer at a temperature condition such that at least a portion of the icosahedron clusters remains in the impurity layer.

5,413,944

# TWIN TUB CMOS PROCESS

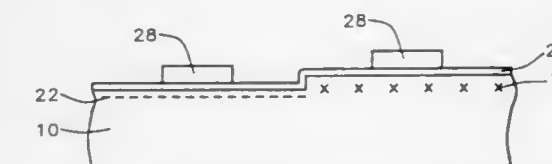
David Lee, Hsin Chu City, Taiwan, Prov. of China, assignor to United Microelectronics Corporation, Hsin Chu, Taiwan, Prov. of China

Filed May 6, 1994, Ser. No. 239,426

Int. Cl.<sup>6</sup> H01L 21/70

U.S. Cl. 437—34

25 Claims



1. A method of forming a self-aligned twin tub structure for a CMOS (Complementary Metal Oxide Semiconductor) device, comprising the steps of:

implanting a first conductivity-imparting dopant in a silicon substrate;

forming a photoresist layer over a portion of said silicon substrate, to act as a mask;

removing a portion of the top surface of said silicon substrate in the region not masked by said photoresist layer;

implanting a second conductivity-imparting dopant, of an opposite type to said first conductivity-imparting dopant, into the region of said silicon substrate not masked by said photoresist layer;

removing said photoresist layer;

forming a first insulating layer over said silicon substrate;

forming a second insulating layer over said first insulating layer;



patterning said second insulating layer to form an active region mask centrally located over the planned location of each tub of said self-aligned twin tub structure;  
forming tubs in said silicon substrate;  
forming field oxide regions in and on the surface of said silicon substrate, between said active region masks, whereby said field oxide regions are partially formed during said forming tubs;  
removing remainder of said second insulating layer; and  
implanting a third conductivity-imparting dopant, of the same type as said second conductivity-imparting dopant, into the same region as said implanting a second conductivity-imparting dopant.

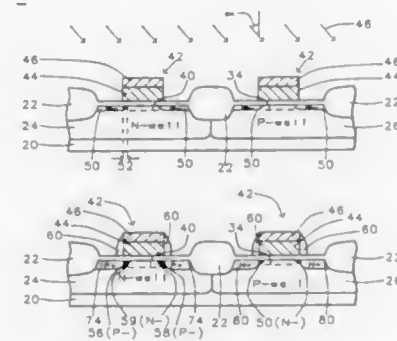
5,413,945

# BLANKET N-LDD IMPLANTATION FOR SUB-MICRON MOS DEVICE MANUFACTURING

Sun-Chieh Chien, and Tzong-Shien Wu, both of Hsin-Chu, Taiwan, Prov. of China, assignors to United Micro Electronics Corporation, Hsinchu, Taiwan, Prov. of China  
Filed Aug. 12, 1994, Ser. No. 289,671  
Int. Cl.<sup>6</sup> H01L 21/336

U.S. Cl. 437—35

18 Claims

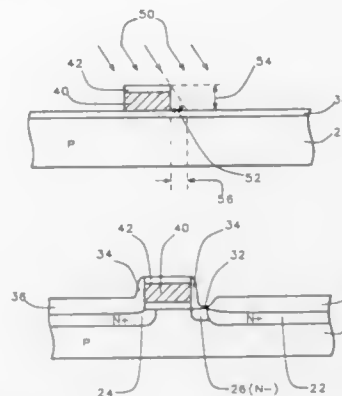


1. A method of forming metal oxide semiconductor (MOS) devices, comprising the steps of:  
providing a silicon substrate with field isolation regions, P-well and N-well regions, and an oxide layer over said P-well and N-well regions;  
implanting, in a substantially vertical direction, said P-well region with a first conductivity-imparting dopant;  
forming gate structures over said P-well and N-well regions;  
implanting, at a large angle to the plane of said silicon substrate, a second conductivity-imparting dopant that is of opposite conductivity to said first conductivity-imparting dopant, into said P-well and N-well regions, masked by said gate structures;  
implanting, in a substantially vertical direction, said N-well region with a third conductivity-imparting dopant, of same conductivity as said first conductivity-imparting dopant;  
forming sidewall spacers on said gate structures;  
implanting, in a substantially vertical direction, said P-well region with a fourth conductivity-imparting dopant, of same conductivity as said second conductivity-imparting dopant;  
implanting, in a substantially vertical direction, said N-well region with a fifth conductivity-imparting dopant, of same conductivity as said first conductivity-imparting dopant; and  
heating said silicon substrate to drive in said dopants.

5,413,946  
METHOD OF MAKING FLASH MEMORY CELL WITH SELF-ALIGNED TUNNEL DIELECTRIC AREA  
Gary Hong, Hsin-Chu, Taiwan, Prov. of China, assignor to United Microelectronics Corporation, Hsinchu, Taiwan, Prov. of China  
Filed Sep. 12, 1994, Ser. No. 304,119  
Int. Cl.<sup>6</sup> H01L 21/266

U.S. Cl. 437—35

14 Claims



1. A method of forming an improved memory cell, comprising the steps of:  
providing a semiconductor substrate;  
forming a gate dielectric layer on the surface of said semiconductor substrate;  
forming a layer of first gate electrode material on the surface of said gate dielectric layer;  
forming a nitride layer on the surface of said layer of first gate electrode material;  
forming a photoresist layer on the surface of said nitride layer;  
forming a first gate electrode pattern in said photoresist layer;  
forming a first gate electrode with sidewalls and a top surface nitride layer by means of etching said first gate electrode pattern in said layer of first gate electrode material and said nitride layer using said first gate electrode pattern in said photoresist layer as a mask;  
forming heavily doped source and drain regions in said semiconductor substrate by means of an oblique angle ion implantation;  
etching said first gate electrode pattern in said gate dielectric layer using said first gate electrode with sidewalls and a top surface nitride layer as a mask;  
forming a lightly doped region in said semiconductor substrate using normally directed ion implantation;  
forming a sidewall oxide layer on the sidewalls of said first gate electrode;  
forming a tunnel oxide layer over said lightly doped region in said semiconductor substrate;  
forming a self-aligned oxide layer over said source and drain regions in said semiconductor substrate;  
removing said top surface nitride layer from said first gate electrode with sidewalls;  
forming a layer of second gate electrode material on the surface of said semiconductor substrate after said first gate electrode has been formed and said top surface nitride layer has been removed so that said first gate electrode makes electrical contact with said layer of second gate electrode material;  
forming a second gate electrode by etching a second gate electrode pattern in said layer of second gate electrode material using photoresist masking and lithography so that said second gate electrode makes electrical contact with said first gate electrode;  
forming a layer of oxide/nitride/oxide on the surface of said second gate electrode;

forming a layer of control gate electrode material on said layer of oxide/nitride/oxide;  
forming a control gate electrode by etching a control gate electrode pattern in said layer of control gate electrode material using photoresist masking and lithography;  
forming a floating gate from said first gate electrode and said second gate electrode;  
forming an insulating-dielectric layer on the surface of said semiconductor substrate after said control gate electrode has been formed;  
forming contact openings in said insulating dielectric layer;  
forming metal contacts in said contact openings in said insulating dielectric layer;  
forming a patterned metal conductor layer on the surface of said insulating dielectric layer; and  
forming a passivation dielectric layer on the surface of said insulating dielectric layer after said patterned metal conductor layer and said metal contacts have been formed.

5,413,947

# METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE WITH AN EPITAXIAL VOID

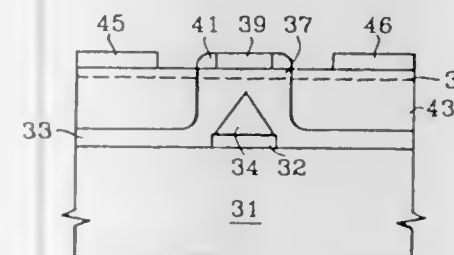
Seok T. Kim, Suweon; Young S. Kim, Seoul, and Yu J. Kim, Suweon, all of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea  
Division of Ser. No. 986,534, Dec. 7, 1992. This application Jun. 7, 1993, Ser. No. 71,993

Claims priority, application Rep. of Korea, Dec. 5, 1991, 91-22197; Jan. 14, 1992, 92-380

Int. Cl.<sup>6</sup> H01L 21/338

U.S. Cl. 437—41

7 Claims



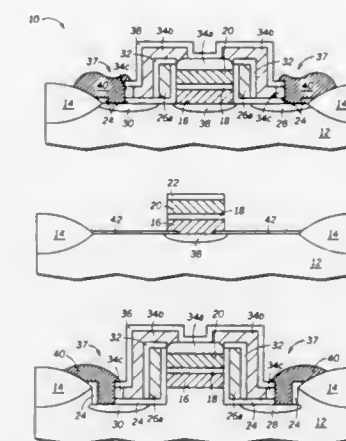
1. A manufacturing method of a compound semiconductor device comprising the steps of:  
forming an insulating layer at an angle to a main crystal direction on a portion of a semi-insulating semiconductor substrate having a crystal direction;  
forming a first conductivity type buffer layer on said semi-insulating semiconductor substrate, respective portions of said buffer layer converging above the insulating layer to form a closed void within the buffer layer over said insulating layer;  
forming a second conductivity type channel region on said buffer layer;  
forming a first conductivity type spacer layer on said channel region;  
forming a gate electrode on the surface of said spacer layer, spaced above said insulating layer;  
forming side walls on both sides of said gate electrode;  
forming second conductivity type well regions in said buffer layer and said spacer layer, outside said side walls; and  
forming source and drain electrodes on respective said well regions.

# 5,413,948 METHOD FOR FORMING A DUAL TRANSISTOR STRUCTURE

James R. Pfister, and James D. Hayden, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.  
Division of Ser. No. 5,965, Jan. 19, 1993, Pat. No. 5,324,960.  
This application Mar. 14, 1994, Ser. No. 209,763  
Int. Cl.<sup>6</sup> H01L 21/336

U.S. Cl. 437—41

20 Claims



1. A method for forming a dual-transistor device, the method comprising the steps of: providing a substrate;  
forming a first transistor at least partially within the substrate, the first transistor having a source, a drain, and a sidewall spacer formation functioning as a gate electrode where the sidewall spacer formation has a height and a width;  
forming a second transistor, which has a source and drain, formed overlying the first transistor, the second transistor using the sidewall spacer formation as a gate electrode, the sidewall spacer formation being formed such that the height is greater than the width.

5,413,949

# METHOD OF MAKING SELF-ALIGNED MOSFET

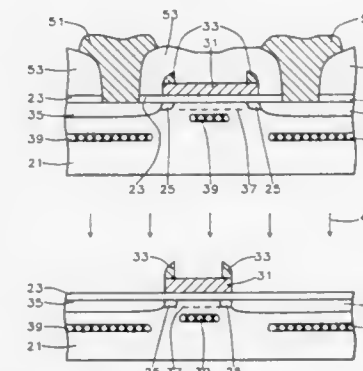
Gary Hong, Hsin-chu, Taiwan, Prov. of China, assignor to United Microelectronics Corporation, Hsinchu, Taiwan, Prov. of China

Filed Apr. 26, 1994, Ser. No. 233,339

Int. Cl.<sup>6</sup> H01L 21/266, 21/8234

U.S. Cl. 437—44

10 Claims



1. A method of forming a MOSFET structure, comprising the steps of:  
providing a silicon substrate with a gate oxide layer formed on the surface of said silicon substrate;  
doping said silicon substrate using ion implantation;  
forming a first polysilicon layer on the surface of said gate oxide layer;





5,413,955

# METHOD OF BONDING SILICON WAFERS AT TEMPERATURES BELOW 500 DEGREES CENTIGRADE FOR SENSOR APPLICATIONS

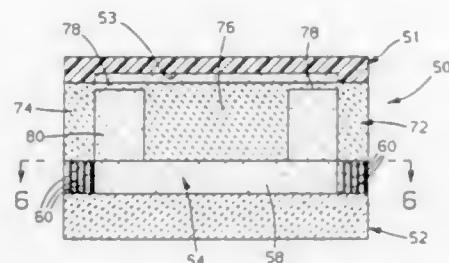
Han-Sbeng Lee, Bloomfield Hill, Mich.; Steven E. Staller, Kokomo, and Dan W. Chilcott, Sharpville, both of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Dec. 21, 1993, Ser. No. 169,117

Int. Cl.<sup>6</sup> H01L 21/20

U.S. Cl. 437—86

5 Claims



1. A method of silicon wafer-to-wafer bonding, the method comprising the steps of:  
providing a first wafer having an electric circuit formed from conductive materials including aluminum;  
providing a second wafer;  
treating a surface of the first wafer and a surface of the second wafer so as to create hydrophilic surfaces, the treating step comprising a plasma etch technique to smooth the surfaces and to make the surfaces hydrophilic, the plasma etch technique involving bombardment of the surfaces with ions of oxygen, argon or a combination thereof;  
placing the hydrophilic surfaces of the first and second wafers in contact with each other;  
heating the first and second wafers to a temperature below about 500° C. so that the first and second wafers are bonded together.

5,413,956

# METHOD FOR PRODUCING A SEMICONDUCTOR LASER DEVICE

Masanori Watanabe, Nara; Ken Ohbayashi, Tenri; Kazuaki Sasaki, Yao; Osamu Yamamoto, Nara, and Mitsuhiko Matsumoto, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

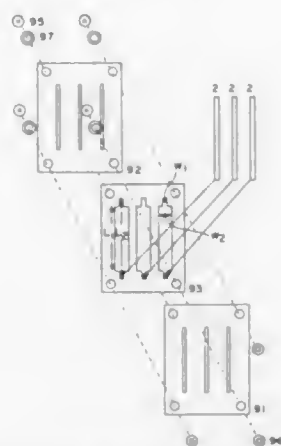
Filed Dec. 22, 1992, Ser. No. 995,064

Claims priority, application Japan, Mar. 4, 1992, 4-046975; Mar. 4, 1992, 4-046976

Int. Cl.<sup>6</sup> H01L 21/20

U.S. Cl. 437—129

16 Claims



10. A method for producing a semiconductor laser device in

which a substrate with a layered structure for light emitting is cleaved into a plurality of bars, the layered structure including an active layer, and the bars are cut into chips, comprising the steps of:

forming window layers on light-emitting end facets of the bars;  
holding the bars with the window layers into a holding and masking means having openings for forming electrodes on top surfaces and reverse surfaces of the bars with aligning the top surfaces and reverse surfaces of the bars with the openings, and forming the electrodes on the top surfaces and the reverse surfaces of the bars under the condition that the bars are in the holding and masking means;  
heating the bars under the condition that the bars are in the holding and masking means; and  
cutting the bars on which the electrodes are formed into the chips.

5,413,957

# METHOD FOR FABRICATING MOS TRANSISTOR HAVING SOURCE/DRAIN REGION OF SHALLOW JUNCTION AND SILICIDE FILM

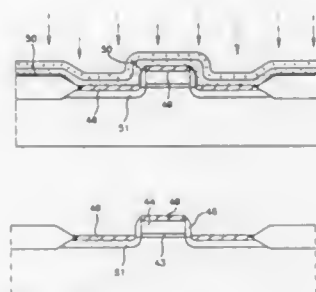
Jeong S. Byun, Chungcheongbuk-do, Rep. of Korea, assignor to Goldstar Electron Co., Ltd., Rep. of Korea

Filed Jan. 24, 1994, Ser. No. 185,553

Int. Cl.<sup>6</sup> H01L 21/225

U.S. Cl. 437—161

9 Claims



1. A method for fabricating an MOS transistor having a source/drain region of shallow junction and a thin silicide film, comprising the steps of:

conducting a field oxidation process to form a device separation field oxide film on a portion of a silicon substrate;  
coating said substrate with an insulating film and a polysilicon film and patterning them to form a gate insulating film and a gate on a portion of said substrate, the other portion of said substrate being exposed;  
forming a spacer at respective side wall of said gate;  
depositing a titanium film and thereafter a titanium nitride film over the entire resulting structure;  
performing a rapid heat treatment process under an ammonia ambient to form silicide films at the interface between said exposed substrate and said titanium film and at the interface between said gate and said titanium film and to form a  $Ti_xO_yN_z$  at the interface between said field oxide film and said titanium film and at the interface between said side wall spacer and said titanium film, remaining titanium film being transformed into titanium nitride film;  
implanting dopant ions having a conductive type opposite to said substrate in said titanium nitride film and the titanium silicide film;  
applying a heat treatment process to said titanium nitride film and said titanium silicide film including said dopants, to form a source/drain region of shallow junction in said substrate, said dopants being diffused into said substrate; and  
removing all remaining titanium nitride films and  $Ti_xO_yN_z$  film except for said titanium silicide films.

5,413,958

# METHOD FOR MANUFACTURING A LIQUID CRYSTAL DISPLAY SUBSTRATE

Issel Imahashi, Yamanashi; Kiichi Hama, Chino, and Jiro Hata, Yamanashi, all of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

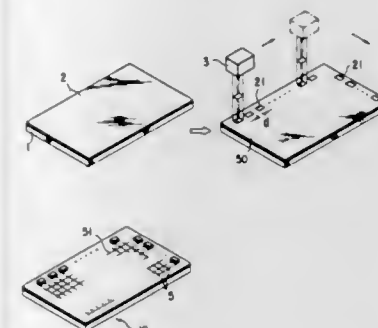
Filed Nov. 16, 1993, Ser. No. 153,376

Claims priority, application Japan, Nov. 16, 1992, 4-330073; Jan. 25, 1993, 5-029975

Int. Cl.<sup>6</sup> H01L 21/26

U.S. Cl. 437—173

10 Claims



1. A method of manufacturing a liquid crystal display substrate comprising a substrate, a plurality of semiconductor elements arranged in a pixel region of the substrate, and a plurality of drive circuit sections for driving the semiconductor elements, said method comprising the steps of:

forming an amorphous semiconductor film on said substrate; intermittently applying laser beam pulses having a cross section of predetermined dimensions, onto target surface regions of said amorphous semiconductor film, thereby changing said target surface regions into island-shaped polycrystalline regions having dimensions substantially identical to said predetermined dimensions;  
forming the drive circuit sections by using said island-shaped polycrystalline regions; and  
forming said semiconductor elements in said pixel region and electrically connecting said semiconductor elements to said drive circuit sections, by using parts of said amorphous semiconductor film.

5,413,959

# METHOD OF MODIFYING TRANSPARENT CONDUCTIVE OXIDE FILM INCLUDING METHOD OF MANUFACTURING PHOTOVOLTAIC DEVICE

Yasuaki Yamamoto; Hiroshi Hosokawa; Wataru Shinohara, and Seichi Kiyama, all of Moriguchi, Japan, assignors to Sayno Electric Co., Ltd., Osaka, Japan

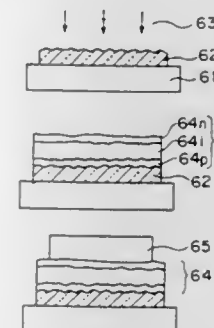
Filed Sep. 10, 1993, Ser. No. 119,879

Claims priority, application Japan, Sep. 14, 1992, 4-244765; Jun. 22, 1993, 5-150422

Int. Cl.<sup>6</sup> H01L 31/18, 27/14

U.S. Cl. 437—174

20 Claims



1. A method of modifying a transparent conductive oxide

film, comprising the steps of: emitting an energy beam from an energy beam generating device; and irradiating said transparent conductive oxide film with said energy beam, thereby increasing the carrier concentration and reducing the resistance in said film.

5,413,960

# ANTIBIOTIC REUTERIN

Walter J. Dobrogosz, Raleigh, N.C., and Sven E. Lindgren, Upsala, Sweden, assignors to Biogala AB, Stockholm, Sweden  
Continuation of Ser. No. 671,204, Mar. 18, 1991, abandoned, which is a division of Ser. No. 268,361, Sep. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 102,830, Sep. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 46,027, May 1, 1987, abandoned. This application Jul. 27, 1993, Ser. No. 97,871

Int. Cl.<sup>6</sup> C12N 9/02, 9/99

U.S. Cl. 435—189

1 Claim

1. A method of decreasing the ribonucleotide reductase B1 subunit activity by 50% in a reaction mixture, comprising adding  $\beta$ -hydroxypropionaldehyde produced by *Lactobacillus reuteri* cells to said reaction mixture in a concentration of about 50  $\mu$ l  $\beta$ -hydroxypropionaldehyde per nmole of ribonucleotide reductase.

5,413,961

# METHOD FOR FORMING A CONTACT OF A SEMICONDUCTOR DEVICE

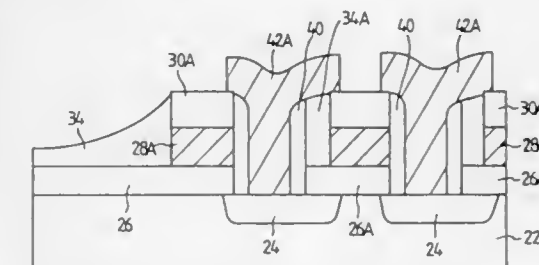
Jae K. Kim, Kyongki, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Kyongki, Rep. of Korea  
Filed Nov. 16, 1993, Ser. No. 152,707

Claims priority, application Rep. of Korea, Nov. 16, 1992, 92-21471

Int. Cl.<sup>6</sup> H01L 21/44, 21/48

U.S. Cl. 437—195

9 Claims



5,413,962

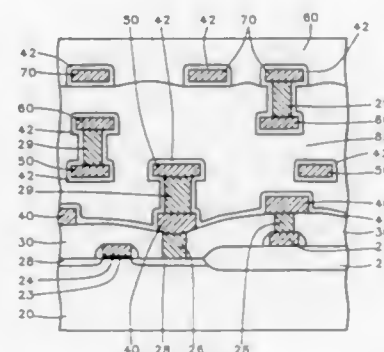
**MULTI-LEVEL CONDUCTOR PROCESS IN VLSI FABRICATION UTILIZING AN AIR BRIDGE**  
 Water Lur, Taipei, and Jiunn Y. Wu, Don-Lio, both of Taiwan, Prov. of China, assignors to United Microelectronics Corporation, Hsinchu, Taiwan, Prov. of China

Filed Jul. 15, 1994, Ser. No. 275,268

Int. Cl.<sup>6</sup> H01L 21/44

U.S. Cl. 437—195

12 Claims



1. A method of forming a multi-level conductor structure for VLSI circuits, comprising the steps of:  
 providing a silicon substrate with circuits formed therein, a base dielectric layer formed on said substrate, and contact studs formed in said base dielectric layer making electrical contact with said circuits;  
 forming a first electrode metal layer on said base dielectric layer and contact studs;  
 etching a first electrode pattern in said first electrode metal layer;  
 forming a first thin envelope oxide layer on said first electrode pattern and said base dielectric layer;  
 forming a first inter-metal dielectric layer over said thin envelope oxide layer;  
 forming a second thin envelope oxide layer over said first inter-metal dielectric layer;  
 etching first inter-level vias with sidewalls in said first inter-metal dielectric layer, said first thin envelope oxide layer, and said second thin envelope oxide layer;  
 forming a thin envelope oxide spacer on said sidewalls of said first inter-level vias;  
 filling said first inter-level vias with first inter-level metal studs;  
 forming a second electrode metal layer on said second thin envelope oxide layer and said first inter-level metal studs;  
 forming a third thin envelope oxide layer on said second electrode metal layer;  
 etching a second electrode pattern in said second electrode metal layer, said second envelope oxide layer, and said third envelope oxide layer said second electrode pattern having sidewalls;  
 forming a thin envelope oxide spacer on said sidewalls of said second electrode pattern;  
 removing all said inter-metal dielectric; and  
 forming a passivation layer with poor step coverage over said silicon substrate.

5,413,963

**METHOD FOR DEPOSITING AN INSULATING INTERLAYER IN A SEMICONDUCTOR METALLURGY SYSTEM**

Po-Wen Yen, Army Chung, and Her-Song Liaw, all of Hsin-Chu, Taiwan, Prov. of China, assignors to United Microelectronics Corporation, Hsinchu, Taiwan, Prov. of China

Filed Aug. 12, 1994, Ser. No. 289,648

Int. Cl.<sup>6</sup> H01L 21/28, 21/318

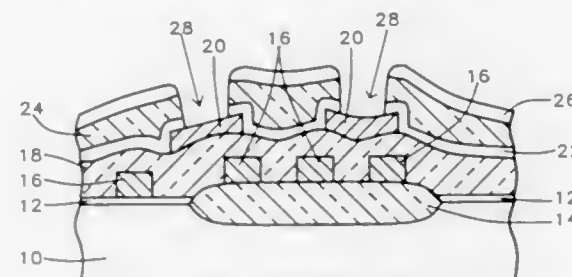
U.S. Cl. 437—195

9 Claims

1. A method of fabricating an improved insulating interlayer

in a metallurgy system for integrated semiconductor devices comprising:

providing a semiconductor substrate having an insulating layer on the substrate and a first level of metallurgy on said insulating layer;  
 depositing a first conformal layer of SiO<sub>2</sub> over the first level of metallurgy using plasma enhanced chemical vapor deposition;  
 depositing a non-conformal organic layer of insulating material composed of siloxane spin-on-glass over said first conformal layer;  
 placing the substrate in an enclosure and heating in N<sub>2</sub> at a temperature in excess of 400° C. to cure the organic layer, without opening said enclosure to another atmosphere,



subjecting the substrate to an N<sub>2</sub> plasma environment for a time of at least 30 minutes to convert alkyl groups in the organic layer to nitride groups,  
 without opening the inclosure, depositing a second conformal layer of SiO<sub>2</sub> over said organic layer using plasma enhanced chemical vapor deposition,  
 depositing, exposing, and developing a photoresist layer over said second conformal layer that defines via openings over said first level of metallurgy,  
 etching via openings through said second conformal layer, said non-conformal layer, and said first conformal layer, removing said photoresist layer by exposing it to a plasma environment, and  
 completing said devices by forming a second metallurgy layer and an overlying passivating layer.

5,413,964

**PHOTO-DEFINABLE TEMPLATE FOR SEMICONDUCTOR CHIP ALIGNMENT**

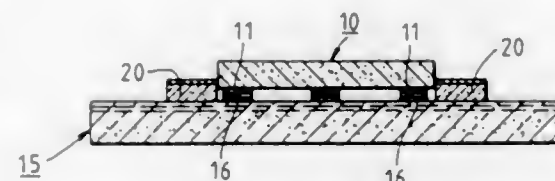
Thomas J. Massingill, Scotts Valley, and William M. Loh, Sunnyvale, both of Calif., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 24, 1991, Ser. No. 720,262

Int. Cl.<sup>6</sup> H01L 31/60

U.S. Cl. 437—209

13 Claims



1. A method of securing a chip to a substrate, wherein the chip has conductive pads on selected limited areas of one face and the substrate has conductive pads in mirror image on a mating face, comprising the steps of:

a) forming a template in situ and adhered to said mating face with inner edges of the template aligned with said conductive pads on the substrate within the template, the template being shaped to receive said chip; and  
 b) placing said face of the chip on said face of the substrate within and aligned with said edges of said template so that

said conductive pads on said one face of the chip are aligned with and contacting said conductive pads on said mating substrate.

5,413,965

**METHOD OF MAKING MICROELECTRONIC DEVICE PACKAGE CONTAINING A LIQUID**

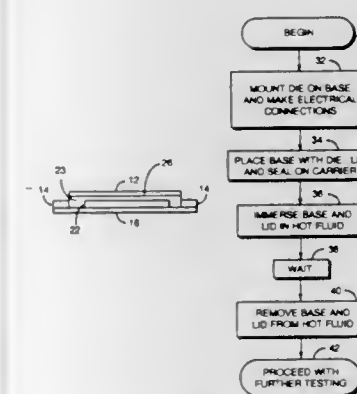
Brian A. Webb, Chandler, and Robert M. Wentworth, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 13, 1993, Ser. No. 119,555

Int. Cl.<sup>6</sup> H01L 21/56

U.S. Cl. 437—219

13 Claims



10. A method for filling a cavity within a package enclosing a semiconductor device, the method comprising steps of:  
 heating a liquid to a first temperature;  
 placing a package having a lid and a base, including sealant disposed between the lid and the base, in the liquid to seal the lid to the base; and  
 leaving the package in the liquid until the cavity contains the liquid and the sealant is cured.

5,413,966

**SHALLOW TRENCH ETCH**

Philippe Schoenborn, San Jose, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.

Continuation of Ser. No. 719,838, Jun. 24, 1991, abandoned, which is a continuation-in-part of Ser. No. 711,624, Jun. 6, 1991, Pat. No. 5,290,396, which is a continuation-in-part of Ser. No. 632,461, Dec. 20, 1990, Pat. No. 5,242,536. This application Sep. 9, 1993, Ser. No. 179,751

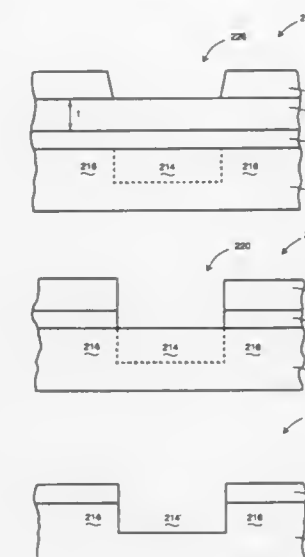
Int. Cl.<sup>6</sup> H01L 21/302

U.S. Cl. 437—225

16 Claims

1. A method of forming isolation trenches adjacent active areas in semiconductor devices, consisting of essentially:  
 applying a first non-patterned layer of a first material over a substrate;  
 applying a second non-patterned layer of a second material, dissimilar from the first material, over the first non-patterned layer;  
 in a first etching step, etching holes through the first and second non-patterned layers directly atop selected areas in the substrate, and exposing a surface of the substrate underlying the first layer, said first etching step being conducted as an anisotropic plasma etch employing a chlorine containing gas and hydrogen bromide;  
 in a second, subsequent etching step, etching the second layer and the substrate until the first layer is exposed, thereby forming trenches in the substrate;  
 wherein:

the second layer is applied to a thickness "t" which is a multiple, based on the disparity of the etching rates of the



second layer and the substrate, of a desired trench depth "d", and wherein "d" is at most about 1 micrometer.

5,413,967

**METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES**

Tetsuo Matsuda, Kanagawa, and Haruo Okano, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 883,576, May 15, 1992, abandoned.

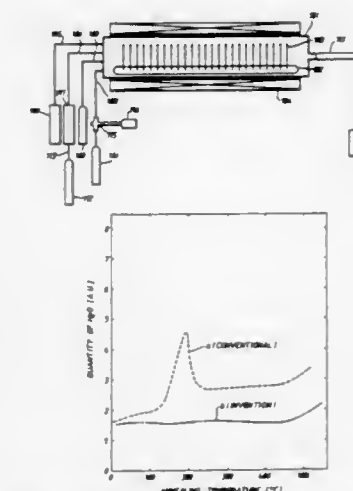
This application May 3, 1994, Ser. No. 237,412

Claims priority, application Japan, May 16, 1991, 3-111399

Int. Cl.<sup>6</sup> H01L 21/02

U.S. Cl. 437—235

11 Claims



1. A method of manufacturing semiconductor devices, comprising the steps of:  
 arranging at least one substrate in a reaction vessel;  
 decomposing a gas including at least one halogen into halogen radicals;  
 supplying an organic silane compound gas, an ozone gas, and said gas including at least one halogen decomposed into halogen radicals into said reaction vessel; and  
 forming a silicon oxide film, including said at least one halogen, on said substrate by heating an inner portion of said reaction vessel to a predetermined temperature, while



decreasing exhausted products to levels at which reliability of said silicon oxide film is not impaired.

**5,413,968**  
**SEMICONDUCTOR DEVICE AND MANUFACTURING METHOD THEREOF**

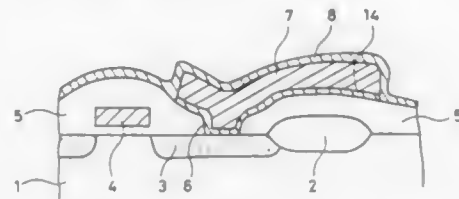
Yasuo Inoue; Kazuyuki Sugahara; Takashi Ipposhi; Yasuo Yamaguchi, and Tadashi Nishimura, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 612,699, Nov. 15, 1990, abandoned. This application Feb. 25, 1993, Ser. No. 22,876

Claims priority, application Japan, Nov. 20, 1989, 1-302592  
Int. Cl.<sup>6</sup> H01L 21/44

U.S. Cl. 437—200

5 Claims



1. A manufacturing method of a semiconductor device, comprising the steps of:  
forming a conductor layer including a silicon crystal;  
forming an insulator layer on the conductor layer;  
forming an opening in said insulator layer so as to expose a surface of said conductor layer;  
forming a barrier layer on an inner surface of the opening and on a surface of said insulator layer;  
depositing a polysilicon layer on said barrier layer;  
forming a metal layer on said polysilicon layer and on said insulator layer;  
reacting said metal layer with said polysilicon layer to transform all of said polysilicon layer into a metal silicide layer.

**5,413,969**  
**DIFFERENTIAL TREATMENT TO SELECTIVELY AVOID SILICIDE FORMATION ON ESD I/O TRANSISTORS IN A SALICIDE PROCESS**

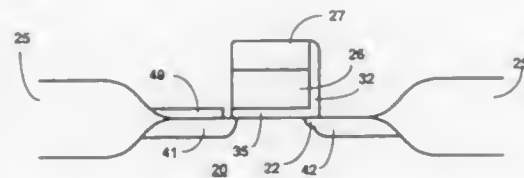
Tiao-Yuan Huang, Cupertino, Calif., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Nov. 23, 1999, Ser. No. 156,159

Int. Cl.<sup>6</sup> H01L 21/44, 21/48

U.S. Cl. 437—200

21 Claims



1. A method for selective salicidation of source/drain regions of transistors on an integrated circuit, the method comprising the steps of:

- differentially treating a first subset of the source/drain regions to hinder formation of metal-silicide over the first subset of the source/drain regions by performing an implant of atoms into the first subset of the source/drain regions, but not into a second set of the source/drain regions;
- depositing a metal layer over the first subset of the source/drain regions and the second subset of the source/drain regions;
- annealing the metal layer deposited in step (b), the annealing being done at a temperature such that the metal

reacts to form metal-silicide over the second subset of the source/drain regions, but not over the first subset of the source/drain regions; and,

- stripping off the unreacted metal from over the first plurality of the source/drain regions.

**5,413,970**  
**PROCESS FOR MANUFACTURING A SEMICONDUCTOR PACKAGE HAVING TWO ROWS OF INTERDIGITATED LEADS**

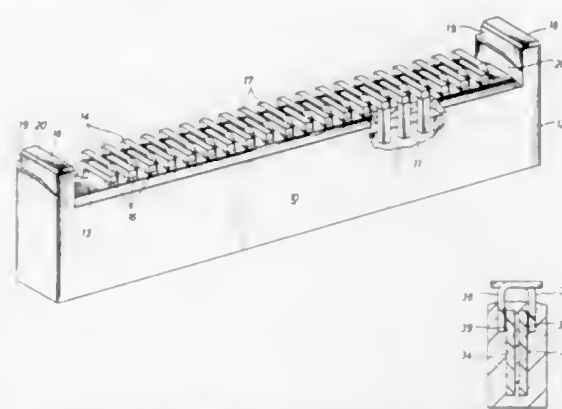
Ernest J. Russell, Richmond, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 8, 1993, Ser. No. 134,149

Int. Cl.<sup>6</sup> H01L 21/56, 21/58, 21/60

U.S. Cl. 437—208

4 Claims



1. A method for making a semiconductor package having interdigitated leads, the method comprising the steps of:  
providing a semiconductor package having two generally parallel and opposing rows of conductive leads, each row having a spacing between adjacent pairs of leads, wherein the two rows of leads extend from one side of the package, each lead having an unconnected end, and  
shaping each of the two rows of leads to extend toward the other row in an interdigitating and non-contacting configuration.

**5,413,971**  
**LASER ABSORBING FILTER GLASS**

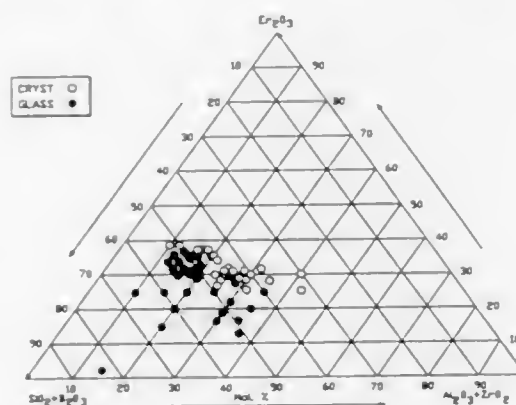
Donald M. McPherson, 6018 Colby St., Oakland, Calif. 94618

Filed Sep. 14, 1993, Ser. No. 121,015

Int. Cl.<sup>6</sup> C03C 3/068

U.S. Cl. 501—78

40 Claims



1. A filter element consisting essentially of, in mole percent, 19–31% SiO<sub>2</sub>, 19–31% B<sub>2</sub>O<sub>3</sub>, 10–20% Al<sub>2</sub>O<sub>3</sub>, 2–10% ZrO<sub>2</sub>, 0–10% Y<sub>2</sub>O<sub>3</sub>, and 25–39% of one or more rare earth oxides selected from the group Er<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub>, Dy<sub>2</sub>O<sub>3</sub>, Sm<sub>2</sub>O<sub>3</sub>, Ce<sub>2</sub>O<sub>3</sub>, Pr<sub>2</sub>O<sub>3</sub>, Ho<sub>2</sub>O<sub>3</sub>, Yb<sub>2</sub>O<sub>3</sub> and Tm<sub>2</sub>O<sub>3</sub>.

**5,413,972**  
**SIALON COMPOSITES AND METHOD OF PREPARING THE SAME**

Chinmau J. Hwang; Donald R. Beaman, and David W. Sunitzky, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 23, 1993, Ser. No. 178,377

The portion of the term of this patent subsequent to Jul. 13, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C04B 35/58

U.S. Cl. 501—98

19 Claims

1. A SiAlON ceramic material having no greater than 3 volume percent of intergranular amorphous phase and consisting essentially of:

- a first phase of alpha-SiAlON represented by the general formula  $M_x(Si,Al)_{12}(O,N)_{16}$ , wherein  $0 < x \leq 2$  and M is at least one cationic element selected from the group consisting of Li, Na, Mg, Ca, Sr, Ce, Y, Nd, Sm, Gd, Dy, Er, and Yb; and
- a second phase of beta-SiAlON represented by the general formula  $Si_6-yAl_3O_8N_{2-y}$ , wherein  $0 < y < 4.3$ ; wherein the SiAlON ceramic material has a fracture toughness of at least 5.0 MPa (m)<sup>1/2</sup>.

**5,413,973**  
**METHOD FOR THERMAL PROCESSING ALUMINA-ENRICHED SPINEL SINGLE CRYSTALS**

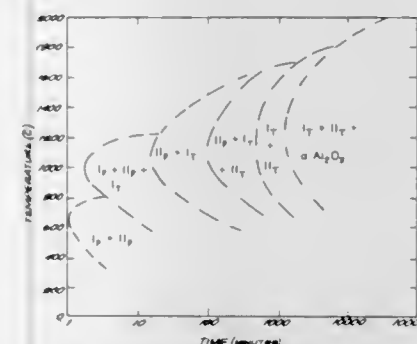
Carol M. Jantzen, Aiken, S.C., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation of Ser. No. 100,219, Aug. 2, 1993, abandoned, which is a continuation of Ser. No. 957,957, Oct. 8, 1992, abandoned, which is a continuation of Ser. No. 793,504, Nov. 15, 1991, abandoned, which is a continuation of Ser. No. 363,020, Jun. 8, 1989, abandoned. This application Feb. 3, 1994, Ser. No. 190,940

Int. Cl.<sup>6</sup> C04B 35/10

U.S. Cl. 501—120

15 Claims



1. A process for age hardening alumina-enriched spinel crystals from a single phase, alumina-enriched spinel crystal comprising the steps of:

- employing a temperature and time transformation combination in which the temperature and time are selected so as to produce a transformation of alumina enriched magnesium spinel containing at least one of the species  $I_p$  and  $II_p$  in which:  
said  $I_p$  species is defined as elliptical pre-precipitates with elongated axes aligned at about 18 degrees to the (001) or (010) crystallographic direction of the spinel matrix under the dark-field electron microscopy;  
said  $II_p$  species is defined as parallel rows of elongated pre-precipitates aligned parallel to the (001) or (100) crystallographic direction of the spinel matrix under dark-field microscopy;  
and quenching the spinel crystals containing at least one of the species  $I_p$  and  $II_p$  so formed.

**5,413,974**  
**ALUMINUM-CONTAINING OXIDE AND PROCESS FOR PRODUCING ALUMINUM-CONTAINING OXIDE**

Akinori Yokoyama, Kurashiki, and Hitoshi Nakajima, Yokohama, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

PCT No. PCT/JP90/00399, § 371 Date Nov. 22, 1991, § 102(e) Date Nov. 22, 1991, PCT Pub. No. WO91/14654, PCT Pub. Date Oct. 3, 1991

PCT Filed Mar. 27, 1990, Ser. No. 776,408

Int. Cl.<sup>6</sup> C04B 35/10, 35/60; B01J 21/04, 23/18

U.S. Cl. 501—153

2 Claims

1. A process for producing an amorphous, aluminum-containing oxide having the composition  $Al_{1-x-y_1-y_2}Bi_xM_{1y_1}M_{2y_2}O_x$ , or a powder of said oxide having an average particle diameter of 0.1 to 100 microns, or an aluminum-containing metal composition containing an amorphous oxide having the composition  $Al_{1-x-y_1-y_2}Bi_xM_{1y_1}M_{2y_2}O_x$ , or a powder of said metal average particle diameter of 0.1 to 100 microns, which comprises the steps of forming a melt having a composition of  $Al_{1-x-y_1-y_2}Bi_xM_{1y_1}M_{2y_2}$  (wherein x is defined by  $0.0001 \leq x \leq 0.10$ ;  $M_1$  is at least one selected from Si, P, B, Sb, Se, Te, Sn, Zn, In, Cr, Nb, Sc, Y, Sr, Ba, Ca, Na, Li, Mg, Mn, W, Ti, Zr, Hf, Be and rare earth metals;  $M_2$  is at least one selected from Fe, Ni, Co, Rh, Ru, Re, Cu and Pb;  $y_1$  is defined by  $0 \leq y_1 \leq 0.1$ ;  $y_2$  is defined by  $0 \leq y_2 \leq 0.01$ , and x,  $y_1$ ,  $y_2$  and z are each an atomic ratio), rapidly cooling said melt to coagulate the melt, oxidizing the resulting coagulation product and recovering said amorphous, aluminum-containing oxide or said aluminum-containing metal composition from said coagulation product.

**5,413,975**  
**FIXING LARGE ZEOLITE AND ZEOLITE-LIKE MOLECULAR SIEVE CRYSTALS ON MOLDINGS**  
Ulrich Mueller, Neustadt; Wolfgang Hoelderich, Frankenthal; Hans D. Schaefer, Altrip; Ulrich Eiden, and Norbert Woessner, both of Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany  
Filed May 19, 1993, Ser. No. 64,713  
Claims priority, application Germany, May 21, 1992, 42 16 846.5

Int. Cl.<sup>6</sup> B01J 29/04

U.S. Cl. 502—60

11 Claims

1. A process for the manufacture of a supported zeolite, aluminum phosphate or silicoaluminophosphate catalyst in which molecular sieve crystals of the catalyst are affixed to an inert, amorphous and non-porous molding composed of glass, ceramic, metal, polymeric materials or glass- or carbon-containing polymeric composites which has been preshaped as a structural element to act as a carrier for the catalyst, said process comprising:

- preheating said structural element to its softening point without melting it, and coating the surface thereof with a free-flowing powder of said catalyst crystals for adherence to said surface in its softened state, said crystals having a particle size of from 3  $\mu$ m to about 500  $\mu$ m and a transformation or melting point which is above the softening point of said structural element; and
- then cooling said structural element to permanently affix at least a single layer of said catalyst crystals thereto.

5,413,976

## EXHAUST GAS PURIFICATION CATALYST

Akibide Takami, Hiroshima; Yasuto Watanabe, Iwakuni; Hideharu Iwakuni, Hiroshima, and Takashi Takemoto, Higashihiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 30, 1993, Ser. No. 128,698

Claims priority, application Japan, Sep. 30, 1992, 4-261298  
Int. Cl.<sup>6</sup> B01J 29/068

U.S. Cl. 502—66

20 Claims

1. An exhaust gas purifying catalyst comprising:  
a silicate carrier; and  
an active material carried by said silicate carrier, said active material comprising platinum (Pt) and iridium (Ir) as an essential active material base, and any combination of at least two metals including terbium (Tb), nickel (Ni), indium (In), tin (Sn), cobalt (Co) and cerium (Ce), excepting a combination of indium (In) and tin (Sn), as an additive active material.

5,413,977

## CATALYST CONTAINING ZEOLITE BETA AND A LAYERED MAGNESIUM SILICATE

Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 843,984, Feb. 27, 1992, Pat. No. 5,328,590.  
This application Jun. 23, 1994, Ser. No. 264,688

Int. Cl.<sup>6</sup> B01J 29/076, 21/10, 21/16, 23/24

U.S. Cl. 502—68

19 Claims

1. A composition of matter comprising zeolite Beta and a layered magnesium silicate, wherein said composition is devoid of an intercalated clay.

5,413,978

## CATALYTICALLY INERT PARTICLES FOR BLENDING WITH PETROLEUM CRACKING CATALYST

Larry J. Kramer, Tallahassee, Fla., assignor to Engelhard Corporation, Iselin, N.J.

Filed Nov. 30, 1993, Ser. No. 160,000

Int. Cl.<sup>6</sup> B01J 21/16

U.S. Cl. 502—80

18 Claims

1. A particulate attrition resistant composition of matter suitable for circulating in a fluid catalytic cracking unit with an active cracking catalyst and comprising catalytically inert, fluidizable particles comprising attapulgite clay that has been sintered at a temperature above 1350° F., said particles having a BET surface area below 15 m<sup>2</sup>/g, an apparent bulk density below about 1.1, and an EAI below 1%/sec.

5,413,979

## METHOD FOR THE PREPARATION OF A CATALYST COMPONENT FOR THE POLYMERIZATION OF OLEFINS, A POLYMERIZATION CATALYST COMPONENT PRODUCED BY THE METHOD AND USE OF THE SAME

Arja Kostialinen; Bill Gustafsson, and Pekka Sormunen, all of Porvoo, Finland, assignors to Borealis Holding A/S, Lyngby, Denmark

PCT No. PCT/FI90/00279, § 371 Date Jun. 16, 1992, § 102(e) Date Jun. 16, 1992, PCT Pub. No. WO91/07443, PCT Pub. Date May 30, 1991

PCT Filed Nov. 20, 1990, Ser. No. 856,967

Claims priority, application Finland, Nov. 20, 1989, 895526  
Int. Cl.<sup>6</sup> B01J 31/00

U.S. Cl. 502—107

11 Claims

1. A method for the preparation of a solid procatalyst composition for a catalyst system intended for the polymerization of olefins, comprising the steps of:

- silanating a support material with an organic silicon compound;
- subjecting the resulting silanated support material to an impregnation treatment with a magnesium halide and a

monocarboxylic acid alkyl ester which dissolves or disperses said halide;

- reacting the impregnated support material with an organometallic compound of a metal of Group IA-III A or a silicon compound selected from the group consisting of halide silicon compounds and alkyl halide silicon compounds; and
- treating said support material with a transition metal compound.

5,413,980

## HIGH-T SUPERCONDUCTOR AND PROCESS FOR PREPARING IT

Joachim Maier, Wlernshelm; Albrecht Rabenau, deceased, late of Stuttgart by Marie-Luise J. O. Rabenau, néDamm, Thomas Rabenau, legal heirs, and Pandijan Murugaraj, Stuttgart, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

PCT No. PCT/EP89/00163, § 371 Date Oct. 9, 1991, § 102(e) Date Oct. 9, 1991, PCT Pub. No. WO89/08330, PCT Pub. Date Sep. 8, 1989

PCT Filed Feb. 22, 1989, Ser. No. 573,038

Claims priority, application Germany, Feb. 25, 1988, 38 05 954.1

Int. Cl.<sup>6</sup> H01B 12/00; H01L 39/12

U.S. Cl. 505—121

8 Claims

1. A ceramic molded body consisting of a high-T<sub>c</sub> superconductor of the formula ME<sub>2-y</sub>R<sub>2</sub>O<sub>x</sub>, ME<sub>2-y</sub>R<sub>3</sub>O<sub>x</sub> or M<sub>2</sub>E<sub>3-y</sub>R<sub>2</sub>O<sub>x</sub>, where M is at least one lanthanide element, yttrium, bismuth or combinations thereof, E is at least one alkaline earth metal element, R is copper, x is the proportion of oxygen, and 0.05 < y < 0.3, wherein crystal grains of the ceramic molded body are aligned approximately 95% perpendicular to the c-axis.

5,413,981

## OXIDE SUPERCONDUCTOR AND A METHOD FOR MANUFACTURING AN OXIDE SUPERCONDUCTOR

Kunihiko Egawa; Toshio Umemura; Shinichi Kinouchi; Mitsunobu Wakata; Shio Utsunomiya, and Ayumi Nozaki, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 794,915, Nov. 20, 1991, abandoned.

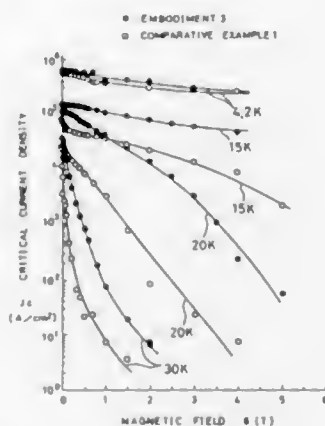
This application Jul. 19, 1993, Ser. No. 93,137

Claims priority, application Japan, Jan. 31, 1991, 3-010989; Jul. 8, 1991, 3-194721

Int. Cl.<sup>6</sup> H01B 12/00; H01L 39/12

U.S. Cl. 505—121

3 Claims



1. An oxide superconductor comprising:  
a superconducting crystal including Bi, Sr, Ca and Cu oxides, and  
separate oxide phases, each including Pt as a principal component,

wherein said separate oxide phases are finely dispersed in said superconducting crystal; and  
wherein each of said separate oxide phases further includes oxides of Cu and Sr.

5,413,982

## FIELD EFFECT TRANSISTOR HAVING C-AXIS CHANNEL LAYER

Hiroshi Inada; So Tanaka, and Michitomo Iiyama, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Dec. 14, 1992, Ser. No. 990,836

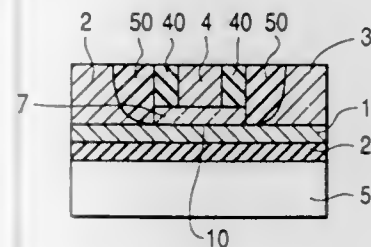
Claims priority, application Japan, Dec. 13, 1991, 3-352196; Dec. 13, 1991, 3-352198; Dec. 10, 1992, 4-352660

The portion of the term of this patent subsequent to Aug. 17, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H01B 12/00; H01L 39/22; B05D 5/12

U.S. Cl. 505—193

15 Claims



1. A superconducting device comprising:  
a substrate having a principal surface,  
a non-superconducting oxide layer having a crystal structure similar to that of an overlying c-axis oriented oxide superconducting channel,  
an overlying, c-axis oriented superconducting channel, a-axis oriented, compound oxide superconducting source and drain regions at each end of the superconducting channel, the source and drain regions being electrically connected to each other by the superconducting channel, so that superconducting current can flow through the superconducting channel between the superconducting source region and the superconducting drain region, the superconducting channel being of a thickness such that a complete ON/OFF operation is obtained,  
a gate insulator positioned between the superconducting channel and an overlying gate electrode, and  
a gate electrode of a material which includes silicon, the gate electrode being embedded between the superconducting source region and the superconducting drain region and being isolated from the superconducting source region and the superconducting drain region by insulating regions of compound oxide containing silicon.

5,413,983

## MILLIMETER WAVE FERRITE SWITCH UTILIZING A SUPERCONDUCTING SWITCHING COIL

Richard A. Stern, Allenwood; Richard W. Babbitt, Fair Haven, and Thomas E. Koscica, Clark, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 10, 1993, Ser. No. 104,312

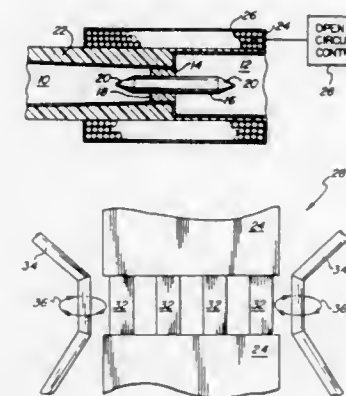
Int. Cl.<sup>6</sup> H01P 1/11, 1/175

U.S. Cl. 505—211

3 Claims

1. A tetrahedral junction waveguide switch comprising:  
a first hollow rectangular waveguide tapered along a first longitudinal axis and having a first end and a first transverse axis;  
a second hollow rectangular waveguide tapered along a second longitudinal axis and having a second end and a second transverse axis, wherein the first and second waveguides are positioned such that the first and second

ends are adjacent each other and define a common aperture and such that the first and second transverse axes of the first and second waveguides are orthogonal;  
a ferrite rod having tapered ends mounted in said common aperture, said ferrite rod having a longitudinal axis aligned with the first and second longitudinal axes of said first and second waveguides, said ferrite rod respectively cooperating with said first and second ends of said first and second waveguides;  
a superconducting coil comprised of superconducting material encircling said ferrite rod;  
open circuit control means, coupled to said superconducting coil, for selectively and controllably creating an open circuit in said superconducting coil, the open circuit control means comprising superconducting weak links in said superconducting coil, a control line disposed adjacent to the superconducting weak links, and means to supply a control voltage to the control line;



means to generate electromagnetic wave energy electrically connected to the first waveguide; and  
means to provide a current flow connected to said superconducting coil;  
wherein said generated electromagnetic wave energy is applied to said first waveguide and propagates through said aperture from said first waveguide to said second waveguide when a unidirectional magnetic field is applied along the longitudinal axis of said ferrite rod by providing the current flow through said superconducting coil and wherein said propagation of the electromagnetic wave energy is stopped when the magnetic field is not applied to said ferrite rod by interrupting the current flow around said superconducting coil by applying the control voltage to the control line thereby causing the superconducting weak links to be non-superconducting and thereby ceasing the current flow in said superconducting coil and removing the unidirectional longitudinal magnetic field applied to the longitudinal axis of said ferrite rod.

5,413,984

## METHOD FOR PREPARING MULTI-METAL CATALYSTS

Patrice Marecot, St. Georges les Baillargeaux; Jacques Barbier, Chasseneuil du Poitou; Gil Mabilon, Carrieres S/Seine; Daniel Durand, and Michel Prigent, both of Rueil Malmaison, all of France, assignors to Institut Français du Pétrole, Rueil Malmaison, France

PCT No. PCT/FR91/00969, § 371 Date Oct. 13, 1992, § 102(e) Date Oct. 13, 1992, PCT Pub. No. WO92/11086, PCT Pub. Date Jul. 9, 1992

PCT Filed Dec. 4, 1991, Ser. No. 934,515

Int. Cl.<sup>6</sup> B01J 23/44

U.S. Cl. 502—333

21 Claims

1. In a method of producing a multimetal catalyst in which the active phase comprises at least two metals, A and B, be-



longing to Groups VIII and IB of the Periodic Table, deposited on a porous carrier, the method comprising:

- in a first stage, impregnating at least part of the porous carrier with at least one precursor of metal A;
- in a second stage, activating a product of the first stage in a neutral or oxidizing atmosphere;
- in a third stage, impregnating at least part of the carrier which is already at least partly impregnated with the precursor of metal A with at least one precursor of metal B; and
- in a fourth stage, activating a product of the third stage in a neutral or oxidizing atmosphere, the improvement comprising directly after the second stage activation in a neutral or oxidizing atmosphere, treating a product of the second stage in a reducing medium at 0° to 800° C.

5,413,985

# PARTIALLY CRYSTALLINE, TRANSITIONAL ALUMINUM OXIDES, METHODS FOR THEIR SYNTHESIS AND USE FOR OBTAINING MOLDED ARTICLES, WHICH CONSIST ESSENTIALLY OF GAMMA $Al_2O_3$

Roland Thome, Bonn; Hubertus Schmidt, Eitorf; Reinhard Feige, Bonn; Ulrich Bollmann, Halle; Rudiger Lange, Lelha, and Seigfried Engels, Halle-Neustadt, all of Germany, assignors to Vereinigte Aluminium-Werke A.G., Bonn and Leuna-Werke AG, Leuna, both of Germany

Division of Ser. No. 894,330, Jun. 4, 1992, abandoned. This application Dec. 30, 1992, Ser. No. 997,736

Claims priority, application Germany, Jun. 6, 1991, 41 18 564.1

Int. Cl.<sup>6</sup> B01J 21/04, 37/00

U.S. Cl. 502—355 17 Claims

1. A process for making highly reactive molded articles of gamma  $Al_2O_3$ , the process comprising the steps of:
  - a) subjecting finely crystalline hydrargillite particles having a uniform morphological structure to a shock calcination process comprising passing the hydrargillite particles through a reaction zone, the zone having a temperature between 350° and 750° C. for a period of time such that the average residence time of said particles in the reaction zone is between 0.05 and 10.0 seconds and obtaining a partially crystalline, transitional aluminum oxide composition comprising 4-fold coordinated aluminum oxide and 5-fold coordinated aluminum oxide wherein the ratio of 5-fold coordinated aluminum oxide to 4-fold coordinated aluminum oxide is at least 1:2 by weight;
  - b) rehydrating the partially crystalline, transitional aluminum oxide composition to obtain predominantly fibrillar boehmite;
  - c) filtering and washing with water the rehydration product to remove alkali metal ions;
  - d) mixing the rehydration product with a compound selected from the group consisting of peptizing agents, binders and lubricants, and mixtures thereof;
  - e) molding the mixture into a molded article; and
  - f) thermally treating the molded article to convert the alumina therein to essentially active, gamma  $Al_2O_3$ .

5,413,986

# METHOD FOR PRODUCTION OF THIN OXIDE SUPERCONDUCTING FILM AND SUBSTRATE FOR PRODUCTION OF THE FILM

Kozo Nakamura, Hiratsuka, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

PCT No. PCT/JP89/01299, § 371 Date Jun. 21, 1991, § 102(e) Date Jun. 21, 1991, PCT Pub. No. WO90/07591, PCT Pub. Date Jul. 12, 1990

PCT Filed Dec. 25, 1989, Ser. No. 691,057

Claims priority, application Japan, Dec. 23, 1988, 63-323739 Int. Cl.<sup>6</sup> C30B 25/18

U.S. Cl. 505—476 2 Claims

1. A method for the production of a thin oxide superconducting film, comprising providing a substrate of a single crystal comprising  $Sr_{1-x}La_xY_{1-y}Ga_{1-z}O_{4-w}$ , wherein X, Y, Z, and W fall in the following respective ranges:  $-0.1 < X < 0.1$ ,  $-0.1 < Y < 0.1$ ,  $-0.1 < Z < 0.1$ ,  $-0.4 < W < 0.4$  and forming on the substrate by epitaxial growth a thin oxide superconducting film possessing lattice constants a and b in the range of 3.76 to 3.92 Å or in the range of 5.32 to 5.54 Å, wherein said oxide superconducting film comprises an oxide of the Bi—Sr—Ca—Cu—O type.

5,413,987

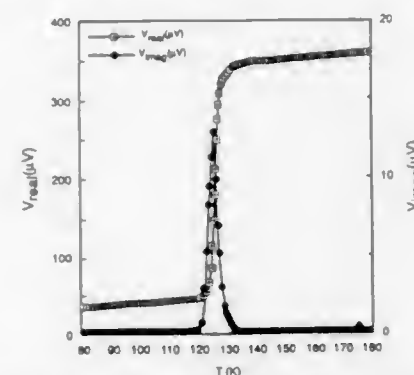
# PREPARATION OF SUPERCONDUCTOR PRECURSOR POWDERS

Raghunath Bhattacharya, Littleton, and Richard D. Blaugher, Evergreen, both of Colo., assignors to Midwest Research Institute, Kansas City, Mo.

Filed Jan. 24, 1994, Ser. No. 185,058

Int. Cl.<sup>6</sup> C25D 1/00

U.S. Cl. 505—492 15 Claims



1. A process for the preparation of a precursor metallic powder composition for use in the subsequent formation of a superconductor, the process comprising the sequential steps of:
  - a) providing an electrodeposition bath comprising an electrolyte medium and a cathode substrate electrode;
  - b) providing to the bath soluble salts of thallium, barium, calcium and copper metals;
  - c) electrically energizing the bath to thereby direct ions of each respective metal in the bath to the substrate electrode to thereby cause formation of metallic particles at the electrode;
  - d) continually energizing the bath to cause the particles formed at the electrode to drop as a powder from the electrode into the bath; and
  - e) recovering the powder from the bath.

5,413,988

# METHOD FOR MANUFACTURING AN OXIDE SUPERCONDUCTOR THIN FILM AND A TARGET FOR USE IN THE METHOD

Kunihiko Hayashi; Shuichi Fujino; Youichi Enomoto, and Shoji Tanaka, all of Tokyo, Japan, assignors to International Superconductivity Technology Center and Mitsubishi Materials Corporation, both of Tokyo, Japan

Filed Apr. 13, 1994, Ser. No. 227,004

Claims priority, application Japan, Apr. 16, 1993, 5-090201 Int. Cl.<sup>6</sup> C30B 15/00; B05D 3/106, 5/12

U.S. Cl. 505—511 14 Claims

1. A method for manufacturing an oxide superconductor thin film, comprising the steps of:
  - preparing a target having an apparent density of 95% or more, substantially consisting of an oxide material represented by  $Y_{1-x}Ba_{2-x}Cu_{3-y}O_{7-δ}$  wherein  $α ≤ 0.8$ ,  $β ≤ 0.4$ ,  $γ ≤ 0.4$ ,  $-2 ≤ δ ≤ 1$ ; and
  - applying a laser beam to said target so as to evaporate an oxide material from the target and depositing the evaporated oxide material on a substrate, thereby forming on the substrate a thin film substantially consisting of  $Y_{1-x}Ba_{2-x}Cu_{3-y}O_{7-δ}$  wherein  $α ≤ 0.8$ ,  $β ≤ 0.4$ ,  $γ ≤ 0.4$ ,  $-2 ≤ δ ≤ 1$ .

5,413,989

# METHOD AND ACTIVIN COMPOSITIONS FOR INDUCING BONE GROWTH

Yasushi Ogawa, Pacifica; David K. Schmidt, Santa Cruz; Rosa Armstrong, Palo Alto; Ranga Nathan, Newark; Andrea Y. Thompson, Mountain View, and Saeid M. Seyedin, Saratoga, all of Calif., assignors to Celtrix Pharmaceuticals, Inc., Santa Clara, Calif.

Continuation of Ser. No. 655,313, Feb. 14, 1991, Pat. No.

5,208,219. This application May 3, 1993, Ser. No. 56,469

The portion of the term of this patent subsequent to May 4, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C07K 7/10, 15/14; A61K 37/24

U.S. Cl. 514—12 15 Claims

1. A composition for inducing deposition and maturation of bone in a subject in need thereof, comprising an osteogenically effective amount of activin in a pharmaceutically acceptable excipient and an effective amount of a BMP, wherein said BMP and said activin are present in a ratio of about 1:0.01 to about 1:100 by weight.

5,413,990

# N-TERMINUS MODIFIED ANALOGS OF LHRH

Fortuna Haviv, Deerfield, Ill.; Timothy D. Fitzpatrick, Boulder, Colo.; Rolf E. Swenson, Grayslake, Ill.; Charles J. Nichols, Greendale, Wis., and Nicholas A. Mort, Waukegan, Ill., assignors to Tap Pharmaceuticals Inc., Deerfield, Ill.

Filed Aug. 6, 1993, Ser. No. 103,022

Int. Cl.<sup>6</sup> A61K 37/00, 37/02; C07K 5/00, 7/00

U.S. Cl. 514—15 1 Claim

1. A compound or a pharmaceutically acceptable salt thereof selected from the group consisting of:
  - N-Glycyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DCit-Leu-Arg-Pro-DAlaNH<sub>2</sub>;
  - N-Formyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DCit-Leu-Arg-Pro-DAlaNH<sub>2</sub>;
  - N-Propionyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DCit-Leu-Arg-Pro-DAlaNH<sub>2</sub>;
  - N-Butyryl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DCit-Leu-Arg-Pro-DAlaNH<sub>2</sub>;
  - N-Succinamyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DCit-Leu-Arg-Pro-DAlaNH<sub>2</sub>;
  - N-Formyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DLys(-Nicotinyl)-Leu-Lys(N-epsilon-Isopropyl)-Pro-DAlaNH<sub>2</sub>;
  - N-Propionyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DLys(N-epsilon-Nicotinyl)-Leu-Lys(N-epsilon-Iso-propyl)-Pro-DAlaNH<sub>2</sub>;
  - N-Butyryl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DLys(N-

epsilon-Nicotinyl)-Leu-Lys(N-epsilon-Isopropyl)-Pro-DAlaNH<sub>2</sub>; and

N-Cyanoacetyl-D2Nal-D4CIPhe-D3Pal-Ser-NMeTyr-DLys(N-epsilon-Nicotinyl)-Leu-Lys(N-epsilon-Iso-propyl)-Pro-DAlaNH<sub>2</sub>.

5,413,991

# ALLOSAMIDIN COMPOUNDS

Yasuhiro Yamada, Ikeda; Shohei Sakuda, Takatsuki, and Seiji Takayama, Kasawaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

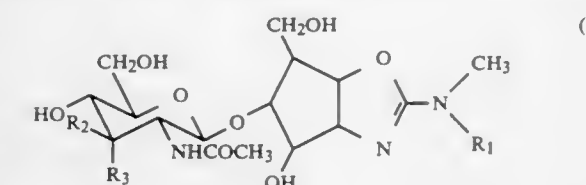
Filed Jan. 31, 1992, Ser. No. 830,353

Claims priority, application Japan, Jan. 31, 1991, 3-011028

Int. Cl.<sup>6</sup> A61K 31/70

U.S. Cl. 514—27 8 Claims

5. A composition comprising an amount of a compound effective for the inhibition of the growth of a fungus, said compound having the chemical structure (2):



wherein R<sub>1</sub> and R<sub>2</sub> are hydrogen and R<sub>3</sub> is hydroxy; R<sub>1</sub> and R<sub>2</sub> are hydrogen and R<sub>2</sub> is hydroxy; or R<sub>1</sub> is methyl, R<sub>2</sub> is hydroxy and R<sub>3</sub> is hydrogen, in an inert carrier.

5,413,992

# DAUNOMYCIN DERIVATIVE WITH REDUCED CYTOTOXICITY TOWARD NORMAL CELLS

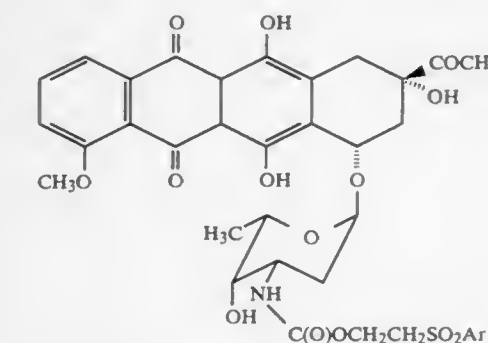
Kyriacos C. Nicolaou; Wolfgang A. Wrasidlo, and Peter E. Maligres, all of La Jolla, Calif., assignors to The Scripps Research Institute, La Jolla, Calif.

Filed Jul. 31, 1992, Ser. No. 922,834

Int. Cl.<sup>6</sup> A61K 31/70; C07H 15/24

U.S. Cl. 514—34 6 Claims

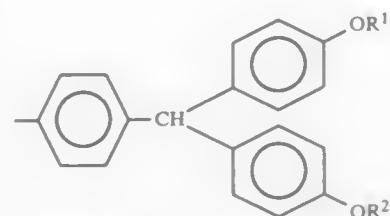
5. A process for killing or inhibiting the growth of cancerous cells that comprises contacting cancerous cells to be killed or whose growth is to be inhibited in vitro in an aqueous medium suitable for growth of those cells with a chemotherapeutic amount of an active agent, said active agent having a structure that corresponds to structural Formula I wherein Ar is phenyl, 1-naphthyl or 2-naphthyl,



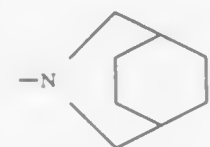
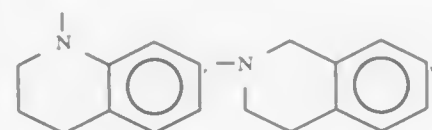
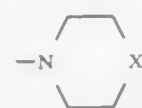
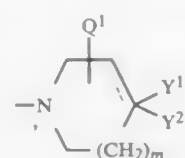
and maintaining said contact in said aqueous medium for a time period sufficient for the contacted cells to be killed or their growth inhibited.

or

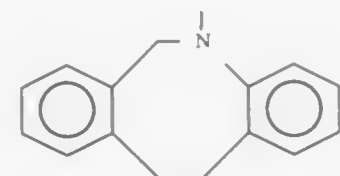




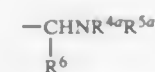
where  $R^4$  and  $R^5$  do not represent hydrogen at the same time, or  $R^4$  and  $R^5$  are combined with nitrogen atom adjacent thereto to form a heterocyclic ring selected from the group consisting of



and



provided that when  $R^4$  is hydrogen,  $R^5$  is not hydrogen, methyl or phenyl,



where  $R^6$  represents hydrogen or lower alkyl, and  $R^{4a}$  and  $R^{5a}$  independently have the same meaning as  $R^4$  and  $R^5$ , provided that when  $R^{4a}$  is hydrogen,  $R^{5a}$  is not hydrogen or butyl,  $R^{4a}$  and  $R^{5a}$  are not both methyl or ethyl, and  $R^{4a}$  and  $R^{5a}$  are not combined with nitrogen atom adjacent thereto to form piperidino or morpholino, or



where  $R^{4b}$  has the same meaning as  $R^4$  and  $R^5$  previously defined with the proviso that  $R^4$  and  $R^5$  may not be combined with the nitrogen atom adjacent thereto to form a heterocyclic ring; or a pharmaceutically acceptable salt thereof.

5,413,998

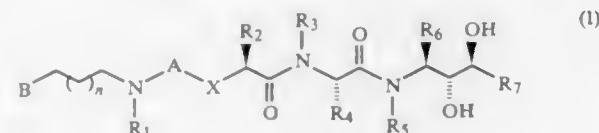
**BENZO-FUSED THIAZOPINYL-TERMINATED  
ALKYLAMINO ETHYNYL ALANINE AMINO DIOL  
COMPOUNDS FOR TREATMENT OF HYPERTENSION**  
Gunnar J. Hanson, Skokie, Ill., and Robert E. Manning, St. Louis, Mo., assignors to G. D. Searle & Co., Chicago, Ill.  
Division of Ser. No. 930,069, Aug. 14, 1992. This application  
Feb. 22, 1994, Ser. No. 198,414

Int. Cl. C07D 281/10; A61K 31/55

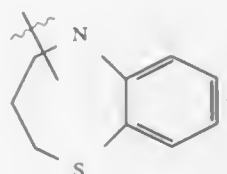
U.S. Cl. 514—211

14 Claims

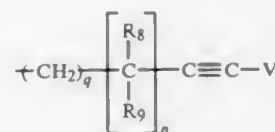
1. A compound of Formula I:



wherein A is selected from CO and SO<sub>2</sub>; wherein X is selected from oxygen atom and methylene; wherein  $R_1$  is selected from hydrido and alkyl; wherein B is a benzo-fused thiazopinyll radical having the structure



wherein the bond bisected by the wavy line represents a point of attachment of B in Formula I to any attachable position of B, including the nitrogen atom of B, and wherein the bond bisected by the wavy line also represents any substitutable position of B; wherein any substitutable position of B may be substituted with one or more radicals selected from alkyl, alkoxy, alkenyl, alkynyl, halo, trifluoromethyl, oxo, cyano and phenyl, and wherein the ring nitrogen atom of B may be combined with oxygen to form an N-oxide; wherein  $R_2$  is selected from alkyl, cycloalkylalkyl, alkylcarbonylaminoalkyl, phenylalkyl and naphthylalkyl, and wherein the cyclic portion of any of said phenylalkyl, cycloalkylalkyl and naphthylalkyl groups may be substituted by one or more radicals selected from halo, hydroxy, alkoxy and alkyl; wherein each of  $R_3$  and  $R_5$  is independently selected from hydrido and alkyl; wherein  $R_4$  is selected from



wherein V is selected from hydrido, alkyl, benzyl and phenyl; wherein each of  $R_8$  and  $R_9$  is a radical independently selected from hydrido, alkyl, alkenyl and phenyl; wherein  $R_6$  is selected from alkyl, cycloalkylalkyl and phenylalkyl, any one of which

may be substituted with one or more groups selected from alkyl, hydroxy and alkoxy; wherein  $R_7$  is selected from alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl and alkenyl; wherein p is a number selected from zero through five, inclusive; wherein q is a number selected from zero through five, inclusive; and wherein n is a number selected from zero through five, inclusive; or a pharmaceutically-acceptable salt thereof.

5,413,999

**HIV PROTEASE INHIBITORS USEFUL FOR THE  
TREATMENT OF AIDS**

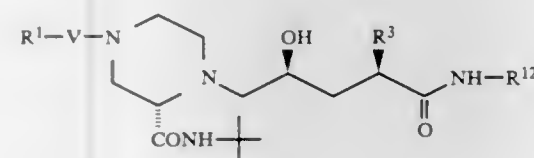
Joseph P. Vacca, Telford; Bruce D. Dorsey, Harleysville; James P. Guare, Quakertown; M. Katharine Holloway; Randall W. Hungate, both of Lansdale, and Rhonda B. Levin, Lafayette Hill, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.  
Continuation-in-part of Ser. No. 40,729, Mar. 31, 1993, abandoned, which is a continuation-in-part of Ser. No. 883,825, May 15, 1992, abandoned, which is a continuation-in-part of Ser. No. 789,508, Nov. 8, 1991, abandoned. This application May 7, 1993, Ser. No. 59,038

Int. Cl. A61K 31/495; C07D 241/02

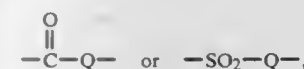
U.S. Cl. 514—231.5

13 Claims

1. A compound of the formula



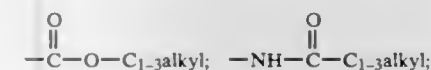
wherein V is absent or



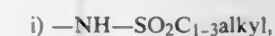
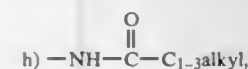
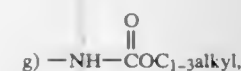
wherein Q is absent or -O-, -NR-, or heterocycle optionally substituted with -C<sub>1-4</sub>alkyl;

$R^1$  is:

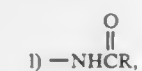
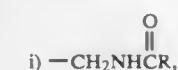
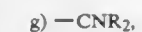
- C<sub>1-4</sub> alkyl unsubstituted or substituted with one or more of
  - halo,
  - C<sub>1-3</sub> alkoxy,
  - aryl unsubstituted or substituted with one or more of C<sub>1-4</sub>alkyl, amino, hydroxy or aryl,
  - W-aryl or -W-benzyl, wherein W is -O-, -S-, or -NH-,
  - a 5-7 membered cycloalkyl group unsubstituted or substituted with one or more of
    - halo,
    - C<sub>1-3</sub>alkoxy, or
    - aryl,
  - heterocycle unsubstituted or substituted with one or more of oxo, halo, C<sub>1-4</sub>alkoxy, C<sub>1-4</sub>alkyl;



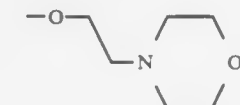
or Boc,



- NR<sub>2</sub>, and R is hydrogen or C<sub>1-4</sub> alkyl;
- COOR, or
- ((CH<sub>2</sub>)<sub>m</sub>O)<sub>n</sub>R wherein m is 2, 3, 4, or 5, and n is zero, 1, 2 or 3, or
- aryl, unsubstituted or substituted with one or more of
  - halo,
  - hydroxy,
  - NO<sub>2</sub> or -NR<sub>2</sub>,
  - C<sub>1-4</sub>alkyl,
  - C<sub>1-3</sub> alkoxy, unsubstituted or substituted with one or more of C<sub>1-3</sub> alkoxy,

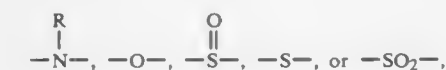


- R<sup>5</sup>, as defined below; or
  - heterocycle unsubstituted or substituted with one or more of oxo, halo, amino, C<sub>1-4</sub>alkoxy, C<sub>1-4</sub>alkyl; or Boc;
  - carbocyclic unsubstituted or substituted with one or more of halo, amino, or C<sub>1-4</sub>alkoxy;
- $R^3$  is benzyl, unsubstituted or substituted with one or more of (1) hydroxy, (2) C<sub>1-3</sub> alkoxy substituted with one or more of -OH or (3)



$R^5$  is

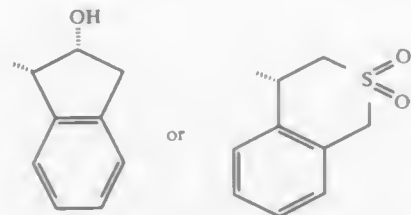
- 1) -W-(CH<sub>2</sub>)<sub>m</sub>-NR<sup>6</sup>R<sup>7</sup> wherein W is as defined above, m is 2, 3, 4 or 5, and  $R^6$  and  $R^7$  are independently
  - hydrogen,
  - C<sub>1-6</sub> alkyl, unsubstituted or substituted with one or more of
    - C<sub>1-3</sub> alkoxy, or
    - NR<sub>2</sub>,
  - the smile or different and joined together to form a 5-7 member heterocycle, such as morpholino, containing up to two additional heteroatoms selected from



the heterocycle optionally substituted with C<sub>1-4</sub> alkyl, or

- aromatic heterocycle unsubstituted or substituted with one or more of

- i) C<sub>1-4</sub> alkyl, or  
 ii) —NR<sub>2</sub>,  
 2) —(CH<sub>2</sub>)<sub>q</sub>—NR<sup>6</sup>R<sup>7</sup> wherein q is 1,2,3,4, or 5, and R<sup>6</sup> and R<sup>7</sup> are defined above, except that R<sup>6</sup> or R<sup>7</sup> are not H or unsubstituted C<sub>1-6</sub> alkyl, or  
 3) benzofuryl, indolyl, azacycloalkyl, azabicyclo C<sub>7-11</sub> cycloalkyl, or benzopiperidiny, unsubstituted or substituted with C<sub>1-4</sub> alkyl;  
 R<sup>12</sup> is



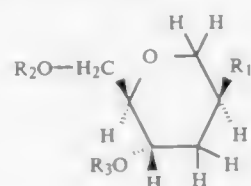
or pharmaceutically acceptable salt thereof.

5,414,000

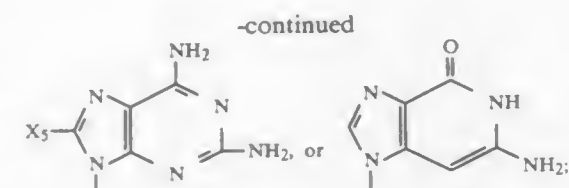
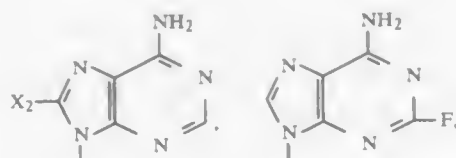
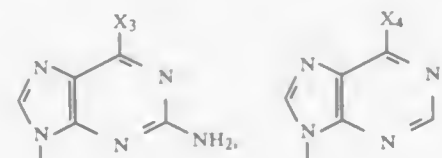
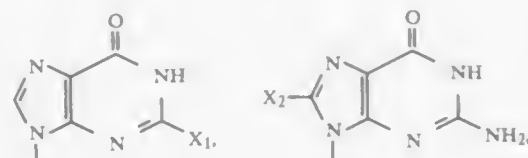
# ANTIVIRAL PYRINYL SUBSTITUTED TETRAHYDROPYRANS

Joseph A. Tino, Robbinsville; Gregory S. Bisacchi, Lawrenceville, and Saleem Ahmad, Plainsboro, all of N.J., assignors to Bristol-Myers Squibb Co., Princeton, N.J.  
 Division of Ser. No. 9,485, Jan. 25, 1993, Pat. No. 5,314,893.  
 This application Feb. 22, 1994, Ser. No. 200,024  
 Int. Cl.<sup>6</sup> A61K 31/505; C07D 239/47, 239/54, 239/545  
 U.S. Cl. 514—261 7 Claims

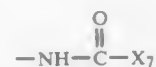
1. A compound of the formula



including a pharmaceutically acceptable salt thereof wherein:  
 R<sub>1</sub> is



X<sub>1</sub> is hydrogen, amino,

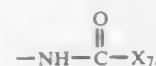


or —N=CHN (X<sub>8</sub>)<sub>2</sub>;

X<sub>2</sub> is methyl, fluoro, chloro, bromo, iodo, hydroxy, or amino;

X<sub>3</sub> is hydrogen, chloro, iodo, or —O—X<sub>8</sub>;

X<sub>4</sub> is amino chloro,



or —N=CHN(X<sub>8</sub>)<sub>2</sub>;

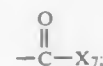
X<sub>5</sub> is hydrogen, methyl, fluoro, chloro, bromo, iodo, hydroxy or amino;

X<sub>7</sub> is hydrogen, alkyl, substituted alkyl, or aryl;

X<sub>8</sub> is alkyl;

R<sub>2</sub> and R<sub>3</sub> are independently selected from hydrogen,

—PO<sub>3</sub>H<sub>2</sub>, and



and

the term "alkyl" refers to straight and branched chain groups of 1 to 10 carbons, the term "substituted alkyl" refers to such alkyl groups having one or more substituents selected from the group consisting of chloro, bromo, fluoro, iodo, amino, azido, hydroxy, cyano, trialkylammonium (wherein each alkyl group has 1 to 6 carbons), alkoxy of 1 to 6 carbons, aryl and carboxy, and the term "aryl" refers to phenyl and phenyl substituted with one, two or three substituents selected from the group consisting of alkyl of 1 to 6 carbons, alkoxy of 1 to 6 carbons, chloro, bromo, fluoro, iodo, trifluoromethyl, amino, alkyl-amino of 1 to 6 carbons, dialkylamino wherein each alkyl is of 1 to 6 carbons, nitro, cyano, alkanoyloxy of 2 to 11 carbons, carboxy, carbamoyl, and hydroxy.

5,414,001

# ANTINEOPLASTIC

## PYRROLO[4,3,2-DE]QUINOLIN-8(1H)-ONES

Chris M. Ireland, Sandy; Derek C. Radisky; Louis R. Barrows, both of Salt Lake City, all of Utah, and Robert Kramer, Upper Saddle River, N.J., assignors to American Cyanamid Company, Wayne, N.J.

Continuation of Ser. No. 890,989, May 29, 1992, abandoned.

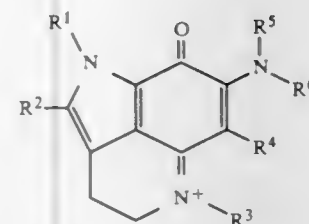
This application Apr. 16, 1993, Ser. No. 48,441

Int. Cl.<sup>6</sup> A61K 31/44; C07D 471/00

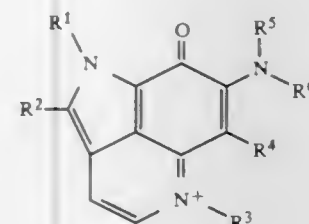
U.S. Cl. 514—287

71 Claims

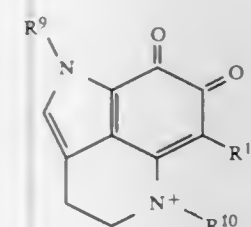
1. An essentially pure compound of the formula I, II or III



Formula I



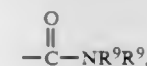
Formula II



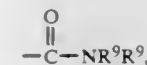
Formula III

wherein:

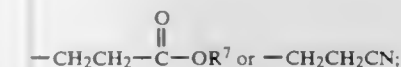
R<sup>1</sup> is H, straight alkyl of 1 to 4 carbon atoms, allyl, benzyl optionally substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br,



or —CO<sub>2</sub>R<sup>9</sup>, benzyl disubstituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br, OH,

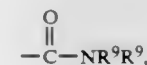


—CO<sub>2</sub>R<sup>9</sup>, with the proviso that R<sup>4</sup> is not Cl in Formula II;

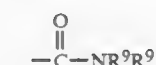


R<sup>2</sup> is H, Cl, Br or I;

R<sup>3</sup> is H, straight alkyl of 1 to 4 carbon atoms, benzyl, mono-substituted benzyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, or O-alkyl of 1 to 4 carbon atoms straight chain, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br, OH,

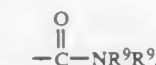


or —CO<sub>2</sub>R<sup>9</sup>, disubstituted benzyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br, OH,

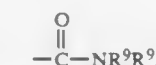


or —CO<sub>2</sub>R<sup>9</sup>;

R<sup>4</sup> is H, straight alkyl of 1 to 4 carbon atoms, Cl, Br, I, benzyl, mono-substituted benzyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br, OH,

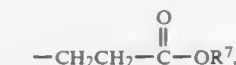


—CO<sub>2</sub>R<sup>9</sup>, disubstituted benzyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br, OH,

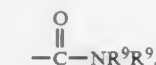


or —CO<sub>2</sub>R<sup>9</sup>; with the proviso that R<sub>4</sub> is not Cl in Formula II;

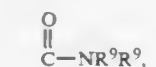
R<sup>5</sup> is H, straight or branched alkyl of 1 to 10 carbon atoms,



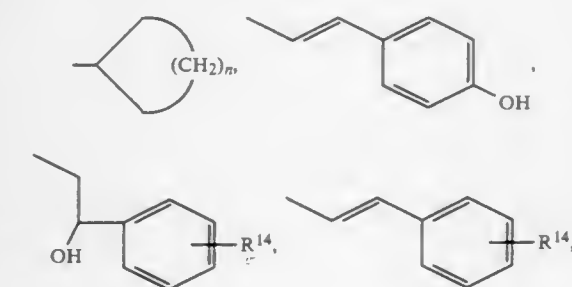
—CH<sub>2</sub>R<sup>8</sup>, benzyl optionally substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, hydroxyl, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br,



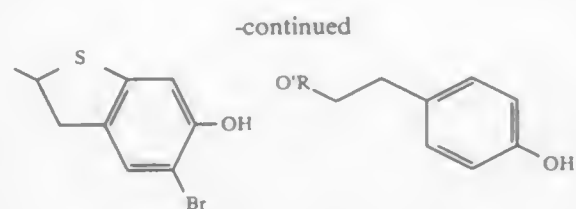
or —CO<sub>2</sub>R<sup>9</sup>, disubstituted benzyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, hydroxyl, —NR<sup>7</sup>R<sup>7</sup>, F, Cl, Br,



or —CO<sub>2</sub>R<sup>9</sup>—CH<sub>2</sub>—furan, —CH<sub>2</sub>—thiophene, —CH<sub>2</sub>—naphthyl, —CH<sub>2</sub>—pyridyl







phenyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, hydroxyl, F, Cl, or Br, disubstituted phenyl substituted with straight alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro, O-alkyl of 1 to 4 carbon atoms straight chain, hydroxyl, F, Cl or Br[]];

n is 2 to 5;

R<sup>6</sup> is H, or CH<sub>2</sub>R<sup>8</sup>;

R<sup>7</sup> is straight alkyl 1 to 4 carbon atoms;

R<sup>8</sup> is straight alkyl 1 to 7 carbon atoms;

R<sup>9</sup> is H or straight alkyl 1 to 4 carbon atoms;

R<sup>10</sup> is H or straight alkyl 1 to 4 carbon atoms;

R<sup>11</sup> is H or Br and R<sup>14</sup> is F, Cl, Br, NO<sub>2</sub>, straight alkyl of 1 to 4 carbon atoms, O-alkyl of 1 to 4 carbon atoms straight chain or trifluoromethyl; or pharmaceutically acceptable salts thereof.

5,414,002

#### 5- OR 6-SUBSTITUTED $\beta$ -CARBOLINE-3-CARBOXYLIC ACID ESTERS

Helmut Biere; Andreas Huth; Dieter Rahtz; Ralph Schmichen; Dieter Seidelmann; Wolfgang Kehr; Herbert H. Schneider, all of Berlin, Germany; Mogens Engeltsoft, Vaerloose, Denmark; Bondo J. Hansen, Lyngby, Denmark; Frank Waetjen, Bajsvarer, Denmark, and Tage Honoré, Maaloev, Denmark, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Continuation of Ser. No. 933,435, Nov. 21, 1986, abandoned.

This application Oct. 3, 1989, Ser. No. 416,629

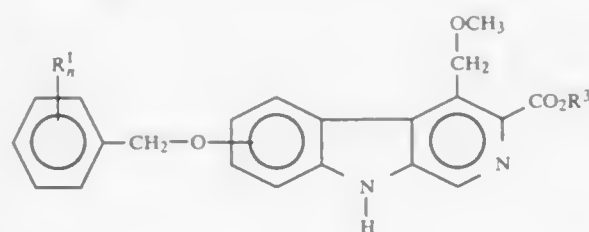
Claims priority, application Germany, Mar. 20, 1986, 36 09 699.7

Int. Cl.<sup>6</sup> C07C 471/04

U.S. Cl. 514—292

30 Claims

1. A 5- or 6-substituted  $\beta$ -carboline-3-carboxylic acid ester of the formula



wherein

R<sup>1</sup> is halogen, lower alkyl, or lower alkoxy,

R<sup>3</sup> is branched C<sub>3-6</sub>-alkyl, branched C<sub>3-6</sub>-alkyl substituted by halogen, C<sub>3-6</sub>-cycloalkyl, or C<sub>3-6</sub>-cycloalkyl substituted by methyl, n is 0-5;

and the R<sup>1</sup> benzyloxy group is in the 5- or 6-position.

5,414,003

#### PYRIDINYLMETHYL-SUBSTITUTED PYRIDINES AND PYRIDONES

Peter Fey, Wuppertal; Jürgen Dressel, Radevormwald; Rudolf Hanko, Essen; Walter Hübsch, Wuppertal; Thomas Krämer, Wuppertal; Ulrich Müller, Wuppertal; Matthias Müller-Gliemann, Solingen; Martin Beuck, Erkrath; Hilmar Bischoff, Wuppertal; Stefan Wohlfeil, Hilden; Dirk Denzer; Stanislav Kazda, both of Wuppertal; Johannes-Peter Stasch, Solingen; Andreas Koorr, Erkrath, and Siegfried Zaiss, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 29, 1994, Ser. No. 235,770

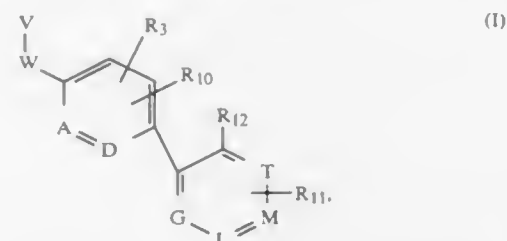
Claims priority, application Germany, May 6, 1993, 43 14 964.2

Int. Cl.<sup>6</sup> C07D 401/14; A61K 31/44, 31/50, 31/53

U.S. Cl. 514—333

5 Claims

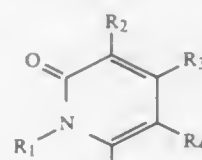
1. A pyridinylmethyl-substituted pyridine or pyridone compound of the formula



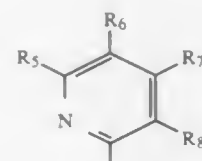
in which

A, D, G, L, M and T are identical or different and represent the CH group or a nitrogen atom, but where at least one of the radicals and in each case at most one of the radicals in each cycle may represent a nitrogen atom,

V represents a radical of the formula



or

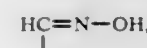


in which

R<sup>1</sup> denotes straight-chain or branched alkyl having up to 10 carbon atoms, which is optionally substituted by cycloalkyl having 3 to 6 carbon atoms or hydroxyl or by straight-chain or branched alkoxy or alkylthio in each case having up to 6 carbon atoms, or denotes cycloalkyl having 3 to 6 carbon atoms,

R<sup>2</sup>, R<sup>5</sup> and R<sup>6</sup> are identical or different and denote hydrogen, hydroxyl, nitro, cyano, formyl or halogen, or denote straight-chain or branched alkyl, alkenyl, alkynyl, alkoxy or alkylthio in each case having up to 8 carbon atoms, each of which is optionally substituted up to 3 times by identical or different substituents which are hydroxyl, cyano, halogen, carboxyl and straight-chain or branched alkoxy, acyl or alkoxycarbonyl in each case having up to 6 carbon atoms, or by cycloalkyl having 3 to 6 carbon atoms, benzyl, phenyl, phenoxy or benzoyl or by a 5- to 7-membered, saturated or unsaturated heterocycle having up to 3 hetero atoms selected from the group consisting of

S, N and O, where all cycles for their part are optionally substituted up to 2 times by identical or different substituents wherein said substituents are trifluoromethyl, trifluoromethoxy, halogen, nitro, cyano, hydroxyl or hydroxymethyl or straight-chain or branched alkyl or alkoxy in each case having up to 6 carbon atoms, or denote straight-chain or branched acyl or alkoxycarbonyl in each case having up to 8 carbon atoms, phenoxycarbonyl, benzyloxycarbonyl or carboxyl, or denote tetrazolyl, which is optionally substituted by triphenylmethyl or by straight-chain or branched alkyl having up to 6 carbon atoms, which for its part is optionally substituted by cyano, halogen, carboxyl, phenoxycarbonyl or hydroxyl or by straight-chain or branched alkoxy or alkoxycarbonyl in each case having up to 6 carbon atoms, or denote a group of the formula



—NR<sup>13</sup>R<sup>14</sup>, —CO—NR<sup>15</sup>R<sup>16</sup>, —CH<sub>2</sub>—OR<sup>17</sup> or S(O)<sub>a</sub>—R<sup>18</sup> in which

R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup> and R<sup>16</sup> are identical or different and denote hydrogen, cycloalkyl having 3 to 8 carbon atoms or straight-chain or branched alkyl having up to 8 carbon atoms, which is optionally substituted by phenyl,

R<sup>17</sup> denotes straight-chain or branched acyl having up to 6 carbon atoms or benzoyl,

R<sup>18</sup> denotes straight-chain or branched alkyl having up to 8 carbon atoms,

a denotes a number 1 or 2,

R<sup>3</sup> and R<sup>7</sup> are identical or different and denote hydrogen, hydroxyl, carboxyl, straight-chain or branched alkoxy or alkoxycarbonyl in each case having up to 8 carbon atoms, or denote a group of the formula —NR<sup>19</sup>R<sup>20</sup>,

in which

R<sup>19</sup> and R<sup>20</sup> have the abovementioned meaning of R<sup>13</sup> and R<sup>14</sup> and are identical to or different from this, or denote aryl having 6 to 10 carbon atoms, which can optionally be substituted up to 2 times by identical or different substituents wherein substituents are trifluoromethyl, trifluoromethoxy, halogen, nitro, cyano, hydroxyl and hydroxymethyl or by straight-chain or branched alkyl or alkoxy in each case having up to 6 carbon atoms, or denote straight-chain or branched alkyl or alkenyl in each case having up to 8 carbon atoms, each of which is optionally substituted up to 3 times by identical or different substituents wherein the substituents are hydroxyl, cyano, halogen, carboxyl and straight-chain or branched alkoxy, acyl or alkoxycarbonyl in each case having up to 6 carbon atoms, or by cycloalkyl having 3 to 6 carbon atoms, benzyl, phenyl, phenoxy, benzoyl or by a 5- to 7-membered, saturated or unsaturated heterocycle having up to 3 hetero atoms selected from the group consisting of S, N and O, where the cycles for their part are optionally substituted up to 2 times by identical or different substituents wherein the substituents are trifluoromethyl, trifluoromethoxy, halogen, nitro, cyano, hydroxyl or hydroxymethyl or straight-chain or branched alkyl or alkoxy in each case having up to 6 carbon atoms,

R<sup>4</sup> denotes hydrogen, nitro, carboxyl or straight-chain or branched alkoxycarbonyl having up to 8 carbon atoms, or denotes a group of the formula —NR<sup>21</sup>R<sup>22</sup>,

in which

R<sup>21</sup> and R<sup>22</sup> have the abovementioned meaning of R<sup>13</sup> and R<sup>14</sup> and are identical to or different from this, or denote straight-chain or branched alkyl or alkenyl in each case having up to 8 carbon atoms, each of which is optionally substituted up to 3 times by identical or different substituents wherein the substituents are hydroxyl, cyano, halogen, carboxyl and straight-chain or branched alkoxy, acyl or alkoxycarbonyl in each case having up to 6 carbon atoms or by cycloalkyl having 3 to 6 carbon atoms, benzyl, phenyl, phenoxy or benzoyl or by a 5- to 7-membered

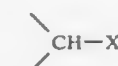
saturated or unsaturated heterocycle having up to 3 hetero atoms selected from the group consisting of S, N and O, where all cycles for their part can be substituted up to 2 times by identical or different substituents wherein the substituents are trifluoromethyl, trifluoromethoxy, hydroxymethyl or straight-chain or branched alkyl or alkoxy in each case having up to 6 carbon atoms,

R<sup>8</sup> has the abovementioned meaning of R<sup>1</sup> and R<sup>4</sup> and is identical to or different from this,

W represents the



group, or represents a group of the formula



in which

X denotes hydrogen or straight-chain or branched alkyl having up to 8 carbon atoms,

R<sup>9</sup>, R<sup>10</sup> and R<sup>11</sup> are identical or different and represent hydrogen, halogen, cyano, nitro, trifluoromethyl, hydroxyl, amido or straight-chain or branched alkyl, alkoxy or alkoxycarbonyl having up to 6 carbon atoms,

represents a group of the formula —CO—R<sup>23</sup>, —SO<sub>2</sub>R<sup>24</sup>, —CO—NR<sup>25</sup>R<sup>26</sup>, —NH—SO<sub>2</sub>R<sup>27</sup> or —SO<sub>2</sub>NR<sup>28</sup>R<sup>29</sup>,

in which

R<sup>23</sup> denotes hydroxyl or straight-chain or branched alkoxy having up to 6 carbon atoms,

R<sup>24</sup> denotes hydroxyl, trifluoromethyl, straight-chain or branched alkoxy or alkyl in each case having up to 6 carbon atoms, phenyl or benzyl, each of which is optionally substituted up to 2 times by identical or different substituents selected from the group consisting of halogen, trifluoromethyl and straight-chain or branched alkyl having up to 4 carbon atoms,

R<sup>25</sup> and R<sup>26</sup> are identical or different and have the abovementioned meaning of R<sup>13</sup> and R<sup>14</sup>, or

R<sup>25</sup> denotes hydrogen and

R<sup>26</sup> denotes the group —SO<sub>2</sub>R<sup>24</sup>,

in which

R<sup>24</sup> has the abovementioned meaning,

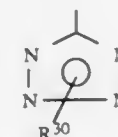
R<sup>27</sup> has the abovementioned meaning of R<sup>24</sup> and is identical to or different from this,

R<sup>28</sup> and R<sup>29</sup> have the abovementioned meaning of R<sup>13</sup> and R<sup>14</sup> and are identical to or different from this, or

R<sup>28</sup> denotes hydrogen or straight-chain or branched alkyl having up to 4 carbon atoms and

R<sup>29</sup> has the abovementioned meaning of R<sup>24</sup> and is identical to or different from this,

R<sup>12</sup> represents a radical of the formula



in which

R<sup>30</sup> denotes hydrogen or straight-chain or branched alkyl having up to 8 carbon atoms, which is optionally substituted by straight-chain or branched acyl having up to 6 carbon atoms or denotes the triphenylmethyl group, or its salt.

5,414,004

## NEUROTRANSMITTER RELEASES USEFUL FOR COGNITION ENHANCEMENT

Wendell W. Wilkerson, New Castle; Richard A. Earl, Wilmington, both of Del., and Matthew E. Voss, Lincoln University, Pa., assignors to The Du Pont Merck Pharmaceutical Company, Wilmington, Del.

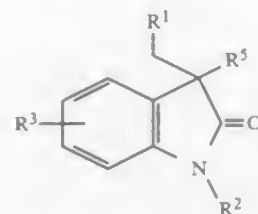
Continuation of Ser. No. 821,572, Jan. 16, 1992, abandoned. This application Sep. 20, 1993, Ser. No. 124,523

Int. Cl.<sup>6</sup> A61K 31/44; C07D 401/06, 401/14

U.S. Cl. 514—339

51 Claims

1. A compound of the formula



R<sup>1</sup> is 4-, 3-, or 2-pyridyl, 2-, or 3-fluoro-4-pyridyl or 3-fluoro-4-pyridyl;

R<sup>2</sup> is alkyl of 1 to 10 carbons, cycloalkyl of 3 to 8 carbons, 2-, 3-, or 4-pyridyl, Phe or Phe-W;

Phe is a phenyl group;

W is F, Cl, Br, —OH, R<sup>4</sup>, —OR<sup>4</sup>, —NO<sub>2</sub>, —NH<sub>2</sub>, —NHR<sup>4</sup>, —NR<sup>4</sup>R<sup>4</sup>, —CN, —S(O)<sub>m</sub>R<sup>4</sup>;

R<sup>3</sup> is H, F, Cl, Br, —CN, —OH, —NO<sub>2</sub>, —NH<sub>2</sub>, —CF<sub>3</sub>, —NHR<sup>4</sup>, —NR<sup>4</sup>R<sup>4</sup>, R<sup>4</sup>, —OR<sup>4</sup>, —S(O)<sub>m</sub>R<sup>4</sup>;

R<sup>4</sup> is independently selected at each occurrence from the group: alkyl of 1 to 4 carbons, Phe, and CH<sub>2</sub>Phe;

R<sup>5</sup> is —(CH<sub>2</sub>)<sub>n</sub>—Y or —OCOR<sup>4</sup>;

Y is NH<sub>2</sub>, —NHR<sup>4</sup>, —NR<sup>4</sup>R<sup>4</sup>, —NHCOR<sup>4</sup>, —NHCO<sub>2</sub>R<sup>4</sup>, F, Cl, Br, OR<sup>4</sup>, —S(O)<sub>m</sub>R<sup>4</sup>, —CO<sub>2</sub>H, —CO<sub>2</sub>R<sup>4</sup>, —CN,

—CONR<sup>4</sup>R<sup>4</sup>, —CONHR<sup>4</sup>, —CONH<sub>2</sub>, —COR<sup>4</sup>, —CH=CHCO<sub>2</sub>R<sup>4</sup>, —OCOR<sup>4</sup>, —C=CCO<sub>2</sub>R<sup>4</sup>,

—CH=CHR<sup>4</sup>, or —C=CR<sup>4</sup>;

m is 0, 1 or 2;

n is 1 to 7;

and physiologically suitable salts thereof.

5,414,005

## METHODS AND ARTICLES OF MANUFACTURE FOR THE TREATMENT OF NICOTINE WITHDRAWAL AND AS AN AID IN SMOKING CESSATION

F. Howard Schneider, Yarmouthport; Indu A. Muni, North Reading, both of Mass.; B. Ram Murty, Lexington, Ky.; Mahendra K. Pandya, Massillon, Ohio, and Rajinder P. S. Matharu, Lexington, Ky., assignors to DynaGen, Inc., Cambridge, Mass.

Filed Oct. 28, 1993, Ser. No. 145,203

Int. Cl.<sup>6</sup> A61K 9/20, 31/465

U.S. Cl. 514—343

12 Claims

1. A method of treating nicotine withdrawal symptoms, comprising:

administering to a subject an effective amount of lobeline or lobeline analog to the sublingual mucosa, prior to or during a period in which the subject is experiencing nicotine withdrawal symptoms, said lobeline or lobeline analog absorbed through the sublingual mucosa to alleviate the subject's desire for nicotine; said lobeline or lobeline analog administered as a sublingual tablet, said sublingual tablet comprising lobeline or a lobeline analog in a tablet core having disintegrants capable of causing tablet disintegration within a five minute period in the presence of oral secretions.

5,414,006

## ARYLALKOXYTHIOCOUMARINS, THE PREPARATION THEREOF AND THERAPEUTIC COMPOSITIONS CONTAINING THESE

Beatrice Rendenbach-Mueller, Waldsee; Ulrich Karl, and Harald Weifenbach, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany Filed Oct. 14, 1993, Ser. No. 136,033

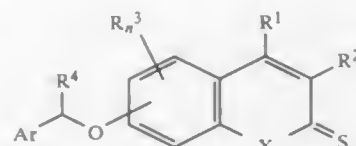
Claims priority, application Germany, Oct. 22, 1992, 42 35 603.2

Int. Cl.<sup>6</sup> C07D 417/12; A01K 31/37

U.S. Cl. 514—363

4 Claims

1. An arylalkoxythiocoumarin of the formula



where

R<sup>1</sup> and R<sup>2</sup> are each, independently of one another, hydrogen, C<sub>1</sub>–C<sub>5</sub>-alkyl, trifluoromethyl, phenyl or halogen, or together are a C<sub>3</sub>–C<sub>5</sub>-alkylene chain, and

X is oxygen or sulfur,

R<sup>3</sup> is C<sub>1</sub>–C<sub>5</sub>-alkyl or halogen,

n is an integer from 0 to 3,

R<sup>4</sup> is hydrogen or C<sub>1</sub>–C<sub>4</sub>-alkyl and

Ar is phenyl, which can be mono- or disubstituted by halogen, C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>3</sub>–C<sub>7</sub>-cycloalkyl, C<sub>1</sub>–C<sub>6</sub>-alkoxy, nitro, cyano, trifluoromethyl or a combination of these substituents or is a heteroaromatic ring which has from one to three heteroatoms which can, independently of one another, be N, O or S, and which can be substituted by C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>3</sub>–C<sub>7</sub>-cycloalkyl, C<sub>1</sub>–C<sub>6</sub>-alkoxy, C<sub>1</sub>–C<sub>4</sub>-alkoxy-substituted C<sub>1</sub>–C<sub>6</sub>-alkyl, 5-6-membered oxacycloalkyl, benzyl, C<sub>1</sub>–C<sub>5</sub>-alkoxycarbonyl, perfluoro-C<sub>1</sub>–C<sub>2</sub>-alkyl, phenyl or halogen.

5,414,007

## ACETYLENES DISUBSTITUTED WITH A THIAZOLE GROUP AND A SUBSTITUTED PHENYL GROUP HAVING RETINOID LIKE ACTIVITY

Roshantha A. S. Chandraratna, El Toro, Calif., assignor to Allergan, Inc., Irvine, Calif.

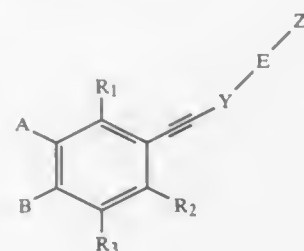
Division of Ser. No. 967,889, Oct. 28, 1992, Pat. No. 5,264,456, which is a division of Ser. No. 669,696, Mar. 14, 1991, Pat. No. 5,175,185, which is a division of Ser. No. 458,963, Dec. 29, 1989, Pat. No. 5,013,744. This application Sep. 24, 1993, Ser. No. 126,952

Int. Cl.<sup>6</sup> A61K 31/425

U.S. Cl. 514—365

13 Claims

1. A compound of the formula



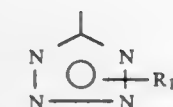
wherein

R<sub>1</sub>–R<sub>3</sub> independently are hydrogen, lower alkyl, lower cycloalkyl or lower alkenyl, A and B independently are hydrogen, lower alkyl, lower cycloalkyl, lower alkenyl, SR<sub>4</sub> or OR<sub>4</sub> where R<sub>4</sub> is lower alkyl, lower cycloalkyl or lower alkenyl;

Y is thiazolyl;

E is divalent lower alkenyl, lower alkynyl, lower cycloalkyl, lower branched chain alkyl, or is characterized by the formula (CH<sub>2</sub>)<sub>n</sub> where n is 0–5,

and Z is OH, OR<sub>5</sub>, OCOR<sub>5</sub>, —COOH or a pharmaceutically acceptable salt, ester or amide thereof, or —CHO, CH(OR<sub>7</sub>)<sub>2</sub>, CHOR<sub>8</sub>O, or COR<sub>9</sub> or CR<sub>9</sub>(OR<sub>7</sub>)<sub>2</sub>, CR<sub>9</sub>OR<sub>8</sub>O, where R<sub>5</sub> is lower alkyl, phenyl or lower alkylphenyl, R<sub>7</sub> is lower alkyl, R<sub>8</sub> is a divalent alkyl radical of 2–5 carbons, and R<sub>9</sub> is an alkyl, cycloalkyl or alkenyl group having 1 to 5 carbons.



in which

R<sup>10</sup> denotes hydrogen, straight-chain or branched alkyl having up to 6 carbon atoms or the triphenylmethyl group or a salt thereof.

5,414,008

## IMIDAZOLYL-SUBSTITUTED PHENYLPROPIONIC AND CINNAMIC ACID DERIVATIVES

Ulrich E. Müller; Jürgen Dressel; Peter Fey, all of Wuppertal; Rudolf H. Hanko, Duesseldorf; Walter Hübsch, Wuppertal; Thomas Krämer, Wuppertal; Matthias Müller-Gliemann, Solingen; Martin Beuck, Erkrath; Stanislaw Kazda, Wuppertal; Andreas Knorr, Erkrath; Johannes-Peter Stasch, Wuppertal, and Stefan Wohlfeil, Hilden, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany Filed Jun. 21, 1993, Ser. No. 80,854

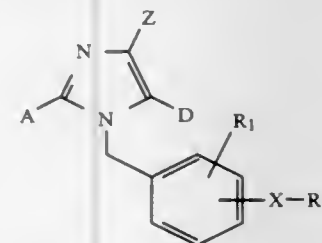
Claims priority, application Germany, Jun. 26, 1992, 42 20 983.8

Int. Cl.<sup>6</sup> A61K 31/415; C07D 403/10

U.S. Cl. 514—381

8 Claims

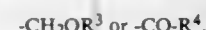
1. An imidazolyl-substituted phenylpropionic and cinnamic acid derivative of the formula



in which

A represents straight-chain or branched alkyl or alkenyl each having up to 8 carbon atoms, or represents cycloalkyl having 3 to 8 carbon atoms, Z represents hydrogen, halogen or perfluoroalkyl having up to 5 carbon atoms,

D represents a group of the formula

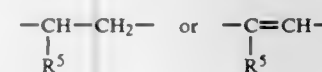


in which

R<sup>3</sup> denotes hydrogen or straight-chain or branched alkyl having up to 8 carbon atoms,

R<sup>4</sup> denotes hydrogen, hydroxyl or straight-chain or branched alkoxy having up to 8 carbon atoms,

X represents a group of the formula



in which

R<sup>5</sup> denotes cycloalkyl having 3 to 8 carbon atoms, or denotes phenyl, or denotes straight-chain or branched alkyl having up to 8 carbon atoms, which is optionally substituted by phenyl or cyclo-alkyl having 3 to 8 carbon atoms,

R<sup>1</sup> represents hydrogen, halogen, nitro, hydroxyl, trifluoromethyl, trifluoromethoxy, straight-chain or branched alkyl, alkoxy or alkoxycarbonyl each having up to 6 carbon atoms, or cyano or carboxyl,

R<sup>2</sup> represents

## 5,414,009 AZABICYCLO SUBSTITUTED OXA- OR THIA-DIAZOLE COMPOUNDS

Preben H. Olesen, København, and Per Sauerberg, Valby, both of Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark

Filed Jan. 4, 1993, Ser. No. 550

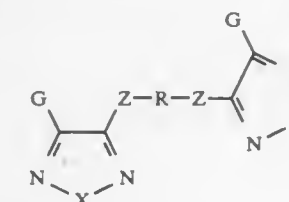
Claims priority, application WIPO, Jan. 13, 1992, PCT/DK92/00009

Int. Cl.<sup>6</sup> C07D 417/14, 413/14, 453/02, 521/00

U.S. Cl. 514—299

28 Claims

1. A compound of formula I



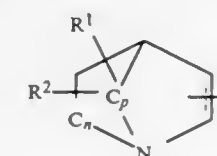
wherein

X is independently oxygen or sulfur to form an oxadiazole or thiadiazole ring;

Z is independently oxygen or sulfur;

R is straight or branched C<sub>1</sub>–10-alkylene, straight or branched C<sub>2</sub>–10-alkenylene, straight or branched C<sub>2</sub>–10-alkynylene, C<sub>3</sub>–8-cycloalkylene or R<sup>4</sup>–R<sup>5</sup>–R<sup>6</sup> wherein R<sup>4</sup> and R<sup>6</sup> independently are straight or branched C<sub>1</sub>–5-alkylene, straight or branched C<sub>2</sub>–5-alkenylene or straight or branched C<sub>2</sub>–5-alkynylene, and R<sup>5</sup> is C<sub>3</sub>–8-cycloalkylene, CO, CHOH, S or O; and

G is the following azabicyclic ring:

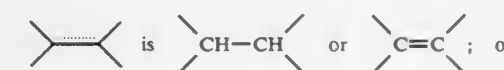


wherein

the oxadiazole or thiadiazole ring can be attached at any position of the azabicyclic ring;

R<sup>1</sup> and R<sup>2</sup> independently are H, straight or branched C<sub>1</sub>–5-alkyl, straight or branched C<sub>2</sub>–5-alkenyl, straight or branched C<sub>2</sub>–5-alkynyl, straight or branched C<sub>1</sub>–5-alkoxy, hydroxy, halogen, amino, carboxy or straight or branched C<sub>1</sub>–6-alkyl substituted with hydroxy;

n and p independently are 1, 2, or 3; and



a pharmaceutically acceptable salt thereof.



5,414,010

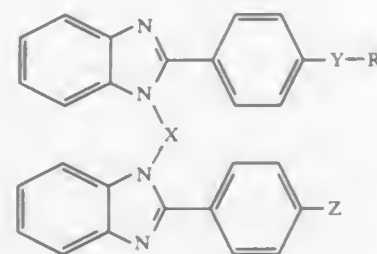
**DIMERIC BENZIMIDAZOLES AS CENTRAL NERVOUS SYSTEM AGENTS**

Dennis M. Downing, Lawrence D. Wise, and Jonathan L. Wright, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

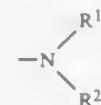
Filed May 10, 1994, Ser. No. 240,354

Int. Cl.<sup>6</sup> A61K 31/415; C07D 401/14, 403/06, 403/14  
U.S. Cl. 514—316

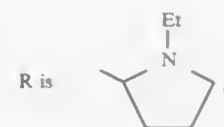
1. A compound of Formula I



wherein R is



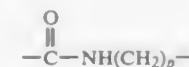
wherein R<sup>1</sup> and R<sup>2</sup> are each the same or different and each is alkyl of from 1 to 6 carbon atoms, alkenyl of from 2 to 6 carbon atoms, alkynyl of from 2 to 6 carbon atoms, arylalkyl wherein alkyl is from 1 to 6 carbon atoms, 2-thienylalkyl wherein alkyl is from 1 to 6 carbon atoms or R<sup>1</sup> and R<sup>2</sup> together with the nitrogen which they substitute form a 1-piperidiny, or 1-pyrrolidiny ring or



X is

alkyl of from 2 to 6 carbon atoms, alkenyl of from 2 to 6 carbon atoms, or alkynyl of from 2 to 6 carbon atoms;

Y is —O(CH<sub>2</sub>)<sub>n</sub>— wherein n is an integer of from 2 to 6, or



wherein p is zero or an integer of from 1 to 6; and Z is hydrogen, hydroxyl, alkyl of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms, or Y—R wherein Y and R are as defined above; and corresponding isomers thereof; or a pharmaceutically acceptable acid addition salt thereof.

5,414,011

**PRESERVATIVE SYSTEM FOR OPHTHALMIC FORMULATIONS**

Cherng-Chyi R. Fu, Saratoga, and Deborah M. Lidgate, Los Altos, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 96,173, Sep. 11, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 329,451 The portion of the term of this patent subsequent to May 5, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> A61K 31/47, 31/14

U.S. Cl. 514—413

10 Claims

1. An ophthalmologically acceptable ketorolac formulation, comprising:  
ketorolac in an effective amount for ophthalmic treatment between 0.001% and 10.0% wt/vol;  
an ophthalmologically acceptable antibiotic in an effective amount for ophthalmic treatment between 0.001% and 10.0% wt/vol;  
a quaternary ammonium preservative in an amount between 0.001% and 1.0% wt/vol;  
octoxynol 40 in a stabilizing amount between 0.001% and 1.0% wt/vol; and  
an aqueous vehicle q.s. to 100%.

5,414,012

**INDALYL-TERMINATED NON-PEPTIDYL α-SUCCINAMIDOACYL AMINODIOLS AS ANTI-HYPERTENSIVE AGENTS**

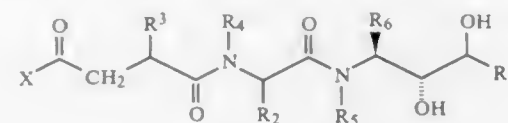
Gunnar J. Hanson, Skokie, and John S. Baran, Winnetka, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 732,880, Jul. 19, 1991, which is a continuation of Ser. No. 103,623, Oct. 1, 1987, abandoned. This application Feb. 22, 1994, Ser. No. 199,403  
Int. Cl.<sup>6</sup> A61K 31/40; C07D 209/44, 209/46

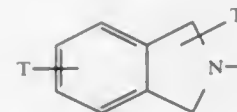
U.S. Cl. 514—416

10 Claims

1. A compound of the formula:



wherein X is



wherein each T is independently selected from one or more groups selected from linear or branched lower alkyl, lower alkoxy, oxo, halo, haloloweralkyl, lower alkenyl, lower alkynyl and cyano; wherein R<sub>1</sub> is selected from linear or branched lower alkyl, haloloweralkyl, lower alkylcycloalkyl, lower alkylcycloalkenyl and lower alkoxy carbonyl; wherein R<sub>2</sub> is selected from linear or branched lower alkyl and benzyl; wherein R<sub>3</sub> is selected from lower alkyl, lower alkylcarbonylaminoalkyl, benzyl, naphthylmethyl, phenyl, naphthyl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R<sub>4</sub> and R<sub>5</sub> is independently selected from H or lower alkyl; and wherein R<sub>6</sub> is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from lower alkyl, lower alkoxy, halo, haloloweralkyl, lower alkenyl, lower alkynyl and cyano.

5,414,013

**TRIFLUOROMETHYL MERCAPTAN AND MERCAPTOACYL DERIVATIVES AND METHOD OF USING SAME**

Norma G. Delaney, Princeton; George C. Rovnyak, Hopewell, both of N.J., and Melanie J. Loots, Champaign, Ill., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

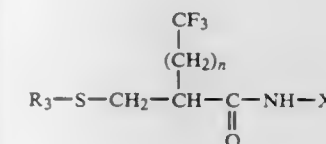
Division of Ser. No. 690,436, Apr. 24, 1991, Pat. No. 5,223,516, which is a continuation-in-part of Ser. No. 497,386, Mar. 22, 1990, abandoned. This application Mar. 26, 1993, Ser. No. 38,032

Int. Cl.<sup>6</sup> A61K 31/40; C07D 207/06, 207/08

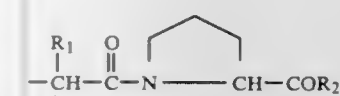
U.S. Cl. 514—423

5 Claims

1. A compound of the formula

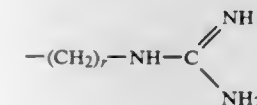
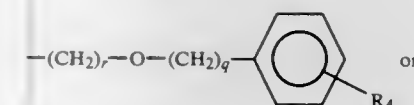
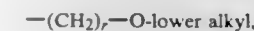
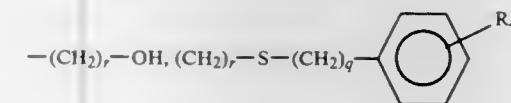
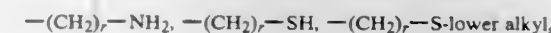
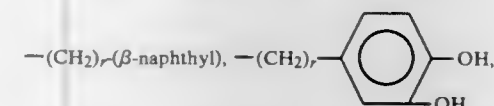
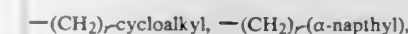
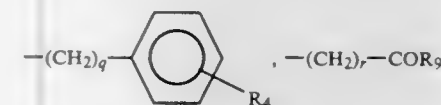


wherein X is

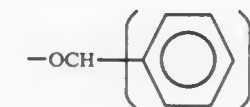


n is zero, 1 or 2;

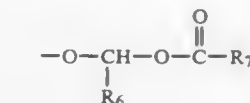
R<sub>1</sub> is hydrogen, lower alkyl, halo substituted lower alkyl,



R<sub>2</sub> and R<sub>9</sub> are independently hydroxy, lower alkoxy, (phenyl)lower alkoxy,

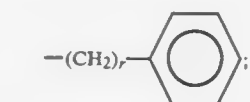


—O—M<sup>+</sup> where M<sup>+</sup> is a salt forming metal ion,

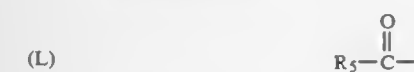


or —NRR';

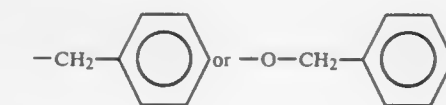
R and R' are independently hydrogen, alkyl or



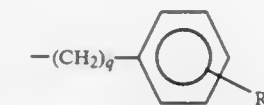
R<sub>3</sub> is hydrogen or



R<sub>4</sub> is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, halo, hydroxy, CF<sub>3</sub>, phenyl,



R<sub>5</sub> is lower alkyl



—(CH<sub>2</sub>)<sub>q</sub>—(α-naphthyl), —(CH<sub>2</sub>)<sub>q</sub>—(β-naphthyl), or —(CH<sub>2</sub>)<sub>q</sub>—cycloalkyl;

R<sub>6</sub> is hydrogen, lower alkyl, cycloalkyl or phenyl;

R<sub>7</sub> is hydrogen, lower alkyl, lower alkoxy or phenyl;

r is an integer from 1 to 4; and

q is zero or an integer from 1 to 7.

5,414,014

**METHODS FOR EFFICACIOUS REMOVAL OF ATTACHED, SUCKING ANTHROPODS FROM HUMAN DERMIS**

Linda H. Schneider, and Randall B. Murphy, both of Irvington, N.Y., assignors to Innova Biomed, Inc., Irvington, N.J.

Filed Apr. 8, 1993, Ser. No. 46,195

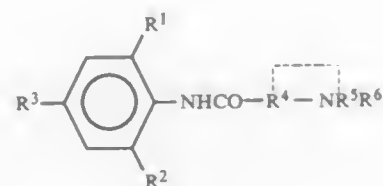
Int. Cl.<sup>6</sup> A61K 31/24, 37/14, 31/70, 31/56

U.S. Cl. 514—535

5 Claims

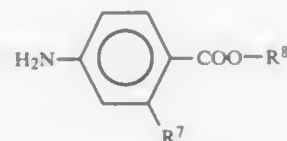
1. A method for facilitating removal of attached sucking arthropods from the skin of a mammal comprising topically applying at least one thin layer of a composition for topical application comprising

a) 0.05–10% weight/volume of a primary anesthetic having the formula



wherein

- R<sup>1</sup>=H, a C<sub>1-4</sub>alkyl or -COOCH<sub>3</sub>;  
 R<sup>2</sup>=H or a C<sub>1-4</sub>alkyl;  
 R<sup>3</sup>=H or CH<sub>3</sub>;  
 R<sup>4</sup>=C<sub>1-4</sub>alkyl;  
 R<sup>5</sup> and R<sup>6</sup> independently=H or C<sub>1-4</sub>alkyl,  
 where at least one of R<sup>1</sup> and R<sup>2</sup> is C<sub>1-4</sub>alkyl and where at least one of R<sup>5</sup> and R<sup>6</sup> is C<sub>1-4</sub>alkyl, provided that where R<sup>4</sup> and R<sup>5</sup> are joined in R<sup>4</sup>-NR<sup>5</sup>R<sup>6</sup>, R<sup>4</sup> and R<sup>5</sup> together with N form a heterocycloalkyl moiety; or the hydrohalide thereof;  
 b) a water-soluble carrier which enhances skin permeability; and  
 c) a compound selected from the group consisting of  
 i) 0.5-20% weight/volume of a secondary anesthetic which is a substituted ester of p-aminobenzoic acid having the formula



- wherein R<sup>7</sup>=H or Cl; R<sup>8</sup>=C<sub>1-4</sub>alkyl-X, where X=H or -N(R<sup>9</sup>)<sub>2</sub>, and R<sup>9</sup>=C<sub>1-4</sub>alkyl; or the hydrohalide thereof, and  
 ii) 0.01-10% weight/volume of an anti-inflammatory compound,  
 iii) an effective amount of an antibiotic, and  
 iv) 1-50% weight/volume of an insect repellent; to the sucking arthropod and the immediately surrounding topical area, waiting 5-30 minutes from the application of said at least one thin layer and removing said sucking arthropod.

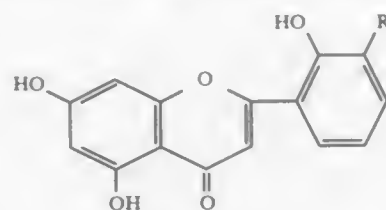
5,414,015

**ANTI-SKIN TUMOR PROMOTING COMPOSITION**  
 Takao Konoshima; Harukuni Tokuda, both of Kyoto; Muneakazu Iinuma, and Mizuo Mizuno, both of Gifu, all of Japan, assignors to Tsujimoto Kagaku Kogyo Co., Ltd., Osaka, Japan  
 Continuation of Ser. No. 859,165, Mar. 27, 1992, abandoned.  
 This application Jan. 8, 1993, Ser. No. 2,091  
 Claims priority, application Japan, Jul. 23, 1991, 3-207634  
 Int. Cl.<sup>6</sup> A61K 31/35

U.S. Cl. 514-456

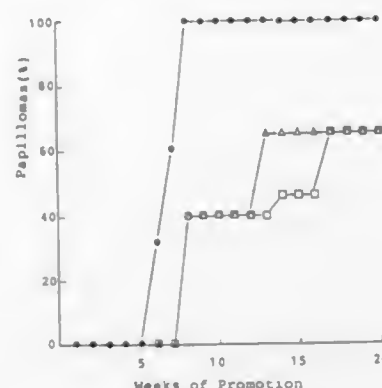
3 Claims

1. A method for chemoprevention of skin tumors in mammals which comprises administering to the skin of a mammal a composition comprising a compound of the general formula



wherein R means a hydrogen atom or a hydroxyl group, as an active ingredient, and a pharmaceutical acceptable carrier, said

composition being administered in an amount effective to prevent skin tumors.



5,414,016

**NEW LEUKOTRIENE-B<sub>4</sub> DERIVATIVES, PROCESS FOR THEIR PRODUCTION AND THEIR USE AS PHARMACEUTICAL AGENTS**

Werner Skuballa; Bernd Buchmann; Josef Heindl; Wolfgang Fröhlich; Roland Ekerdt, and Claudia Giesen, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

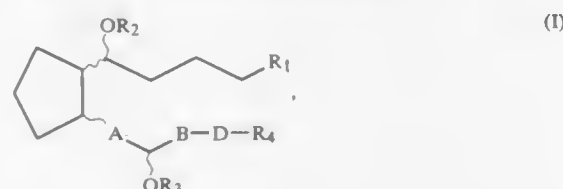
Continuation of Ser. No. 961,728, Jan. 12, 1993, abandoned. This application Jun. 13, 1994, Ser. No. 259,111  
 Claims priority, application Germany, Mar. 12, 1991, 41 08 351.2

Int. Cl.<sup>6</sup> C07C 405/00; A61K 31/557

U.S. Cl. 514-460

8 Claims

1. Leukotriene-B<sub>4</sub> derivatives of formula I

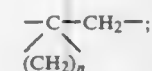


in which

- R<sup>1</sup> is CH<sub>2</sub>OH, CH<sub>3</sub>, CF<sub>3</sub>, COOR<sup>5</sup>, or CONR<sup>6</sup>R<sup>7</sup>, or R<sup>1</sup> together R<sup>2</sup> is a carbonyl group;  
 R<sup>2</sup> and R<sup>3</sup> are the same or different and are H or an organic carboxylic acid or sulfonic acid radical with 1-15C atoms selected from aliphatic, cycloaliphatic, aromatic, aromatic aliphatic, and heterocyclic radicals, optionally substituted independent from one another by C<sub>1-4</sub>alkyl, hydroxy, C<sub>1-4</sub>alkoxy, amino, or oxo groups or fluorine, chlorine, or bromine atoms;  
 R<sup>4</sup> is H, (C<sub>1-10</sub>)-alkyl, optionally substituted by chlorine or bromine; C<sub>3-10</sub>-cycloalkyl, optionally substituted by C<sub>1-4</sub>alkyl groups; a C<sub>6-10</sub>-aryl radical, optionally substituted, independent from one another, by 1-3 chlorine or bromine atoms, a phenyl group, 1-3 C<sub>1-4</sub>alkyl groups, a C<sub>1-4</sub>alkoxy group, a fluoromethyl group, a chloromethyl group, a trifluoromethyl group, a carboxyl group, or a hydroxy group; or a 5-6-member heterocyclic ring;  
 R<sup>5</sup> is hydrogen; C<sub>1-10</sub>-alkyl, optionally substituted by halogen atoms, C<sub>1-2</sub>-alkoxy, C<sub>6-10</sub>-aryl, di-C<sub>1-4</sub>-alkylamino, tri-C<sub>1-4</sub>-alkylammonium; C<sub>3-10</sub>-cycloalkyl, optionally substituted by a C<sub>1-4</sub>alkyl group; a C<sub>6-10</sub>-aryl radical, optionally substituted by 1-3 chlorine or bromine atoms, a phenyl group, 1-3 C<sub>1-4</sub>alkyl groups, a C<sub>1-4</sub>alkoxy group, a fluoromethyl group, a chloromethyl group, a trifluoromethyl group, a carboxyl group, or a hydroxy group;

CH<sub>2</sub>-CO-(C<sub>6</sub>-C<sub>10</sub>)-aryl; or a 5-6-member heterocyclic ring;

A is a trans-, trans-CH=CH-CH=CH, a CH<sub>2</sub>CH<sub>2</sub>-CH=CH- or a tetramethylene group;  
 B is a C<sub>1-10</sub>-straight-chain or branched-chain alkylene group, which optionally can be substituted by fluorine or the group



D is a direct bond, oxygen, sulfur, -C≡C-, -CH=CR<sup>8</sup> or, together with B, can also be a direct bond;  
 R<sup>6</sup> and R<sup>7</sup> are the same or different and are H or C<sub>1-4</sub>-alkyl or R<sup>7</sup> is H and R<sup>6</sup> is C<sub>1-10</sub>-alkanoyl or C<sub>1-10</sub>-alkanesulfonyl;  
 R<sup>8</sup> is H, C<sub>1-5</sub>-alkyl, chlorine, or bromine; and  
 n is 3-5 and, if R<sup>5</sup> is hydrogen, their salts with physiologically compatible bases and their cyclodextrin clathrates.

5,414,017

**TRIFLUOROMETHYL MERCAPTAN AND MERCAPTOACYL DERIVATIVES AND METHOD OF USING SAME**

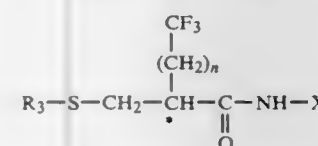
Norma G. Delaney, Princeton; George C. Rovnyak, Hopewell, both of N.J., and Melanie J. Loots, Champaign, Ill., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.  
 Division of Ser. No. 690,436, Apr. 24, 1991, Pat. No. 5,223,516, which is a continuation-in-part of Ser. No. 497,386, Mar. 22, 1990, abandoned. This application Mar. 26, 1993, Ser. No. 38,207

Int. Cl.<sup>6</sup> A10K 31/265, 31/21; C07C 261/00, 327/00

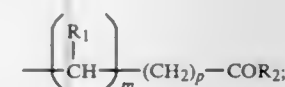
U.S. Cl. 514-512

7 Claims

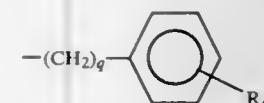
1. A compound of the formula



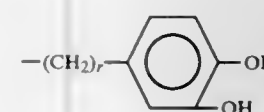
wherein  
 X is



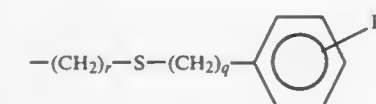
- m is zero or 1;  
 n is zero, 1 or 2;  
 p is zero or 1 to 6 provided that m and p are not both zero;  
 R<sub>1</sub> is hydrogen, lower alkyl, halo substituted lower alkyl,



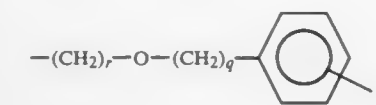
-(CH<sub>2</sub>)<sub>r</sub>-COR<sub>9</sub>, -(CH<sub>2</sub>)<sub>r</sub>-cycloalkyl, -(CH<sub>2</sub>)<sub>r</sub>-(α-naphthyl), -(CH<sub>2</sub>)<sub>r</sub>-(β-naphthyl),



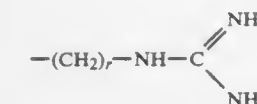
-(CH<sub>2</sub>)<sub>r</sub>-NH<sub>2</sub>, -(CH<sub>2</sub>)<sub>r</sub>-SH, -(CH<sub>2</sub>)<sub>r</sub>-S-lower alkyl, -(CH<sub>2</sub>)<sub>r</sub>-OH,



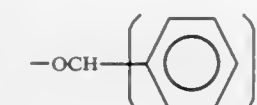
-(CH<sub>2</sub>)<sub>r</sub>-O-lower alkyl,



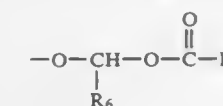
or



R<sub>2</sub> and R<sub>9</sub> are independently hydroxy, lower alkoxy, (phenyl) lower alkoxy,

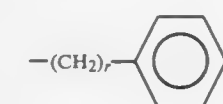


-O-M<sup>+</sup> where M<sup>+</sup> is a salt forming metal ion,

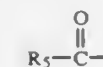


or -NRR';

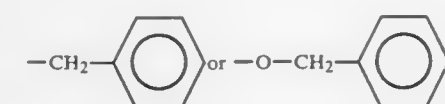
R and R' are independently hydrogen, alkyl or



R<sub>3</sub> is hydrogen or

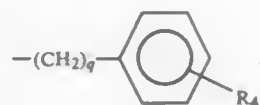


R<sub>4</sub> is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, halo, hydroxy, CF<sub>3</sub>, phenyl,



R<sub>5</sub> is lower alkyl,





$-(CH_2)_q-(\alpha\text{-naphthyl})$ ,  $-(CH_2)_q-(\beta\text{-naphthyl})$ , or  $-(CH_2)_q\text{-cycloalkyl}$ ;  
 $R_6$  is hydrogen, lower alkyl, cycloalkyl or phenyl;  
 $R_7$  is hydrogen, lower alkyl, lower alkoxy or phenyl;  
 $r$  is an integer from 1 to 4; and  
 $q$  is zero or an integer from 1 to 7.

5,414,018

# ALKYLAMINOALKYL-TERMINATED SULFIDE/SULFONYL-CONTAINING PROPARGYL AMINO-DIOL COMPOUNDS FOR TREATMENT OF HYPERTENSION

Gunnar J. Hanson, Skokie, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

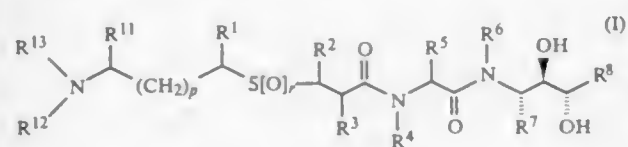
Filed Sep. 24, 1993, Ser. No. 126,940

Int. Cl.<sup>6</sup> A61K 31/16, 31/165; C07C 323/25

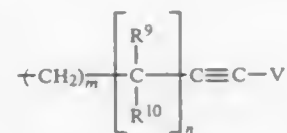
U.S. Cl. 514—618

14 Claims

1. A compound of Formula I:



wherein each of  $R^1$  and  $R^{11}$  is a group independently selected from hydrido, alkyl, alkylaminoalkyl and phenyl; wherein  $p$  is a number selected from zero through five, inclusive; wherein  $r$  is a number selected from zero, one and two; wherein  $R^2$  is selected from hydrido and alkyl; wherein  $R^3$  is a group selected from hydrido, cycloalkylalkyl, aralkyl and haloaralkyl; wherein each of  $R^4$  and  $R^6$  is a group independently selected from hydrido and methyl; wherein  $R^5$  is selected from



wherein  $V$  is selected from hydrido, alkyl, cycloalkyl, aryl and aralkyl; wherein each of  $R^9$  and  $R^{10}$  is a group independently selected from hydrido, alkyl, alkenyl, alkynyl, cycloalkyl and aryl; wherein  $m$  is a number selected from zero through three; wherein  $n$  is a number selected from zero through three; wherein  $R^7$  is a group selected from alkyl, cycloalkylalkyl and aralkyl; wherein  $R^8$  is a group selected from hydrido, alkyl, hydroxyalkyl, cycloalkyl, cycloalkylalkyl, alkenyl and haloalkenyl; wherein each of  $R^{12}$  and  $R^{13}$  is a group independently selected from hydrido, alkyl, cycloalkyl, cycloalkylalkyl, alkylacyl, aryl, aralkyl, haloaryl and haloaralkyl; and wherein any one of said  $R^1$  through  $R^{13}$  groups having a substitutable position may be substituted with one or more groups selected from alkyl, hydroxy, hydroxyalkyl, halo, alkoxy, alkoxyalkyl and alkenyl; or a pharmaceutically-acceptable salt thereof.

5,414,019

# REGRESSION OF MAMMALIAN CARCINOMAS Michael N. Gould, Madison, Wis.; Pamela L. Crowell, Indianapolis, Ind., and Charles E. Elson, Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis. Filed Apr. 9, 1992, Ser. No. 865,561 Int. Cl.<sup>6</sup> A61K 31/045

U.S. Cl. 514—729

1 Claim

1. A method for causing the regression of a carcinoma, comprising the step of administering to a carcinoma-containing mammal an effective amount of perillyl alcohol, wherein after administration the carcinoma is smaller in size than its size at the beginning of said administering step for a minimum of three consecutive weeks.

5,414,020

# PROCESS FOR THE PREPARATION OF ANION EXCHANGE RESINS OF THE POLY(METH)ACRYLAMIDE TYPE

Harold Heller, Cologne; Friedrich Werner, Roesrath-Forsbach; Alfred Mitschker, Odenthal-Holz, and Axel Ingendoh, Odenthal-Oseanau, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 987,095, Dec. 7, 1992, abandoned, which is a continuation of Ser. No. 718,710, Jun. 21, 1991, abandoned. This application Dec. 1, 1993, Ser. No. 160,453

Claims priority, application Germany, Jun. 30, 1990, 40 20 943.1

Int. Cl.<sup>6</sup> C08F 8/32; B01J 41/08, 41/12

U.S. Cl. 521—32

5 Claims

1. Process for the preparation of poly(meth)acrylamide anion exchange resins by aminolysis of bead polymers of cross-linked poly(meth)acrylic acid esters with excess polyamine, subsequent separation of the anion exchange resins from the liquid phase containing the unreacted polyamine, washing the anion exchangers free of amine with water and recovering the polyamines from the washing waters, characterised in that the polyamine is N,N-dimethylpropylene-1,3-diamine and the liquid phase containing the unreacted polyamine and the polyamine-containing washing waters are immediately mixed with bead polymer of cross-linked poly(meth)acrylic acid ester which is to be subjected to aminolysis, the amount of fresh polyamine necessary for the establishment of the desired polyamine excess is added to the mixture, the mixture thus obtained is distillatively dewatered until its water content has fallen to a value of < 7% by weight and the mixture remaining after this distillative dewatering, comprising the bead polymer to be subjected to aminolysis and polyamine, is subjected to aminolysis in the customary manner.

5,414,021

# METHOD FOR SALVAGING AROMATIC POLYCARBONATE BLEND VALUES

Victoria J. Eddy, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 2, 1993, Ser. No. 100,392

The portion of the term of this patent subsequent to Aug. 23, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C08J 11/04

U.S. Cl. 521—48

6 Claims

1. A method for salvaging aromatic polycarbonate blend values from an aromatic polycarbonate blend substrate, surface treated with a thermally cured polyurethane paint, which method comprises:

- (1) contacting the polyurethane painted aromatic polycarbonate blend substrate in a paint removal bath at a temperature of 20° C. to 100° C. and at a pH of 10 to 14 for a period of time which is at least sufficient to effect the substantial deprotonation of available phenolic and alcohol groups in the mixture,
- (2) removing the treated aromatic polycarbonate blend substrate from the mixture of (1), and

- (3) rinsing the treated aromatic polycarbonate blend substrate with an aqueous solution having a pH of less than 7 until the pH of the resulting run-off rinse water has stabilized in the range of 4 to 7, where the paint removal bath comprises by weight, 50 to 95% water, 5 to 30% of an organic solvent, and based on the weight of the paint removal bath, an effective amount of a surfactant, and at least 2% by weight of an hydroxide selected from the group consisting of alkali metals, ammonium, tetraalkylammonium, and alkaline earth metals.

5,414,022

# PROCESS OF RECOVERING COMPONENTS FROM POLYESTER RESINS

Walter E. Toot, Jr., and Bruce R. Debruin, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

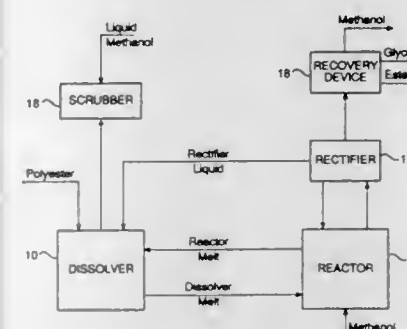
Filed Mar. 10, 1994, Ser. No. 209,150

The portion of the term of this patent subsequent to Mar. 29, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C08J 11/04

U.S. Cl. 521—48

10 Claims



1. A process for depolymerizing polyester into its components and separating the components using apparatus comprising:

- a dissolver for receiving polyester,
- a reactor for depolymerizing polyester into components, and
- a rectifier for separating polyester components; the process comprising the steps of:
  - a) adding polyester to the dissolver and combining it with melt from the reactor and liquid from the rectifier to reduce the chain length of the polyester,
  - b) transferring reduced chain length polyester from the dissolver to the reactor,
  - c) passing super-heated methanol through the reactor to depolymerize polyester into its constituent monomers;
  - d) transferring depolymerization products from the reactor to the rectifier; and
  - e) separating the depolymerization products in the rectifier into a vapor phase containing component monomers and a liquid phase containing higher molecular weight materials;

wherein

- i) the dissolver is operated at a temperature of 180° to 270° C. and a pressure of 80 to 150 kPaa,
  - ii) the reactor is operated at a temperature in the range of 180° to 305° C., and a pressure in the range of 101 to 800 kPaa,
  - iii) the relative proportions, on a weight basis, of melt from the reactor and liquid from the rectifier fed to the dissolver is in the range of 0 to 1 parts rectifier liquid per part reactor melt, and
  - iv) the relative proportions, on a weight basis, of reactor melt plus rectifier liquid and polyester fed to the dissolver is in the range of 0 to 10 parts reactor melt plus rectifier liquid per part polyester,
- so that the viscosity of the polyester exiting the dissolver is maintained in the range of 0.001 to 0.2 Pa.s.

5,414,023

# THIXOTROPIC FOAMABLE ORGANOSILOXANE COMPOSITIONS

Brian P. Loisel, Midland, and Thomas G. Jacobs, Jr., Hemlock, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 18, 1994, Ser. No. 245,347

Int. Cl.<sup>6</sup> C08J 9/02

U.S. Cl. 521—88

5 Claims

1. In an improved foamable organosiloxane composition comprising

- A. a liquid polyorganosiloxane containing at least two reactive groups per molecule selected from the group consisting of silanol groups and alkenyl radicals;
- B. an amount sufficient to foam and cure said composition of an organohydrogensiloxane containing at least three silicon-bonded hydrogen atoms per molecule wherein there is no more than one of said hydrogen atoms per silicon atom;
- C. a compound containing at least one carbinol or silanol group per molecule, and
- D. as the catalyst, an amount of a metal from the platinum group of the periodic table or a compound of said metal sufficient to promote foaming and curing of said composition,

the improvement comprising the presence in said composition of a thixotropic additive in an amount sufficient to prevent substantial flowing of said composition prior to curing, said additive consisting essentially of the hydrogenated glyceride of at least one ethylenically unsaturated hydroxycarboxylic acid containing from 12 to 20 carbon atoms.

5,414,024

# WATER-PERMEABLE AND FIRE-RESISTANT PRODUCT AND A PREPARING METHOD THEREOF

Shin-Chuan Yao, Tu Cheng; Jong-Fu Wu; Kun-Lin Cheng, both of Taipei; Chiu-Hsiung Tsai, Yun Lin Hsien; Farn-Ping Koong, Taipei; Kun-Lung Chuang, Tao Yuan Hsien; Shu-Lan Yao, Taipei, and Chin-Liu Liu, Chuang, all of Taiwan, Prov. of China, assignors to China Textile Institute, Taipei Hsien, Taiwan, Prov. of China

Division of Ser. No. 241,406, May 11, 1994, Pat. No. 5,376,208.

This application Oct. 12, 1994, Ser. No. 321,803

Int. Cl.<sup>6</sup> C08J 9/00

U.S. Cl. 521—114

7 Claims

1. A water-permeable and fire-resistant product, comprising: polyurethane resin;
- a first fire-resistant agent selected from the group consisting of paraffine chlorinated, decabromodiphenyl oxide, hexachloro benzene, hexabromo benzene, pentabromo ethyl benzene, pentabromo diphenyl oxide and octabromo diphenyl ether;
- a second fire-resistant agent selected from the group consisting of Sb<sub>2</sub>O<sub>3</sub> and Sb<sub>2</sub>O<sub>5</sub>;
- an inorganic fire-resistant agent; and
- an additive agent.

5,414,025

# METHOD OF CROSSLINKING OF SOLID STATE BATTERY ELECTROLYTES BY ULTRAVIOLET RADIATION

Harry R. Allcock; Constance J. Nelson, and William D. Coggio, all of State College, Pa., assignors to The Penn State Research Foundation, University Park, Pa.

Filed Sep. 30, 1992, Ser. No. 954,444

Int. Cl.<sup>6</sup> C08G 73/06, 79/02

U.S. Cl. 522—46

11 Claims

6. A method for crosslinking a crosslinkable material that consists essentially of an electrolyte and a polyorganophosphazene which contains an alkyl C—H bond, comprising: exposing the material to a sufficient amount of ultraviolet

radiation to induce crosslinking of the polyorganophosphazene.

5,414,026

Patent Not Issued For This Number

5,414,027

# HIGH MELT STRENGTH, PROPYLENE POLYMER, PROCESS FOR MAKING IT, AND USE THEREOF

Anthony J. DeNicola, Jr., Newark, Del.; Jeanine A. Smith, West Chester, Pa., and Massimo Felloni, Ferrara, Italy, assignors to Himont Incorporated, Wilmington, Del.

Filed Jul. 15, 1993, Ser. No. 92,344

Int. Cl.<sup>6</sup> C08J 3/28; C08L 23/10, 23/16, 53/00, 23/26  
U.S. Cl. 522—112 11 Claims

1. An irradiated normally solid, high molecular weight, non-linear, substantially gel-free, propylene polymer material having a strain hardening elongational viscosity and enhanced melt strength as indicated by a melt tension of greater than or equal to 7.1 selected from the group consisting of:

- (1) a propylene polymer composition consisting essentially of:
  - (a) from 10 to 50% of a propylene homopolymer having an isotactic index of from 80 to 99%, or a copolymer selected from the group consisting of (i) propylene and ethylene, (ii) propylene, ethylene and a  $\text{CH}_2=\text{CHR}$  alpha-olefin, where R is a  $\text{C}_{2-8}$  straight or branched alkyl, and (iii) propylene and an alpha-olefin, as defined above in (a)(ii), wherein said copolymer contains from 85 to 99% propylene and having an isotactic index greater than 80 to 99%,
  - (b) from 5 to 20% of a semi-crystalline, essentially linear copolymer fraction having a crystallinity of about 20 to 60%, by differential scanning calorimetry (DSC), wherein the copolymer is selected from the group consisting of (i) ethylene and propylene containing over 55% ethylene; (ii) ethylene, propylene, and an alpha-olefin, as defined above in (a)(ii), containing from 1 to 10% of the alpha-olefin and over 55% up to 98% of both ethylene and alpha-olefin; and (iii) ethylene and an alpha-olefin, as defined in (a)(ii), containing over 55% up to 98% of said alpha-olefin, which copolymer is insoluble in xylene at room or ambient temperature, and
  - (c) from 40 to 80% of a copolymer fraction selected from the group consisting of a copolymer of (i) ethylene and propylene wherein the copolymer contains from 20% to less than 40% ethylene; (ii) ethylene, propylene, and an alpha-olefin, as defined in (a)(ii), wherein the alpha-olefin is present in an amount of from 1 to 10% and the amount of ethylene and alpha-olefin present is from 20% to less than 40%; and (iii) ethylene and an alpha-olefin, as defined in (a)(ii), containing from 20 to less than 40% of the alpha-olefin, and optionally containing 0.5 to 10% of a diene, said copolymer fraction being soluble in xylene at ambient temperature, and having an intrinsic viscosity of from 1.7 to 3.0 dl/g, wherein the total amount of ethylene units or said alpha-olefin units or of ethylene and said alpha-olefin units when both are present in the composition is from 15 to 35%, the total amount of (b) and (c) fractions, based on the total olefin polymer composition is from about 65% to 80%, the weight ratio of (b)/(c) is from 0.1 to about 0.3 and the total content of ethylene or  $\text{C}_{4-8}$  alpha-olefin or combination thereof in (b+c) is less than 50%; and
- (2) a propylene polymer composition consist essentially of:
  - (a) 10–60 parts by weight of homopolymer polypropylene with isotactic index greater than 90 to 99, or of crystalline propylene copolymer with ethylene, with a  $\text{CH}_2=\text{CHR}$  olefin where R is a 2–6 carbon alkyl radical, or combinations thereof, containing over 85% by weight of propylene and having an isotactic index greater than 85 to 94%;

- (b) 8–40 parts by weight of a semi-crystalline, polymer fraction containing ethylene and propylene, having an ethylene content greater than 50% and insoluble in xylene at room temperature;
- (c) 30–60 parts by weight of an amorphous ethylene-propylene copolymer fraction containing optionally small proportions of a diene, soluble in xylene at room temperature and containing 40 to 70% by weight ethylene.

5,414,028

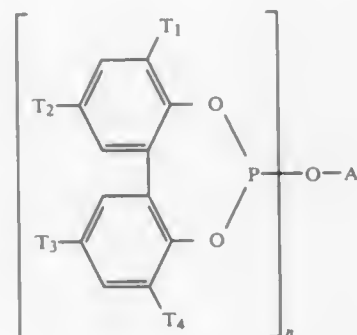
# CARBOHYDRATE SUBSTITUTED DIBENZO[D,F][1,3,2]DIOXAPHOSPHEPIN STABILIZERS

Stephen D. Pastor, Danbury, Conn., and Joseph E. Babiarz, Amawalk, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 918,324, Jul. 22, 1992, Pat. No. 5,310,889. This application Feb. 17, 1994, Ser. No. 198,017

Int. Cl.<sup>6</sup> C08K 5/52; C08L 23/12; C09K 15/32  
U.S. Cl. 524—30 11 Claims

1. A stabilized composition which comprises
  - (a) an organic material subject to oxidative or thermal degradation, and
  - (b) an effective stabilizing amount of a compound of formula I



wherein

n is 1 to 6,

T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> are independently alkyl of 1 to 12 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aryl of 6 to 10 carbon atoms or phenylalkyl of 7 to 15 carbon atoms, and A is a carbohydrate residue.

5,414,029

# AQUEOUS BITUMEN-POLYMER EMULSIONS, THEIR METHOD OF PREPARATION AND THEIR USE

Guy Lemoine, and Sophie Mariott, both of le Havre, France, assignors to Total Raffinage Distribution S.A., Levallois Perret, France

Filed Dec. 14, 1993, Ser. No. 166,641

Claims priority, application France, Dec. 14, 1992, 92 15017  
Int. Cl.<sup>6</sup> C08L 95/00

U.S. Cl. 524—60 79 Claims

73. A bitumen-polymer emulsion comprising:

- a) at least one bitumen;
- b) at least one polymer having hydrocarbon chains with mobile hydrogens or free electrons, said polymer being grafted and crosslinked in situ in said bitumen through a complex including at least one organic silicon compound, said complex being formed from a primary constituent for grafting an organic silicon onto the polymer and a secondary constituent, said secondary constituent being the organic silicon compound;
- c) water, and
- d) at least one emulsifying agent.

5,414,030

# AGRICULTURAL FILM

Kozo Kotani, Toyonaka, and Taiichi Sakaya, Takatsuki, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 22, 1992, Ser. No. 994,998

Claims priority, application Japan, Dec. 24, 1991, 3-340820  
The portion of the term of this patent subsequent to Nov. 16,

2010, has been disclaimed.

Int. Cl.<sup>6</sup> C08K 5/34

U.S. Cl. 524—99 20 Claims  
1. An agricultural film produced by forming into a film a composition comprising:

- (a) a polyolefin resin,
- (b) a dripping agent,
- (c) a heat stabilizer,
- (d) a weather resistance improving agent which comprises at least one hindered amine compound, and
- (e) a solution of a hypophosphite compound in an organic solvent.

5,414,031

# INTUMESCENT NONHALOGENATED FLAME RETARDANT POLYSTYRENE COMPOSITION

Carol L. Knox, Monroeville, Pa., assignor to Polymer Product Company, Inc., Stockertown, Pa.

Filed Nov. 19, 1993, Ser. No. 155,043

Int. Cl.<sup>6</sup> C08K 13/02, 5/34, 3/32; C08L 9/06

U.S. Cl. 524—101 15 Claims  
1. An intumescent nonhalogenated flame retardant polystyrene composition comprising:

- (a) polystyrene;
- (b) ammonium polyphosphate wherein the weight ratio of said ammonium polyphosphate to the polystyrene in said intumescent nonhalogenated flame retardant polystyrene composition is in the range of from 0.2:1 to 3.2:1;
- (c) tris(2-hydroxyethyl) isocyanurate;
- (d) hydrated zinc borate; and
- (e) substantially amorphous elastomeric polymer wherein the weight ratio of said substantially amorphous elastomeric polymer to said polystyrene in said intumescent nonhalogenated flame retardant polystyrene composition is in the range of from 0.05:1 to 0.4:1.

5,414,032

# RESIN COMPOSITION FOR A CORE FOR WEB MATERIAL

Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

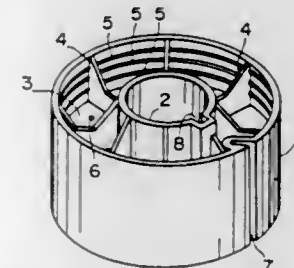
Continuation of Ser. No. 612,230, Nov. 13, 1990, abandoned, which is a division of Ser. No. 268,372, Nov. 7, 1988, Pat. No. 4,989,802. This application Sep. 28, 1992, Ser. No. 952,148

Claims priority, application Japan, Nov. 6, 1987, 62-169097; Dec. 9, 1987, 62-309403

The portion of the term of this patent subsequent to Jul. 6, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C08K 5/49, 5/16, 5/13, 3/34

U.S. Cl. 524—115 13 Claims



1. An injection, moldable resin composition consisting essentially of 70 to 30 wt. % of polypropylene resin having a molec-

ular weight distribution of 1.5 to 8, a melt index of 10 to 60 g/10 minutes, a bending elastic modulus of more than 8,000 kg/cm<sup>2</sup>, an Izod impact strength of more than 2 kg.cm/cm and a Rockwell hardness of more than 70 R, 30 to 70 wt. % of linear low density polyethylene resin having a molecular weight distribution of 1.5 to 8, a melt index of 3 to 50 g/10 minutes, a density of 0.910 to 0.935 g/cm<sup>3</sup>, an Olsen rigidity of more than 1,500 kg/cm<sup>2</sup> and a Shore hardness of more than 40 D, 0.03 to 2 wt. % of a fatty acid amide lubricant having 15 to 35 carbon atoms and/or a silicone lubricant and 0.03 to 1 wt. % of a phenol and/or phosphorus containing antioxidant.

5,414,033

# PHENYL PHOSPHITES FOR USE AS STABILIZERS FOR ORGANIC MATERIALS

Peter Nesvadba, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

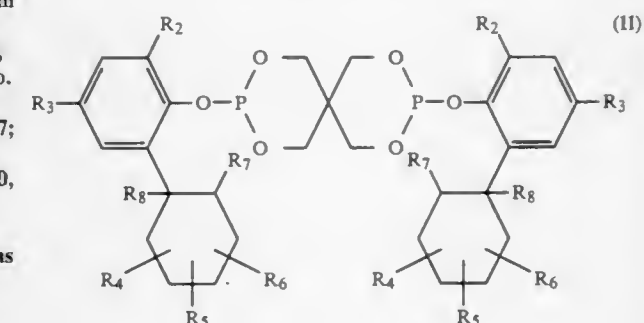
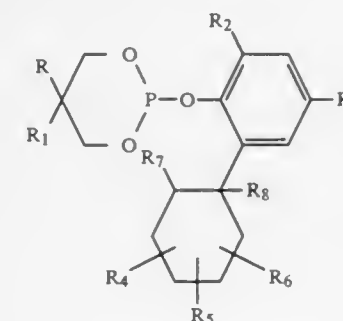
Filed Oct. 15, 1993, Ser. No. 138,533

Claims priority, application Switzerland, Oct. 21, 1992, 3262/92

Int. Cl.<sup>6</sup> C08K 5/527; C07F 9/6574

U.S. Cl. 524—117 12 Claims

1. A compound of the formula I or II



in which

R and R<sub>1</sub>, independently of one another, are hydrogen or C<sub>1</sub>–C<sub>4</sub>alkyl or together with the carbon atom to which they are attached form a 3,4-dehydrocyclohexylidene ring,  
R<sub>2</sub> is hydrogen, C<sub>1</sub>–C<sub>8</sub>alkyl or C<sub>5</sub>–C<sub>6</sub>cycloalkyl,  
R<sub>3</sub> is C<sub>1</sub>–C<sub>8</sub>alkyl or C<sub>5</sub>–C<sub>6</sub>cycloalkyl,  
R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub>, independently of one another, are hydrogen or C<sub>1</sub>–C<sub>4</sub>alkyl, when alkyl, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> together containing 1 to 4 carbon atoms, and  
R<sub>7</sub> and R<sub>8</sub> together form an additional direct bond.



5,414,034

## PROCESSING STABILIZER FORMULATIONS

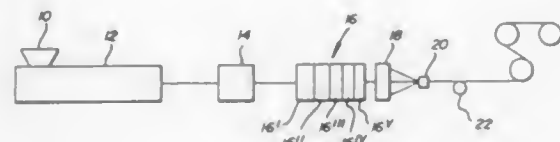
William P. Enlow, Belpre, Ohio, and Roger W. Avakian, Parkersburg, W. Va., assignors to General Electric Company, Parkersburg, W. Va.

Filed Mar. 29, 1993, Ser. No. 38,413

Int. Cl.<sup>6</sup> C08K 5/527

U.S. Cl. 524—120

3 Claims



1. A composition for melt extrusion which resists screen pack plugging, said composition comprising
  - a) a polyolefin present at a level of from 50 to 99.9 weight percent based on the total weight of the composition,
  - b) bis(2,6-di-*t*-butyl-4-methylphenyl) pentaerythritol diphosphate present at a level of from 0.001 to 5 weight percent based on the total weight of the composition, and
  - c) a metal salt of a lactic acid present at a level of from 0.01 to 5 weight percent based on the total weight of the composition.

5,414,035

## CALENDERED RIGID VINYL POLYMER COMPOSITIONS

Robert Lindner, N. Wales, Pa., and Vincent Clarke, Union, N.J., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Filed Jul. 1, 1994, Ser. No. 270,078

Int. Cl.<sup>6</sup> C08K 5/57

U.S. Cl. 524—181

20 Claims

1. A composition comprising:
  - (a) a vinyl polymer;
  - (b) an effective amount for stabilizing said vinyl polymer of tin stabilizer; and
  - (c) an effective amount for lubricating said vinyl polymer of polyethylene having a Brookfield viscosity at a temperature of 140° C. of greater than about 85,000 centipoises and an acid number as determined by standardized titration of KOH of between about 5 and about 9.

5,414,036

## RAPIDLY CRYSTALLIZING POLYESTER MOLDING COMPOSITIONS

John W. Gilmer, West Windsor, N.J., assignor to Enichem S.p.A., Italy

Filed Apr. 12, 1993, Ser. No. 45,943

Int. Cl.<sup>6</sup> C08L 67/02

U.S. Cl. 524—394

16 Claims

1. A molding composition comprising a thermoplastic polyester and a polymeric nucleating additive consisting of a polymer comprising first and second monomeric repeating units, wherein said first monomeric repeating unit comprises a pendant ionizable alkali metal phenolate group, and said second monomeric repeating unit comprises a comonomer which is selected to provide said polymeric nucleating additive with a lower  $T_g$  than said polyester.

5,414,037

## COMPOSITION FOR MOLDING OF VEHICLE BODY PANELS

Nippani R. Rao, Farmington Hills; Saad M. Abouzahr, Highland; Russ Spencer, W. Bloomfield, and Denis E. Falkowski, Farmington Hills, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 28,077, Mar. 8, 1993, Pat. No. 5,336,710. This application Oct. 25, 1993, Ser. No. 140,943

Int. Cl.<sup>6</sup> C08K 3/34; B29C 45/46; B27N 3/10; B32B 7/00 U.S. Cl. 524—445

14 Claims

1. A process for resin transfer molding of vehicle body panels comprising the steps of:
  - a) providing a resin transfer mold for a vehicle body panel having a show surface portion capable of molding of a class "A" surface;
  - b) providing a composition consisting of from about 38% to about 44% of a modified acrylic resin binder, wherein said modified acrylic resin binder includes a low profile additive; from about 28% to about 32% by weight of glass fibers; from about 28% to about 30% by weight of a filler material other than glass fibers;
  - c) molding a vehicle body part by injection of said composition into said mold for forming a final part having a class "A" surface.

5,414,038

Patent Not Issued For This Number

5,414,039

## REPULPABLE HOT MELT ADHESIVE FOR PACKAGING MATERIALS CONTAINING AN ETHYLENE VINYL ACETATE COPOLYMER HAVING 40-60 WEIGHT PERCENT OF VINYL ACETATE UNITS, A TACKIFIER AND A HIGH MOLECULAR WEIGHT OXYGEN-CONTAINING POLYMER

Michael D. Watson, Tulsa; William P. Cottom, Mounds; Susan M. Teeters, Sand Springs, all of Okla.; Charles H. Heroux, Scarborough, Canada, and Terrance D. Duryee, Charlotte, N.C., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Feb. 16, 1993, Ser. No. 17,776

Int. Cl.<sup>6</sup> C09J 123/08, 131/04, 173/00

U.S. Cl. 524—502

25 Claims

1. A repulpable hot melt adhesive composition comprising:
  - (i) an ethylene vinyl acetate copolymer having between about 40 to about 60 weight percent of vinyl acetate units;
  - (ii) a tackifier; and
  - (iii) an oxygen-containing polymer, having the formula:

A—B

(1)

wherein the molecular weight of A is less than 2,000 and further wherein A is represented by an alkyl unit of the formula



and B is represented by a unit of the formula



where R and  $R_1$  are independently selected from the group consisting of hydrogen and a  $C_1$ - $C_{10}$  alkyl group;  $R_2$  is hydrogen or a  $C_1$ - $C_5$  alkyl group; x is greater than or equal to 1 but less than 70; and y is between about 0.37 to about 45; provided the weight ratio of B/A+B is between 0 and 50 percent.

5,414,040

FORMULATED ETHYLENE/ $\alpha$ -OLEFIN ELASTOMERIC COMPOUNDS

Kevin W. McKay, Baton Rouge; Robert R. Blanchard, Brusly; Edwin R. Feig, Baton Rouge, all of La., and Kyle G. Kummer, Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 15, 1992, Ser. No. 945,035

The portion of the term of this patent subsequent to Jan. 11, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C08J 3/24

U.S. Cl. 524—576

12 Claims

1. A curable formulated elastomeric composition comprising at least one substantially linear ethylene/ $\alpha$ -olefin copolymer, at least one curing agent, and at least one filler, wherein the substantially linear ethylene/ $\alpha$ -olefin copolymer is characterized as having:
  - a) a melt flow ratio,  $I_{10}/I_2 \geq 5.63$ ,
  - b) a molecular weight distribution,  $M_w/M_n$ , defined by the equation:  $M_w/M_n \leq (I_{10}/I_2) - 4.63$ , and
  - c) a critical shear rate at onset of surface melt fracture of at least 50 percent greater than the critical shear rate at the onset of surface melt fracture of a linear ethylene/ $\alpha$ -olefin copolymer having about the same  $I_2$  and  $M_w/M_n$ .

5,414,041

## WATERBORNE COATING COMPOSITION

Gary R. Larson, Hatfield; Caren A. Puschak, Norristown; Linda S. Smith, Orelan, and Kurt A. Wood, Abington, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Apr. 8, 1994, Ser. No. 224,923

Int. Cl.<sup>6</sup> C08L 75/04

U.S. Cl. 524—589

7 Claims

1. A waterborne coating composition comprising an aqueous dispersion of a polymer, said polymer being substantially free from hydroxyl, primary amino, and secondary amino groups and said polymer bearing at least two active methylene groups; and an aqueous dispersion of a polyisocyanate bearing at least two isocyanate groups.

5,414,042

## REINFORCED POLYAMIDE RESIN COMPOSITION AND PROCESS FOR PRODUCING THE SAME

Kenji Yasue; Tsuneo Tamura; Shinichiro Katahira, and Mioko Watanabe, all of Kyoto, Japan, assignors to Unitika Ltd., Hyogo, Japan

Filed Dec. 28, 1993, Ser. No. 174,040

Claims priority, application Japan, Dec. 29, 1992, 4-360955

Int. Cl.<sup>6</sup> C08K 3/34

U.S. Cl. 524—789

16 Claims

1. A process for producing a reinforced polyamide resin composition which comprises polymerizing monomer to form a polyamide therefrom where from 0.01 to 100 parts by weight of fluoromica-based mineral with swelling characteristics is present per the monomer in an amount of forming 100 parts by weight of a polyamide.

5,414,043

## CURABLE MOLDING MATERIAL

Anton Hesse, Weinheim; Albin Berger, Ludwigshafen; Walter Heckmann, Weinheim, and Roger Klimesch, Alsbach-Haehnlein, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 12, 1993, Ser. No. 134,030

Claims priority, application Germany, Oct. 12, 1992, 42 34 324.0

Int. Cl.<sup>6</sup> C08L 63/10, 67/06, 75/16

U.S. Cl. 525—64

15 Claims

1. A curable molding material, comprising
  - A. as coherent phase, a free-radical curable, unsaturated polyester resin and

B. as disperse phase, finely particulate non-crosslinked polyolefin particles, wherein the phases A and B are chemically bonded to one another at the interfaces by ionic bonds.

5,414,044

## POLYOLEFIN RESIN COMPOSITION AND CROSSLINKED MOLDED ARTICLE AND PROCESS FOR THE PRODUCTION THEREOF

Satoru Moriya, Ohtake; Mamoru Takahashi, Yamaguchi; Akio Ishimoto, Iwakuni, and Toshiyuki Hirose, Ohtake, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 798,041, Nov. 27, 1991, abandoned, which is a division of Ser. No. 552,509, Jul. 16, 1990, abandoned. This application Oct. 29, 1993, Ser. No. 143,245 Claims priority, application Japan, Jul. 19, 1989, 1-186242; Mar. 30, 1990, 2-85212

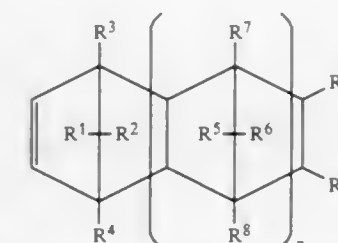
The portion of the term of this patent subsequent to Jan. 11, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C08L 51/06

U.S. Cl. 525—74

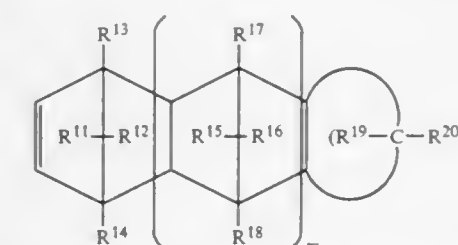
20 Claims

1. A polyolefin resin composition comprising:
  - (A) a polyolefin resin of a random copolymer of at least one cyclic olefin selected from the group consisting of compounds of the formula (1)



(1)

wherein each of  $R^1$  to  $R^{10}$  independently represents a hydrogen atom, a halogen atom or a monovalent hydrocarbon group, and n represents 0 or a positive integer and compounds of the formula (2)



(2)

wherein each of  $R^{11}$  to  $R^{20}$  independently represents a hydrogen atom, a halogen atom or a monovalent hydrocarbon group, m represents 0 or a positive integer, and k represents an integer of not less than 3, ethylene, and, optionally, another olefin.

- (B) a graft-modified  $\alpha$ -olefin copolymer grafted with unsaturated carboxylic acid or its derivative, and
- (C) an amino group-containing compound, said polyolefin resin composition containing a crosslinked structure between the amino group-containing compound (C) and the graft-modified  $\alpha$ -olefin copolymer (B), and containing, based on 100 parts by weight of the polyolefin resin (A) and the graft-modified  $\alpha$ -olefin copolymer (B) in total, 60 to 95 parts by weight of the polyolefin resin (A), 5 to 40 parts by weight of the graft-modified  $\alpha$ -olefin copolymer (B) and 0.01 to 0.5 parts by weight of the amino group-containing compound (C).

5,414,045

# GRAFTING, PHASE-INVERSION AND CROSS-LINKING CONTROLLED MULTI-STAGE BULK PROCESS FOR MAKING ABS GRAFT COPOLYMERS

Chen-Youn Sue, Williamstown; Robert Koch, Parkersburg; John E. Pace, Washington, and Gregory R. Prince, Sandyville, all of W. Va., assignors to General Electric Company, Parkersburg, W. Va.

Filed Dec. 10, 1993, Ser. No. 165,766

Int. Cl.<sup>6</sup> C08L 51/04, 55/02

U.S. Cl. 525—86

9 Claims

1. A bulk resin composition obtained by reacting an organic continuous phase comprising vinyl aromatic monomer, unsaturated nitrile monomer and rubbery diene polymer dissolved in said monomers, said resin composition comprising a graft copolymer and a rubber free copolymer, said graft copolymer comprising a diene rubber substrate and a vinyl aromatic/unsaturated nitrile polymer grafted to said substrate, said rubber substrate having a number average particle size diameter of not more than 0.3 microns, said rubber substrate having both interior and exterior surfaces and having a cell morphology defined as a rubber membrane network of spherical surface with occluded vinyl aromatic/unsaturated nitrile copolymer inside the rubber substrate, said grafted vinyl aromatic/unsaturated nitrile polymers being grafted on both the interior and exterior surfaces of the rubber substrate whereby said composition has a gloss of greater than 90% at 60 degrees as measured by a Gardner Gloss Meter.

5,414,046

# FLAME RETARDANT POLYMER COMPOSITIONS COMPRISING THERMALLY STABLE RESINS

Gary C. Davis, Albany, N.Y., assignor to General Electric Company, Schenectady, N.Y.

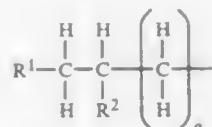
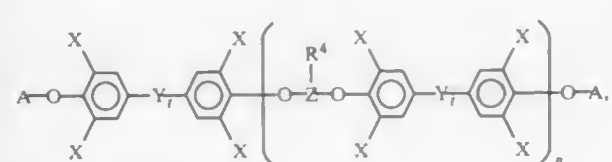
Filed Jun. 17, 1994, Ser. No. 262,105

Int. Cl.<sup>6</sup> C08F 8/00; C08G 63/68

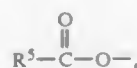
U.S. Cl. 525—132

16 Claims

1. A polymer resin having the formula



and R<sup>1</sup> is hydrogen, a hydroxy group, a C<sub>1-5</sub> alkoxy group or a C<sub>1-5</sub> acyloxy group and R<sup>2</sup> is hydrogen, a hydroxy group or a C<sub>1-5</sub> acyloxy group and q is 1 to 4, provided that R<sup>1</sup> and R<sup>2</sup> are not simultaneously hydrogen and each Y is independently a bridging radical and each t is independently 0 or 1 and R<sup>4</sup> is a hydroxy group or



wherein R<sup>5</sup> is a C<sub>1-5</sub> alkyl group, provided that R<sup>4</sup> is not a hydroxy group when R<sup>1</sup> and R<sup>2</sup> are acyloxy groups and X is a halogen and Z is a C<sub>1-5</sub> trivalent hydrocarbon radical and n is 1 to 100.

5,414,047

# PROCESS FOR SEGMENTED COPOLYMERS

Richard R. Clikeman, Washington Crossing, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 221,112, Mar. 31, 1994, which is a continuation-in-part of Ser. No. 87,243, Jul. 2, 1993, abandoned.

This application Jun. 7, 1994, Ser. No. 255,034

Int. Cl.<sup>6</sup> C08F 2/06, 2/10

U.S. Cl. 525—298

7 Claims

1. A process for preparing a segmented copolymer of a polyolefin and of a polymer comprised of greater than about 50 weight percent of units derived from at least one alkyl (meth)acrylate, comprising:

- preparing a slurry of about 100 parts of particles of polyolefin of average particle size below about 6 mm. with from about 100 to about 500 parts of water;
- heating the slurry in a pressure vessel with agitation until a temperature of at least about 60° C. is obtained;
- prior to or during said heating adding to the slurry from about 0 to about 100 parts of one or more organic solvents, miscible with the later-added first monomer mixture;
- adding to the heated slurry either separately or in combination
  - from about 5 to about 120 parts of a first monomer mixture which is greater than 50% by weight of at least one alkyl (meth)acrylate and which contains from greater than 5 to 25% by weight of units derived from an unsaturated copolymerizable acid;
  - from about 0.01 to about 2 parts of at least one polymerization initiator;
  - one or more organic solvents, miscible with the first monomer mixture so that the total of solvent added in steps (c) and (d) is from about 5 to about 100 parts of solvent;
- continuing heating to maintain the reaction temperature at at least 60° C. for at least about 30 minutes;
- neutralizing the units derived from an unsaturated polymerizable acid to convert the units at least partially to an ammonium or alkali metal salt;
- concurrently or sequentially heating the reaction mixture to a temperature at least above 115° C. and above the softening point of the polyolefin particles;
- further adding to the reaction vessel
  - from about 5 to about 200 parts of a second monomer mixture which is greater than 50% by weight of at least one alkyl (meth)acrylate;
  - from about 5 to about 150 parts of at least one organic solvent, miscible with the second monomer mixture;
  - from about 0.01 to about 2 parts of at least one polymerization initiator;
- holding the reaction vessel at a temperature above 115° C. and above the softening point of the polyolefin particles until essentially complete conversion of the monomers to polymer occurs, the polymer being formed being at least partially grafted to the polyolefin to form the segmented copolymer, the segmented copolymer remaining in particulate form.

5,414,048

# METHOD FOR PREPARING POLY(VINYL TRIFLUOROACETATE) AND POLY(VINYL TRIFLUOROACETATE/VINYL ESTER) IN THE ABSENCE OF CHLOROFLUOROCARBON SOLVENT

Gilbert L. Eian, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 152,393, Nov. 12, 1993, Pat. No. 5,336,740.

This application Aug. 4, 1994, Ser. No. 285,784

Int. Cl.<sup>6</sup> C08F 14/18

U.S. Cl. 525—326.2

1 Claim

1. A method for the free-radical(copolymerization of vinyl trifluoroacetate monomer comprising the steps of:

- preparing a mixture comprising:
  - vinyl trifluoroacetate monomer;

- optionally, vinyl ester monomer(s);
  - a solvent selected from the group consisting of siloxane oligomers; organosiloxanes, polyorganosiloxanes, and mixtures thereof;
  - a free-radical polymerization initiator;
  - optionally, a water scavenger; and
- (b) activating the mixture to effect (co)polymerization of the monomers and form a (co)polymer; and
- (c) hydrolyzing the (co)polymer.

5,414,049

# NON-OXIDIZING POLYMERIC MEDICAL IMPLANT

Deh-Chuan Sun, Rockaway, and Casper F. Stark, Pompton Lakes, both of N.J., assignors to Howmedica Inc., New York, N.Y.

Filed Jun. 1, 1993, Ser. No. 70,074

Int. Cl.<sup>6</sup> C08F 8/00

U.S. Cl. 525—333.7

41 Claims

1. A method for producing a medical implant formed from an olefinic material, the material having improved oxidation resistance comprising the steps of:

sealing the implant in an oxygen impermeable package in an oxygen reduced non-reactive atmosphere;

radiation sterilizing said packaged implant; and

heating said packaged implant for a predetermined time at a temperature of between about 37° C. and the melting point of said olefinic material to form cross-links between free radicals in neighboring polymeric chains.

5,414,050

# POLYMER PRECURSORS FOR ALUMINUM NITRIDE ALUMINUM NITRIDE-CONTAINING CERAMICS FROM POLYMERIC PRECURSORS

James A. Jensen, Hockessin, Del., assignor to Lanxide Technology Company, L.P., Newark, Del.

Continuation of Ser. No. 885,719, Jun. 15, 1992, abandoned, which is a division of Ser. No. 594,754, Oct. 9, 1990, abandoned.

This application Dec. 22, 1993, Ser. No. 172,016

Int. Cl.<sup>6</sup> C08G 79/00

U.S. Cl. 525—389

2 Claims

1. A process for preparing an AlN-containing ceramic which comprises pyrolyzing in a non-oxidizing atmosphere the aluminum-nitrogen polymer prepared by (a) reacting an organic nitrile having the formula RCN, where R is a 1-12 carbon-alkyl, cycloalkyl or aryl group, with a dialkylaluminum hydride having the formula R'R''AlH, wherein R' and R'' are the same or different 1-12 carbon alkyl groups, to form an organoaluminum imine, and (b) heating the organoaluminum imine to a temperature of from about 50° to about 200° C.

5,414,051

# NYLON COMPOSITIONS FEATURING IMPROVED RATES OF CRYSTALLIZATION AND METHODS FOR FORMING THE SAME

Charles D. Mason, Chatham Township, Morris County, and Nicolas Vanderkooi, Jr., Pompton Plains, both of N.J., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 77,156, Jun. 14, 1993, abandoned, which is a continuation of Ser. No. 656,377, Feb. 19, 1991, abandoned. This application Mar. 14, 1994, Ser. No. 214,055

Int. Cl.<sup>6</sup> C08L 77/00

The portion of the term of this patent subsequent to Oct. 25, 2011, has been disclaimed.

U.S. Cl. 525—432

23 Claims

1. A process for producing a polyamide molding resin composition suitable for use in extrusion molding and injection molding, comprising at least two polyamides, one of said polyamides comprising poly(tetramethylenediamine-co-adipic acid)(nylon 4,6), which process includes:

heating the polyamide molding resin composition to a temperature which is above the melting point of a first polyamide having the lower melting temperature but below the melting temperature of a second polyamide having the

higher melting temperature than the melting temperature of said first polyamide, with the proviso that at no time during the process is the temperature of the composition raised to or above the melting temperature of the polyamide having the higher melting temperature.

5,414,052

# PROCESSES FOR PREPARING TONER

Hadi K. Mahabadi; Enno E. Agur, both of Toronto, Canada; Hui Chang, Pittsford, N.Y.; Gerald R. Allison, Oakville; Michael S. Hawkins, Cambridge, both of Canada, and Joo T. Chung, Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 21, 1993, Ser. No. 64,773

Int. Cl.<sup>6</sup> C08G 63/02

U.S. Cl. 525—437

32 Claims

1. A one step process for the preparation of toner compositions consisting essentially of adding to an extruder a thermoplastic unsaturated polyester, initiator, pigment, and optional charge enhancing additive; effecting crosslinking of the unsaturated polyester in the extruder to provide a toner comprising a pigment, optional charge additive and crosslinked resin comprising linear portions and crosslinked portions; and wherein said crosslinked portions are comprised of densely crosslinked microgel particles; and wherein the extruder barrel temperature is from about 40° C. to about 250° C.; the temperature range for mixing the resin, initiator, pigment and optional charge additive in the upstream barrel sections immediately following the extruder supply port is from about the melting temperature of the unsaturated polyester to below the crosslinking temperature; the temperature range for the crosslinking reaction in the extruder barrel zones after mixing the resin, pigment, optional additive and initiator is above the unsaturated polyester melting temperature and is within about 150° C. of the unsaturated polyester melting temperature; and the rotational speed of the extruder screw ranges from about 50 to about 500 revolutions per minute; and wherein said pigment is carbon black, which is added to the extruder subsequent to the addition of unsaturated polyester, initiator, and optional charge enhancing additive, said carbon black being added at a downstream supply port located subsequent to a sixth barrel section in said extruder.

5,414,053

# THERMOFORMABLE, THERMOSETTABLE ADHESIVES PREPARED FROM EPOXY RESINS AND POLYESTERS AND/OR POLYCARBONATES

Curtis L. Volkman, Brighton, Mich., and Theodore L. Parker, Alpharetta, Ga., assignors to Essex Specialty Products, Inc., Clifton, N.J. and The Dow Chemical Company, Midland, Mich.

Filed Jun. 23, 1993, Ser. No. 81,588

Int. Cl.<sup>6</sup> C08F 20/00, 283/02; B32B 17/10, 27/38

U.S. Cl. 525—438

9 Claims

1. An adhesive composition comprising

- an aromatic polyester or aromatic polycarbonate;
- a polyepoxide
- an effective amount of an initiator or catalyst for the reaction of carbonate or ester groups in the aromatic polycarbonate or aromatic polyester with oxirane groups in the polyepoxide, and
- from about 1 to about 50 weight percent of an adhesion-enhancing material of (i) a polymeric material different from (b) having a glass transition temperature below about 50° C. that is a blend of epoxy and phenolic resin containing tetrabromobisphenol A and sulfanilimide, or an epoxy-capped polysulfide rubber, or (ii) a solution of a copolymer of an alkyl ester of an  $\alpha,\beta$ -ethylenically unsaturated carboxylic acid and a hydroxyalkyl ester of an  $\alpha,\beta$ -ethylenically unsaturated carboxylic acid, in a polyether polyol having a molecular weight of at least about 200; wherein the number ratio of oxirane groups in component (b) to the sum of the number of ester groups and twice the number





5,414,062

**METHOD FOR REDUCTION OF AQUEOUS PHASE  
POLYMER FORMATION IN SUSPENSION  
POLYMERIZATION**

Eric G. Lundquist, North Wales, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Mar. 10, 1994, Ser. No. 209,653

Int. Cl.<sup>6</sup> C08F 2/18

U.S. Cl. 526—74

4 Claims

1. A process for reducing the formation of aqueous phase polymer or buildup of polymer on reactor surfaces during suspension polymerization of unsaturated monomer that comprises:

(a) preparation of an aqueous phase containing an amount of a water-soluble peroxide compound that is effective to reduce the formation of aqueous phase polymer or buildup of polymer on reactor surfaces, wherein the water-soluble peroxide compound is selected from perborate or percarbonate compounds; and

(b) suspension polymerization of unsaturated monomer in the presence of the aqueous phase containing the water-soluble peroxide compound.

5,414,063

**PROCESS FOR THE PRODUCTION OF  
POLYPROPYLENE**

Horst K. Seeger, Yao-Ching Liu, LeVoy G. Haight, Luis A. Pagan, Kimberly R. Payne, and Jeffrey J. Vanderbilt, all of Longview, Tex., assignors to Huntsman Polypropylene Corporation, Salt Lake City, Utah

Filed Mar. 30, 1993, Ser. No. 40,049

Int. Cl.<sup>6</sup> C08F 2/34

U.S. Cl. 526—88

24 Claims

1. A process for the production of polypropylene comprising:

(I) reacting in a reactor under gas-phase fluidized bed reactor conditions about 95 to 100 mole % propylene and up to about 5 mole % of a comonomer, based on total monomer, in the presence of a catalyst system comprising;

(A) a solid catalyst component prepared by

(a) reacting in an organic solvent a suspended magnesium compound with titanium tetrachloride in the presence of an organic acid chloride to form a solid substance, containing an internal strong electron donor formed in situ, wherein said magnesium compound is of the formula

$MgQ_2-nX_n$

wherein each Q is independently selected from an alkoxide, aryloxy, or carboxylate group, X is a halogen and n=0 or 1,

(b) decanting then washing said solid substance with an organic solvent that does not dissolve said solid substance,

(c) contacting said solid substance suspended in an organic solvent, with titanium tetrachloride, and

(d) decanting then washing said solid substance with an organic solvent that does not dissolve said solid substance;

(B) cyclohexylmethyldimethoxysilane; and

(C) an organoaluminum compound of the general formula;

$R''_nAlX_3-n$

wherein R'' is an alkyl group, X is a halogen or hydrogen atom and n is an integer of 1-3, with the proviso that when n is 2 or 3, plural R'' groups may be identical or different; and

(II) introducing into the reactor an external strong electron donor, p-ethoxy ethyl benzoate.

5,414,064

**PREPARATION OF HOMOPOLYMERS OF ETHYLENE  
OR COPOLYMERS OF ETHYLENE**

Martin Lux, Dannstadt-Schauernheim; Guido Funk, Worms; Roland Salve, Ludwigshafen; Hans-Helmut Goertz, Freinheim, and Rainer Konrad, Goennheim, all of Germany, assignors to BASF Atkiengesellschaft, Ludwigshafen, Germany

Filed Jul. 14, 1994, Ser. No. 274,692

Claims priority, application Germany, Jul. 31, 1993, 43 25 824.7

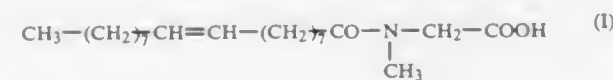
Int. Cl.<sup>6</sup> C08F 2/34

U.S. Cl. 526—215

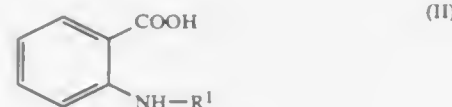
9 Claims

1. A process for the preparation of homopolymers of ethylene or copolymers of ethylene with minor amounts of other C<sub>3</sub>-C<sub>12</sub>-alk-1-enes by catalytic polymerization in a suspension or in the gas phase in the presence of an antistatic agent at from 50° to 120° C. and from 5 to 50 bar, wherein the antistatic agent used is a mixture of the following substances:

a) a metal salt of medilanic acid of the formula (I)



b) a metal salt of an anthranilic acid of the formula (II)



where the organic radical R<sup>1</sup> is either

a)  $-CO-(CH_2)_x-CH_3$  (IIIa)

or

$-CO-(CH_2)_y-CH=CH-(CH_2)_z-CH_3$  (IIIb)

and x, y and z are each an integer and are from 6 to 18 for x, from 1 to 16 for y, from 1 to 16 for z and from 4 to 17 for y+z, and

c) a polyamine obtainable by reacting epichlorohydrin and an aliphatic primary monoamine or an N-alkylalkylenediamine of the formula (IV)

$R^2NH-R^3-NH_2$  (IV),

where

R<sup>2</sup> is C<sub>8</sub>-C<sub>24</sub>-alkyl and

R<sup>3</sup> is C<sub>2</sub>-C<sub>6</sub>-alkylene.

5,414,065

**POLYMER COMPRISING FLUOROALKYL GROUP, A  
METHOD OF PREPARATION THEREOF, A SURFACE  
ACTIVE AGENT, A SURFACE TREATMENT AGENT AND  
A COATING COMPOSITION**

Hideo Sawada, Kamakura; Keiji Komoto, Tokyo; Masahiro Sano, Yokohama; Yutaka Enokida, Yokosuka; Mitani Motohiro, Tsukuba; Takeo Matsumoto, Tsukuba; Masaharu Nakayama, Tsuchiura, and Masato Okajima, Kusatsu, all of Japan, assignors to NOF Corporation, Tokyo, Japan

Division of Ser. No. 959,372, Oct. 13, 1992, Pat. No. 5,324,803.

This application Jun. 21, 1994, Ser. No. 262,981

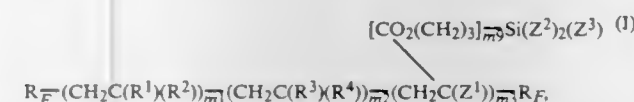
Claims priority, application Japan, Oct. 14, 1991, 3-265061; Oct. 16, 1991, 3-267728; Nov. 8, 1991, 3-293447; Nov. 11, 1991, 3-294547; Mar. 9, 1992, 4-50883; Apr. 10, 1992, 4-91280; Jul. 3, 1992, 4-177037; Jul. 16, 1992, 4-189553; Aug. 6, 1992, 4-210362; Aug. 19, 1992, 4-220298

Int. Cl.<sup>6</sup> C08F 30/08, 4/32

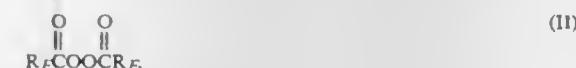
U.S. Cl. 526—279

4 Claims

1. A method of preparation of the polymer comprising fluoroalkyl group having the formula (I):



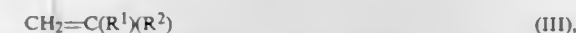
comprising reacting a fluoroalkanoxy peroxide having the formula (II):



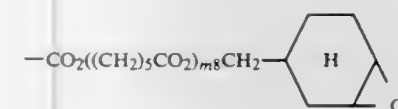
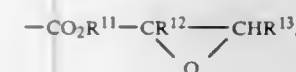
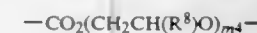
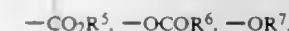
wherein R<sub>F</sub> is  $-(CF_2)_nX$  or



m<sub>1</sub> is an integer of 1 to 1000, m<sub>2</sub> and m<sub>3</sub> are respectively an integer of 0 to 3000, n<sub>1</sub> is an integer of 1 to 10, X is a fluorine atom, chlorine atom or hydrogen atom and n<sub>2</sub> is an integer of 0 to 8, R<sup>1</sup> is R<sup>1</sup> of the following formula (III), R<sup>1</sup> and R<sup>3</sup> of the formula (I) are the same or different atoms or groups, R<sup>4</sup> is R<sup>2</sup> of the following formula (III), R<sup>2</sup> and R<sup>4</sup> of the formula (I) are the same or different atoms or groups; with a monomer having the formula (III):



wherein R<sup>1</sup> is hydrogen atom, halogen atom or alkyl group having 1 to 5 carbon atoms, R<sup>2</sup> is hydrogen atom, halogen atom, cyano group, alkylsulfonic acid group having 1 to 4 carbon atoms, amidoalkylsulfonic acid group having 1 to 4 carbon atoms,



-continued



R<sup>5</sup> is hydrogen atom, alkyl group having 1 to 18 carbon atoms or hydroxyalkyl group having 3 to 6 carbon atoms, R<sup>6</sup> and R<sup>7</sup> are the same or different atoms or groups respectively selected from the group consisting of hydrogen atom, alkyl group having 1 to 18 carbon atoms and hydroxyalkyl group having 1 to 4 carbon atoms, R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> are the same or different groups respectively selected from the group consisting of hydrogen atom and methyl group, R<sup>11</sup> is alkylene group having 1 to 10 carbon atoms or  $-(CH_2CH_2O)_pCH_2-$ , R<sup>12</sup> and R<sup>13</sup> are the same or different atoms or groups respectively selected from the group consisting of hydrogen atom and alkyl group having 1 to 18 carbon atoms, R<sup>14</sup> is alkyl group having 1 to 18 carbon atoms, m<sub>4</sub> is an integer of 1 to 20, m<sub>5</sub> and m<sub>6</sub> are respectively an integer of 0 to 20, m<sub>7</sub> is 1 or 2, m<sub>8</sub> is an integer of 0 to 5, p is an integer of 1 to 10, R<sup>15</sup>, R<sup>16</sup>, R<sup>17</sup> and R<sup>18</sup> are the same or different atoms or groups respectively selected from the group consisting of hydrogen atom and methyl group, r is an integer of 0 to 2, s and t are respectively an integer of 0 to 3 and u is an integer of 1 to 5; or a monomer having the formula (IV):



wherein Z<sup>1</sup> is hydrogen atom or methyl group, Z<sup>2</sup> and Z<sup>3</sup> are groups having 1 to 10 carbon atoms respectively selected from the group consisting of alkyl group, alkoxy group and alkylcarbonyloxy group, m<sub>9</sub> is 0 or 1 and Z<sup>1</sup> is hydrogen atom when m<sub>9</sub>=0.

5,414,066

**N-HETEROCYCLIC SILANE ADHESION PROMOTERS**  
Judith Stein, Schenectady, and Mark W. Davis, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 165,625, Dec. 13, 1993, Pat. No. 5,380,788.

This application Aug. 5, 1994, Ser. No. 286,369

Int. Cl.<sup>6</sup> C08G 77/18

U.S. Cl. 528—40

2 Claims

1. 2,6 bis(trimethoxysilyltrimethyleneoxy) pyridine.

5,414,067

**PROCESS FOR REDUCING CURE TIME IN  
CYCLOALIPHATIC AMINE BASED EPOXY RESINS**  
Menas S. Vratsanos, Breinigsville, and Andrea K. Smith, Bethlehem, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 25, 1994, Ser. No. 248,786

Int. Cl.<sup>6</sup> C08G 59/44, 59/50, 65/00

U.S. Cl. 528—120

15 Claims

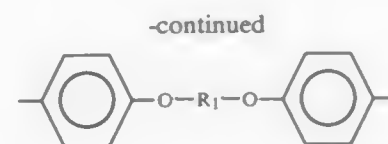
1. In a process for curing an epoxy resin by reacting a polyglycidyl ether of a polyhydric phenol with a cycloaliphatic polyamine curative wherein the ratio of polyglycidyl ether of a polyhydric phenol to polyamine curative is from 0.6-1.7 amine hydrogens per epoxide equivalent of polyglycidyl ether of a polyhydric phenol, said cure being effected at an initial cure temperature and then gradually increased to a final elevated cure temperature, the improvement for reducing the cure time without significant reduction in ultimate physical properties which comprises:

effecting an initial and partial cure of the epoxy resin at a temperature between 60° and 100° C.;

increasing the temperature of the epoxy resin at a point when the ratio of the slope of the equilibrium modulus to the initial slope of the equilibrium modulus in megapascals plotted as a function of time in minutes for the curing epoxy resin as determined by the equation:







wherein R is an hydrogen atom or CH<sub>3</sub>— and R<sub>1</sub> is defined above.

5,414,071

## HUMAN CYTOKINE IL-9

Yu-Chung Yang, Arlington; Agnes B. Ciarletta, Haverhill; Susan T. Ricciardi, Randolph, and Steven C. Clark, Winchester, all of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.

Division of Ser. No. 356,033, May 23, 1989, abandoned. This application Aug. 23, 1991, Ser. No. 750,154

Int. Cl.<sup>6</sup> C07K 3/02, 15/06, 15/14

U.S. Cl. 530—351

2 Claims

1. Purified human IL-9 having:

- (i) an apparent molecular weight under reducing conditions on SDS-PAGE of approximately 20–30 kD; and
- (ii) an amino acid sequence substantially as set forth in Table I.

5,414,072

## ANTI-OCTOPUS RHODOPSIN MONOCLONAL ANTIBODY

Tadashi Ishibashi, Kumagaya; Hiraki Kezuka, Saitama; Saeko Yoshino, Kawagoe; Norio Shimizu, Sayama; Motoyuki Tsuda, Himeji, and Shuji Imazeki, Saitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 27, 1990, Ser. No. 588,783

Claims priority, application Japan, Sep. 27, 1989, 1-249138; Feb. 28, 1990, 2-45410; May 30, 1990, 2-138209

Int. Cl.<sup>6</sup> C07K 15/28; C12N 5/20, 15/02; C12P 21/08

U.S. Cl. 530—387.9

1 Claim

1. An anti-rhodopsin monoclonal antibody which binds to octopus rhodopsin and octopus metarhodopsin, and which binds with a greater binding affinity to said octopus metarhodopsin than to said octopus rhodopsin, such that binding of said antibody to said octopus rhodopsin can be distinguished from binding of said antibody to said octopus metarhodopsin in an immunoassay, wherein said antibody binds to a site of said octopus rhodopsin or said octopus metarhodopsin without inhibiting light-induced rhodopsin-metarhodopsin interconversion of said octopus rhodopsin or said octopus metarhodopsin, and wherein said site is a polypeptide having the following amino acid sequence: Val-Ile-Gly-Arg-Pro-Met-Ala-Ala-Ser-Lys-Lys-Met-Ser.

5,414,073

## PRADIMIC ACIDS, AMIDES, AND NOVEL PRADIMICIN DERIVATIVES

Satsuki Okuyama, Hachioji; Takaaki Okita, Tokyo, and Hajime Kamachi, Urayasu, all of Japan, assignors to Bristol-Myers Squibb, New York, N.Y.

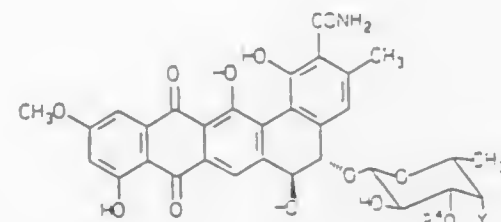
Continuation of Ser. No. 214,909, Mar. 17, 1994, abandoned, which is a division of Ser. No. 914,908, Jul. 16, 1992, Pat. No. 5,326,867. This application Aug. 3, 1994, Ser. No. 285,327

Int. Cl.<sup>6</sup> A61K 31/70; C07H 15/24

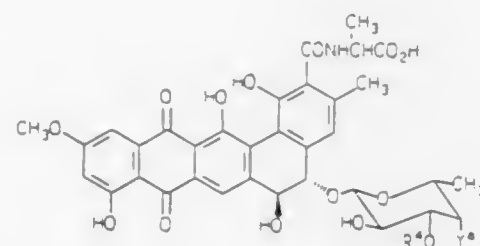
U.S. Cl. 536—18.5

3 Claims

1. A process for the preparation of a compound having the formula



wherein Y is OH or NR<sup>2</sup>R<sup>3</sup>; R<sup>2</sup> is hydrogen or methyl; R<sup>3</sup> is hydrogen, C<sub>1-5</sub> alkyl, or an amino protecting group; R<sup>4</sup> is hydrogen, hydroxy protecting group, or β-D-xylosyl; which comprises (a) treating a compound having the formula



wherein Y<sup>a</sup> is OH or NR<sup>2a</sup>R<sup>3a</sup>; R<sup>2a</sup> is hydrogen or methyl, R<sup>3a</sup> is C<sub>1-5</sub> alkyl or an amino protecting group with the proviso that when R<sup>2a</sup> is hydrogen R<sup>3a</sup> is an amino protecting group; and R<sup>4</sup> is hydrogen, β-D-xylosyl or a hydroxy protecting group; with diphenylphosphoryl azide in the presence of a base; (b) treating the product formed in step (a) with alkaline aqueous alcohol; (c) hydrolyzing the product formed in step (b) under acidic conditions; and (d) optionally replacing the protecting groups with hydrogen.

5,414,074

## SYNTHESIS OF C-GLYCOSYLATED COMPOUNDS WITH THE USE OF A MILD, IODINE-CATALYZED REACTION

Masato Koreeda, and Todd A. Houston, both of Ann Arbor, Mich., assignors to University of Michigan, Ann Arbor, Mich.

Filed Sep. 25, 1992, Ser. No. 951,529

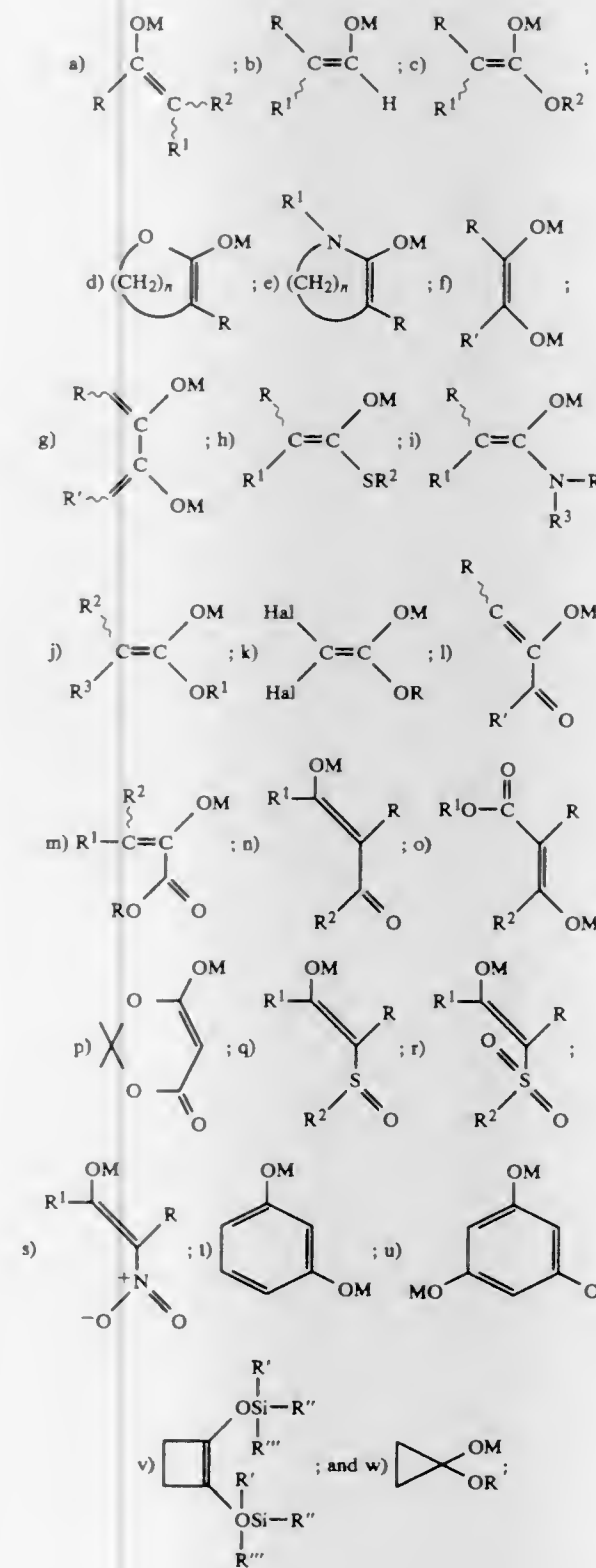
Int. Cl.<sup>6</sup> C07H 1/00, 15/04; C07G 3/00

U.S. Cl. 536—18.6

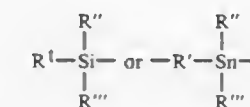
4 Claims

1. A process for preparing C-glycoside compounds comprising reacting a soft carbon nucleophile and a glycol selected from acylated, carbonated and thionocarbonated five- and six-membered glycols in the presence of a catalytic amount of iodine to provide a reaction mixture containing the corresponding C-1α and C-1β glycosylated C-glycoside epimers, isolating at least one or both of said α and β epimers stereoselectively from said mixture, and optionally removing one or more acyl groups from said epimer products, wherein the soft carbon nucleophile comprises a compound or a moiety se-

lected from members of the group consisting of enolate derivatives having the formulas a) to w)



and allyl, vinyl, alkynyl and propargyl silanes and stannanes, arid MCN; wherein M represents



R, R<sup>1</sup> and R<sup>2</sup> are independently selected from alkyl, aryl, alkenyl and alkynyl, n is from 1 to 5, Hal is a halogen atom, and R', R'' and R''' are independently selected from lower alkyl groups.

5,414,075

## RESTRAINED MULTIFUNCTIONAL REAGENT FOR SURFACE MODIFICATION

Dale G. Swan, St. Louis Park, and Charles A. Hastings, Hopkins, both of Minn., assignors to BSI Corporation, Eden Prairie, Minn.

Filed Nov. 6, 1992, Ser. No. 972,533

Int. Cl.<sup>6</sup> C07C 49/00; C12N 11/00

U.S. Cl. 568—333

20 Claims

1. A restrained, multifunctional reagent selected from the group consisting of the tetrakis (4-benzoylbenzyl ether) and the tetrakis (4-benzoylbenzoate ester) of pentaerythritol.

5,414,076

## DNA ENCODING GIBBON APE LEUKEMIA VIRUS RECEPTOR

Bryan M. O'Hara, Pearl River, N.Y., assignor to American Cyanamid Company, Wayne, N.J.

Continuation-in-part of Ser. No. 398,351, Aug. 24, 1989, abandoned. This application Mar. 25, 1991, Ser. No. 674,287

Int. Cl.<sup>6</sup> C07H 15/12; C07K 15/00

U.S. Cl. 536—23.5

2 Claims

1. The purified isolated DNA sequence encoding for GALV receptor protein defined in SEQ. I.D. NO. 1 or 3.

5,414,077

## NON-NUCLEOSIDE LINKERS FOR CONVENIENT ATTACHMENT OF LABELS TO OLIGONUCLEOTIDES USING STANDARD SYNTHETIC METHODS

Kuei-Ying Lin, Fremont, and Mark Matteucci, Burlingame, both of Calif., assignors to Glend Sciences, Foster City, Calif.

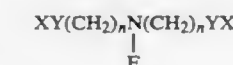
Continuation of Ser. No. 594,147, Oct. 9, 1990, abandoned, which is a continuation-in-part of Ser. No. 482,943, Feb. 20, 1990, abandoned. This application May 2, 1994, Ser. No. 237,233

Int. Cl.<sup>6</sup> C07H 21/04

U.S. Cl. 536—24.3

9 Claims

1. A compound of the formula



wherein n is an integer of 1 to 10; each Y is independently O or S; and wherein one X is selected from the group consisting of a nucleoside, a nucleotide, an oligonucleotide, an activated nucleotide synthesis coupling moiety and a solid support linked to Y and the other X is selected from the group consisting of H PO<sub>3</sub><sup>2-</sup>, a protecting group, a nucleoside, a nucleotide, and an oligonucleotide; and wherein F is a functional group capable of linking an additional moiety or a functional group and said additional moiety linked thereto, wherein said additional moiety is selected from the group consisting of a reporter group, an oligonucleotide cleavage entity, an oligonucleotide binding agent, a membrane penetration enhancer, an oligonucleotide crosslinking agent and a protecting group.



5,414,078

# PREPARATION OF 3'-SUBSTITUTED-2',3'-DIDEOXYNUCLEOSIDES AND 2'-DIDEOXYNUCLEOSIDES FROM ACYCLIC, ACHIRAL PRECURSORS

Dennis C. Liotta, Stone Mountain, and Michael W. Hager, Atlanta, both of Ga., assignors to Emory University, Atlanta, Ga.

Filed Apr. 5, 1991, Ser. No. 681,109

Int. Cl.<sup>6</sup> C07H 1/00

U.S. Cl. 536—26.71

33 Claims

1. A process for preparing a 3'-substituted-2',3'-dideoxynucleoside or a 2'-dideoxynucleoside comprising:

- (i) preparing a 5-(protected)oxy-5-(heterocyclic base)-3(S)-substituted-1,2-(S)-pentanediol from a 5,5-di(protected)-oxy-2E-pentene-1-ol by epoxidizing the 5,5-di(protected)-oxy-2E-pentene-1-ol to the corresponding 2(S),3(R)-epoxy alcohol and reacting the epoxy alcohol with a nucleophile; and
- (ii) cyclizing the product of step (i) to a 3'-α-substituted-2',3'-dideoxy-β-anomeric nucleoside or a 2'-dideoxynucleoside under kinetic conditions in the presence of a protic acid or Lewis acid.

5,414,079

# OXIDIZED CELLULOSE

Gilbert S. Banker, Iowa, and Vijay Kumar, Coralville, both of Iowa, assignors to Biocontrol Incorporated, Iowa City, Iowa

Filed Aug. 3, 1993, Ser. No. 101,184

Int. Cl.<sup>6</sup> C08B 11/00

U.S. Cl. 536—56

21 Claims

1. A method of oxidizing a cellulose material into an oxidized cellulose product, comprising:

- treating the cellulose material with a hypochlorite solution having an active chlorine content of between about 4 and about 6%, at a pH exceeding 9.5 and at a temperature, and for a time, effective to convert the cellulose material into the oxidized cellulose product;
- filtering the oxidized cellulose product; and
- washing the oxidized cellulose product to remove chlorine and to raise the oxidized cellulose product to a neutral pH.

5,414,080

# PORPHYRIN-METALLIC COMPLEX INTERCALATED LAYERED DOUBLE HYDROXIDES

Thomas J. Pinnavaia, East Lansing, Mich.; Elena M. Perez-Bernal; Ricardo Ruano-Casero, both of Salamanca, Spain, and Malama Chibwe, East Lansing, Mich., assignors to Board of Trustees operating Michigan State University, East Lansing, Mich.

Division of Ser. No. 981,603, Nov. 25, 1992, Pat. No. 5,302,709. This application Jan. 25, 1994, Ser. No. 186,111

Int. Cl.<sup>6</sup> C09B 47/00

U.S. Cl. 540—145

9 Claims

1. A crystalline layered double hydroxide (LDH) metal complex which comprises:



as a spaced apart hydroxide host layers wherein  $M^{II}$  is a divalent metal cation,  $M^{III}$  is a trivalent metal cation, and  $A^{n-}$  is an intercalated anionic porphyrin metal complex with a disc-like shape which is approximately orthogonal to a plane of the spaced apart hydroxide host layers which have a basal spacing greater than approximately 18 Å and x is between about 0.17 and 0.37, n is the charge on A, and y is a positive number, representing bound  $H_2O$ , wherein the metal in the porphyrin is selected from the group consisting of a Group VII-B metal, metals from a cobalt and iron triads of Group VIII and mixtures thereof.

5,414,081

# PROCESS FOR PREPARING β-LACTAM DERIVATIVE AND SYNTHETIC INTERMEDIATE THEREOF

Hiroshi Horikawa, Kawanishi; Kazuhiko Kondo, Osaka, and Tameo Iwasaki, Nishinomiya, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Feb. 17, 1993, Ser. No. 18,407

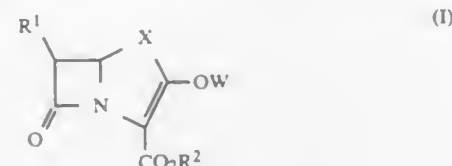
Claims priority, application Japan, Mar. 6, 1992, 4-099023

Int. Cl.<sup>6</sup> C07D 487/04

U.S. Cl. 540—302

14 Claims

1. A process for preparing a β-lactam compound represented by the formula:



wherein:

$R^1$  represents

a hydroxy-substituted lower alkyl group which may be protected by a group selected from the group consisting of a lower alkoxy carbonyl group, a halogeno lower alkoxy carbonyl group, a phenyl lower alkyl group which may be substituted by a nitro group or a lower alkoxy group, a tri-lower alkylsilyl group, and a phenyl lower alkoxy carbonyl group which may be substituted by a nitro group or a lower alkoxy group, or

an amino group which may be protected by a group selected from the group consisting of a lower alkanoyl group, a lower alkoxy carbonyl group, a benzoyl group, a benzenesulfonyl group, a phenyl lower alkoxy carbonyl group, a tri-lower alkylsilyl group and a trityl group;

$R^2$  represents a hydrogen atom, a group of the formula  $-Q-OCOR$ ,  $-Q-OCO_2R$  or  $-Q-O-R$

wherein Q represents a lower alkylene group, and R represents a lower alkyl group, a cycloalkyl group of 3 to 8 carbon atoms, a lower alkenyl group, a lower alkoxy lower alkyl group, or a lower alkanoyloxy lower alkyl group,

a lower alkyl group, a lower alkenyl group, a halogeno lower alkyl group, a nitrobenzyl group or a lower alkoxybenzhydryl group;

X represents a methylene group

substituted by a lower alkyl group; and

W represents an active ester residue of a hydroxyl group, said active ester group residue being selected from the group consisting of

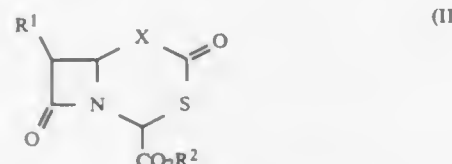
a di-lower alkylphosphoryl group or a diphenylphosphoryl group of the formula:  $-P(O)(OR^0)_2$  wherein  $R^0$  represents a lower alkyl group or a phenyl group;

a lower alkylsulfonyl group, which may be trifluoro-substituted; and

a phenylsulfonyl group, which may be p-methoxy-substituted,

or an alkali metal salt of said compound, consisting essentially of the steps of:

treating a 1-aza-3-thia-bicycloalkane compound represented by the formula:



where  $R^1$ ,  $R^2$  and X have the same meanings as defined

above, or an alkali metal salt thereof, with a base in the presence of a desulfurizing agent selected from the group consisting of a triphenylphosphine, a tri(lower alkyl)-phosphite, a tri-lower alkylphosphine, tris(di-lower alkylamino)phosphite and bis(di-lower alkylamino-lower alkyl)phosphite, and then

reacting the resulting compound with an active esterifying agent corresponding to the above defined active ester residue of a hydroxyl group.

5,414,082

# METHOD FOR PRODUCING 1-UNSUBSTITUTED 3-AMINOPYRROLES

Andreas Rolfs; Jüriger Liebscher, both of Berlin; Klaus Unverferth, Dresden, and Gottfried Faust, Radebeul, all of Germany, assignors to Arzneimittelwerk Dresden GmbH, Radebeul, Germany

Filed Aug. 11, 1993, Ser. No. 104,795

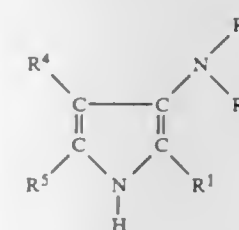
Claims priority, application Germany, Aug. 20, 1992, 42 27 479.6

Int. Cl.<sup>6</sup> C07D 207/34

U.S. Cl. 544—60

4 Claims

1. A process for producing a 1-unsubstituted 3-aminopyrrole of Formula (I)



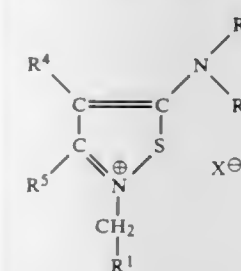
wherein

$R^1$  is hydrogen, alkyl, alkenyl, aryl, heteroaryl, nitro, cyano, acyl, alkoxy carbonyl, amino, carbonyl, aryloxy carbonyl, or a sulfonyl residue;

$R^2$  and  $R^3$  can be the same or different, hydrogen, aryl, or alkyl residue which are optionally substituted by hetero atoms, or

$R^2$  and  $R^3$  can form together an alkyl bridge which optionally contains or is optionally substituted with a hetero atom optionally containing nitrogen, oxygen, or sulfur; and

$R^4$  and  $R^5$  can be the same or different, hydrogen, alkoxy carbonyl, aminocarbonyl, aminothiocarbonyl, substituted or unsubstituted alkyl, aryl, or heteroaryl residue, by transforming the ring, optionally in the presence of a base, of a corresponding 1,2-thiazolium salt of Formula (II)



wherein  $R^1$ , and  $R^2$ ,  $R^3$ , and respectively  $R^2/R^3$ ,  $R^4$ , and  $R^5$  have the aforementioned meanings, and wherein  $X^-$  is an acid residue.

5,414,083

# METHOD FOR THE PRODUCTION OF N-CYCLIC AND N,N'-DICYCLIC UREAS AND THEIR USE AS CHEMICAL SOLVENTS

Kurt A. Hackl; Markus Rössler; Martin Müllner, all of Linz, and Gerhard Stern, Sonnberg, all of Austria, assignors to Chemie Linz Gesellschaft m.b.H., Linz, Austria

Filed Jan. 24, 1994, Ser. No. 185,246

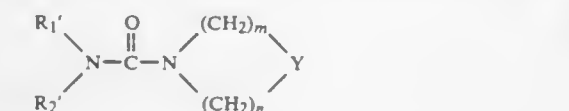
Claims priority, application Austria, Jan. 22, 1993, 9493

Int. Cl.<sup>6</sup> C07D 413/02, 401/02, 403/02, 211/02

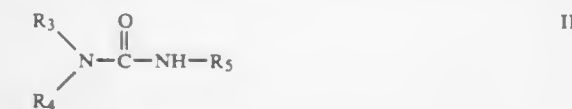
U.S. Cl. 544—130

5 Claims

1. A method for the production of ureas of the formula:

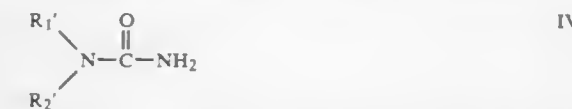


in which Y represents a methylene group or an oxygen atom, m and n representing independently of one another the numbers 1 to 3, whereby n plus m represent the numbers 3 or 4,  $R_1'$  and  $R_2'$  independently of one another denote a straight-chain, branched or cyclic alkyl group having 1 to 22 C atoms, which is unsubstituted or substituted by fluorine atoms; nitro groups; alkenyl- or alkylidene groups having 2 to 6 C atoms; phenyl groups which are unsubstituted or substituted by fluorine atoms, nitro groups, alkyl groups having 1 to 5 C atoms, alkoxy groups having 1 to 5 C atoms or phenoxy groups; benzyl or phenylethyl groups which are unsubstituted or substituted by fluorine atoms, nitro groups, alkyl groups having 1 to 5 atoms, alkoxy groups having 1 to 5 C atoms or phenoxy groups; which are unsubstituted or substituted by fluorine atoms, nitro groups, alkyl groups having 1 to 5 atoms, alkoxy groups having 1 to 5 C atoms or phenoxy groups; or, together with the nitrogen atom, a five or six-member non-aromatic ring which can be broken by an oxygen or sulphur atom;  $R_1'$  additionally represents hydrogen, or  $R_1'$  represents hydrogen and  $R_2'$  represents a group of the formula:

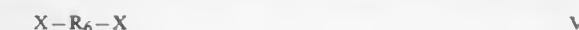


in which  $R_3$  and  $R_4$  have the meanings of  $R_1'$  and  $R_2'$  as described above, whereby  $R_3$  and  $R_4$  additionally represent hydrogen, and  $R_5$  represents an alkylene group with 2 to 20 C atoms or an alkylene phenylene alkylene group, in which the alkylene groups independently of one another have 1 to 3 C atoms,

comprising reacting a urea or a bis urea of the formula:



in which  $R_1'$  and  $R_2'$  have the meaning as described above in the presence of a solid base and a phase-transfer catalyst in a diluting agent which is inert under reaction conditions at temperatures of 0° to 150° C. with a compound of the formula:



in which  $R_6$  represents a straight-chain alkylene group with 4 or 5 C atoms in which the C atom can be replaced in the 2 or 3 position by an oxygen or sulphur atom, and X represents a halogen, sulphonic acid, or hydrogen sulphate leaving group, whereby the  $-NH_2$  group of the urea of the formula IV is dialkylated by elimination of both hydrogen atoms through the

compound of the formula V by elimination of the X leaving groups through ring closure.

5,414,084

# PROCESS FOR THE PREPARATION OF SULFONYLUREAS

Lothar Willms, Hilscheld; Stephen Lachbain, Hofheim am Taunus; Günter Schlegel, Liederbach, and Heinz Kehne, Hofheim am Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

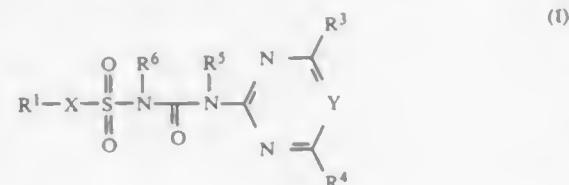
Filed Mar. 5, 1992, Ser. No. 846,553

Claims priority, application Germany, Mar. 7, 1991, 41 07 326.6

Int. Cl.<sup>6</sup> C07D 239/42, 239/47, 251/46, 25/52

U.S. Cl. 544—194 6 Claims

1. A process for the preparation of a compound of the formula (I) or a salt thereof,



in which

X is —O—NR<sup>2</sup>— or SO<sub>2</sub>—NR<sup>2</sup>—, the O or SO<sub>2</sub> of the two last-mentioned divalent groups being directly bound to R<sup>1</sup>,

Y is nitrogen or CH,

R<sup>1</sup> is (C<sub>1</sub>–C<sub>6</sub>)-alkyl, (C<sub>2</sub>–C<sub>6</sub>)-alkenyl or (C<sub>2</sub>–C<sub>6</sub>)-alkynyl, each of said 3 radicals being unsubstituted or mono- or polysubstituted by radicals selected from the group comprising halogen, (C<sub>1</sub>–C<sub>4</sub>)-alkoxy and (C<sub>1</sub>–C<sub>4</sub>)-alkoxycarbonyl,

R<sup>2</sup> is hydrogen, (C<sub>1</sub>–C<sub>6</sub>)-alkyl, (C<sub>2</sub>–C<sub>6</sub>)-alkenyl, (C<sub>2</sub>–C<sub>6</sub>)-alkynyl or (C<sub>3</sub>–C<sub>6</sub>)-cycloalkyl,

R<sup>3</sup>, R<sup>4</sup> are, independently of each other, hydrogen, (C<sub>1</sub>–C<sub>4</sub>)-alkyl or (C<sub>1</sub>–C<sub>4</sub>)-alkoxy, each of the last-mentioned two radicals being unsubstituted or mono- or polysubstituted by radicals selected from the group comprising halogen, alkoxy and alkylthio, or halogen, (C<sub>1</sub>–C<sub>4</sub>)-alkylthio, (C<sub>1</sub>–C<sub>4</sub>)-alkylamino or di-[(C<sub>1</sub>–C<sub>4</sub>)-alkyl]amino and

R<sup>5</sup>, R<sup>6</sup> are, independently of each other, hydrogen or (C<sub>1</sub>–C<sub>4</sub>)-alkyl, or their physiologically tolerated salts with acids, or, where at least one of the R<sup>5</sup> and R<sup>6</sup> radicals is hydrogen, with bases, which comprises reacting compounds of the formula II,



in which R<sup>1</sup>, R<sup>6</sup> and X are defined as in formula I with compounds of the formula III,



in which R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup> and Y are defined as in formula I.

## 5,414,085 BARBITURATE DERIVATIVES AND PROTEIN AND POLYPEPTIDE BARBITURATE DERIVATIVE CONJUGATES AND LABELS

Kenneth F. Buechler, San Diego, Calif., assignor to Biosite Diagnostics, Inc., San Diego, Calif.

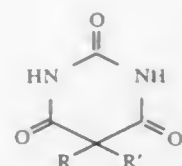
Filed Apr. 6, 1992, Ser. No. 864,110

Int. Cl.<sup>6</sup> C07D 239/62, 409/12

U.S. Cl. 544—300

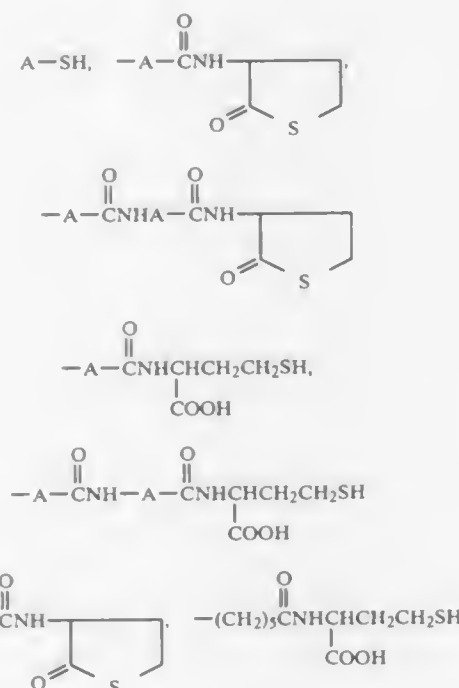
2 Claims

1. Compounds of the formula:



where R is hydrogen, a saturated or unsaturated aliphatic group of from 1 to 10 carbons, either branched or straight chain, or an aryl group;

where R' is a linking group comprising one of the following:



where A is a linking hydrocarbyl group of from 1 to 20 carbon atoms and 0 to 10 heteroatoms selected from the group consisting of nitrogen, oxygen, and sulfur, which may be positioned either in a chain or substituted on the chain, except in A—SH where A is not methylene, ethylene, propylene, butylene, or pentylene when R is —CH<sub>2</sub>—CH<sub>2</sub>SH, 2-butenyl or isopentyl.

5,414,086

# PREPARATION OF 4-METHYLPYRIMIDINES

Stefan Rittinger, Ludwigshafen, and Norbert Rieber, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Feb. 22, 1994, Ser. No. 199,452

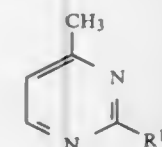
Claims priority, application Germany, Mar. 13, 1993, 43 08 073.1

Int. Cl.<sup>6</sup> C07D 239/26, 239/34, 239/38, 239/42

U.S. Cl. 544—315

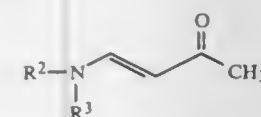
8 Claims

1. A process for the preparation of a 4-methylpyrimidine of the formula



in which R<sup>1</sup> is C<sub>1</sub>–C<sub>20</sub>-alkyl, C<sub>3</sub>–C<sub>8</sub>-cycloalkyl, phenyl, naphthyl, C<sub>7</sub>–C<sub>12</sub>-phenalkyl, C<sub>7</sub>–C<sub>12</sub>-alkylphenyl, NH<sub>2</sub>, NHCN, OH or SH,

which comprises reacting a 1-aminovinyl methyl ketone of the formula



in which each of R<sup>2</sup> and R<sup>3</sup>, when taken individually, is C<sub>1</sub>–C<sub>20</sub>-alkyl, C<sub>3</sub>–C<sub>8</sub>-cycloalkyl, phenyl, naphthyl, C<sub>7</sub>–C<sub>12</sub>-phenalkyl, or C<sub>7</sub>–C<sub>12</sub>-alkylphenyl, or in which R<sup>2</sup> and R<sup>3</sup>, when taken together form a C<sub>2</sub>–C<sub>7</sub>-alkylene chain optionally mono- to tetra-substituted by C<sub>1</sub>–C<sub>4</sub>-alkyl and optionally interrupted by a single oxygen, nitrogen or sulfur atom, with a carboxamide or amidine, including a salt thereof, of the formula



in which R<sup>1</sup> has the aforementioned meanings and X is oxygen or NH, at a temperature of from 20° to 200° C. and a pressure of from 0.01 to 50 bar.

5,414,087

# PREPARATION OF N-ALKYLPYPERAZINES

George P. Speranza, and James H. Templeton, both of Austin, Tex., assignors to Huntsman Corporation, Salt Lake City, Utah

Filed Jul. 7, 1993, Ser. No. 87,093

Int. Cl.<sup>6</sup> C07D 295/03

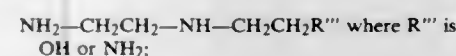
U.S. Cl. 544—404

7 Claims

1. A one-step method for preparing N-alkylpiperazines, eliminating the need for the initial preparation and isolation of piperazine, comprising reacting a carbonyl compound of the formula:



where R'' and R' are an alkyl group or H; and an amine of the formula:



in the presence of hydrogen over a metal hydrogenation catalyst consisting essentially of nickel, copper and chromium.

5,414,088

# 2-BICYCLOBENZIMIDAZOLES, PROCESSES FOR THEIR PREPARATION AND MEDICAMENTS CONTAINING THESE COMPOUNDS

Wolfgang Von Der Saal, Weinheim; Harald Zilch, Mannheim, and Erwin Böhm, Ladenburg, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

PCT No. PCT/EP90/01663, § 371 Date Apr. 14, 1992, § 102(e) Date Apr. 14, 1992, PCT Pub. No. WO91/04974, PCT Pub. Date Apr. 18, 1991

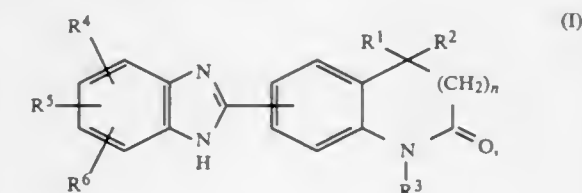
PCT Filed Sep. 4, 1990, Ser. No. 847,060

Int. Cl.<sup>6</sup> C07D 215/227, 235/18; A61K 31/415, 31/47

U.S. Cl. 546—158

13 Claims

1. Bicyclobenzimidazoles of formula I



wherein

R<sup>1</sup> is hydrogen, C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>2</sub>–C<sub>6</sub>-alkenyl or C<sub>3</sub>–C<sub>7</sub>-cycloalkyl,

R<sup>2</sup> is C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>2</sub>–C<sub>6</sub>-alkenyl, cyano, carboxy, C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>1</sub>–C<sub>6</sub>-alkoxy, amino, C<sub>1</sub>–C<sub>6</sub>-alkylamino, di-C<sub>1</sub>–C<sub>6</sub>-alkylamino or hydrazino or

R<sup>1</sup> and R<sup>2</sup> together form a C<sub>2</sub>–C<sub>6</sub>-alkylidene or C<sub>3</sub>–C<sub>6</sub>-cycloalkylidene or

R<sup>1</sup> and R<sup>2</sup>, together with the carbon atoms to which they are attached, form a C<sub>3</sub>–C<sub>7</sub>-spirocycle, n is 1, R<sup>3</sup> is hydrogen, C<sub>1</sub>–C<sub>8</sub>-alkyl, C<sub>2</sub>–C<sub>6</sub>-alkenyl, C<sub>2</sub>–C<sub>6</sub>-alkynyl, C<sub>3</sub>–C<sub>7</sub>-cycloalkyl, benzyl, carboxy-C<sub>1</sub>–C<sub>6</sub>-alkyl, C<sub>1</sub>–C<sub>6</sub>-alkyloxycarbonyl-C<sub>1</sub>–C<sub>6</sub>-alkyl or di-C<sub>1</sub>–C<sub>6</sub>-alkyloxophosphinylmethyl,

R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> are the same or different and are hydrogen, a C<sub>1</sub>–C<sub>7</sub>-alkanesulphonyloxy, trifluoromethanesulphonyloxy, C<sub>1</sub>–C<sub>7</sub>-alkanesulphonyl-amino, trifluoromethanesulphonylamino, N-C<sub>1</sub>–C<sub>7</sub>-alkyl-C<sub>1</sub>–C<sub>7</sub>-alkanesulphonylamino, N-C<sub>1</sub>–C<sub>7</sub>-alkyl-trifluoromethanesulphonylamino, phenylsulphonylamino, C<sub>1</sub>–C<sub>7</sub>-alkylsulphenylmethyl, C<sub>1</sub>–C<sub>7</sub>-alkylsulphenylmethyl, C<sub>1</sub>–C<sub>7</sub>-alkylsulphenylmethyl, carboxy, C<sub>1</sub>–C<sub>7</sub>-alkoxy, C<sub>1</sub>–C<sub>7</sub>-alkyl, amino, C<sub>1</sub>–C<sub>7</sub>-alkylamino, di-C<sub>1</sub>–C<sub>7</sub>-alkylamino, sulphonyl, C<sub>1</sub>–C<sub>7</sub>-alkylamino, di-C<sub>1</sub>–C<sub>7</sub>-alkylamino, morpholino, thiomorpholino, pyrrolidino, piperidino, hexamethyleneimino, C<sub>1</sub>–C<sub>7</sub>-alkylcarbonylamino C<sub>1</sub>–C<sub>7</sub>-alkylcarbonyloxy, aminocarbonylamino, C<sub>1</sub>–C<sub>7</sub>-alkylaminocarbonylamino, C<sub>1</sub>–C<sub>7</sub>-alkyl-mercapto, C<sub>1</sub>–C<sub>7</sub>-alkylsulphonyl, C<sub>1</sub>–C<sub>7</sub>-alkylsulphonyl, nitro, amino, hydroxyl, benzyloxy, C<sub>1</sub>–C<sub>7</sub>-alkoxy, C<sub>1</sub>–C<sub>7</sub>-alkyl, C<sub>2</sub>–C<sub>7</sub>-alkenyl, C<sub>2</sub>–C<sub>7</sub>-alkenyloxy, C<sub>2</sub>–C<sub>7</sub>-alkynyloxy, cyano-C<sub>1</sub>–C<sub>7</sub>-alkoxy, carboxy-C<sub>1</sub>–C<sub>7</sub>-alkoxy, phenyl-C<sub>1</sub>–C<sub>7</sub>-alkoxy, C<sub>1</sub>–C<sub>7</sub>-alkoxycarbonyl, C<sub>1</sub>–C<sub>7</sub>-alkoxy, C<sub>1</sub>–C<sub>7</sub>-alkylamino, di-C<sub>1</sub>–C<sub>7</sub>-alkylamino, trifluoromethyl, cyano, halogen or imidazolyl and

when n=1 the benzimidazole ring is attached in the 5-, 7-, 8-position or, if R<sup>3</sup> is not hydrogen, further in the 6-position of the 1,2,3,4-tetrahydroquinolin-2-one, or their physiologically compatible salts and optical isomers.



5,414,089

## LONG CHAIN CARBOXYLIC ACID IMIDE ESTER

Iwao Ebashi; Tetsuo Takigawa, both of Kurashiki, and Masayasu Inoue, Kumamoto, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Division of Ser. No. 872,534, Apr. 23, 1992, Pat. No. 5,336,782.

This application Aug. 16, 1993, Ser. No. 106,644

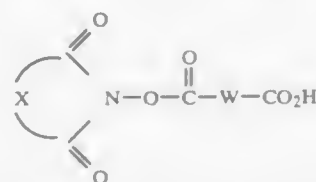
Claims priority, application Japan, Apr. 24, 1991, 3-122737

Int. Cl.<sup>6</sup> C07D 207/46, 211/94

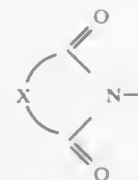
U.S. Cl. 546—243

31 Claims

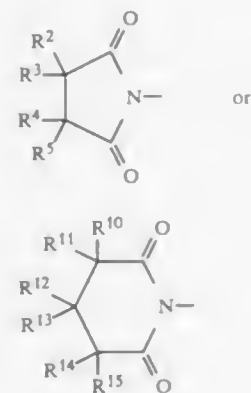
15. A compound of the formula



or a salt thereof, wherein W is a divalent long chain hydrocarbon radical interrupted by one or more groups each independently selected from the group consisting of an oxygen atom, a sulfur atom and an —N(R<sup>1</sup>)— group wherein R<sup>1</sup> is lower alkyl, said radical W having from 8 to 28 principal chain atoms; and



is a radical of the formula



wherein each of R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup>, which can be the same or different, is a hydrogen atom; an alkyl radical; an aryl radical; an aralkyl radical; an —SO<sub>3</sub>H group; a radical of the formula —OR<sup>6</sup> wherein R<sup>6</sup> is selected from the group consisting of a hydrogen atom, an alkyl radical, an aryl radical, an aralkyl radical and an acyl radical; a radical of the formula —NR<sup>7</sup>R<sup>8</sup> wherein each of R<sup>7</sup> and R<sup>8</sup>, which can be the same or different, is selected from the group consisting of an alkyl radical, an aryl radical, an aralkyl radical and an acyl radical; or a radical of the formula —CO<sub>2</sub>R<sup>9</sup> wherein R<sup>9</sup> is selected from the group consisting of a hydrogen atom, an alkyl radical, an aryl radical and an aralkyl radical; or R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> can, in combination with the carbon atoms to which they bond, form a benzene, cyclohexane, cyclopentane, bicyclo [2.2.1]heptane, bicyclo [2.2.1]hepta-2-ene, 7-oxabicyclo[2.2.1]heptane or 7-oxabicyclo[2.2.1]hepta-2-ene ring system which is optionally substituted by —SO<sub>3</sub>H, —CO<sub>2</sub>H, —OH, F, Cl, Br, I, —CH<sub>3</sub> or —OCH<sub>3</sub>; or R<sup>2</sup> and R<sup>3</sup> and/or R<sup>4</sup> and R<sup>5</sup>, in combination, can be a methylene or isopropylidene group; and each of R<sup>10</sup>, R<sup>11</sup>,

R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup> and R<sup>15</sup>, which can be the same or different, is a hydrogen atom; an alkyl radical; an aryl radical; an aralkyl radical; an —SO<sub>3</sub>H group; a radical of the formula —OR<sup>6</sup> wherein R<sup>6</sup> is selected from the group consisting of a hydrogen atom, an alkyl radical, an aryl radical, an aralkyl radical and an acyl radical; a radical of the formula —NR<sup>7</sup>R<sup>8</sup> wherein each of R<sup>7</sup> and R<sup>8</sup>, which can be the same or different, is selected from the group consisting of an alkyl radical, an aryl radical, an aralkyl radical and an acyl radical; or a radical of the formula —CO<sub>2</sub>R<sup>9</sup> wherein R<sup>9</sup> is selected from the group consisting of a hydrogen atom, an alkyl radical, an aryl radical or an aralkyl radical.

5,414,090

## LUBRICANT ASHLESS ANTIWEAR-ANTIOXIDANT ADDITIVE

Doris Love, Fishkill; Julian H. Dancy, Poughkeepsie, and Jayne M. Lucas, Campbell Hall, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

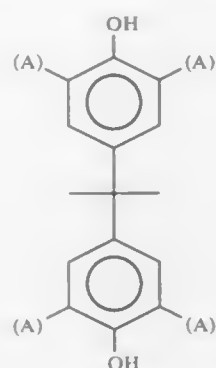
Filed Nov. 2, 1993, Ser. No. 144,376

Int. Cl.<sup>6</sup> C07D 285/12; C10M 135/36

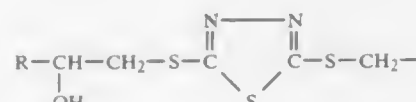
U.S. Cl. 548—142

19 Claims

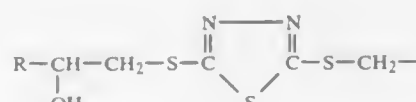
1. An adduct of 2,5-dimercapto-1,2,4-thiadiazole represented by the formula:



wherein A is H or



and at least one A is



and R is H or a (C<sub>1</sub>-C<sub>30</sub>) alkyl group.

5,414,091

## DYE-PROVIDING COMPOUNDS

Eftihmios Chinoporos, Cambridge; Robert H. Pauze, Middleboro; David P. Waller, Lexington, and David C. Whittenour, Franklin, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

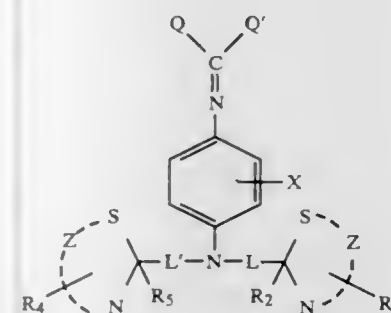
Division of Ser. No. 58,494, May 6, 1993, Pat. No. 5,340,689, which is a continuation-in-part of Ser. No. 923,843, Jul. 31, 1992, Pat. No. 5,316,887. This application May 23, 1994, Ser. No. 247,877

Int. Cl.<sup>6</sup> C07D 277/60, 249/08; C08F 28/06

U.S. Cl. 548—214

12 Claims

1. A compound represented by the formula:



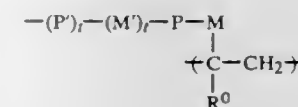
wherein:

Q, Q' and C taken together represent a dye forming coupler moiety wherein C is the coupling carbon of said coupler moiety;

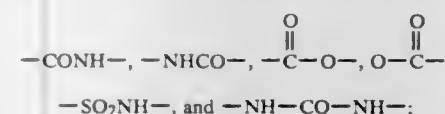
X is selected from hydrogen, branched or unbranched alkyl, substituted alkyl, alkoxy, aryl, alkaryl, carboxy, amido, sulfamyl, sulfonamido, halo, nitro, and cyano;

R<sub>2</sub> and R<sub>3</sub>, the same or different, represent hydrogen, a monovalent organic radical or together with L or L' represent the atoms necessary to complete a spiro union with one of the cyclic 1,2-sulfur-nitrogen moieties, or R<sub>2</sub> together with R<sub>5</sub> represents the atoms necessary to complete a 5, 6 or 7-membered heterocyclic ring with L', N and L;

R<sub>3</sub> and R<sub>4</sub>, the same or different, are selected from the group consisting of: hydrogen, alkyl, aralkyl, alkaryl, and a polymer residue represented by the formula



wherein R<sup>0</sup> represents hydrogen or lower alkyl containing 1 to 6 carbon atoms; M and M', the same or different, each represent a divalent linking group selected from the group consisting of



P and P', the same or different, each represent a divalent hydrocarbon group containing at least two carbon atoms; and t is 0 or 1;

L and L' represent divalent organic linking groups, the same or different, each containing at least two carbon atoms, provided that when one of L and L' contains 2 carbon atoms, the other contains at least 3 carbon atoms; and, Z and Z', the same or different, represent the carbon atoms necessary to complete an unsubstituted or substituted 5- or 6-membered heterocyclic ring system.

5,414,092

## THIOXANTHONE DERIVATIVES

William A. Green, and Allan W. Timms, both of Widnes, United Kingdom, assignors to International Bio-Synthetics Limited, United Kingdom

Continuation of Ser. No. 897,666, Jun. 12, 1992, abandoned.

This application Mar. 4, 1994, Ser. No. 205,727

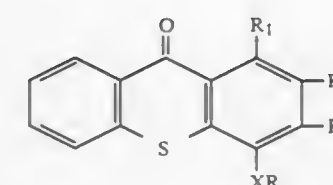
Claims priority, application United Kingdom, Jun. 24, 1991, 9113580

Int. Cl.<sup>6</sup> C07D 335/12

U.S. Cl. 549—27

25 Claims

1. Thioxanthone derivatives of the formula:



wherein

R<sub>1</sub> is Cl or Br;

R<sub>2</sub> is hydrogen or C<sub>1-6</sub> alkyl;

X is an oxygen or sulfur atom;

R<sub>4</sub> is hydrogen, Cl, Br or a C<sub>1-6</sub> alkyl group; and

R<sub>3</sub> is a C<sub>2-10</sub> alkyl group, optionally substituted by a hydroxy group which hydroxy group may be alkylated by an optionally substituted C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl or a benzyl group or acylated by a C<sub>1-8</sub> alkanoyl or a C<sub>2-8</sub> alkenoyl group; a C<sub>2-10</sub> alkenyl group, a C<sub>3-6</sub> cycloalkyl group, a C<sub>1-8</sub> alkanoyl group, a C<sub>2-8</sub> alkenoyl group, an optionally substituted phenyl group, or an optionally substituted benzoyl group.

5,414,093

## HYDROLYZABLE AND POLYMERIZABLE SILANES

Herbert Wolter, Gerschheim, Germany, assignor to Fraunhofer-Gesellschaft zur Förderung der Angewandten, München, Germany

Filed Jul. 20, 1992, Ser. No. 916,584

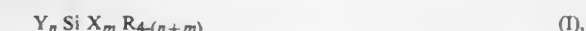
Claims priority, application Germany, Jul. 30, 1991, 41 25 201.2

Int. Cl.<sup>6</sup> C07D 323/02

U.S. Cl. 549—214

5 Claims

1. Hydrolyzable and polymerizable silanes of the general formula (I),



wherein the residues X, Y and R may be the same or different and are defined as follows:

R=alkyl, alkenyl, aryl, alkylaryl or arylalkyl,

X=hydrogen, halogen, hydroxyl, alkoxy, acyloxy, alkylcarbonyl, alkoxy carbonyl or NR'<sub>2</sub>, with R'=hydrogen, alkyl or aryl,

Y=a substituent containing a substituted or unsubstituted 1,4,6-trioxaspiro-(4,4)-nonane residue,

n=1, 2 or 3,

m=1, 2 or 3, with n+m≤4.

5,414,094

## HIGH PURITY AND HIGH YIELD SYNTHESIS OF DIANHYDRIDES

Joseph Csapilla, Stamford, Conn., assignor to Cytec Technology Corp., Wilmington, Del.

Filed Jan. 26, 1990, Ser. No. 471,297

Int. Cl.<sup>6</sup> C07D 307/06

U.S. Cl. 549—236

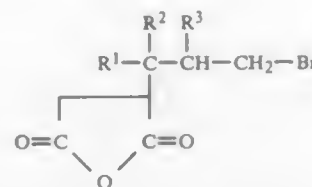
6 Claims

1. A process for making a dianhydride product, said process comprising reacting two moles of maleic anhydride and one mole of a vinyl benzene compound in a reaction mixture comprising about 1.5 to 2.0 moles of the vinyl benzene compound per mole of maleic anhydride at reaction temperature in the range from 105° to 125° C. for time to complete the reaction, adding a polar organic liquid to the reaction product mixture and refluxing the mixture, cooling the mixture following reflux and adding a hydrocarbon liquid to precipitate the product, separating the solid dianhydride product by filtration, washing the solids on the filter and drying the solids to make the finished dianhydride product.

5,414,095  
ANHYDRIDE-FUNCTIONAL PRIMARY ALKYL  
HALIDES

Rodney M. Harris, Chicago, Ill., assignor to The Sherwin-Williams Company, Cleveland, Ohio  
Filed Jan. 3, 1994, Ser. No. 176,408  
Int. Cl.<sup>6</sup> C07D 307/60

U.S. Cl. 549—254 4 Claims  
1. An anhydride-functional primary alkyl halide having the structure:

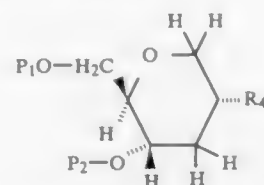


wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are each individually hydrogen or methyl and the total number of carbon atoms in R<sup>1</sup> and R<sup>2</sup> and R<sup>3</sup> combined is two or less.

5,414,096  
ANTIVIRAL TETRAHYDROPYRANS

Joseph A. Tino, Robbinsville; Gregory S. Bisacchi, Lawrenceville, and Saleem Ahmad, Plainsboro, all of N.J., assignors to Bristol-Myers Squibb Co., Princeton, N.J.  
Division of Ser. No. 9,485, Jan. 25, 1993, Pat. No. 5,314,893.  
This application Feb. 22, 1994, Ser. No. 200,022  
Int. Cl.<sup>6</sup> A61K 31/505; C07D 239/47, 239/54, 239/545  
U.S. Cl. 549—417 5 Claims

1. A compound of the formula

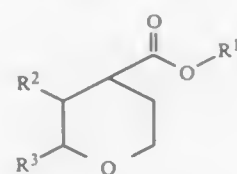


wherein R<sub>4</sub> is a leaving group; and P<sub>1</sub> and P<sub>2</sub> are hydroxy protecting groups.

5,414,097  
PURIFICATION OF ESTERS OF  
TETRAHYDRO-PYRAN-4-CARBOXYLIC ACID

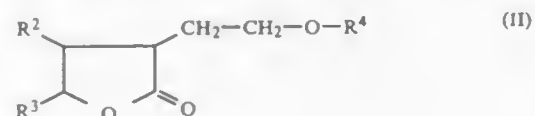
Rolf Fischer, Heidelberg; Norbert Goetz, Worms; Thomas Kuekenhoefer, Boehl-Iggelheim; Harald Rust, Neustadt, and Werner Schnurr, Herxheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany  
Continuation-in-part of Ser. No. 990,285, Dec. 14, 1992, abandoned. This application Jan. 24, 1994, Ser. No. 185,179  
Claims priority, application Germany, Dec. 13, 1991, 41 41 221.4

Int. Cl.<sup>6</sup> C07D 309/08 2 Claims  
U.S. Cl. 549—425  
1. A process for purifying esters of tetrahydropyran-4-carboxylic acid of the formula I



where R<sup>1</sup> to R<sup>3</sup> are each C<sub>1</sub>-C<sub>4</sub>-alkyl, and R<sup>2</sup> and R<sup>3</sup> are each

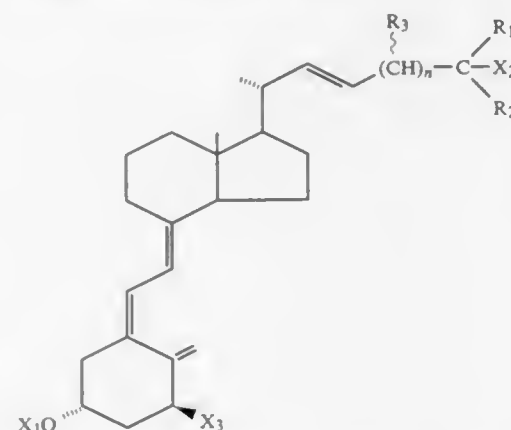
additionally hydrogen, from mixtures produced in the reaction of butyrolactones of the formula II



where R<sup>2</sup> and R<sup>1</sup> have the above-mentioned meanings, and R<sup>4</sup> is hydrogen, alkyl of 1-6 carbons or acyl of the formula —CO—R<sup>2</sup>, with alcohols of the formula R<sup>1</sup>OH in the presence of oxide catalysts, by distillation, which comprises  
a) removing overhead, in a first column with 5-25 theoretical plates with a distillate pressure of 700-1100 mbar and a distillate temperature of 50°-80° C., an alcohol and up to 10% of the water, and  
b) transferring the bottom product from the first column into a second column with 18-40 theoretical plates, into which a water entrainer is metered between plates 15 and 30, and is circulated, and which operates with a distillate pressure of 35-350 mbar and a distillate temperature of 18°-70° C., with the esters of tetrahydropyran-4-carboxylic acid being removed between plates 8 and 18 at 90°-150° C.

5,414,098  
HOMOLOGATED VITAMIN D<sub>2</sub> COMPOUNDS AND THE  
CORRESPONDING 1α-HYDROXYLATED DERIVATIVES  
Hector F. DeLuca, Deerfield; Heinrich K. Schnoes, and Kato L. Perlman, both of Madison, all of Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.  
Continuation of Ser. No. 732,008, Jul. 22, 1991, abandoned, which is a division of Ser. No. 654,746, Feb. 13, 1991, Pat. No. 5,260,290, which is a continuation-in-part of Ser. No. 481,990, Feb. 14, 1990, Pat. No. 5,030,772. This application Dec. 3, 1992, Ser. No. 985,432  
Int. Cl.<sup>6</sup> C07C 401/00 5 Claims

U.S. Cl. 552—653  
1. Vitamin D compounds having the formula:

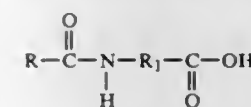


(I) where the configuration about carbon 24 may be R or S and wherein n is an integer having a value of 3, X<sub>1</sub> is selected from hydrogen or a hydroxy protecting group, X<sub>2</sub> is selected from hydrogen, hydroxy and protected hydroxy, X<sub>3</sub> is selected from hydrogen, hydroxy, and protected hydroxy, each R<sub>3</sub> is independently selected from alkyl, hydroxy, protected hydroxy, hydrogen or fluorine, with the proviso that at least one R<sub>3</sub> must be alkyl, and wherein R<sub>1</sub> and R<sub>2</sub>, which may be the same or different, are each selected from an alkyl or aryl group.

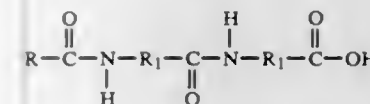
5,414,099  
SYNTHESIS OF AMIDO ACIDS FROM CARBOXYLIC  
ACIDS AND LACTAMS

Stephen W. Heinzman, Wyoming; Jeffrey S. Dupont, Fairfield, and William C. Tettenhorst, Okeana, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio  
Filed Sep. 14, 1993, Ser. No. 121,013  
Int. Cl.<sup>6</sup> C07C 231/00 22 Claims

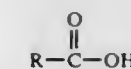
U.S. Cl. 554—69 1. A method for preparing amido acids of the formula



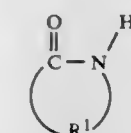
and



wherein R is a C<sub>1</sub>-C<sub>21</sub> hydrocarbyl substituent and R<sup>1</sup> is C<sub>2</sub>-C<sub>10</sub> hydrocarbylene substituent by reacting in the presence of an acid catalyst a carboxylic acid of the formula



with a lactam of the structure



wherein R and R<sup>1</sup> are as described before.

5,414,100  
DEACIDIFICATION OF VEGETABLE OILS  
Folahan O. Ayorinde, Kettering, and Mahmoud Hassan, Silver Spring, both of Md., assignors to Howard University, Washington, D.C.  
Filed Aug. 27, 1993, Ser. No. 112,915  
Int. Cl.<sup>6</sup> C11B 3/10 17 Claims

U.S. Cl. 554—191 1. A process for the deacidification of a vegetable oil in which the major acid of the vegetable oil is from the group comprised of epoxy fatty acids, hydroxy fatty acids, linoleic acid and oleic acid, said process comprising the passing of the vegetable oil through a column of activated alumina while the vegetable oil is dissolved in a solvent.

5,414,101  
PREPARATION OF HYDRIDOCARBONYL TRIS  
(TRIORGANOPHOSPHORUS) RHODIUM COMPOUNDS  
Jung U. Choi; Sang M. Lee, and Seong M. Jung, all of Daejeon, Rep. of Korea, assignors to Lucky, Ltd., Seoul, Rep. of Korea  
Filed May 18, 1994, Ser. No. 245,659  
Claims priority, application Rep. of Korea, Oct. 20, 1993, 93-22084

Int. Cl.<sup>6</sup> C07F 15/00 15 Claims

U.S. Cl. 556—136 1. A process for the direct preparation of a hydridocarbonyl tris (triorganophosphorus) rhodium according to a one-phase organic reaction from a concentrate residue containing a deactivated rhodium complex, which is derived from a spent hydroformylation reaction medium containing the deactivated

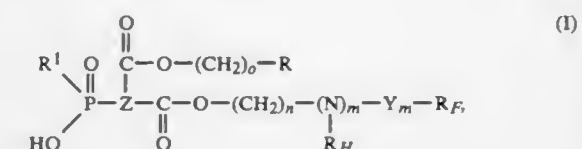
rhodium complex catalyst, the process comprising the following steps:

- oxidizing the concentrate residue with an appropriate oxidant;
- synthesizing a rhodium carbonyl complex from the deactivated rhodium complex under a carbon monoxide and oxygen gas mixture atmosphere;
- preparing the hydridocarbonyl tris (triorganophosphorus) rhodium complex by directly reacting the rhodium carbonyl complex with a hydroxyl group containing compound, an alkali metal hydroxide, formaldehyde and a triorganophosphorus ligand; and
- reacting remaining rhodium carbonyl complex with carbon monoxide, and reacting the hydridocarbonyl tris (triorganophosphorus) complex with hydrogen.

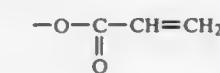
5,414,102  
FLUORINATED CARBOXYLIC ACID ESTERS OF  
PHOSPHONO- AND PHOSPHINOCARBOXYLIC ACIDS  
CONTAINING ACRYLATE AND/OR METHACRYLATE  
GROUPS

Klaus Pohmer, Köln; Rainer Weber, Odenthal; Hans-Dieter Block, and Hans-Heinrich Moretto, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen  
Filed Dec. 27, 1993, Ser. No. 172,751  
Claims priority, application Germany, Jan. 14, 1993, 43 00 799.6

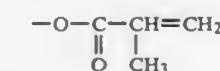
Int. Cl.<sup>6</sup> C07C 9/02, 269/00, 229/00 6 Claims  
U.S. Cl. 558—45 1. Fluorinated carboxylic acid esters of phosphono- or phosphinocarboxylic acids containing acrylate and/or methacrylate groups, of formula (I)



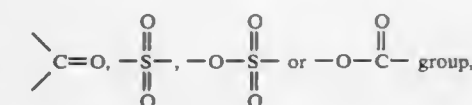
wherein:  
R<sup>1</sup> is a hydroxyl group, a methyl group, an ethyl group or a phenyl radical,  
R<sub>F</sub> is a linear or branched fluoroalkyl radical with 1 to 18 carbon atoms, or a fluorinated branched or linear monomeric ether or polyether with 1 to 18 carbon atoms,  
R<sub>H</sub> is a linear or branched alkyl radical with 1 to 10 carbon atoms,  
R is an acrylate group of structure



or a methacrylate group of structure

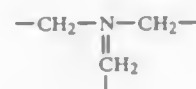


Y represents a

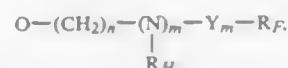


Z represents a linear or branched alkanetriyl radical (trivalent hydrocarbon radical) with 1 to 20 carbon atoms, or a radical of the formula





or  
a linear or branched alkanetriyl radical with 1 to 20 carbon atoms with one or more substituent groups of structure COR<sup>2</sup>, or  
a linear or branched alkanetriyl radical with 1 to 20 carbon atoms with one or more substituent groups of structure —PO<sub>2</sub>HR<sup>1</sup>, where R<sup>1</sup> has the same meaning as above,  
m is 0 or 1,  
n is an integer from 0 to 6,  
is an integer from 0 to 6, and  
R<sup>2</sup> represents a hydroxyl radical or a radical of structure



or a radical of structure O—(CH<sub>2</sub>)<sub>n</sub>—R, or  
a linear or branched alkoxy radical with 1 to 30 carbon atoms, where n, m, o, R<sub>H</sub>, R<sub>F</sub> and Y have the same meaning as above,  
and their salts.

5,414,103

## POLYETHER PHOSPHATE ESTERS

Robert B. Cracknell, Lymington, and Anthony J. Moore, Camberley, both of England, assignors to Oceanfloor Limited, Southampton, England

Filed Dec. 28, 1992, Ser. No. 997,224

Claims priority, application United Kingdom, Jan. 10, 1992, 9200501

Int. Cl.<sup>6</sup> C07F 9/09; C10M 145/38

U.S. Cl. 558—90

17 Claims

1. A polyalkylene glycol ether phosphate ester, or salt thereof, having the formula:



wherein w is an integer from 1 to 3, and

R is an oil-soluble polyether moiety having the formula:



wherein R<sup>1</sup> is either an alkyl or an alkyl phenyl group having from 7 to 30 carbon atoms,

X is either O, S, or N

x is an integer from 2 to 4,

y is an integer from 6 to 30,

m is 1 when X is O or S and m is 2 when X is N,

n and p are such that the polyether moiety contains between 1 and 35% by weight of (C<sub>x</sub>H<sub>2x</sub>O) units and between 35 and 80% by weight of (C<sub>y</sub>H<sub>2y</sub>O) units, and the molecular weight of the polyalkylene glycol moiety is between 500 and 5000.

12. A process for the production of a polyether phosphate ester of the formula (I), or a salt thereof, which process comprises reacting at a temperature of from 70° to 120° C. a polyether having the formula:



(wherein R<sup>1</sup>, X, x, y, m, n and p are as defined in claim 1 and Z is either hydrogen or a hydrocarbyl group containing from 1 to 30 carbon atoms), with a phosphating agent and water, said phosphating agent and water being present in a molar ratio

less than 1:1 so as to substantially avoid the formation of polyalkylene glycol pyrophosphate.

5,414,104

## PROCESS FOR PREPARING DIALKYL CARBONATES

Joerg-Dietrich Jentsch, Mülheim; Alexander Klausener, Köln; Heinz Landscheldt, Duisburg; Erich Wolters, Köln, and Eberhard Zirngiebl, Köln, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 22, 1994, Ser. No. 231,607

Claims priority, application Germany, Apr. 29, 1993, 43 14 038.6

Int. Cl.<sup>6</sup> C07C 69/76

U.S. Cl. 558—277

20 Claims

1. A process for preparing a dialkyl carbonate of the formula



in which

R represents a straight-chain or branched C<sub>1</sub>–C<sub>4</sub>-alkyl,

by reaction of carbon monoxide (CO) with an alkyl nitrite of the formula



in which

R is as defined above,

in the presence or absence of an inert gas and also in the presence or absence of the alcohol ROH on which it is based and also in the presence or absence of NO over a supported platinum metal catalyst at elevated temperature in a continuous gas-phase reaction, wherein a metal phosphate having acid centres is used as support, the platinum metal is present in the form of a halide or a halide-containing complex, which may each be formed in situ in the process reactor from the platinum metal or a halogen-free platinum metal compound with the aid of hydrogen halide under the reaction conditions, the reaction is carried out with a volume ratio of nitrite: CO=0.1–10:1, a pressure from 0.5 to 10 bar and a temperature from 50 to –150° C. being used and hydrogen halide is added stepwise or continuously.

5,414,105

CYCLOPENTANECARBOXYLIC ACID DERIVATIVES  
USEFUL FOR PRODUCING AZOLE COMPOUNDS

Satoru Kumazawa; Susumu Shimizu; Hiroyuki Enari; Atsushi Ito, all of Iwaki; Susumu Ikeda, Naka; Nobuo Sato, and Toshihide Saishoji, both of Iwaki, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 910,450, Jul. 8, 1992, Pat. No. 5,239,089, which is a division of Ser. No. 691,406, Apr. 25, 1991, Pat. No. 5,159,118, which is a division of Ser. No. 514,170, Apr. 24, 1990, Pat. No. 5,028,254, which is a division of Ser. No. 115,084, Oct. 30, 1987, Pat. No. 4,938,792. This application May 17, 1993, Ser. No. 61,526

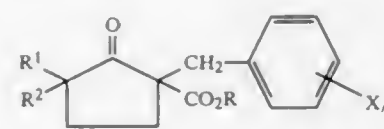
Claims priority, application Japan, Nov. 10, 1986, 61-265559; Jun. 30, 1987, 62-161126; Oct. 27, 1987, 62-271277

Int. Cl.<sup>6</sup> C07C 69/74

U.S. Cl. 560—51

1 Claim

1. An ester derivative of a cyclopentanecarboxylic acid which is represented by the formula (V):



wherein R<sup>1</sup> and R<sup>2</sup> respectively represent a (C<sub>1</sub>–C<sub>5</sub>) alkyl group or a hydrogen atom; R represents a (C<sub>1</sub>–C<sub>5</sub>) alkyl group; X represents a halogen atom, a (C<sub>1</sub>–C<sub>3</sub>) alkyl group or a phenyl

group and n represents an integer of from 0 to 2, provided that R<sup>1</sup> is not a hydrogen atom when R<sup>2</sup> is a hydrogen atom.

5,414,106

PROCESS FOR RECOVERING DIMETHYL  
TEREPHTHALATE

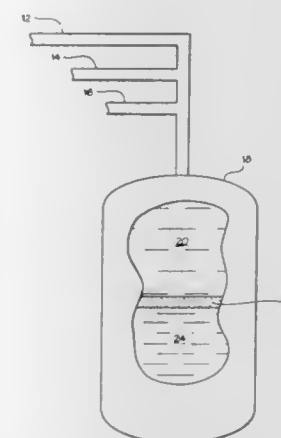
Brad L. Smith, and Gary E. Wilkins, both of Wilmington, N.C., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Feb. 14, 1994, Ser. No. 195,669

Int. Cl.<sup>6</sup> C07C 67/48

U.S. Cl. 560—78

7 Claims



1. A method for recovering dimethyl terephthalate comprised in the steps of:

- (a) providing a dimethyl terephthalate stream, the stream containing dimethyl terephthalate, catalyst, and ethylene glycol;
- (b) adding a solvent to the dimethyl terephthalate stream, the solvent being immiscible with water and miscible with dimethyl terephthalate;
- (c) adding water to the dimethyl terephthalate stream;
- (d) forming two phases, a first phase of solvent and dimethyl terephthalate, and a second phase of water, dimethyl terephthalate ethylene glycol, and catalyst; and
- (e) recovering the dimethyl terephthalate from the first phase.

5,414,107

PROCESS FOR RECYCLING POLYETHYLENE  
TEREPHTHALATE PROCESS RESIDUES CONTAINING  
ALKALI METAL ORGANIC SALTS

Brad L. Smith, Wilmington, N.C., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Jul. 20, 1994, Ser. No. 277,685

Int. Cl.<sup>6</sup> C07C 67/48

U.S. Cl. 560—79

7 Claims

1. A process for recycling by-products produced from a process for the manufacture of polyethylene terephthalate comprising the steps of:

- (a) providing ethylene glycol distillation bottoms from an ethylene glycol recovery unit associated with the manufacture of polyethylene terephthalate, the bottoms containing an alkali metal organic salt produced during the manufacture of polyethylene terephthalate, the alkali metal organic salt being in excess of about 100 ppm of the bottoms;
- (b) stripping the alkali metals from the organic acid by use of a strong acid; and
- (c) depolymerizing the organic acid.

5,414,108

PROCESS FOR THE PREPARATION OF CARBOXYLIC  
ACIDS AND DERIVATIVES OF THEM

György Tóth, Nyíregyháza; János Bálint, Debrecen; Klára Elek née Herczik, Debrecen; Zsuzsanna Móricz née Garai, Debrecen, and Éva Mudra née Kántor, Ebes, all of Hungary, assignors to Biogal Gyógyszergrár, Debrecen, Hungary

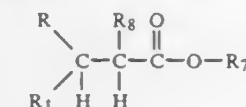
Filed Aug. 11, 1992, Ser. No. 928,247

Int. Cl.<sup>6</sup> C07C 69/76

U.S. Cl. 560—104

9 Claims

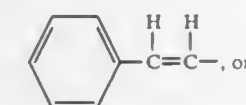
1. A process for the preparation of carboxylic acids and derivatives of them of the formula



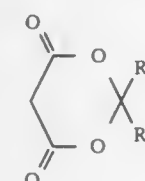
wherein

R means hydrogen, or a C<sub>1</sub>-alkyl or a (C<sub>1</sub>-alkoxy)carbonyl group,

R<sub>1</sub> stands for a C<sub>1</sub>-alkyl group, a C<sub>1</sub>-alkoxy-carbonyl group, a (C<sub>1</sub>-alkyl)carbonyl group, a (C<sub>1</sub>-alkoxy)carbonyl(C<sub>1</sub>-alkyl) group, a phenyl group, optionally monosubstituted by a C<sub>1</sub>-alkyl or C<sub>2</sub>-alkenyl group, di- or tri-substituted by C<sub>1</sub>-alkoxy groups, monosubstituted by a nitro group, disubstituted by C<sub>1</sub>-alkoxy and hydroxy groups, monosubstituted by a C<sub>1</sub>-alkylthio group, mono- or disubstituted one or two di(C<sub>1</sub>-alkyl) amino groups or monosubstituted by halogen, for a furyl group, for a thiofuryl group, for a thienyl group, or for a group of the formula



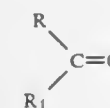
R and R<sub>1</sub> together form a straight-chain C<sub>4</sub>-alkylene group, R<sub>7</sub> stands for hydrogen or a C<sub>1</sub>-alkyl group and R<sub>8</sub> means hydrogen or a carboxyl group, which process comprises reacting a 1,3-dioxane-4,6-dione derivative of the formula



wherein

R<sub>9</sub> stands for a C<sub>1</sub>-alkyl group or a phenyl group, optionally monosubstituted by halogen and

R<sub>10</sub> stands for hydrogen or a C<sub>1</sub>-alkyl group or R<sub>9</sub> and R<sub>10</sub> together form a pentamethylene group, and an aldehyde or ketone of the formula



wherein

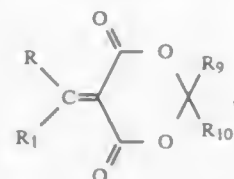
R and R<sub>1</sub> are as defined above, in the presence of formic acid and of 1 or more members selected from the group consisting of secondary amines and tertiary amines and, optionally of an alcohol of the formula



VI,

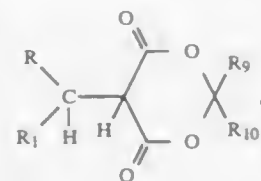
wherein

R<sub>7</sub> is C<sub>1-7</sub>alkyl group, at a temperature of 20° to 140° C., optionally in the presence of an inert organic solvent, or reducing at least one compound selected from the group consisting of an unsaturated 1,3-dioxane-4,6-dione derivative of the formula



wherein

R, R<sub>1</sub>, R<sub>9</sub> and R<sub>10</sub> are defined above, and a 1,3-dioxane-4,6-dione derivative of the formula



wherein

R, R<sub>1</sub>, R<sub>9</sub> and R<sub>10</sub> are as defined above, with formic acid in the presence of 1 or more members selected from the group consisting of secondary amines and tertiary amines and, optionally of an alcohol of the formula



wherein

R<sub>7</sub> is a C<sub>1-7</sub>alkyl group at a temperature of 20° to 140° C. optionally in the presence of an inert organic solvent.

5,414,109

PROCESS FOR THE CARBONYLATION OF ACETYLENICALLY UNSATURATED COMPOUNDS  
Eit Drent, and Eric Kragt, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 18, 1994, Ser. No. 198,918

Claims priority, application European Pat. Off., Mar. 19, 1993, 93200821

Int. Cl.<sup>6</sup> C07C 67/36

U.S. Cl. 560—207

20 Claims

1. A process for the carbonylation of acetylenically unsaturated compounds in the presence of a nucleophilic compound having at least one removable hydrogen atoms and a catalyst system comprising:

(a) a source of platinum

(b) a bisphosphine of the formula R<sub>1</sub>R<sub>2</sub>PR<sub>3</sub>R<sub>4</sub> (I) wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> independently are selected from the group consisting of unsubstituted hydrocarbyl groups and hydrocarbyl groups substituted with substituents selected from the group consisting of halogen atoms, cyano, alkoxy, acyl, alkylamino and dialkylamino groups, R is a bivalent bridging group containing 2 to 5 atoms in the bridge; and

(c) a source of anions being the conjugated base of an acid having a pK<sub>a</sub> of less than 4.

5,414,110

RU-SN HETERO-POLYNUCLEAR COMPLEX AND PROCESS FOR PRODUCING ACETIC ACID OR METHYL ACETATE BY USING THE SAME

Sumio Shinoda, Tokyo, Japan, assignor to Daisel Chemical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP93/01282, § 371 Date Mar. 10, 1994, § 102(e) Date Mar. 10, 1994, PCT Pub. No. WO94/05420, PCT Pub. Date Mar. 17, 1994

IV

PCT Filed Sep. 9, 1993, Ser. No. 211,050

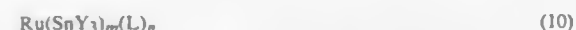
Claims priority, application Japan, Sep. 10, 1992, 4-269737

Int. Cl.<sup>6</sup> C07C 53/08, 51/16; B01J 31/16; C07B 61/00

U.S. Cl. 560—238

27 Claims

1. A catalyst represented by the following general formula (10):



wherein Y represents a halogen atom, an alkyl group, a cycloalkyl group, an aryl group, an aralkyl group or an alkoxy group, L represents a ligand, m is an integer of 1 to 6, n is an integer of 0 to 5 and m+n is an integer of 1 to 6.

V

5,414,111

POLYFLUORO NITROGEN-CONTAINING ORGANIC COMPOUNDS

Jack R. Kirchner, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 34,628, Mar. 22, 1993, abandoned, which is a continuation of Ser. No. 790,097, Nov. 6, 1991, abandoned, which is a continuation-in-part of Ser. No. 459,060, Dec. 29, 1989, abandoned. This application Feb. 2, 1994, Ser. No. 190,704

Int. Cl.<sup>6</sup> C07C 265/02, 265/14, 275/14; D06M 15/576

U.S. Cl. 560—357

24 Claims

1. A polyfluoro organic compound having at least one urea linkage, which compound is the product of the reaction of: (1) at least one organic polyisocyanate containing at least three isocyanate groups, (2) at least one fluorochemical compound which contains per molecule (a) a single functional group having one or more Zerewitinoff hydrogen atoms and (b) at least two carbon atoms each of which contains at least two fluorine atoms, and (3) water in an amount sufficient to react with from about 5% to about 60% of the isocyanate groups in said polyisocyanate.

5,414,112

N-BIS(PHOSPHONOMETHYL) AMINO ACIDS AND THEIR USE AS SCALE INHIBITORS

Vera Dragisich, Lisle, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Nov. 9, 1993, Ser. No. 149,652

Int. Cl.<sup>6</sup> C07F 9/38

U.S. Cl. 562—12

2 Claims

1. N,N-bis(phosphonomethyl) L-serine.

5,414,113

PROCESS FOR RECOVERY OF AROMATIC ACID FROM WASTE POLYESTER RESIN

Jeffrey L. Broecker, John A. Macek, both of Naperville; Mossman; Allen B., Wheaton; Bruce I. Rosen, Morton Grove, and Thomas M. Bartos, Naperville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Oct. 18, 1993, Ser. No. 138,917

Int. Cl.<sup>6</sup> C07C 51/16

U.S. Cl. 562—413

21 Claims

1. A process for recovering dibasic aromatic acid from polyester resin comprising repeating units of dibasic aromatic acid residue and repeating units of dihydric alcohol residue linked by ester bonds which process comprises:

depolymerizing polyester resin in a solvent under conditions suitable for hydrolysis of ester bonds to form a mixture

containing a solution of aromatic acid and impurities consisting of alcohol and other components of the resin; burning at least a portion of the impurities in a liquid-phase oxidation with an oxygen-containing gas in the presence of an oxidation catalyst at elevated pressures and temperatures in an oxidation solvent system consisting of a C<sub>2</sub> to C<sub>6</sub> monocarboxylic acid, water, or a mixture thereof, to form an oxidation product containing aromatic acid; and separating from the oxidation solvent system resulting solid product of crude dibasic aromatic acid substantially free of alcohol, but containing organic impurities.

5,414,114

METHOD FOR MAKING CONJUGATE MOIETIES CAPABLE OF CHELATING PARAMAGNETIC METALS AND DESIGNED FOR COUPLING WITH A FACTOR RESPONSIVE TO SPECIFIC CELLULAR MARKER SITES  
Paul Palacios, Madrid, Spain, assignor to Bracco International B.V., Amsterdam, Netherlands

PCT No. PCT/EP92/01560, § 371 Date Feb. 18, 1993, § 102(e) Date Feb. 18, 1993, PCT Pub. No. WO93/01837, PCT Pub. Date Feb. 4, 1993

PCT Filed Jul. 19, 1992, Ser. No. 975,533

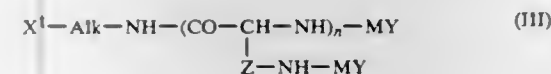
Claims priority, application European Pat. Off., Jul. 22, 1991, 91810589

Int. Cl.<sup>6</sup> C07C 229/04, 321/14; C07D 233/04

U.S. Cl. 562—556

10 Claims

1. A method for preparing a conjugate moiety of formula (III) to be used for coupling with targeting factors specifically responsive and/or binding to bioactive cellular marker sites of living tissues in order to provide administrable targeted conjugates capable of carrying paramagnetic MRI contrast enhancer species to be selectively delivered to organs or tissues of interest, the said conjugate moiety III carrying at least one polyalkyleneaminopolycarboxylic acid chelant group and having the formula:



wherein X<sup>1</sup> is a —CHO or —SH group;

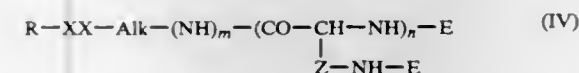
alk is a C<sub>1</sub> to C<sub>4</sub> alkylene, optionally interrupted by a —S— bond;

Z is a C<sub>1</sub> to C<sub>4</sub> alkylene, optionally interrupted by a —COO— bond;

Y represents H or a polyalkyleneaminopolycarboxylic acid chelant group either in its free acid form or as a complex with a paramagnetic ion, at least one of Y being a said polyalkyleneaminopolycarboxylic acid chelant group either in its free acid form or as a complex with a paramagnetic ion;

n is an integer from 0 to about 100; and

M represents a link between —NH and Y, said link being either an amido bond involving a —CO of Y and said —NH of formula (III), or an organic bridging substituent formed from a group selected from the group consisting of benzene diazonium, haloacetamido-phenyl, haloacetamidobenzyl, isocyanatophenyl, isothiocyanatophenyl and azoimidate, connecting said —NH to an alkylene carbon of Y; said method comprising the step of breaking the —XX— bond of a compound of the formula (IV):



wherein R is an immobilizing solid phase to which the remainder of the molecule of formula (IV) is linked covalently, either directly or via a linker grafted on the surface of said solid phase, X is —S— or —CHOH—, alk, Z and n are as defined above, E is H or MY, wherein MY is as

defined above, m is 0 when E is H and m is 1 when E is MY, said breaking of said —XX— bond being effected by hydrolysis when X is S and by oxidation when X is CHOH said solid phase being recoverable after breaking said —XX— bond and being reusable afterwards in another preparative cycle, to form the moiety (III).

5,414,115

ISOMERIZATION OF CARBOXYLIC ACIDS

Patrick M. Burke, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 19, 1993, Ser. No. 108,416

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 51/353

U.S. Cl. 562—591

3 Claims

1. A process for the isomerization of saturated alkyl carboxylic acids having 4 to 20 carbons atoms and having at least one hydrogen on a beta carbon atom, which comprises heating a reaction medium containing said saturated acid, a solvent for said saturated acid, an aluminum iodide or aluminum bromide promoted rhodium or iridium catalyst, and carbon monoxide to a temperature in the range of 170 to 250 degrees C. at a carbon monoxide pressure of 200 to 10,000 psi, where the amount of iodide or bromide promoted rhodium or iridium catalyst is in the range of 0.005 to 0.50% by weight of rhodium or iridium metal based on the weight of the reaction medium, and the mole ratio of iodide or bromide to rhodium or iridium is 1/1 to 15/1 and the mole ratio of aluminum to iodide or bromide is 1/5 to 2/1.

5,414,116

CATALYST FOR THE DEHALOGENATION OF ALPHAHALOGENATED CARBOXYLIC ACIDS AND ITS USE FOR PURIFYING MONOCHLOROACETIC ACID

Yves Correia, Chateau Arnoux, France, assignor to Societe Elf Atochem S.A., Puteaux, France

Filed Feb. 19, 1993, Ser. No. 20,944

Claims priority, application France, Feb. 19, 1992, 92 01876

Int. Cl.<sup>6</sup> C07B 53/00

U.S. Cl. 562—606

5 Claims

1. Process for the dehalogenation or alphahalogenated carboxylic acids and their esters by hydrogen, comprising carrying out the dehalogenation in the presence of a catalyst consisting essentially of an active charcoal support in the form of particles or cylinders having a diameter from 0.3 to 1.5 mm and a length of about 0.3 to 5 mm or spheres having a diameter from 0.3 to 2 mm, the said particles being loaded with a precious metal from group VIII of the Periodic Table of Elements.

5,414,117

MONOMERS DERIVED FROM PERHALOGENATED SULTONES AND POLYMERS OBTAINED FROM THESE MONOMERS

Michel Armand, Saint-Martin D'Uriage; Jean-Yves Sanchez, Saint-Ismier, both of France, and Salime Sylla, Bamako, Mali, assignors to Centre National de la Recherche Scientifique, Paris, France and Hydro Quebec, Montreal, Canada

PCT No. PCT/FR93/00167, § 371 Date Mar. 8, 1994, § 102(e) Date Mar. 8, 1994, PCT Pub. No. WO93/16988, PCT Pub. Date Sep. 2, 1993

PCT Filed Feb. 19, 1993, Ser. No. 137,020

Claims priority, application France, Feb. 21, 1992, 92 02027

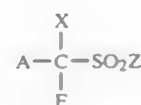
Int. Cl.<sup>6</sup> C07C 303/08

U.S. Cl. 562—828

11 Claims

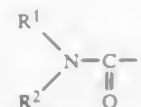
1. Compound corresponding to the following general formula (1)





in which:

A denotes one of the groups  $\text{R}^3-\text{O}-\text{CF}_2-$ ,  $\text{R}^3-$  or



Z denotes F, Cl,  $-\text{OSi}(\text{CH}_3)_3$  or an ionic group; Z being other than F when A denotes  $\text{R}^3-\text{O}-\text{CF}_2-$  or  $\text{R}^3-$ ; X denotes F, Cl, H or  $\text{R}_F$ ; X being  $\text{R}_F$  when A denotes  $\text{R}^3-$ ; the radicals  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$ , which are identical or different, are chosen from polymerizable nonperfluorinated organic radicals;  $\text{R}_F$  is chosen from perfluoroalkyl radicals and perfluoroaryl radicals.

5,414,118

# DIAMINOUREA COMPOUND AND PROCESS FOR PRODUCTION THEREOF AND HIGH HEAT RESISTANT POLYURETHANEUREA AND PROCESS FOR PRODUCTION THEREOF

Akihiko Yosizato, and Satoshi Furubepu, both of Moriyama, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 956,014, Dec. 9, 1992, abandoned. This application Dec. 30, 1993, Ser. No. 176,503

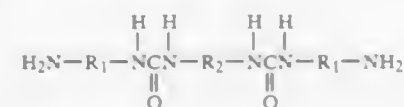
Claims priority, application Japan, Apr. 12, 1991, 3-106496; Jul. 22, 1991, 3-204540; Oct. 8, 1991, 3-260784

Int. Cl.<sup>6</sup> C07C 275/06, 275/28, 273/00

U.S. Cl. 564-51

2 Claims

1. A diamino urea compound represented by the formula (I);



wherein  $\text{R}_1$  is a straight or branched chain alkylene group having to 2 to 8 carbon atoms and  $\text{R}_2$  is a methane diphenylene group.

5,414,119

# HEXAFLUOROPROPYLENE OXIDE COMPOUNDS AND A METHOD OF MAKING SAME

Yasuo Tarumi, Noriyuki Koike, and Toshio Takago, all of Gunma, Japan, assignors to Shin Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 1, 1994, Ser. No. 203,250

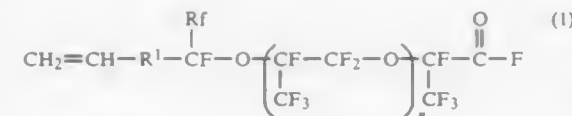
Claims priority, application Japan, Mar. 2, 1993, 5-066020; Mar. 2, 1993, 5-066022

Int. Cl.<sup>6</sup> C07C 51/58

U.S. Cl. 562-851

13 Claims

1. A hexafluoropropylene oxide compound of the formula (I);



wherein  $\text{R}^1$  is a single bond, an alkylene group of 1 to 10 carbon atoms, or said alkylene group in which one or more of

the hydrogen atoms are replaced by fluorine atoms,  $\text{R}_f$  is a fluorine atom, a perfluoroalkyl group of 1 to 10 carbon atoms, or a perfluoroalkyl ether group, and n is 0 or an integer of 1 or more.

5,414,120

# POLYETHER-SUBSTITUTED IMIDE COMPOUNDS AND THEIR USE

Klaus Pohmer, Köln; Rainer Weber, Odenthal; Cornelia Dörzbach-Lange, Kürten-Bechen; Reinhard Haida, Bergisch Gladbach, and Hans-Heinrich Moretto, Leverkusen, all of Germany, assignors to Bayer AG, Leverkusen, Germany

Filed Nov. 12, 1993, Ser. No. 150,722

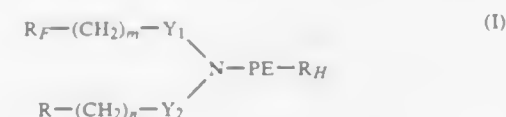
Claims priority, application Germany, Nov. 27, 1992, 42 40 008.2

Int. Cl.<sup>6</sup> C07C 311/48

U.S. Cl. 564-82

7 Claims

1. Imide compounds containing at least one of fluoroalkyl and fluoroaryl groups, which compounds are of the general formula (I):

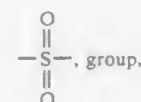


in which

$\text{R}_F$  is a linear or branched fluoroalkyl residue with 1 to 18 carbon atoms, a fluoroaryl residue with 6 to 12 carbon atoms, a mixed fluoroalkylaryl residue with 7 to 18 carbon atoms or a fluorinated mono or polyether with 2 to 18 carbon atoms,

$\text{R}$  is (i) a linear or branched alkyl residue with 1 to 24 carbon atoms, an aryl residue with 6 to 12 carbon atoms or a mixed alkylaryl residue with 7 to 24 carbon atoms, wherein the carbon chain may also be interrupted by oxygen, nitrogen or sulphur atoms, or (ii) a further residue  $\text{R}_F$  as defined above, wherein the two  $\text{R}_F$  residues may be the same or different,

each of  $\text{Y}_1$  and  $\text{Y}_2$  represent a



m is an integer from 0 to 6,

n is an integer from 0 to 6 and

PE is a polyether chain consisting of 5 to 50 ethylene oxide units or 5 to 50 propylene oxide units or a mixture of 5 to 50 ethylene oxide and propylene oxide units and

$\text{R}_H$  is a hydrogen atom or a linear or branched alkyl residue with 1 to 10 carbon atoms.

5,414,121

# ADDUCTS OF EPOXY RESINS AND ACTIVE HYDROGEN CONTAINING COMPOUNDS CONTAINING MESOGENIC MOIETIES

Robert E. Hefner, Jr., and Jimmy D. Earls, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

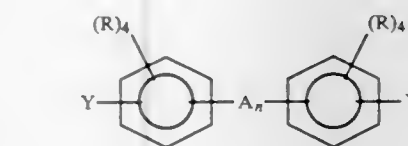
Division of Ser. No. 562,289, Aug. 3, 1990, Pat. No. 5,276,184. This application Sep. 8, 1993, Ser. No. 118,485

Int. Cl.<sup>6</sup> C07C 309/29

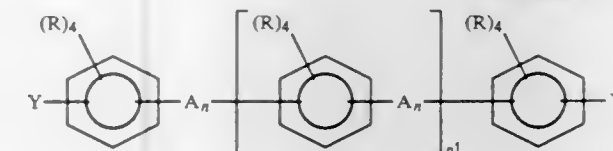
U.S. Cl. 564-86

1 Claim

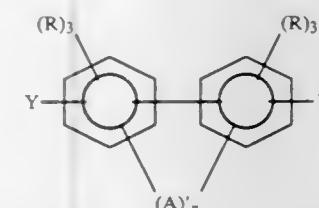
1. A sulfanilamide containing at least one rodlike mesogenic moiety represented by the following Formulas XXI, XXIV or XXV



Formula XXI.

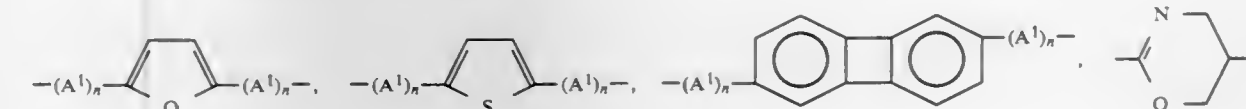
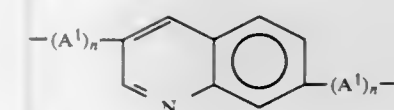
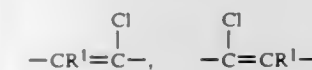
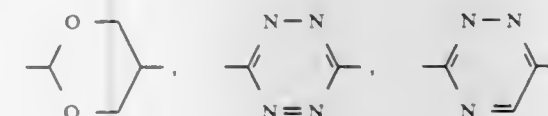
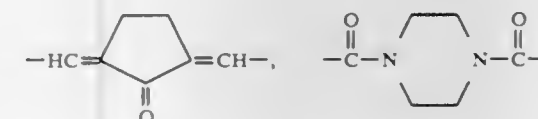
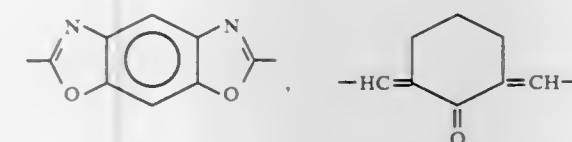


Formula XXIV.

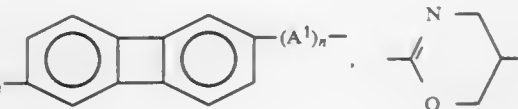
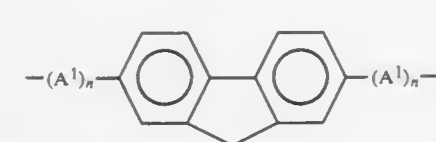
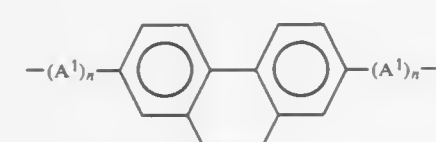
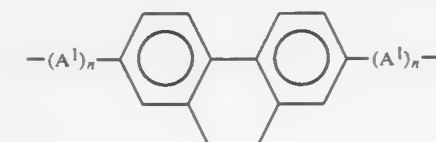
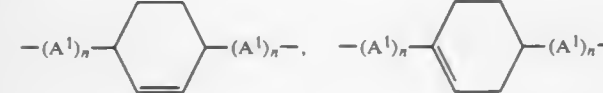
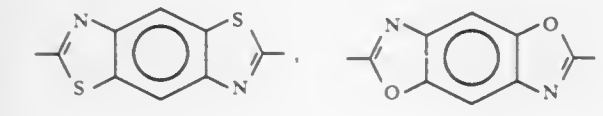
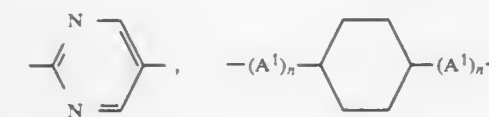
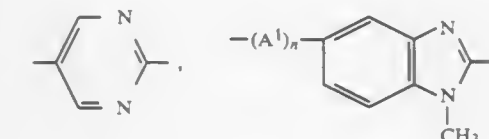
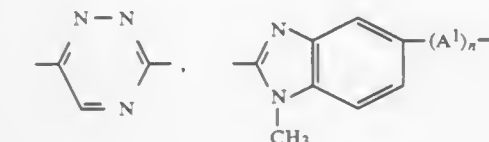
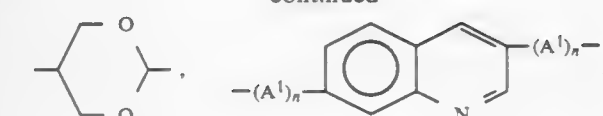


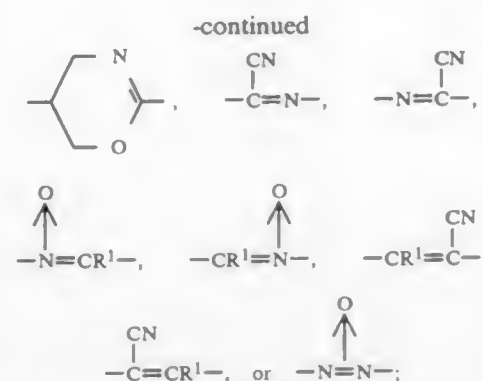
Formula XXV.

wherein each A is independently selected from the group consisting of a direct single bond,  $-\text{CR}^1=\text{CR}^1-$ ,  $-\text{C}\equiv\text{C}-$ ,  $-\text{N}=\text{N}-$ ,  $-\text{CR}^1=\text{N}-$ ,  $-\text{O}-\text{CO}-$ ,  $-\text{NR}^1-\text{CO}-$ ,  $-\text{CR}^1=\text{N}-\text{N}=\text{CR}^1-$ ,  $-\text{CR}^1=\text{CR}^1-\text{CO}-$ ,  $-\text{N}=\text{CR}^1-$ ,  $-\text{CO}-\text{O}-$ ,  $-\text{CO}-\text{NR}^1-$ ,  $-\text{CO}-\text{CR}^1=\text{CR}^1-$ ,  $-\text{CO}-\text{O}-\text{N}=\text{CR}^1-$ ,  $-\text{CR}^1=\text{N}-\text{O}-\text{OC}-$ ,  $-\text{CO}-\text{NR}^1-\text{NR}^1-\text{OC}-$ ,  $-\text{CR}^1=\text{CR}^1-\text{O}-\text{OC}-$ ,  $-\text{CO}-\text{O}-\text{CR}^1=\text{CR}^1-$ ,  $-\text{O}-\text{OC}-\text{CR}^1=\text{CR}^1-$ ,  $-\text{CR}^1=\text{CR}^1-\text{CO}-\text{O}-$ ,  $(-\text{CHR}^1)_n-\text{O}-\text{CO}-\text{CR}^1=\text{CR}^1-$ ,  $-\text{CR}^1=\text{CR}^1-\text{CO}-(\text{CHR}^1)_n-$ ,  $-(\text{CHR}^1)_n-\text{CO}-\text{O}-\text{CR}^1=\text{CR}^1-$ ,  $-\text{CR}^1=\text{CR}^1-\text{CO}-(\text{CHR}^1)_n-$ ,  $-\text{CO}-\text{S}-$ ,  $-\text{S}-\text{OC}-$ ,  $-\text{CH}_2-\text{CH}_2-\text{CO}-\text{O}-$ ,  $-\text{O}-\text{O}-\text{C}-\text{CH}_2-\text{CH}_2-$ ,  $-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-$ ,  $-\text{CR}^1=\text{C}-\text{R}^1-\text{CR}^1=\text{CR}^1-$ ,

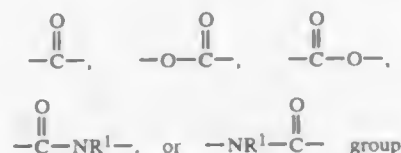


-continued





each A' is independently a divalent hydrocarbyl group having from 1 to about 10 -carbon atoms; each A<sup>1</sup> is independently a



each R is independently hydrogen or a hydrocarbyl or hydrocarbyloxy group having from 1 to about 10 -carbon atoms, a halogen atom, a nitro group, a nitrile group, a phenyl group or a -CO-R<sup>1</sup> group; each R<sup>1</sup> is independently hydrogen or a hydrocarbyl group having 1 to about 3 carbon atoms; one Y is a -NHR<sup>1</sup> group and the other Y is a -SO<sub>2</sub>-NH<sub>2</sub> group; n is zero or 1; n' has a value from 1 to about 6; p<sup>1</sup> has a value from 1 to about 30; and the aromatic rings can optionally contain one or more heteroatoms selected from the group consisting of N, O and S; with the proviso that at least 80% of the molecules are para substituted by both the bridging groups (-A- in Formulas XXI and XXIV, the direct bond in Formula XXV) and the NHR<sup>1</sup> and -SO<sub>2</sub>-NH<sub>2</sub> groups.

5,414,122

# PROCESS FOR PRODUCING ALPHA-KETOAMIDE DERIVATIVE

Akira Murabayashi, Ibaraki; Hideyuki Takenaka, Nabari, and Hiroyuki Kai, Yamatokoriyama, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 985,216, Dec. 3, 1992, Pat. No. 5,258,551.

This application Aug. 17, 1993, Ser. No. 107,032

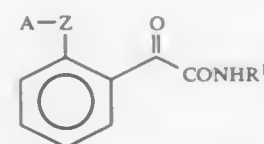
Claims priority, application Japan, Dec. 18, 1991, 3-334858

Int. Cl.<sup>6</sup> C07C 231/06

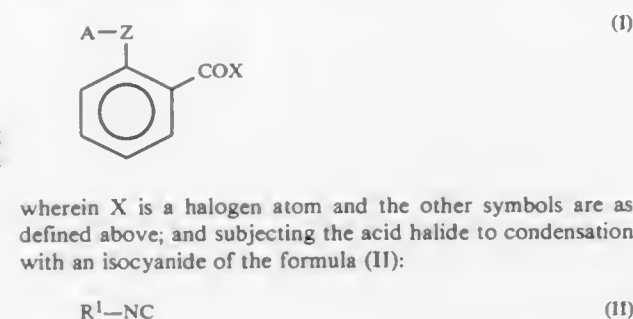
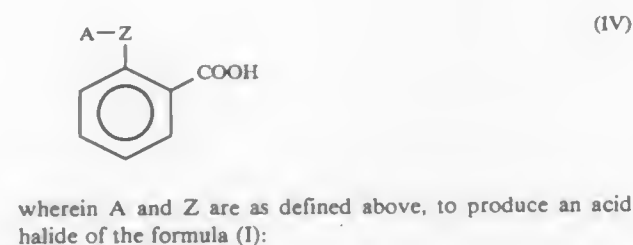
U.S. Cl. 564-129

9 Claims

1. A process for producing an α-ketoamide of the formula (III):



wherein A is a hydrogen atom, a halogen atom, alkyl, alkenyl, alkynyl, alkoxy, alkyl halide, alkenyl halide, alkynyl halide, cycloalkyl, cycloalkenyl, optionally substituted phenyl or optionally substituted heterocyclic group, Z is -CH<sub>2</sub>-, -O-, -S-, -CH(OH)-, -CO-, -NR- (wherein R is a hydrogen atom or alkyl), -CH<sub>2</sub>CH<sub>2</sub>-, -CH=CH-, -C≡C-, -CH<sub>2</sub>O-, -CH<sub>2</sub>S-, -CH<sub>2</sub>S(O)-, -OCH<sub>2</sub>-, -SCH<sub>2</sub>-, -S(O)CH<sub>2</sub>- or epoxy, and R<sup>1</sup> is alkyl or cycloalkyl, which comprises halogenating a carboxylic acid of the formula (IV):



wherein R<sup>1</sup> is as defined above, followed by hydrolysis.

5,414,123

# POLYETHER COMPOUNDS HAVING BOTH IMINE AND HYDROXYL FUNCTIONALITY AND METHODS OF SYNTHESIS

R. Scott Hamilton, Bear River City; Gary K. Lund, Ogden, and Robert M. Hajik, Willard, all of Utah, assignors to Thiokol Corporation, Ogden, Utah

Continuation-in-part of Ser. No. 943,918, Sep. 11, 1992,

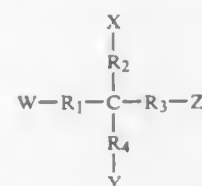
abandoned. This application Dec. 23, 1993, Ser. No. 173,425

Int. Cl.<sup>6</sup> C07C 251/24

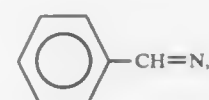
U.S. Cl. 564-275

9 Claims

1. An organic compound produced by the reaction of an amine and an aldehyde or ketone, and the further reaction with a material capable of imparting hydroxyl functionality to the organic compound, such that the ratio of C=N to hydroxyl in the compound is in the range of from about 1 to about 3, said compound comprising the following structure:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are the same or different and are selected from the group consisting of hydrogen and aliphatic linear or branched alkyls having from 1 to 20 carbon atoms, wherein among R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> there are at least two ether linkages between aliphatic residues, wherein at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> contains a hydroxyl group, wherein at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> contains a Schiff base, wherein the only interruptions in the chains comprising R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are, O, N, or Schiff base, wherein W, X, Y, and Z are selected from the group consisting of free hydroxyl,



H, or CH<sub>3</sub>, and wherein in the event one or more of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>,

and R<sub>4</sub> is H then the corresponding W, X, Y, or Z is deleted from the structure.

5,414,124

# METHOD OF PREPARING QUATERNARY AMMONIUM FORMULATIONS WITH HIGH FLASH POINTS

Kim R. Smith; Frederick M. Boyd, both of Huntington, and Samih S. Abouhalkah, Fort Wayne, all of Ind., assignors to Huntington Laboratories, Inc., Huntington, Ind.

Filed Jan. 19, 1993, Ser. No. 5,731

Int. Cl.<sup>6</sup> C07C 209/12

U.S. Cl. 564-282

23 Claims

1. A method of making a non-crystallizing quaternary ammonium compound solution having a flashpoint of at least 200° C. and a concentration of up to about 80% by weight quaternary ammonium compound, said method comprising the steps of dissolving a dialkylmethylamine reactant and an alkyl halide reactant in an alkylene glycol or a dialkylene glycol having the formula



where R' is either H or CH<sub>3</sub> and n is 1 or 2, and heating said reactant solution to elevated temperatures until reaction completion.

5,414,125

# DIAMINO-ALPHA-ALKYLSTILBENES

Robert E. Hefner, Jr., and Jimmy D. Earls, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

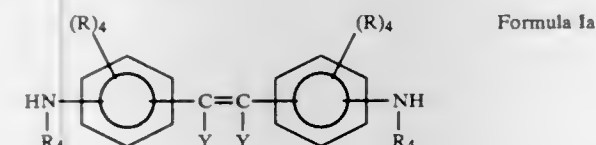
Division of Ser. No. 757, Jan. 5, 1993, Pat. No. 5,268,434, which is a continuation-in-part of Ser. No. 684,082, Jan. 24, 1992, Pat. No. 5,264,502, which is a continuation-in-part of Ser. No. 562,289, Aug. 3, 1990, Pat. No. 5,276,184. This application Jul. 23, 1993, Ser. No. 97,346

Int. Cl.<sup>6</sup> C07C 211/55, 211/56

U.S. Cl. 564-305

4 Claims

1. The diamino-α-methylstilbene represented by the following Formula Ia



wherein each R is independently hydrogen or a hydrocarbyl or hydrocarbyloxy group having from 1 to about 10 carbon atoms, a halogen atom, a nitro group, a nitrile group, a phenyl group or a -CO-R<sup>1</sup> group; each R<sup>1</sup> is independently hydrogen or a hydrocarbyl group having from 1 to about 3 carbon atoms; each R<sup>4</sup> is independently hydrogen or a hydrocarbyl group having from 1 to about 10 carbon atoms; wherein one Y is -CH<sub>3</sub> and the other Y is hydrogen.

5,414,126

# DIAMINO COMPOUNDS AND LIQUID CRYSTAL ALIGNING FILMS

Minoru Nakayama, Minamata; Toshiya Sawai, and Shizuo Murata, both of Ishihara, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Oct. 27, 1993, Ser. No. 141,600

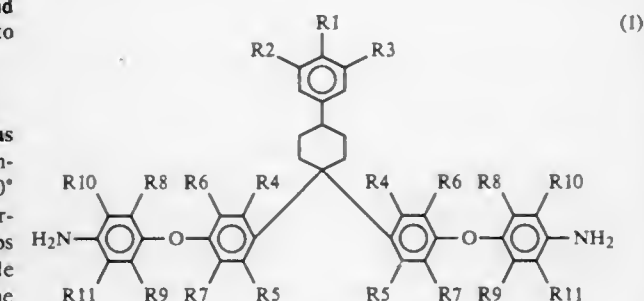
Claims priority, application Japan, Oct. 29, 1992, 4-313995; Nov. 24, 1992, 4-336728

Int. Cl.<sup>6</sup> C07C 217/14

U.S. Cl. 564-322

1 Claim

1. A diamino compound represented by a general formula (1):



wherein R<sub>1</sub> to R<sub>3</sub> are hydrogen or an alkyl group having 1 to 8 carbon atoms, respectively, and a part or all of them may be the same or different,

R<sub>4</sub> to R<sub>11</sub> are hydrogen, fluorine, trifluoromethyl or an alkyl group having 1 to 3 carbon atoms, respectively, and a part or all of them may be the same or different.

5,414,127

# CALCIUM INDEPENDENT CAMP PHOSPHODIESTERASE INHIBITOR ANTIDEPRESSANT

Nicholas A. Saccomano, Ledyard, and Fredric J. Vinick, Waterford, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 984,190, Nov. 20, 1992, Pat. No. 5,294,730, which is a division of Ser. No. 854,136, Mar. 19, 1992, Pat. No. 5,196,426, which is a division of Ser. No. 696,690, May 30, 1991,

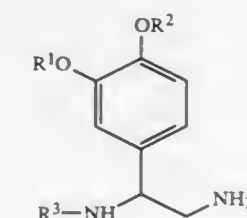
Pat. No. 5,128,358, which is a division of Ser. No. 155,932, Jan. 19, 1988. This application Jan. 19, 1994, Ser. No. 184,092

Int. Cl.<sup>6</sup> C07C 211/27, 223/02, 225/18

U.S. Cl. 564-344

3 Claims

1. A compound having the formula



wherein R<sup>1</sup> is selected from the group consisting of bicyclo[2.2.1]heptyl, bicyclo[2.2.2]octyl, bicyclo[3.2.1]octyl, tricyclo[5.2.1.0<sup>2,6</sup>]decyl, tricyclo[3.3.1.1<sup>3,7</sup>]decyl and indanyl; R<sup>2</sup> is methyl or ethyl; and R<sup>3</sup> is hydrogen, (C<sub>1-5</sub>) alkyl, (C<sub>2-5</sub>) alkenyl, benzyl or phenethyl.



5,414,128

PROCESS FOR THE PREPARATION OF  
N-SUBSTITUTED NITRO-P-PHENYLENEDIAMINES  
Willi Steckelberg, Hofheim/Ts.; Rolf Müller, Karben, and Peter  
Koch, Obertshausen, all of Germany, assignors to Cassella  
AG, Frankfurt, Germany

Filed Dec. 3, 1992, Ser. No. 984,976

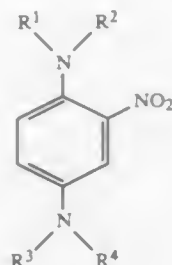
Claims priority, application Germany, Dec. 14, 1991, 41 41  
369.5

Int. Cl.<sup>6</sup> C07C 209/10

U.S. Cl. 564—406

19 Claims

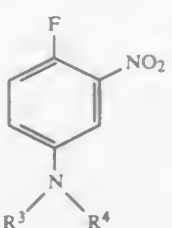
1. Process for the preparation of compounds of the general  
formula I



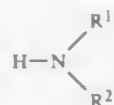
wherein

R<sup>1</sup> and R<sup>2</sup> independently of one another denote hydrogen,  
(C<sub>1</sub>–C<sub>4</sub>)-alkyl, (C<sub>1</sub>–C<sub>4</sub>)-hydroxyalkyl or (C<sub>5</sub>–C<sub>6</sub>)-cycloalkyl  
and

R<sup>3</sup> and R<sup>4</sup> independently of one another denote hydrogen,  
(C<sub>1</sub>–C<sub>4</sub>)-alkyl or (C<sub>1</sub>–C<sub>4</sub>)-hydroxyalkyl, by reaction of a compound  
of the general formula II



with an amine of the general formula III



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are defined as stated above, comprising  
carrying out the reaction in the presence of an alkali  
metal hydroxide, and the amine of the general formula III is  
employed in amounts of 1.4 to 1.8 mol per tool of compound of  
the general formula II.

5,414,129

PROCESS FOR THE PURIFICATION OF  
2-[(DIMETHYLAMINO)METHYL]-1-(3-METHOXY-  
PHENYL)CYCLOHEXANOL AND ITS SALTS

Stephen Cherkez, Ori Lerman, both of Ramat Gan; Michael  
Tennenbaum, Kiryat Ono; Hasalia Avner, Ashdod, and Tamar  
Kunyski, Rehovot, all of Israel, assignors to Chemagis, Ltd.,  
Bnei Brak, Israel

Filed Sep. 8, 1993, Ser. No. 117,803

Claims priority, application Israel, Sep. 8, 1992, 103096

Int. Cl.<sup>6</sup> C07C 209/84, 209/86, 209/88

U.S. Cl. 564—425

6 Claims

1. A process for the improved purification and separation of  
trans 2-[(dimethylamino)methyl]-1-(3-methoxyphenyl)cyclohexanol-hydrochloride from a reaction mixture containing  
the trans-isomer, the cis-isomer and Grignard reaction side

products comprising combining said mixture with a solution of  
hydrochloric acid in a C<sub>2</sub>–C<sub>3</sub> alcohol or with gaseous hydro-  
gen chloride in the presence of an organic solvent selected  
from among the group consisting of C<sub>3</sub>–C<sub>8</sub> alcohols, C<sub>3</sub>–C<sub>8</sub>  
ketones, C<sub>2</sub>–C<sub>7</sub> esters, and anisole to effect the selective precipi-  
tation of trans 2-[(dimethylamino)methyl]-1-(3-methoxy-  
phenyl) cyclohexanol-hydrochloride.

5,414,130

PROCESS FOR THE PREPARATION OF  
DIAMINOESORCINOL

Zenon Lysenko; Richard G. Pews, and Paul Vosejпка, all of  
Midland, Mich., assignors to The Dow Chemical Company,  
Midland, Mich.

Filed Dec. 23, 1993, Ser. No. 173,547

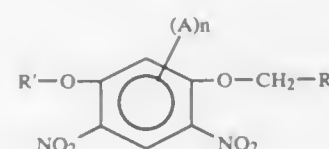
Int. Cl.<sup>6</sup> C07C 209/36

U.S. Cl. 564—418

16 Claims

1. A method for producing 4,6-diaminoresorcinol compris-  
ing

a) reducing a dinitroarylether of the formula:



wherein R is hydrogen, C<sub>1</sub>–C<sub>6</sub> alkyl, cycloalkyl or  
CH=CH<sub>2</sub>, R' is hydrogen or CH<sub>2</sub>–R, each A is indepen-  
dently Cl, Br, or I, and n is 0, 1 or 2; to form a diaminoar-  
ylether, and

(II) b) cleaving the ether group(s) from the diaminoarylether  
under conditions such that 4,6-diaminoresorcinol is  
formed as a salt or other stabilized form thereof.

5,414,131

PROCESS FOR PREPARING  
[5-AMINO-2-(2-HYDROXYETHYLAMINO)-PHENYL](2-  
HYDROXYETHYL)SULPHONE

Karl-Josef Herd, Odenthal, and Hermann Henk, Cologne, both  
of Germany, assignors to Bayer Aktiengesellschaft, Leverku-  
sen, Germany

Filed Dec. 1, 1993, Ser. No. 160,698

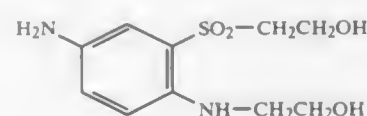
Claims priority, application Germany, Dec. 8, 1992, 42 41  
284.6

Int. Cl.<sup>6</sup> C07C 323/25, 209/30

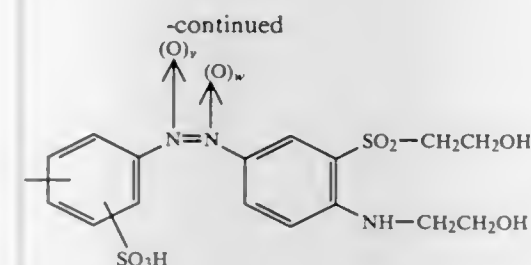
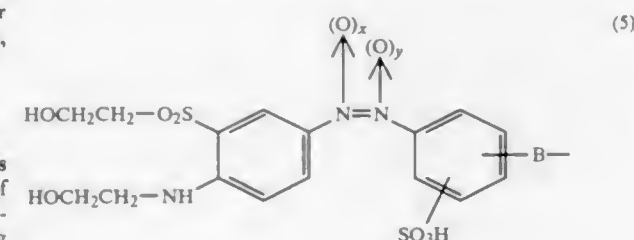
U.S. Cl. 564—440

7 Claims

1. A process for preparing [5-amino-2-(2-hydroxye-  
thylamino)phenyl] (2-hydroxyethyl)sulphone of the formula

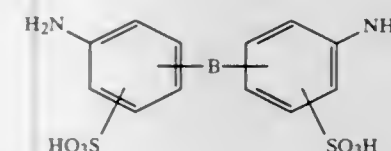


characterized in that a disazo/disazoxy dyestuff of the formula



in which

B is a direct bond or bridging member and  
v, w, x and y, independently of one another, are 0 or 1,  
x+y being 0 or 1 and v+w being 0 or 1, are reductively  
cleaved, and the resulting diamino compound of the for-  
mula (2)



after acidification and precipitation, is separated off as a dou-  
bled, sparingly water-soluble betaine.

5,414,132

1-ALKYL-2-HYDROXY-2-TRIFLUOROMETHYL  
ETHYLAMINES

Mark M. Stein, Wilmington, Del., and Diane A. Trainor, Glen  
Mills, Pa., assignors to Zeneca Inc., Wilmington, Del.  
Division of Ser. No. 491,757, Mar. 9, 1990, Pat. No. 5,194,588,  
which is a division of Ser. No. 5,538, Jan. 20, 1987, Pat. No.  
4,910,190, which is a continuation-in-part of Ser. No. 821,150,  
Jan. 21, 1986, abandoned. This application Sep. 4, 1992, Ser. No.  
940,932

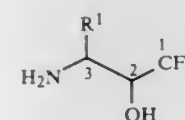
Claims priority, application United Kingdom, Jan. 22, 1985,  
01522; Jan. 22, 1985, 01523; Jan. 22, 1985, 01524

Int. Cl.<sup>6</sup> C07C 215/08

U.S. Cl. 564—503

2 Claims

1. A compound of the formula V



wherein R<sup>1</sup> is an alkyl group containing 1 to 5 carbon atoms  
and the acid-addition salts thereof.

5,414,133

PROTECTED PHOSPHINE OXIDES

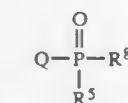
Roger G. Hall, Aesch, and Peter Riebli, Buckten, both of Swit-  
zerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.  
Division of Ser. No. 35,524, Mar. 23, 1993, Pat. No. 5,298,663,  
which is a continuation of Ser. No. 840,353, Feb. 24, 1992,  
abandoned. This application Jan. 10, 1994, Ser. No. 179,403  
Claims priority, application United Kingdom, Feb. 27, 1991,  
9104050

Int. Cl.<sup>6</sup> C07F 9/53

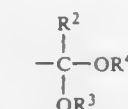
U.S. Cl. 568—15

4 Claims

1. A protected phosphine oxide of formula

where R<sup>8</sup> denotes a hydrogen atom or R<sub>6</sub>;

R<sup>5</sup> and R<sup>6</sup> each independently denote a C<sub>1</sub>–C<sub>20</sub> alkyl group,  
a C<sub>2</sub>–C<sub>20</sub> alkenyl group, a C<sub>3</sub>–C<sub>12</sub> cycloalkyl group, a  
C<sub>6</sub>–C<sub>15</sub> aryl group, a halogen-substituted C<sub>6</sub>–C<sub>15</sub> aryl  
group, or a C<sub>7</sub>–C<sub>16</sub> aralkyl group, and  
Q denotes a group of formula



(2) where R<sup>2</sup> denotes a hydrogen atom or a C<sub>1</sub>–C<sub>4</sub> alkyl group,  
and R<sup>3</sup> and R<sup>4</sup> each independently denote a C<sub>1</sub>–C<sub>4</sub> alkyl group,  
provided that R<sup>5</sup> and R<sup>6</sup> are not both phenyl when Q is a  
dimethoxymethyl or diethoxymethyl group, and that R<sup>5</sup>  
and R<sup>6</sup> are not both C<sub>1</sub>–C<sub>20</sub>alkyl.

5,414,134

BISPHOSPHINE OXIDE MONOMERS

Gary C. Davis, Albany, N.Y., assignor to General Electric Com-  
pany, Schenectady, N.Y.

Division of Ser. No. 51,145, Apr. 22, 1993, Pat. No. 5,312,890.

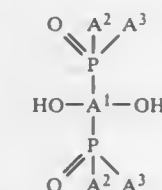
This application Dec. 20, 1993, Ser. No. 170,143

Int. Cl.<sup>6</sup> C07F 9/02

U.S. Cl. 568—16

4 Claims

1. A bisphosphine oxide bisphenol monomer comprising the  
structural units of the formula



wherein A<sup>1</sup> is a tetravalent substituted or unsubstituted aro-  
matic radical and A<sup>2</sup> and A<sup>3</sup> each are independently selected  
from substituted or unsubstituted aromatic radicals.

5,414,135

VINYL SULFONE COUPLING OF  
POLYOXYALKYLENES TO PROTEINS

Robert A. Snow, West Chester, and David L. Ladd, Wayne, both  
of Pa., assignors to Sterling Winthrop Inc., Malvern, Pa.

Continuation of Ser. No. 815,722, Dec. 30, 1991, abandoned.

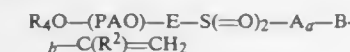
This application Nov. 16, 1993, Ser. No. 153,553

Int. Cl.<sup>6</sup> C07C 315/04, 317/04

U.S. Cl. 568—29

14 Claims

1. A reagent comprising a compound having a structural  
formula:



wherein:

R<sub>4</sub> is H or an alkyl or an aralkyl group of 1 to 8 carbon atoms  
which may be substituted with an alkoxy group of 1 to 3  
carbon atoms;

PAO is a polyalkylene oxide having an average molecular  
weight in the range of 250 to 200,000 daltons;

E is an alkylene group of 1 to 8 carbons, or an alkynyl

group of 2 to 8 carbons or a substituted arylene group of the formula



where:

each  $R^1$  is an electron withdrawing group independently selected from fluoro, trifluoromethyl, and nitro;  $i$  is 0 or an integer from 1 to 4, and

$h$  is (4- $i$ );

$A$  is an arylene or an aralkylene group of 6 to 8 carbons which may be unsubstituted or substituted with one or more substituents selected from the group consisting of halogen, methyl, methoxy, and trifluoromethyl; or an alkylene radical of 1 to 8 carbon atoms which may be saturated or unsaturated and which may contain one or more heteroatoms selected from the group consisting of oxygen, nitrogen and sulfur;

$a$  is zero or one;

$B$  is a sulfoxide group;

$b$  is zero or one; provided that  $a$  and  $b$  are either both zero or both 1; and

$R^2$  is selected from the group consisting of H, F, Cl,  $CF_3$ , and alkyl groups of 1 to 8 carbon atoms.

5,414,136

**METHOD FOR THE PREPARATION OF 4-HALO-2-NITROBUTYROPHENONE COMPOUNDS**  
David A. Cortes, Fairless Hills, Pa., assignor to American Cyanamid, Wayne, N.J.

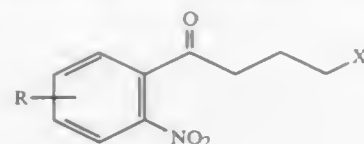
Filed Apr. 29, 1994, Ser. No. 235,579

Int. Cl.<sup>6</sup> C07C 45/65

U.S. Cl. 568—306

10 Claims

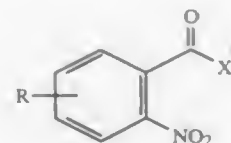
1. A method for the preparation of a 4-halo-2'-nitrobutyrophene compound having the structural formula



wherein

$X$  is Cl or Br; and

$R$  is hydrogen, halogen,  $C_1$ - $C_4$ alkyl or  $C_1$ - $C_4$ haloalkyl, which comprises reacting a 2-nitrobenzoyl halide compound having the structural formula



wherein  $X$  and  $R$  are as described above with at least one molar equivalent of the magnesium enolate of acetylbutyrolactone in the presence of a solvent at an elevated temperature and optionally concentrating the resultant reaction mixture by distillation of the solvent.

5,414,137

**PROCESS FOR PREPARING CARBONYL COMPOUNDS**  
Hirotoshi Ishii, Masanori Tsuzuki, and Yoshinori Saito, all of Chiba, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed May 27, 1993, Ser. No. 67,803

Claims priority, application Japan, May 29, 1992, 4-138785  
The portion of the term of this patent subsequent to Aug. 17, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 45/34

U.S. Cl. 568—360

15 Claims

1. In a method for the oxidation of olefins to carbonyl compounds by contacting the olefin with oxygen in a solvent in the presence of a palladium and polyoxoanion catalyst system, the improvement which comprises adding to the system an organophosphorus compound selected from the group consisting of triarylphosphines, trialkylphosphines, tricycloalkylphosphines, diphenylphosphinobenzene sulfonic acid salts, triarylphosphine oxides, trialkylphosphine oxides and tricycloalkylphosphine oxides.

5,414,138

**PROCESS FOR PRODUCING 2-FORMYL-1,4-BUTANEDIOL**  
Toshihiro Omatsu, Kamisu, and Yasuo Tokitoh, Hasaki, both of Japan, assignors to Kuraray Company Ltd., Kurashiki, Japan

Filed Jun. 2, 1994, Ser. No. 253,276

Claims priority, application Japan, Jun. 2, 1993, 5-156183

Int. Cl.<sup>6</sup> C07C 45/50, 27/00

U.S. Cl. 568—454

10 Claims

1. A process for producing 2-formyl-1,4-butanediol which comprises effecting reaction of 2-butene-1,4-diol with hydrogen and carbon monoxide in the presence of:

(a) a rhodium compound,

(b) a tris(substituted aryl) phosphite having an electronic parameter,  $\nu$ -value, of 2,080 to 2,090  $cm^{-1}$  and a steric parameter,  $\theta$ -value, of 135° to 190° and being represented by the formula  $P(OR)_3$

wherein each of  $R$ 's, which may be the same or different, represents a substituted aryl group having at least 7 carbon atoms, and

(c) a bis(diphenylphosphino)alkane represented by the formula  $Ph_2P(CH_2)_nPPH_2$  wherein  $n$  is an integer of 2 to 6; and at a temperature of not more than 80° C.

5,414,139

**PROCESS FOR THE MANUFACTURE OF MONOCHLOROACETALDEHYDE TRIMER AND CHLORAL**

Takashi Wakasugi, Tadashi Miyakawa, and Fukuichi Suzuki, all of Fukushima, Japan, assignors to Kureha Chemical Industry Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1994, Ser. No. 214,123

Claims priority, application Japan, Apr. 21, 1993, 5-117811

Int. Cl.<sup>6</sup> C07C 45/53, 45/61

U.S. Cl. 568—466

4 Claims

1. A process of manufacturing monochloroacetaldehyde trimer together with chloral comprising,

(a) chlorinating acetaldehyde or paraldehyde with a chlorinating agent to produce a chlorinated liquid of which the major component is monochloroacetaldehyde,

(b) adding chloral to said chlorinated liquid and distilling the mixture to obtain a fraction of which the major components are monochloroacetaldehyde and chloral,

(c) trimerizing monochloroacetaldehyde by reacting said fraction in the presence of a trimerization catalyst and separating the monochloroacetaldehyde trimer by filtration, and

(d) chlorinating other fractions from said distillation step and the filtrate from said trimerization step to produce chloral.

5,414,140

**PROCESS FOR MAKING FLUORINATED ALDEHYDES**  
William B. Farnham, Hockessin, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

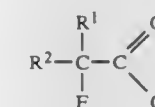
Filed Jan. 21, 1992, Ser. No. 823,211

Int. Cl.<sup>6</sup> C07C 45/63

U.S. Cl. 568—490

9 Claims

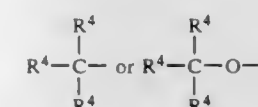
1. A process for the preparation of fluorinated aldehydes comprising contacting finely divided palladium, a silicon hydride of the formula  $(R^5)_3SiH$  wherein each  $R^5$  is independently alkyl containing 1 to 20 carbon atoms, and an acyl chloride of the formula



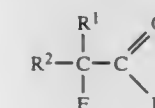
wherein:

$R^1$  is fluorine, pentafluorophenyl or  $R^3R^4CF$ —;

$R^2$  is fluorine, pentafluorophenyl,



$R^3$  and each  $R^4$  are independently fluorine, hydrocarbyl, or ether, fluorine, chlorine, bromine cyano or alkoxy-carbonyl substituted hydrocarbyl, to yield a fluorinated aldehyde of formula



wherein:

$R^1$  and  $R^2$  are as defined above.

5,414,141

**USE OF SUPPORTED PALLADIUM CATALYSTS IN THE PREPARATION OF TERTIARY BUTYL ALCOHOL FROM TERTIARY BUTYL HYDROPEROXIDE**

John R. Sanderson, Leander; John F. Knifton, Austin, and Roger G. Duranleau, Georgetown, all of Tex., assignors to Texaco Chemical Inc., White Plains, N.Y.

Filed Nov. 12, 1993, Ser. No. 150,919

The portion of the term of this patent subsequent to Mar. 21, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 407/00, 409/10, 29/132, 31/12

U.S. Cl. 568—578

3 Claims

1. In a method wherein a tertiary butyl hydroperoxide charge stock comprising a solution of tertiary butyl hydroperoxide in tertiary butyl alcohol is brought into contact with a catalytically effective amount of a hydroperoxide decomposition catalyst in a hydroperoxide decomposition reaction zone in liquid phase with agitation to conjointly convert said tertiary butyl hydroperoxide to decomposition products, principally tertiary butyl alcohol, and ditertiary butyl peroxide, the improvement which comprises:

a) using, as said hydroperoxide decomposition catalyst, palladium and gold supported on alumina and

b) recovering tertiary butyl alcohol and ditertiary butyl peroxide from the products of said hydroperoxide decomposition reaction.

5,414,142

**PROCESS FOR THE PREPARATION OF MEDIUM SIZED CARBOCYCLIC ALKYL ETHERS**

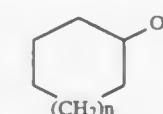
John J. Chapman, Greensboro, and Jack R. Reid, Whitsett, both of N.C., assignors to Lorillard Tobacco Company, New York, N.Y.

Continuation of Ser. No. 859,646, Mar. 23, 1992, abandoned, which is a continuation of Ser. No. 551,404, Jul. 12, 1990, abandoned. This application Jun. 28, 1993, Ser. No. 84,662  
Int. Cl.<sup>6</sup> C07C 41/14

U.S. Cl. 568—579

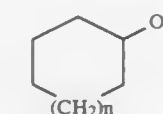
14 Claims

1. A method for the preparation of a carbocyclic ether having from 10 to 16 carbon atoms in the ring of the formula



wherein  $R$  is a straight or branched ( $C_3$ - $C_6$ ) chain alkyl group or a benzyl group and  $n$  is from 5 to 11 carbon atoms, which method comprises:

(1) reacting under an inert atmosphere a mixture consisting essentially of a carbocyclic alcohol of the formula



wherein  $n$  is from 5 to 11 carbon atoms, about 1.5-10 molar equivalents of said alcohol of a straight or branched ( $C_3$ - $C_6$ ) chain alkyl halide or a benzyl halide and a metal hydride;

(2) destroying the excess metal hydride with an alcohol solvent

(3) separating the ( $C_{10}$ - $C_{16}$ ) carbocyclic ether by extraction; and

(4) distilling off the ( $C_{10}$ - $C_{16}$ ) carbocyclic ether in substantially pure form.

5,414,143

**PREPARATION OF POLYOXYALKYLENE GLYCOL MONOETHERS OF MONOHYDRIC ALCOHOLS**

Hans-Juergen Weyer, Mannheim; Rolf Fischer, Heidelberg; Gerhard Jeschek, Gruenstadt, and Herbert Mueller, Frankfurt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation of Ser. No. 843,820, Feb. 28, 1992, abandoned.

This application Mar. 2, 1993, Ser. No. 24,904

Claims priority, application Germany, Mar. 13, 1991, 41 08 045.9

Int. Cl.<sup>6</sup> C07C 41/01, 41/02

U.S. Cl. 568—617

8 Claims

1. A process for the preparation of a polymer which is a polyoxyalkylene glycol monoether of a monohydric alcohol, which comprises:

polymerizing tetrahydrofuran or a mixture consisting of tetrahydrofuran with a total of not more than 95 mol % based on the tetrahydrofuran used, of one or more comonomers selected from the group consisting of cyclic ethers and acetals, in the absence of water and in the presence of a monohydric alcohol and also in the presence of 10 to 300 parts by weight, per 100 parts by weight of the monomers used, of an acid catalyst consisting essentially of a solvated, anhydrous heteropolyacid, the content of the monohydric alcohol being chosen to form the reaction mixture into two homogeneous, liquid phases, wherein the lower heavier phase contains the major part of the heteropolyacid catalyst and of the alcohol in addition to monomeric starting material and freshly formed polymer



and wherein the upper lighter phase is composed essentially of the monomeric starting material and polymer dissolved therein in addition to residual amounts of alcohol and catalyst.

5,414,144

# PROPYLENE GLYCOL CYCLOHEXYL ETHER DERIVATIVES, METHOD OF PRODUCING SAME AND USES THEREOF

Tomonari Watanabe, Yamato; Izumi Yamashita, Yokohama; Masazumi Chono, Yokohama, and Tetsushi Kouno, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

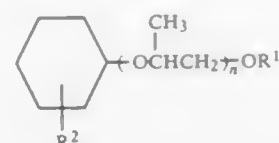
Filed Sep. 21, 1993, Ser. No. 125,094

Int. Cl.<sup>6</sup> C07C 41/00; C11D 1/22; B01F 17/42

U.S. Cl. 568—670

8 Claims

1. A propylene glycol cyclohexyl ether derivative represented by the formula (I)



wherein R<sup>1</sup> represents a straight or branched alkyl group having 1 to 6 carbon atoms, or a cycloalkyl group having 3 to 6 carbon atoms; R<sup>2</sup> represents a hydrogen atom or a hydroxyl group; and n represents an integer of from 1 to 3.

5,414,145

# PRODUCTION OF TERTIARY BUTYL ALCOHOL FROM ISOBUTANE

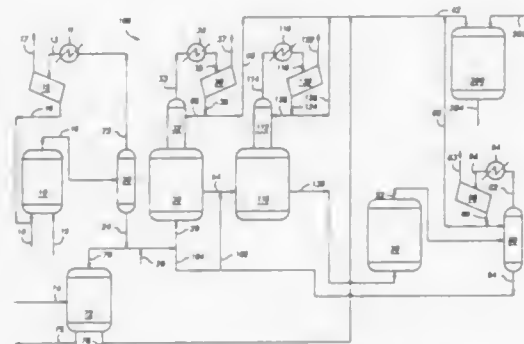
Yu-Hwa E. Sheu, Hsinchu, Taiwan, Prov. of China; John R. Sanderson, Leander, Tex.; Mark A. Mueller, Austin, Tex., and William A. Smith, Houston, Tex., assignors to Texaco Chemical Inc., White Plains, N.Y.

Filed Aug. 11, 1994, Ser. No. 288,842

Int. Cl.<sup>6</sup> C07C 29/132, 31/12, 41/01, 301/19

U.S. Cl. 568—671

7 Claims



1. A process for producing tertiary butyl alcohol from isobutane which comprises the steps of:

noncatalytically contacting isobutane with oxygen in an oxidation reactor under oxidation reaction conditions selected to provide an initial liquid reaction product comprising unreacted isobutane, peroxides including tertiary butyl hydroperoxide and tertiary butyl alcohol and contaminating quantities of oxygen-containing impurities including methanol, acetone and water, distilling said initial reaction product in a first distillation column into a first lighter distillation overhead fraction comprising isobutane and a first heavier liquid distillation

fraction comprising the remainder of said initial liquid reaction product,

charging said first heavier liquid distillation fraction and a catalytically effective amount of a soluble peroxide decomposition catalyst to a first hydroperoxide decomposition reactor fitted with a fractionating column and a condenser and establishing catalytic peroxide decomposition conditions of time, temperature and pressure therein correlated to provide as a second heavier liquid fraction a first liquid hydroperoxide decomposition product comprising tertiary butyl alcohol, peroxide decomposition catalyst, a reduced quantity of peroxides, and contaminating quantities of oxygen-containing impurities including methanol, acetone and water, and as a second lighter overhead fraction a first vaporized hydroperoxide decomposition product comprising oxygen and vaporized normally liquid components comprising tertiary butyl alcohol and contaminating quantities of oxygen-containing impurities including methanol, acetone and water,

discharging said first vaporized decomposition product through said fractionating column, condensing normally liquid components of said first vaporized decomposition product to form a first condensate including tertiary butyl alcohol and oxygen-containing impurities including methanol, acetone and water,

returning a portion of said first condensate to said fractionating column as reflux and recovering the remaining portion as a tertiary butyl alcohol reaction product,

charging said first liquid decomposition product to a second hydroperoxide decomposition reactor and establishing hydroperoxide decomposition reaction conditions of time, temperature and pressure therein sufficient to substantially completely decompose the peroxides in said first liquid decomposition product and to form a second hydroperoxide decomposition product comprising tertiary butyl alcohol, minor quantities of peroxides, oxygen-containing impurities including methanol, acetone and water and oxygen,

charging said second decomposition product to a second distillation column and separating it therein into a third lighter overhead fraction comprising oxygen, and vaporized normally liquid components including tertiary butyl alcohol, water and oxygen-containing impurities including acetone and methanol and a third heavier liquid fraction comprising normally liquid reaction by-products, including tertiary butyl alcohol and residual quantities of hydroperoxide contaminants and dissolved peroxide decomposition catalyst,

recycling said third heavier fraction to said first hydroperoxide decomposition oxidation reactor,

condensing normally liquid components of said third lighter overhead fraction to form a second condensate including tertiary butyl alcohol and oxygen-containing impurities including methanol, acetone and water,

returning a portion of said second condensate to said second distillation column as reflux and recovering the remaining portion as a tertiary butyl alcohol reaction product.

4. A process for continuously producing tertiary butyl alcohol from isobutane which comprises the steps of:

continuously noncatalytically contacting isobutane with oxygen in a first oxidation reactor under oxidation reaction conditions including a temperature of about 80° to about 120° C. a pressure of about 10 to about 25 psig and a reaction time of about 0.5 to about 1 hour selected to provide an initial liquid reaction product comprising unreacted isobutane, peroxides, including tertiary butyl hydroperoxide, tertiary butyl alcohol and contaminating quantities of oxygen-containing impurities including methanol, acetone and water,

continuously distilling said initial reaction product in a first distillation column into a first lighter distillation overhead fraction comprising isobutane and a first heavier liquid distillation fraction comprising the remainder of said initial liquid reaction product,

continuously charging at least a portion of said first heavier liquid distillation fraction and a catalytically effective amount of a soluble molybdenum hydroperoxide decomposition catalyst to a first hydroperoxide decomposition zone containing a plurality of hydroperoxide reaction vessels, each hydroperoxide reaction vessel being fitted with a fractionating column and a condenser, said first heavier liquid distillation fraction being charged to the first of the series of hydroperoxide reaction vessels in the first hydroperoxide decomposition zone and the peroxide decomposition product from the first and succeeding hydroperoxide decomposition vessels in the series being continuously charged to the next succeeding decomposition vessel, the last of the series of hydroperoxide decomposition products being discharged from the first hydroperoxide decomposition zone,

establishing catalytic hydroperoxide decomposition reaction conditions in said peroxide decomposition vessels including a temperature of about 50° to about 200° C., a pressure of about 5 to 50 psia and a reaction time of about 0.25 to about 4 hours correlated to provide as a second heavier liquid fraction a liquid hydroperoxide decomposition reaction product in each of the hydroperoxide reaction vessels comprising tertiary butyl alcohol, soluble molybdenum hydroperoxide decomposition catalyst, a reduced quantity of hydroperoxides and contaminating quantities of oxygen-containing impurities including methanol, acetone and water and as a second lighter overhead fraction a vaporized hydroperoxide decomposition product comprising oxygen, tertiary butyl alcohol and contaminating quantities of oxygen-containing impurities including methanol, acetone and water,

continuously discharging the vaporized hydroperoxide decomposition product of each of the decomposition vessels through the fractionating column associated therewith, condensing normally liquid components of said vaporized hydroperoxide decomposition product to form a condensate including tertiary butyl alcohol and oxygen-containing impurities including methanol and acetone and water, continuously returning a portion of each of said condensates to its said associated fractionating column as reflux and recovering the remaining portion as a tertiary butyl alcohol reaction product,

continuously charging said last of the series of liquid hydroperoxide decomposition products to a second hydroperoxide decomposition zone and establishing hydroperoxide decomposition reaction conditions including a temperature of about 80° to about 170° C., a pressure of about 40 to about 150 psig and a reaction time of about 0.25 to about 6 hours sufficient to substantially completely decompose the hydroperoxides in said second liquid hydroperoxide decomposition product and to form a second hydroperoxide decomposition product comprising tertiary butyl alcohol, minor quantities of peroxides, oxygen-containing impurities including methanol, acetone and water and oxygen,

continuously charging said second hydroperoxide decomposition product to a second distillation zone and separating it therein into a third lighter overhead fraction comprising oxygen and vaporized normally liquid components including tertiary butyl alcohol, water and oxygen-containing impurities including acetone and methanol and a third heavier liquid fraction comprising normally liquid reaction products, including tertiary butyl alcohol and residual quantities of hydroperoxide contaminants and dissolved hydroperoxide decomposition catalyst,

continuously recycling said third heavier fraction to said first hydroperoxide decomposition zone, continuously condensing normally liquid components of said third lighter overhead fraction to form a second condensate including tertiary butyl alcohol and oxygen-containing impurities including methanol and acetone and water, continuously returning a portion of said second condensate to said second distillation column as reflux and recovering

the remaining portion as a tertiary butyl alcohol reaction product.

5. A process as in claim 4 wherein at least a portion of the said tertiary butyl alcohol reaction product is charged together with methanol to a methyl tertiary butyl ether reaction zone wherein the methanol and tertiary butyl alcohol are converted to methyl tertiary butyl ether.

5,414,146

# MULTIZONE CATALYTIC PROCESS

Weldon K. Bell, Pennington; Steven H. Brown, Princeton, both of N.J.; Mohsen N. Harandi, Langhorne, and Jeffrey C. Trevelia, Kennett Square, both of Pa., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Aug. 23, 1993, Ser. No. 109,971

Int. Cl.<sup>6</sup> C07C 41/06

U.S. Cl. 568—697

7 Claims

1. In a continuous process for reacting volatile lower alkanol and tertiary-alkene in a catalytic distillation reactor vessel to produce a corresponding ether, the improvement which comprises:

maintaining a first bed of solid acid resin catalyst particles in a lower portion of the catalytic distillation reactor vessel and a second bed of solid acid porous metallosilicate catalyst particles in an upper portion of the reactor vessel, said metallosilicate having a pore size of 5–8 Å and having active Bronsted acid sites;

introducing at least one volatile reactant stream and contacting the alkanol and tertiary-alkene with the first bed of solid acid catalyst particles at a temperature between 65° and 90° C. at the bottom of the first bed to form ether product under etherification conditions; maintaining catalytic distillation conditions in the first bed of solid acid catalyst particles to condense ether product for recovery as a liquid product stream while vaporizing and transporting unreacted volatile alkanol and tertiaryalkene into contact with the second bed of catalyst particles in an upper portion of the reactor vessel; and further reacting the volatile alkanol and tertiary-alkene in the second bed of catalyst particles at a reaction temperature between 40° and 60° C. at the top of the second bed to produce additional ether product.

5,414,147

# METHOD FOR IMPROVING CONVERSION OF ISOBUTYLENE IN MTBE PROCESS

Kunio Koga, Houston, Tex., assignor to Global Octanes Corporation, Deer Park, Tex.

Filed Aug. 24, 1993, Ser. No. 111,385

Int. Cl.<sup>6</sup> C07C 41/06

U.S. Cl. 568—697

13 Claims

1. A process for increasing the conversion of isobutylene to MTBE in the production of MTBE from a reaction of isobutylene with methanol while simultaneously producing a substantially methanol-free MTBE comprising the steps of:

(a) feeding the methanol and isobutylene to a MTBE reactor at a methanol to isobutylene molar ratio greater than 1.06 but not exceeding 1.2 to achieve a higher isobutylene conversion to MTBE;

(b) feeding a reactor effluent from the MTBE reactor containing MTBE, methanol and C4 hydrocarbons into a distillation column having a top and a bottom zone, wherein the methanol in the distillation column forms an azeotrope with the C4 hydrocarbons at an azeotropic ratio of 0.065 at 95 psig;

(c) recovering an overhead product comprising a mixture of methanol and C4 hydrocarbons from the top zone;

(d) condensing and sending the overhead product to an intermediate tank;

(e) thereafter removing the methanol from the condensed overhead product;

(f) recovering a substantially methanol-free raffinate;

- (g) sending the recovered raffinate to a dehydration tower and producing a methanol-free exit liquid;  
 (h) using a portion of the exit liquid as reflux to the distillation column; and  
 (i) recovering a substantially methanol-free MTBE from the bottom zone of the distillation column.

5,414,148

**PREPARATION OF P-NITROPHENOLIC COMPOUNDS**  
 Pascal Métivier, Lyons, and Laurent Bernard, Venissieux, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie Cedex, France

Filed May 26, 1994, Ser. No. 249,200

Claims priority, application France, May 26, 1993, 93 06325  
 Int. Cl.<sup>6</sup> C07C 205/20, 205/21, 205/26

U.S. Cl. 568—706 24 Claims

1. A process for the preparation of a p-nitrophenolic compound, comprising (a) reacting a phenolic compound with a nitrosating agent in the presence of sulfuric acid, the concentration of which H<sub>2</sub>SO<sub>4</sub> being at least 60%, (b) oxidizing the p-nitrosophenolic compound thus formed with nitric acid, the concentration of sulfuric acid in the medium of reaction, upon completion of oxidation, being no greater than 80%, and (c) separating the p-nitrophenolic compound which thus precipitates.

5,414,149

**COLOR STABLE BISPHENOLS**

Dennis Garrett, Evansville; Mitch Reynolds, Wadesville, and John Vanbuskirk, Evansville, all of Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Mar. 2, 1994, Ser. No. 204,716

Int. Cl.<sup>6</sup> C07C 37/88

U.S. Cl. 568—724 9 Claims

1. A method of color-stabilizing crystallized bisphenol compositions, which comprises:  
 admixing with the molten bisphenol after distillation but before crystallization a color-stabilizing proportion of an  $\alpha$ -hydroxypolycarboxylic acid iron sequestrant.

5,414,150

**PREPARATION OF 4,4'-DIHYDROXY- $\alpha$ -ALKYLSTILBENES AND 4,4'-DIHYDROXY- $\alpha$ -ALPHA, ALPHA-DIALKYLSTILBENES**

Robert E. Hefner, Jr.; Maria I. Villarreal, and David A. Carr, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 3, 1993, Ser. No. 162,517

Int. Cl.<sup>6</sup> C07C 39/215

U.S. Cl. 568—729 2 Claims

1. 4,4'-dihydroxy- $\alpha$ -methylstilbene having a melting point of at least 186° C.

5,414,151

**METHOD FOR MAKING BISPHENOL**

Eric J. Pressman, East Greenbush, and Sheldon J. Shafer, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

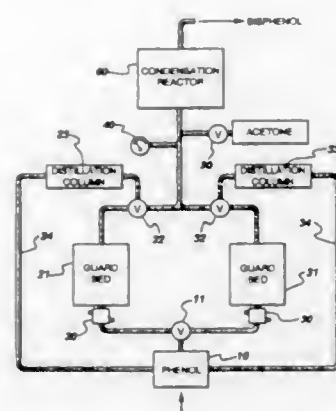
Filed May 2, 1994, Ser. No. 236,816

Int. Cl.<sup>6</sup> C07C 37/20, 39/16

U.S. Cl. 568—727 7 Claims

1. A condensation process for making bisphenol, which comprises effecting reaction between a phenol reactant and a ketone in the presence of a sulfonated aromatic organic polymeric ion-exchange resin having chemically combined organo mercaptan groups attached to backbone sulfonate radicals, where there is used as the phenol reactant, a material produced by passing phenol through an ion-exchange resin comprising a

sulfonated aromatic organic polymeric ion-exchange resin having organo mercaptan groups attached to backbone sulfo-



nate radicals until the resulting phenolic effluent has more than about 1 ppm of hydroxyacetone.

5,414,152

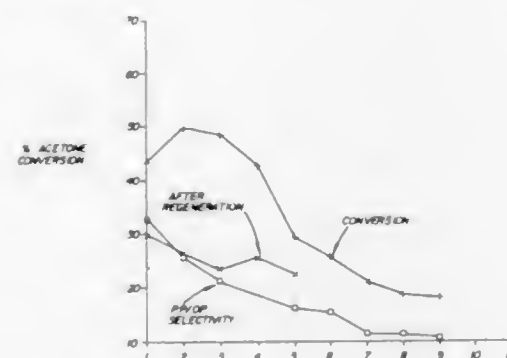
**METHOD FOR EXTENDING THE ACTIVITY OF ACIDIC ION EXCHANGE CATALYSTS**

Michael J. Cipullo, Prattville, Ala., assignor to General Electric Company, Pittsfield, Mass.

Filed May 10, 1994, Ser. No. 241,236

Int. Cl.<sup>6</sup> C07C 37/20, 39/16

U.S. Cl. 568—727 11 Claims



1. In a process for the reaction of a ketone with a phenol, in the presence of an acidic cation exchange resin having organomeraptan promoter groups, the improvement which comprises: adding to the reaction mixture from about 100 to about 5000 ppm of 3-mercaptopropionic acid or the organic ester thereof.

5,414,153

**HYDROXYLATION OF PHENOLIC COMPOUNDS**

Michel Costantini, and Dominique Laucher, both of Lyons, France, assignors to Rhone-Poulenc Chimie, Courbevoie Cedex, France

Filed Apr. 5, 1993, Ser. No. 42,527

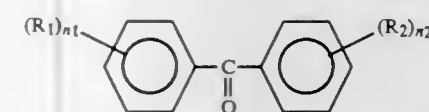
Claims priority, application France, Apr. 3, 1992, 92 04061

Int. Cl.<sup>6</sup> C07C 37/60, 39/08, 39/16, 39/27

U.S. Cl. 568—771 31 Claims

1. A process for the hydroxylation of an aromatic compound substituted with a —OR group and having a hydrogen atom in the para position to the —OR group, where R is a hydrogen atom or a hydrocarbon radical having from 1 to 24 carbon atoms, comprising reacting said aromatic compound with hydrogen peroxide, in the presence of a catalytically effective amount of a sulfonated polymer and a cocatalytically effective

amount of a benzophenone compound having the Formula (II):



in which R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, are each a hydrogen atom or an electron-donor group, and n<sub>1</sub> and n<sub>2</sub>, which may be identical or different, are each a number equal to 0, 1, 2 or 3, with the proviso that the two carbon atoms situated in the alpha position relative to the two carbon atoms from which the



group depends can be bonded together via a valence bond or via a —CH<sub>2</sub>— bridge, thus forming a saturated or unsaturated ketone ring member.

**5,414,154**  
**PHENOL WITH LOW LEVELS OF METHYLBENZOFURAN**

Theodore J. Jenczewski, Midlothian; Lamberto Crescentini, and James A. Kweeder, both of Chester, all of Va., assignors to AlliedSignal Inc., Morris Township, Morris County, N.J.

Filed Jun. 6, 1994, Ser. No. 254,729

Int. Cl.<sup>6</sup> C07C 37/68, 37/70

U.S. Cl. 568—754 9 Claims

1. A process for the reduction of methylbenzofuran (MBF) impurities in phenol obtained from the decomposition product of cumene hydroperoxide comprising:

treating the phenol to reduce the level of acetol to an amount not to exceed 260 ppm;

contacting the phenol containing a low level of acetol with an aromatic sulfonic acid resin or a solid superacid catalyst compound at sufficient temperature and for sufficient time to reduce the level of MBF by conversion to higher boiling compounds; then

distilling the phenol to separate phenol from higher boiling compounds.

5,414,155

**PREPARATION OF O-DIHYDROXYLATED AROMATIC COMPOUNDS VIA OXIDATION OF O-FUCHSONES**

Michel Costantini, Lyon; Daniel Manaut, Meyzieu, and Daniel Michelet, Saint-Nom-la-Breteche, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie Cedex, France

Filed Jan. 10, 1994, Ser. No. 179,130

Claims priority, application France, Jan. 8, 1993, 93 00121

Int. Cl.<sup>6</sup> C07C 37/60

U.S. Cl. 568—771 23 Claims

1. A process for the preparation of an o-dihydroxylated aromatic compound, comprising reacting an oxidizing agent with an o-fuchsonone, said o-fuchsonone being in an anhydrous or hydrated state, or a mixture thereof.

5,414,156

**PROCESS FOR PRODUCING ORTHO-ISOPROPYLATED PHENOL DERIVATIVES**

Jung H. Cho; Kie H. Nam, and Wan S. Kim, all of Seoul, Rep. of Korea, assignors to Dong Kook Pharmaceutical Co., Ltd. and Ki-Beom Kwon, both of Seoul, Rep. of Korea

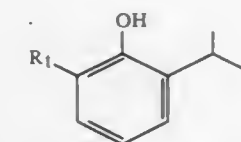
Filed May 10, 1994, Ser. No. 245,091

Claims priority, application Rep. of Korea, Sep. 8, 1993, 1993-18007

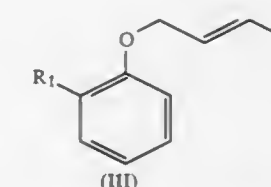
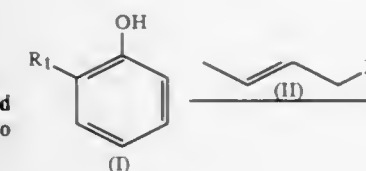
Int. Cl.<sup>6</sup> C07C 37/50, 37/11

U.S. Cl. 568—781 12 Claims

1. A process for producing ortho-isopropylated phenol derivatives having following formula (VIII), the said process comprising the steps for:

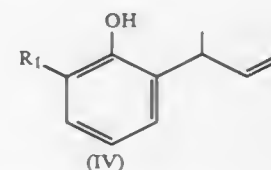
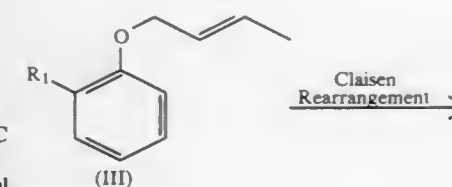


(a) producing a phenyl allyl ether having following formula (III) by reaction of a phenol derivative having following formula (I) and a crotyl derivative having following formula (II)



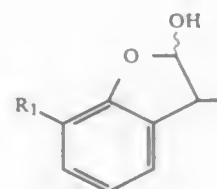
(in this reaction formula, R<sub>1</sub> is a hydrogen or a low alkyl group of C<sub>1</sub>—C<sub>4</sub>, X is chloride, bromide, iodide, para-toluene sulfonyl or methane sulfonyl)

(b) producing a phenol derivative having formula (IV) where allyl group of phenyl allyl ether (III) migrates to ortho position by means of Claisen rearrangement,

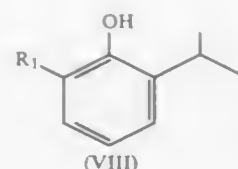
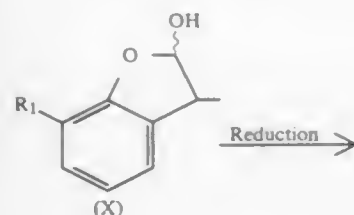


(c) producing a hemiacetal having following formula (X) by oxidation of the phenol derivative (IV), and





(d) producing an ortho-isopropylated phenol derivative (VIII) by reduction of the hemiacetal (X).



5,414,157

## CATALYTIC OXIDATION OF ALKANES

Vincent A. Durante, West Chester, Pa.; Darrell W. Walker, Visalia, Calif.; Steven M. Gussow, Glen Mills, Pa.; James E. Lyons, Wallingford, Pa., and Robert C. Hayes, Media, Pa., assignors to Sun Company, Inc. (R&M), Philadelphia, Pa. Continuation-in-part of Ser. No. 599,185, Oct. 17, 1990, Pat. No. 5,132,472. This application Jul. 20, 1992, Ser. No. 916,915. The portion of the term of this patent subsequent to Jul. 21, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 29/00, 35/06

U.S. Cl. 568—840

9 Claims

1. An oxidation process for converting feedstock to oxidation product comprising passing feedstock comprising gaseous hydrocarbon or oxygenated hydrocarbon having 1 to 10 carbon atoms at a temperature in the range from about 300° C. to 600° C. with air or oxygen through a reaction zone containing an open space and a bed of solid granular oxidation catalyst, withdrawing oxidation product from said open space, and simultaneously withdrawing oxidation product from an additional location in the reaction zone representative of a longer contact with said catalyst bed than the products withdrawn from said open space.

5,414,158

## METHOD OF PREPARING ALKOXY-MAGNESIUM HALIDES

Stefan Gurtzgen, Wuppertal, Germany, assignor to Witco GmbH, Bergkamen, Germany

Filed Aug. 17, 1993, Ser. No. 107,651

Claims priority, application Germany, Mar. 14, 1991, 41 08 204.4

Int. Cl.<sup>6</sup> C07C 31/30, 29/70

U.S. Cl. 568—851

7 Claims

1. A method of preparing alkoxy-magnesium halides of the general formula ROMgX wherein magnesium which has been preactivated by means of small amounts of an alkyl-magnesium compound is reacted stoichiometrically in a one-step process with an equimolar mixture of alkyl halide R<sup>1</sup>X and an alcohol R<sup>2</sup>OH in an inert hydrocarbon under an inert-gas atmosphere, where R is an alkyl from 1 to 18 carbon atoms, X is halide, R<sup>1</sup> is a linear, branched or cyclic hydrocarbon radical having 1-8

carbon atoms, and R<sup>2</sup> is a linear, branched or cyclic hydrocarbon radical having 1-20 carbon atoms.

(X)

5,414,159  
PROCESS

Paul Appleton, Darlington, and Michael A. Wood, Middlesbrough, both of England, assignors to Eastman Chemical Company, Kingsport, Tenn.

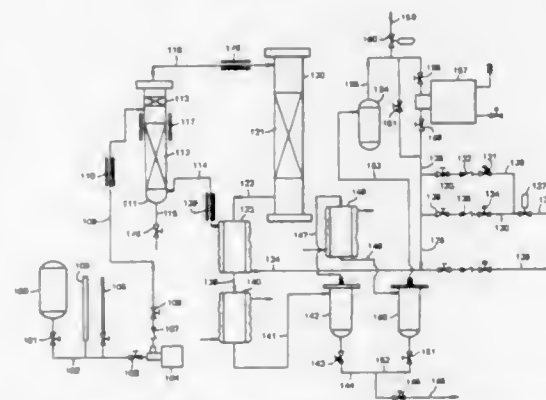
Filed Dec. 30, 1993, Ser. No. 174,320

Claims priority, application United Kingdom, Dec. 2, 1993, 9324785

Int. Cl.<sup>6</sup> C07C 29/136, 31/20

U.S. Cl. 568—864

17 Claims



1. A process for the production of cyclohexanedimethanol by hydrogenation of dialkyl cyclohexanedicarboxylate which comprises the steps of:

- providing a hydrogenation zone containing a charge of a granular reduced manganese promoted copper catalyst;
- forming a vaporous feed stream of a hydrogenatable material comprising a dialkyl cyclohexanedicarboxylate and from about 0.1 wt % up to about 15 wt % of an acidic material at a feed temperature which is in the range of from about 150° C. to about 350° C. and which is above the dew point of the feed stream and at a feed pressure which is in the range of from about 150 psia (about 10.34 bar) up to about 2000 psia (about 137.90 bar), said vaporous mixture having a known hydrogen-containing gas:dialkyl cyclohexanedicarboxylate ratio;
- supplying the vaporous feed stream to the hydrogenation zone;
- maintaining hydrogenation conditions in the hydrogenation zone which are effective to maintain the reaction mixture in contact with the catalyst above its dew point;
- passing the vaporous feed stream through the hydrogenation zone; and
- recovering from the hydrogenation zone a product stream comprising cyclohexanedimethanol; wherein the dialkyl cyclohexanedicarboxylate is selected from di-(C<sub>1</sub> to C<sub>4</sub> alkyl) cyclohexanedicarboxylates.

5,414,160

## METHOD FOR DIMERIZING BUTENES, DIMERIC COMPOSITION OF BUTENES AND METHOD FOR PRODUCING ALCOHOLS BY MEANS THEREOF

Keiichi Sato, Tokyo; Yuuji Kawaragi, and Yasuko Higashino, both of Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

PCT No. PCT/JP93/01477, § 371 Date Jun. 16, 1994, § 102(e) Date Jun. 16, 1994, PCT Pub. No. WO94/08924, PCT Pub. Date Apr. 28, 1994

PCT Filed Oct. 14, 1993, Ser. No. 244,718

Claims priority, application Japan, Oct. 16, 1992, 4-278986

Int. Cl.<sup>6</sup> C07C 29/141, 31/125, 11/02, 2/30

U.S. Cl. 568—883

18 Claims

1. A method for dimerizing butenes in the presence of a catalyst, wherein a catalyst system is used which is produced in situ from (i) an organonickel compound having no nickel-halogen bond, (ii) a triarylphosphine and/or a monoalkyldiarylphosphine, (iii) an organoaluminum compound and (iv) hydrogen.

13. A method for producing alcohols wherein a product obtained by dimerization of butenes in the presence of a catalytic system produced in situ from (i) an organonickel compound having no nickel-halogen bond, (ii) a triarylphosphine and/or a monoalkyldiarylphosphine, (iii) an organoaluminum compound and (iv) hydrogen is subjected to a hydroformylation reaction and a hydrogenation reaction.

5,414,161

## PROCESS FOR THE PREPARATION OF ETHANOL FROM METHANOL

Sung J. Uhm, Seoul; Sung H. Han, Kyonggi; Jun W. Oh, Seoul; Oh S. Joo, Seoul; Kwang D. Jung, Seoul, and Jung Y. Beak, Seoul, all of Rep. of Korea, assignors to Korea Institute of Science and Technology, Seoul, Rep. of Korea

Continuation-in-part of Ser. No. 154,709, Nov. 17, 1993, and a continuation-in-part of Ser. No. 183,344, Jan. 19, 1994, which is a division of Ser. No. 175,577, Dec. 30, 1993, which is a division of Ser. No. 81,107, Jun. 25, 1993, abandoned, which is a division of Ser. No. 174,263, Dec. 28, 1993. This application Mar. 17, 1994, Ser. No. 214,240

Claims priority, application Rep. of Korea, Jun. 30, 1992, 92-11524; Oct. 30, 1992, 92-20188; Nov. 17, 1992, 93-21568; Dec. 23, 1992, 92-25281; Jul. 27, 1993, 93-14265

Int. Cl.<sup>6</sup> C07C 29/147, 31/18

U.S. Cl. 568—885

12 Claims

- A process for producing ethanol, which comprises:
  - carbonylating methanol in a gas phase with carbon monoxide in a carbonylation reactor, said carbon monoxide being optionally in admixture of hydrogen, in the presence of a rhodium catalyst comprised of a rhodium compound and a second metallic component selected from the group consisting of an alkali metal, an alkaline earth metal, a transition metal and a mixture thereof, and supported on an inert material, and a halide co-catalyst under mild carbonylation conditions and a high GHSV (Gas Hourly Space Velocity) of methanol to produce a mixture of acetic acid and methyl acetate;
  - separating from the mixture in a distillation column said acetic acid as a high boiling fraction thereof, and a mixture of said methyl acetate and the co-catalyst as a low boiling fraction thereof;
  - further separating all or a major portion of said methyl acetate from the co-catalyst in the low boiling fraction and recycling the separated co-catalyst with or without a minor portion of said methyl acetate to the carbonylation reactor; and
  - hydrogenating said separated methyl acetate with hydrogen gas in a hydrogenation reactor in the presence of a copper-containing hydrogenation catalyst to produce ethanol at a high yield.

5,414,162

## USE OF PENTAGONALLY SUPPORTED PALLADIUM CATALYST IN THE PREPARATION OF TERTIARY BUTYL ALCOHOL FROM TERTIARY BUTYL HYDROPEROXIDE

John R. Sanderson, Leander, and John F. Knifton, Austin, both of Tex., assignors to Texaco Chemical Inc., White Plains, N.Y.

Filed Nov. 12, 1993, Ser. No. 150,917

The portion of the term of this patent subsequent to Mar. 28, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 29/132, 31/12

U.S. Cl. 568—909.8

7 Claims

1. In a method wherein a solvent solution of a tertiary butyl hydroperoxide charge stock is brought into contact with a catalytically effective amount of a hydroperoxide decomposition catalyst in a hydroperoxide decomposition reaction zone in liquid phase with agitation to convert said tertiary butyl hydroperoxide to decomposition products, principally tertiary butyl alcohol, the improvement which comprises:

- using, as said hydroperoxide decomposition catalyst, a supported hydroperoxide decomposition catalyst consisting essentially of pentagonally cross-sectioned pellets of alumina having palladium deposited thereon; and
- recovering tertiary butyl alcohol from the products of said hydroperoxide decomposition reaction.

5,414,163

## USE OF TITANIA OR ZIRCONIA IN THE PREPARATION OF TERTIARY BUTYL ALCOHOL FROM TERTIARY BUTYL HYDROPEROXIDE

John R. Sanderson, Leander; John F. Knifton, and Edward T. Marquis, both of Austin, all of Tex., assignors to Texaco Chemical Inc., White Plains, N.Y.

Filed Nov. 12, 1993, Ser. No. 150,918

The portion of the term of this patent subsequent to Mar. 28, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 29/132, 31/12

U.S. Cl. 568—909.8

13 Claims

1. In a method wherein a solvent solution of a tertiary butyl hydroperoxide charge stock is brought into contact with a catalytically effective amount of a hydroperoxide decomposition catalyst in a hydroperoxide decomposition reaction zone in liquid phase to convert said tertiary butyl hydroperoxide to decomposition products, principally tertiary butyl alcohol, the improvement which comprises:

- using titania or zirconia or a mixture thereof as said hydroperoxide decomposition catalyst; and
- recovering tertiary butyl alcohol from the products of said hydroperoxide decomposition reaction.

5,414,164

## CHLORINATION PROCESS

Stephen M. Brown, Nr Huddersfield; Janet C. Glass, Ilkley, and Gary N. Sheldrake, Huddersfield, all of United Kingdom, assignors to Zeneca Limited Imperial Chemical House, London, United Kingdom

Filed Aug. 2, 1993, Ser. No. 101,127

Claims priority, application United Kingdom, Aug. 3, 1992, 9216442

Int. Cl.<sup>6</sup> C07C 17/10

U.S. Cl. 570—123

13 Claims

1. A process for the preparation of 1,1,1-trichlorotrifluoroethane in which 1-chloro-2,2,2-trifluoroethane is subjected to chlorination by bringing the 1-chloro-2,2,2-trifluoroethane into contact with chlorine within a reaction vessel characterised in that the process is conducted in the liquid phase in the presence of a chemical free radical initiator under a pressure of from 1 to 20 bar and at a temperature within the range 50° to 120° C, and the product is separated from the reaction mixture by fractional distillation.

5,414,165

PROCESS FOR THE MANUFACTURE OF  
1,1,1,3,3,3-HEXAFLUOROPROPANE

Mario J. Nappa, Newark, Del., and Allen C. Sievert, Elkton, Md., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 29, 1994, Ser. No. 282,940  
Int. Cl.<sup>6</sup> C07C 17/08

U.S. Cl. 570—169

6 Claims

1. A process for producing 1,1,1,3,3,3-hexafluoropropane, comprising:

- (1) contacting 1,1,1,3,3,3-hexachloropropane with hydrogen fluoride in the vapor phase at a temperature of from about 200° C. to 400° C. in the presence of a catalyst comprising trivalent chromium, to produce a fluorinated product containing CF<sub>3</sub>CH<sub>2</sub>CF<sub>3</sub> and its haloprecursors with a total selectivity of at least about 95 percent; and
- (2) reacting a sufficient amount of said haloprecursor with hydrogen fluoride in the vapor phase at a temperature of from about 200° C. to 400° C. in the presence of a catalyst comprising trivalent chromium, to provide an overall selectivity to 1,1,1,3,3,3-hexafluoropropane of at least about 95 percent based upon the amount of 1,1,1,3,3,3-hexachloropropane reacted with HF in (1).

5,414,166

PROCESS FOR THE PREPARATION OF  
1,1,1-TRIFLUORO-2,2-DICHLOROETHANE

Hoon S. Kim; Kun Y. Park, and Byung G. Lee, all of Seoul, Rep. of Korea, assignors to Korea Institute of Science and Technology, Seoul, Rep. of Korea

Filed Nov. 29, 1993, Ser. No. 158,316  
Int. Cl.<sup>6</sup> C07C 19/08

U.S. Cl. 570—176

19 Claims

1. A process for the preparation of 1,1,1-trifluoro-2,2-dichloroethane comprising chlorinating 1,1,1-trifluoro-2-chloroethane with chlorine and hydrogen in the presence of activated carbon in a reactor, said chlorine and said hydrogen being fed into said reactor simultaneously or sequentially.

5,414,167

## PROCESS FOR PURIFYING

1,1,1-TRIFLUORO-2,2-DICHLOROETHANE FROM  
ISOMER 1,1,2-TRIFLUORO-1,2-DICHLOROETHANE

Letanzio Bragante, Padova; Paolo Cuzzato, Treviso, and Antonio Masiero, Padova, all of Italy, assignors to Ausimont S.p.A., Milan, Italy

Continuation of Ser. No. 147,088, Nov. 3, 1993, abandoned, which is a continuation of Ser. No. 961,374, Oct. 15, 1992, abandoned. This application Apr. 28, 1994, Ser. No. 234,708  
Claims priority, application Italy, Oct. 18, 1991, M191A2757  
Int. Cl.<sup>6</sup> C07C 17/38

U.S. Cl. 570—177

8 Claims

1. A process for selectively reducing or removing 1,1,2-trifluoro-1,2-dichloroethane from its mixtures with 1,1,1-trifluoro-2,2-dichloroethane which comprises contacting a gaseous mixture comprising 1,1,2-trifluoro-1,2-dichloroethane and 1,1,1-trifluoro-2,2-dichloroethane with a chrome oxide at temperatures ranging from 220° to 320° C. for a time ranging from 10 to 110 seconds under such conditions that dismutation of 1,1,2-trifluoro-1,2-dichloroethane occurs to yield a dismutation product, or products, removable from 1,1,1-trifluoro-2,2-dichloroethane.

5,414,168

ABSORPTION AND COLD SEPARATION PROCESS FOR  
RECOVERING PURIFIED HYDROGEN FROM A  
CATALYTIC DEHYDROGENATION ZONE EFFLUENT

Norman H. Scott, Arlington Heights, Ill., assignor to UOP, Des Plaines, Ill.

Division of Ser. No. 996,204, Dec. 23, 1992. This application May 6, 1993, Ser. No. 57,400

U.S. Cl. 585—2

7 Claims

1. A process for producing a hydrogen/hydrocarbon admixture for use in a catalytic dehydrogenation reaction zone by treating an effluent of said dehydrogenation zone, said effluent comprising at least about 20 to 60 mole % C<sub>2</sub>–C<sub>5</sub> olefinic hydrocarbons, comprising the steps of:

- (a) cooling said effluent by indirect heat exchange with said admixture;
- (b) passing said effluent to a first vapor-liquid separation zone and recovering therefrom a hydrogen-containing vapor phase comprising methane and a liquid phase comprising C<sub>2</sub>–C<sub>5</sub> olefinic hydrocarbons;
- (c) contacting said hydrogen-containing vapor phase with a lean liquid absorbent comprising C<sub>2</sub>–C<sub>5</sub> hydrocarbons at a temperature of less than about –120° F. in a countercurrent absorption zone to produce a hydrogen-rich gas stream and a methane-rich liquid absorbent;
- (d) refrigerating said hydrogen-rich gas stream to a temperature of less than about –200° F. to recover high purity hydrogen and passing said refrigerated, hydrogen-rich gas stream in indirect heat exchange with said hydrogen-containing vapor phase;
- (e) admixing said hydrogen-rich gas stream from step (d) with a hydrocarbon liquid comprising C<sub>2</sub>–C<sub>5</sub> paraffins to form said admixture; and
- (f) recycling at least a portion of the admixture to said dehydrogenation zone.

5,414,169

METHOD OF OBTAINING HYDROCARBON OIL FROM  
WASTE PLASTIC MATERIAL OR WASTE RUBBER  
MATERIAL AND APPARATUS FOR CARRYING OUT  
THE METHOD

Toshiki Takahashi, Higashihiroshima; Yoshio Tanimoto, Hiroshima; Akemi Muraoka, Kure, and Tatsuto Fukushima, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 21, 1994, Ser. No. 183,825

Claims priority, application Japan, Jan. 22, 1993, 5-009236; Dec. 1, 1993, 5-301981

U.S. Cl. 585—241

4 Claims

1. A method of obtaining hydrocarbon oil from waste plastic material or waste rubber material, comprising the steps of: subjecting the waste plastic material or the waste rubber material to thermal cracking so as to obtain a thermal cracking product; liquefying the thermal cracking product into a liquefied product; causing a liquid phase cracking reaction of the liquefied product under action of a catalyst on the liquefied product so as to produce a cracking product; and cooling the cracking product so as to obtain the hydrocarbon oil.

5,414,170

MIXED PHASE FRONT END C<sub>2</sub> ACETYLENE  
HYDROGENATION

Richard H. McCue, and Edna B. Hicks, both of Houston, Tex., assignors to Stone &amp; Webster Engineering Corporation, Boston, Mass.

Filed May 12, 1993, Ser. No. 60,880  
Int. Cl.<sup>6</sup> C07C 5/00, 5/03

U.S. Cl. 585—264

16 Claims

1. A process for hydrogenating acetylene in an olefin production plant, comprising the steps of, in sequence,

- (i) passing an olefin plant feedstream through a depropanizer to produce a liquid phase stream rich in C<sub>4</sub>+ components and a vapor phase stream rich in C<sub>3</sub> and lighter components and comprising acetylene;
- (ii) cooling said vapor phase stream to form a mixed vapor-liquid stream and passing said mixed vapor-liquid stream through a mixed phase hydrogenation zone to selectively hydrogenate at least a portion of the acetylene in said vapor phase stream;
- (iii) separating the effluent from the mixed phase hydrogenation zone into a hydrogenated vapor stream and a hydrogenated liquid stream and passing said hydrogenated vapor stream to a vapor phase hydrogenation zone;
- (iv) passing the effluent from the vapor phase hydrogenation zone to zones of further separation; and
- (v) recycling said hydrogenated liquid stream to said depropanizer as a reflux for said depropanizer.

5,414,171

PROCESS AND WASHED CATALYST FOR PARTIALLY  
HYDROGENATING AROMATICS TO PRODUCE  
CYCLOOLEFINS

Michael A. Richard, Foster City; Jacques C. De Deken, Palo Alto, and David K. Yee, Milpitas, all of Calif., assignors to Catalytica, Inc., Mountain View, Calif.

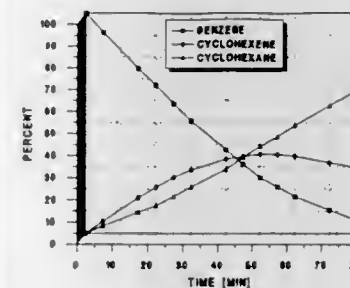
Filed Feb. 26, 1992, Ser. No. 843,347

The portion of the term of this patent subsequent to Aug. 2, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> C07C 5/11

U.S. Cl. 585—269

35 Claims



1. A process for producing cycloolefins from aromatic feedstocks comprising the steps of:

- preparing a partial hydrogenation catalyst comprised of ruthenium metal, a metallic selectivity promoter, and a composite catalyst support, wherein the ruthenium metal is loaded onto the catalyst support by initially depositing a ruthenium salt precursor on the catalyst support and reducing the ruthenium salt precursor to its metallic state;
- the metallic selectivity promoter is loaded onto the catalyst support after the ruthenium salt precursor has been reduced to its metallic state;
- the composite catalyst support is made up of a core of a first oxidic material having a surface area greater than about 50 m<sup>2</sup>/gm which is at least partially surrounded by a second oxidic material having a surface area less than about 10 m<sup>2</sup>/gm and the composite catalyst support has a BET surface area of at least 50 m<sup>2</sup>/gm; and

5,414,172

## NAPHTHA UPGRADING

Arthur A. Chin, Cherry Hill; Nick A. Collins, Medford, both of N.J.; Mohsen N. Harandi, Longhorne, Pa.; Robert T. Thomson, Laurenceville, N.J., and Robert A. Ware, Wyndmoor, Pa., assignors to Mobil Oil Corporation, Fairfax, Va. Continuation of Ser. No. 28,054, Mar. 8, 1993, abandoned. This application Jan. 21, 1994, Ser. No. 184,902

Int. Cl.<sup>6</sup> C07C 2/66, 4/06

U.S. Cl. 585—322

25 Claims

1. A process for upgrading a hydrocarbon naphtha feed to form a gasoline boiling range product of reduced benzene content, which comprises:

- (i) fractionating the hydrocarbon naphtha to form a C<sub>6</sub> fraction and a C<sub>7</sub>+ fraction;
- (ii) subjecting the C<sub>7</sub>+ fraction to reforming to form a reformat containing aromatic compounds formed by reforming of the hydrocarbons in the C<sub>7</sub>+ fraction;
- (iii) fractionating the reformat to form a C<sub>6</sub>— fraction containing benzene;
- (iv) reacting the benzene with olefins in the presence of the C<sub>6</sub> fraction of the naphtha and a catalyst of acidic functionality to form alkylaromatics.

5,414,173

PROCESS OF PREPARING CYCLOPENTADIENE AND  
SUBSTITUTED DERIVATIVES THEREOF

Juan M. Garces; Guo-shuh J. Lee, and David R. Wilson, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 22, 1993, Ser. No. 173,533

Int. Cl.<sup>6</sup> C07C 1/24

U.S. Cl. 585—357

20 Claims

1. A process of preparing cyclopentadiene or substituted cyclopentadiene comprising contacting cyclopentenol or a substituted cyclopentenol with a catalytic amount of a catalyst selected from the group consisting of aluminophosphate molecular sieves and silicoaluminophosphate molecular sieves, the contacting being conducted under reaction conditions sufficient to form cyclopentadiene or a substituted cyclopentadiene.

5,414,174

## SIDE-CHAIN ALKYLATION METHOD

Toshio Sato; Ikuo Ito; Hiromichi Yamaguchi, and Kyoichi Takeda, all of Kashima, Japan, assignors to Sumikin Chemical Co., Ltd., Japan

Filed Jun. 7, 1993, Ser. No. 73,162

Claims priority, application Japan, Jun. 5, 1992, 4-171772  
Int. Cl.<sup>6</sup> C07C 2/66

U.S. Cl. 585—467

16 Claims

1. A side-chain alkylation method to alkylate an alkyl aromatic compound, comprising the step of reacting the alkyl aromatic compound with an unsaturated hydrocarbon in the presence of an ether selected from the group of an alkyl ether and an alkyl aromatic ether, and in the presence of an alkaline metal catalyst and a promoter selected from the group of naphthalene, biphenyl, terphenyl, anthracene, pyrene, phenanthrene.



5,414,175

INCREASED PRODUCTION OF  
ALKYLNAPHTHALENES FROM REFORMINGBruce R. Cook, Baton Rouge, La., assignor to Exxon Research  
and Engineering Company, Florham Park, N.J.

Filed Oct. 8, 1993, Ser. No. 134,359

Int. Cl.<sup>6</sup> C10G 35/085, 35/095; C07C 2/66

U.S. Cl. 585—467

5 Claims

1. A method for increasing the production of alkylnaphthalenes in a reformer process unit, which method comprises: (i) reforming a gasoline boiling range hydro-carbonaceous feed-stream in the presence of a platinum containing supported catalyst at reforming conditions including temperatures from about 425° C. to about 650° C. and pressures from about 100 psig to about 500 psig; and (ii) introducing up to about 5 vol. % of an additional stream, based on the volume of the feedstream, which additional stream contains at least about 20 wt. % of tetralins and decalins.

5,414,176

METHOD FOR CONVERTING METHANE INTO  
HIGHER HYDROCARBONSHenri Amariglio, Nancy, and Jacques J. Saint Just, Le Pecq,  
both of France, assignors to GAZ de France, Paris, France

Filed Mar. 19, 1992, Ser. No. 842,091

Claims priority, application France, Jul. 20, 1990, 90 09340

The portion of the term of this patent subsequent to Feb. 9, 2011,  
has been disclaimed.Int. Cl.<sup>6</sup> C07C 2/10

U.S. Cl. 585—500

10 Claims

1. Method for converting methane into higher hydrocarbons, consisting essentially of the steps of exposing a catalyst comprising a transition metal and a support comprising a refractory metal oxide having a large specific surface, to a flow of a gas consisting essentially of methane at a temperature between about 100° and 300° C. for a contact time of at least one second, then exposing said catalyst to a hydrogen flow at a temperature between 100° and 300° C. for a contact time of at least one second, recovering a gaseous effluent consisting of said higher hydrocarbons and hydrogen, and separating the higher hydrocarbons from the hydrogen.

5,414,177

## IMMOBILIZED LEWIS ACID CATALYSTS

Tze-Chiang Chung, State College, Pa.; Frank J. Chen, Edison;  
Jon E. Stanat, Westfield, both of N.J., and Alok Kumar, State  
College, Pa., assignors to Exxon Chemical Patents Inc., Lin-  
den, N.J.

Division of Ser. No. 723,130, Jun. 28, 1991, Pat. No. 5,288,677.

This application Nov. 18, 1993, Ser. No. 154,228

Int. Cl.<sup>6</sup> C07C 2/30

U.S. Cl. 585—512

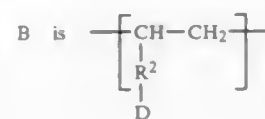
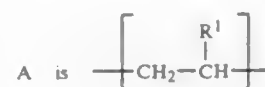
21 Claims

1. A process for polymerizing cationically polymerizable monomer comprising contacting said monomer with a catalytically effective amount of an immobilized Lewis Acid catalyst in a manner and under conditions sufficient to polymerize said monomer, wherein said immobilized catalyst comprises polymer having at least one Lewis Acid immobilized within the structure therein, said polymer having monomer units represented by the structural formula:

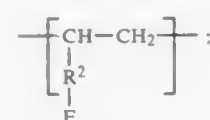


wherein

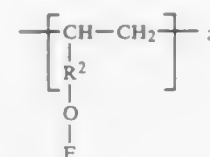
- a represents about 1 to about 99 mole %  
b represents about 0 to about 50 mole %  
c represents about 1 to about 99 mole %  
a + b + c is preferably about 100%;



C is selected from the group consisting of:



(I)



(II)

and,

(III) combinations thereof.

D is OH, halide, OR<sup>4</sup>, NH<sub>2</sub>, NHR<sup>3</sup>, OM', or OM'';E is the residue of the reaction of at least one Lewis Acid  
with the D substituent of monomer unit B;R<sup>1</sup> represents proton, C<sub>1</sub>–C<sub>24</sub> alkyl group, or C<sub>3</sub>–C<sub>24</sub> cyclo-  
alkyl;R<sup>2</sup> represents C<sub>1</sub>–C<sub>24</sub> alkyl group, C<sub>3</sub>–C<sub>24</sub> cycloalkyl,  
C<sub>6</sub>–C<sub>18</sub> aryl, or C<sub>7</sub>–C<sub>30</sub> alkylaryl;R<sup>3</sup> represents C<sub>1</sub>–C<sub>24</sub> alkyl, C<sub>3</sub>–C<sub>24</sub> cycloalkyl, C<sub>1</sub>–C<sub>24</sub> aryl,  
or C<sub>7</sub>–C<sub>30</sub> alkylaryl;R<sup>4</sup> represents C<sub>1</sub>–C<sub>24</sub> alkyl, C<sub>3</sub>–C<sub>24</sub> cycloalkyl, C<sub>1</sub>–C<sub>24</sub> aryl,  
or C<sub>7</sub>–C<sub>30</sub> alkylaryl;

M' represents alkali metal;

M'' represents alkaline-earth metal.

5,414,178

DIMERIZATION CATALYST SYSTEMS AND  
PROCESSESAn-hsiang Wu, Bartlesville, Okla., assignor to Phillips Petro-  
leum Company, Bartlesville, Okla.

Division of Ser. No. 915,143, Jul. 17, 1992, Pat. No. 5,320,993.

This application Jan. 21, 1994, Ser. No. 184,715

Int. Cl.<sup>6</sup> C07C 2/24

U.S. Cl. 585—513

12 Claims

1. A process to dimerize ethylene under conditions to effect dimerization by contacting ethylene with a catalyst system composition comprising:

- (a) a cobalt compound selected from the group consisting of cobalt enolates, cobalt alkoxides, cobalt carboxylates, and mixtures thereof;  
(b) a metal alkyl wherein said metal is selected from the group consisting of aluminum, boron, zinc, magnesium, lithium, and mixtures thereof; and  
(c) a coordinating compound which is a nitrogen-containing compound selected from the group consisting of pyrrole (hydrogen pyrrolide), alkali metal salts of pyrrole, alkali metal salts of pyrrolides, and mixtures thereof.

5,414,179

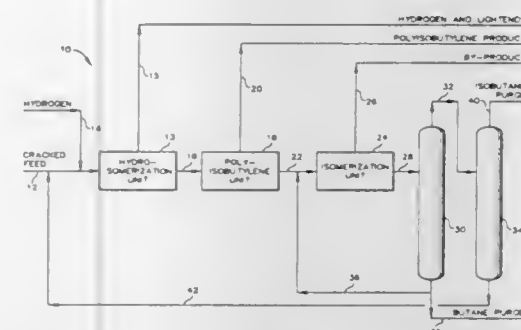
METHOD FOR CONTROLLING THE FEED  
COMPOSITION TO A PROCESS FOR POLYMERIZING  
ISOBUTYLENEHarold R. Hunt, Bartlesville, Okla., and Stephen P. Thomas,  
Houston, Tex., assignors to Phillips Petroleum Company,  
Bartlesville, Okla.

Filed Apr. 29, 1994, Ser. No. 235,773

Int. Cl.<sup>6</sup> C07C 2/02

U.S. Cl. 585—519

4 Claims



1. A process for controlling the composition of a feed stream, containing butane and olefins having at least four carbon atoms per molecule, to a polymerization unit, said process comprising the steps of:

- passing an olefin feed stream to a hydroisomerization unit whereby diolefins are selectively hydrogenated and butene-1 is isomerized to butene-2 to thereby produce a hydroisomerate stream;  
passing said hydroisomerate stream as said feed stream to said polymerization unit to thereby produce a polymerization reaction effluent which is separated into a polyisobutylene product stream and an effluent stream containing butanes and linear butenes;  
passing said effluent stream to an isomerization unit for isomerizing at least a portion of the butene-2 of said effluent stream to isobutylene to thereby produce an isomerate stream;  
passing said isomerate stream to first separation means for separating isobutylene and butene-2 and for producing a first overhead stream comprising isobutylene and a first bottoms stream comprising butene-2;  
introducing at least a portion of said first bottoms stream into said effluent stream;  
passing said first overhead stream to second separation means separating isobutane and isobutylene and for producing a second overhead stream comprising isobutane and a second bottoms stream comprising isobutylene; and  
introducing at least a portion of said bottoms stream into said olefin feed stream.

5,414,180

## ORGANO-ALUMINOXY PRODUCT AND USE

Rolf L. Geerts, Bartlesville, Okla., and Tara G. Hill, Fairfield,  
Ohio, assignors to Phillips Petroleum Company, Bartlesville,  
Okla.

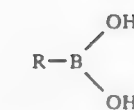
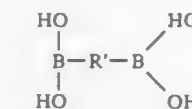
Filed Jul. 14, 1993, Ser. No. 92,143

Int. Cl.<sup>6</sup> C07C 2/02; B01J 31/00; C07F 5/02

U.S. Cl. 585—525

32 Claims

1. A process for preparing a hydrocarbyl aluminosy composition comprising reacting a hydrocarbyl boron compound having boron acid functionality with a tri-hydrocarbyl aluminum compound under suitable reaction conditions, said hydrocarbyl boron compound being selected from the group consisting of monoboronic acids of the formula

wherein R is a monovalent hydrocarbyl radical, diboronic  
acids of the formulawherein R' is a divalent hydrocarbyl radical, and hydrocarbyl  
boronic acids of the formula R<sub>2</sub>B(OH) wherein each R is a  
hydrocarbyl radical.

5,414,181

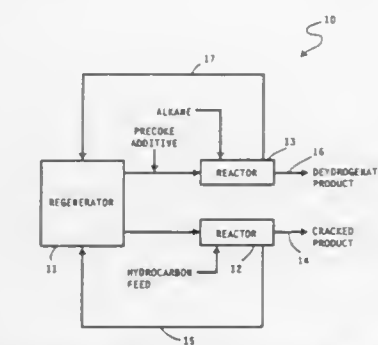
INTEGRATED CATALYTIC CRACKING AND OLEFIN  
PRODUCING PROCESSRoby Bearden, Jr.; Michael C. Kerby, and Stephen M. Davis, all  
of Baton Rouge, La., assignors to Exxon Research and Engi-  
neering Company, Florham Park, N.J.

Filed Nov. 19, 1993, Ser. No. 154,832

Int. Cl.<sup>6</sup> C07C 5/32, 5/333; C01G 11/05

U.S. Cl. 585—654

6 Claims



1. An integrated catalytic cracking and alkane dehydrogena-  
tion process comprising:

- contacting a petroleum hydrocarbon with a catalytic crack-  
ing catalyst containing a zeolite crystalline framework  
oxide to form a coked catalytic cracking catalyst and a  
cracked hydrocarbon product wherein the petroleum  
hydrocarbon and the catalytic cracking catalyst are con-  
tacted under catalytic cracking conditions;  
regenerating the coked catalytic cracking catalyst under  
regeneration conditions to form a regenerated catalytic  
cracking catalyst;  
depositing a measurable content of coke onto the regener-  
ated catalytic cracking catalyst to form an effective dehy-  
drogenation catalyst; and  
contacting under dehydrogenation conditions a C<sub>2</sub>–C<sub>10</sub>  
alkane feed stream with the coke-deposited dehydrogena-  
tion catalyst to selectively form an olefin product.

5,414,182

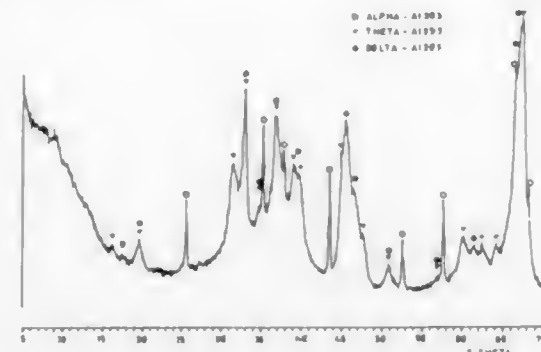
# PROCESS FOR ACTIVATING CATALYST PRECURSORS FOR THE DEHYDROGENATION OF C<sub>2</sub>-C<sub>5</sub> PARAFFINS, AND A CATALYTIC COMPOSITION ACTIVATED BY THE PROCESS

Rodolfo Iezzi; Andrea Bartolini, and Franco Buonomo, all of San Donato Milanese, Italy, assignors to Snamprogetti S.p.A. and Eniricerche S.p.A., both of Milan, Italy  
Division of Ser. No. 27,944, Mar. 8, 1993, Pat. No. 5,308,822.  
This application Feb. 10, 1994, Ser. No. 194,390

Claims priority, application Italy, Mar. 11, 1992, MI92U0558  
Int. Cl.<sup>6</sup> C07C 5/333

U.S. Cl. 585—661

16 Claims



1. In a process for the catalytic dehydrogenation of light paraffins, the improvement comprising:

catalytically dehydrogenating light hydrocarbons over a catalyst composition comprising gallium, alumina, silica and optionally at least one alkali or alkaline-earth metal, wherein gallium expressed as Ga<sub>2</sub>O<sub>3</sub>, is present in an amount of from 0.1 to 33.6 wt. %, the silica is present in an amount of from 0.08 to 3 wt. % and the alkali metal, expressed as the oxide, is present in an amount of from 0 to 5 wt. %, the remainder up to 100 being alumina in the δ or θ phase or in the δ+θ or δ+θ+α phase mixture, said catalytic composition being activated by an activating process comprising thermally activating the catalyst in the air at a temperature of between 450° and 1,000° C., said activation treatment being followed by a post activation treatment effected as follows:

oxidizing the activated catalyst with air, oxygen, or mixtures thereof, or a mixture containing oxygen at least in a 5 volume % concentration in an inert gas, for a time of between 1 and 180 minutes, at a temperature of between 500° and 1,000° C. in a vessel;  
purging the vessel and catalyst therein with an inert gas for a time of between 1 and 10 minutes; and  
reducing the catalyst with hydrogen or a mixture containing hydrogen in at least a 10 volume % concentration in an inert or reducing gas, for a time of between 1 and 120 minutes, at a temperature of between 450° and 800° C.

5,414,183

# NITROGEN REMOVAL FROM LIGHT HYDROCARBON FEED IN OLEFIN ISOMERIZATION AND ETHERIFICATION PROCESS

Hayim Abrevaya, Wilmette; Suleyman M. Ozmen, Winnetka; Paul T. Barger, Arlington Heights; Christopher D. Gosling, Rosehe, and Thomas A. Verachtert, Wheeling, all of Ill., assignors to UOP, Des Plaines, Ill.

Filed Dec. 24, 1992, Ser. No. 996,463

Int. Cl.<sup>6</sup> C07C 5/27, 41/00; C01G 19/02

U.S. Cl. 585—671

14 Claims

1. A process for the isomerization of olefins contained in a nitrile contaminated light hydrocarbon feed stream comprising the steps of:

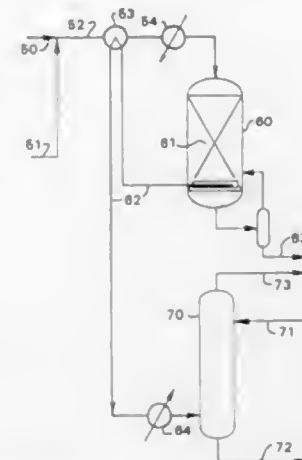
(a) reducing the content of a nitrile contaminant in the nitrile contaminated feed stream by at least 90% in a nitrogen-

removal zone by hydrolyzing the nitrile contaminant at hydrolysis conditions in the presence of an alkaline solution and recovering a nitrile depleted hydrocarbon stream; and,

(b) contacting the nitrile depleted hydrocarbon stream in an isomerization zone at isomerization conditions with a catalyst containing at least one medium-pore molecular sieve to provide an isomerization product containing at least one branched-chain olefin isomer in greater concentration than in the feedstock.

12. A process for the isomerization and etherification of olefins contained in a nitrile-contaminated light hydrocarbon feed stream comprising the steps of:

(a) reducing the content of a nitrile contaminant in the ni-



trile-contaminated feed stream by at least 90% in a nitrile-removal zone by hydrolyzing the nitrile contaminant at hydrolysis conditions in the presence of an alkaline solution and recovering a nitrile depleted hydrocarbon stream;

(b) contacting the nitrile depleted hydrocarbon stream with an alcohol in an etherification zone at etherification conditions to obtain an ether product and a hydrocarbon raffinate; and,

(c) contacting the hydrocarbon raffinate in an isomerization zone at isomerization conditions with a catalyst containing at least one medium-pore molecular sieve to provide an isomerization product containing at least one branched chain olefin isomer in greater concentration than in the feedstock.

5,414,184

# ALKANE DISPROPORTIONATION

An-hsiang Wu; Bruce B. Randolph, and Marvin M. Johnson, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 10, 1994, Ser. No. 178,683

Int. Cl.<sup>6</sup> C07C 6/08

U.S. Cl. 585—708

20 Claims

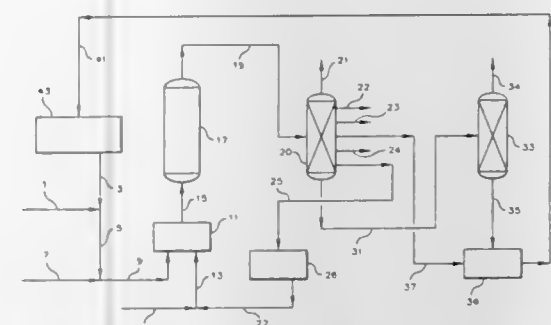
1. An alkane disproportionation process comprising the steps of:

(1) mixing a liquid feed which comprises at least one feed alkane containing 4-15 carbon atoms per molecule with at least one alkylaluminum chloride and at least one chloroalkane,

(2) contacting the mixture obtained in step (1) with a solid material selected from the group consisting of alumina, silica, silica-alumina, clays, zeolites, aluminum phosphate, aluminum oxide/phosphate, aluminum borate, aluminum oxide/borate, aluminum sulfate, aluminum oxide/sulfate, sulfonated styrene polymers and mixtures thereof, at effective disproportionation conditions so as to produce a disproportionation product,

wherein said disproportionation product comprises said at least one feed alkane at a concentration which is lower than the concentration of said at least one feed alkane in said feed,

wherein said disproportionation product contains at least one higher-boiling, alkane containing more carbon atoms per molecule than said feed alkane and at least one lower-boiling alkane containing fewer carbon atoms per molecule than said feed,



and wherein the concentrations of said at least higher-boiling alkane and of said at least one lower-boiling alkane are higher in said disproportionation product than in said feed; and

(3) recovering said at least one higher-boiling alkane and said at least one lower-boiling alkane from said disproportionation product.

5,414,185

# TREATED PILLARED CLAYS AND ALKYLATION PROCESS USING SAME

George F. Salem, Cleveland Hts., and Wayne R. Klier, Solon, both of Ohio, assignors to BP America, Inc., Cleveland, Ohio  
Division of Ser. No. 40,460, Apr. 1, 1993, Pat. No. 5,308,812.

This application Feb. 24, 1994, Ser. No. 201,167

The portion of the term of this patent subsequent to May 30, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> B01J 20/16, 20/10; C07C 2/62

U.S. Cl. 585—721

20 Claims

1. A treated pillared clay, comprising:

a clay comprising metal oxides and hydroxides and having a lamellar structure with lamellar layers and interlamellar spaces disposed between the lamellar layers and exchangeable sodium and/or calcium ions occupying said interlamellar spaces;  
at least part of said sodium and/or calcium ions being replaced by ammonium ions;  
at least part of the hydroxyl groups of said hydroxides being replaced with fluorine;  
an inorganic oxide inserted into the interlamellar spaces to prop open adjacent lamellar layers; and  
an inorganic acid impregnated and/or incorporated on said clay.

5,414,186

# LIQUID ACID ALKYLATION CATALYST AND ISOPARAFFIN-OLEFIN ALKYLATION PROCESS

Jonathan E. Child, and Tomas R. Melli, both of Sewell, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation of Ser. No. 925,009, Aug. 5, 1992, abandoned. This application Oct. 13, 1993, Ser. No. 136,481

Int. Cl.<sup>6</sup> C07C 2/62, 7/10

U.S. Cl. 585—724

19 Claims

1. A process for alkylating an isoparaffin with an olefin comprising the steps of:

(a) providing an alkylation reaction zone for contacting at

least one isoparaffin with at least one olefin in the presence of an alkylation catalyst;

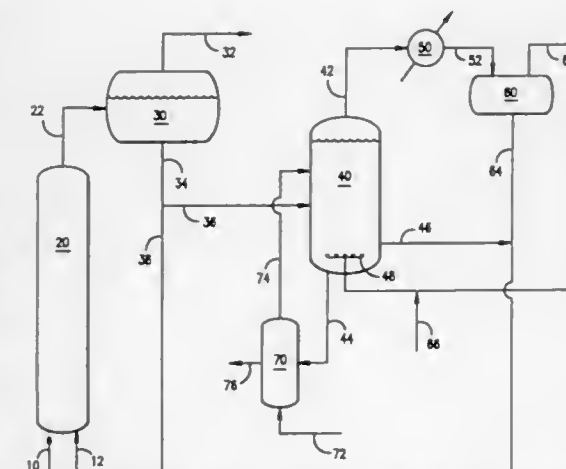
(b) charging said isoparaffin, said olefin, and said alkylation catalyst to said alkylation reaction zone, said alkylation catalyst comprising at least one acid selected from the group consisting of hydrofluoric acid and the halogen-substituted sulfonic acids, together with a vapor pressure reducing additive, wherein the concentration of vapor pressure reducing additive in said acid is from about 10 to about 80 weight percent;

(c) withdrawing an effluent stream containing alkylation catalyst, hydrocarbon product, and conjunct polymer products of said alkylation reaction from said reaction zone;

(d) separating said withdrawn effluent stream of step (c) into an alkylate-enriched hydrocarbon product stream and an alkylation catalyst-enriched stream;

(e) recycling a first portion of said alkylation catalyst-enriched stream to said reaction zone of step (b);

(f) flowing a second portion of said alkylation catalyst-enriched stream to an acid storage zone wherein the concentration of said vapor pressure reducing additive within said acid storage zone exceeds the concentration of said vapor pressure reducing additive in said second portion of



said alkylation catalyst-enriched stream and wherein the concentration of said acid is from about 20 to about 50 weight percent;

(g) charging a first stripping fluid to said acid storage zone; (h) withdrawing acid-enriched first stripping fluid from said acid storage zone and separating condensed acid from said first stripping fluid;

(i) withdrawing a first stream of said acid and said vapor pressure reducing additive from said acid storage zone; (j) mixing said condensed acid of step (h) with said withdrawn first stream of step (i);

(k) flowing said mixed stream of step (j) to said alkylation reaction zone;

(l) withdrawing a second stream containing said acid, said vapor pressure reducing additive and said polymerized side products of said alkylation reaction from said acid storage zone and flowing said second stream to a catalyst stripper;

(m) charging a second stripping fluid to said catalyst stripper to strip said acid and said vapor pressure reducing additive from said conjunct polymer products of said alkylation reaction to produce an overhead stream enriched in said acid and said vapor pressure reducing additive;

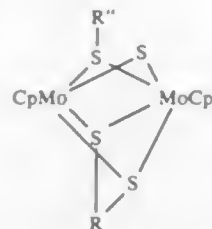
(n) recycling said overhead stream of step (m) to said acid storage zone.





separating the increased affinity alkenes or alkynes from the remainder of the hydrocarbon mixture.

18. A method for removing alkynes from a gaseous hydrocarbon feed stream by use of differential binding rates or equilibrium constants of such compounds to a molybdenum-sulfide dimer comprised of the formula:



wherein Cp is selected from the group consisting of:  $-C_5H_5$ ,  $-C_5H_4CH_3$ ,  $-C_5H_4CO_2CH_3$ ,  $-C_5H_4CO_2Na$ ,  $-C_5H_4CO_2H$ ,  $-C_5H_4CH=CH_2$ ,  $-C_5(CH_3)_5$ ,  $-C_5H_4CONH(CH_2)_xNHR_2^+$  or  $-C_5H_4CHO$ , R is selected from the group consisting of  $-C_2H_4$  or  $-CHR'$ , wherein R' is selected from the group consisting of H,  $-CO_2Na$ ,  $-CO_2CH_3$ ,  $-C(CH_3)_2CO_2Et$ ,  $-C(CH_3)_2CO_2Li$  or  $-CH(CO_2CH_3)_2$ , and R'' is selected from the group consisting of  $-C(CH_3)_3$ ,  $-CH(CH_3)CO_2H$ , or nothing, such method comprised of the steps:

- preparing said molybdenum sulfide-dimer;
- contacting said hydrocarbon feed stream with said molybdenum-sulfide dimer to form the alkene dithiolate adduct of said dimer;
- separating the alkene dithiolate adduct from the remainder of the hydrocarbon feed stream.

5,414,195

#### SYSTEM AND METHOD FOR ON-LINE MONITORING AND CONTROL OF HEAVY METAL CONTAMINATION IN SOIL WASHING PROCESS

Steven H. Peterson, Murrysville; Edward J. Lahoda, Edgewood Borough; David C. Grant, Gibsonia; Edward F. Sverdrup, North Huntingdon; Thomas V. Congedo, Edgewood; John Bartko, State College; Robert E. Witkowski, West Mifflin; Arthur L. Wolfe, Murrysville; William D. Partlow, Forest Hills, all of Pa., and Michael C. Skriba, Irvine, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa. Continuation of Ser. No. 663,962, Mar. 1, 1991, Pat. No. 5,133,901. This application Jun. 17, 1992, Ser. No. 899,962. The portion of the term of this patent subsequent to Jul. 28, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> G21F 9/00; B07C 5/34

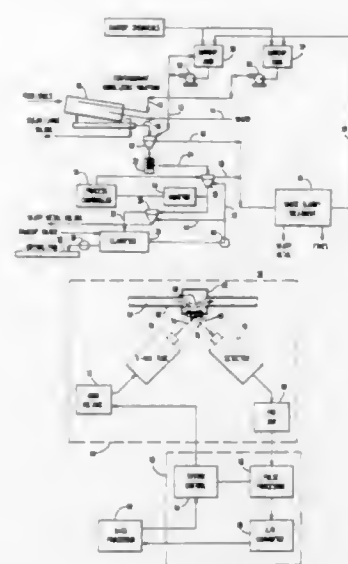
U.S. Cl. 588—1

5 Claims

1. A system for washing particulate material, including soil, contaminated by one or more contaminants, said system including means processing said particulate material to produce a flow of a stream including particulate material having residual contaminants in a concentration of less than about 1000 ppm of particulate material, the improvement comprising:

- means for on-line monitoring of the concentration of said residual contaminants in the particulate material in said stream including:
- means applying energy to said slurry to produce characteristic electromagnetic radiation from constituents in said stream including said residual contaminants, and analyzing means analyzing the electromagnetic radiation produced to measure an amount of characteristic electromagnetic radiation emitted by the residual contaminants and an amount of electromagnetic radiation representative of at least one other constituent of the particulate material in the stream to which said energy is applied that is substantially homogeneously present therein, and determining from said amount of residual contaminants and from the amount of radiation representative of the particulate material in the slurry the concentration of said residual contaminants in said particulate material; and means responsive to

the concentration of contaminants in the particulate material in the stream to adjust the means processing the particulate material to change the level of residual contaminants in the stream.



5,414,196

#### METHOD OF DECONTAMINATING A CEMENTITIOUS SURFACE

Howard T. Jennings, Chester, United Kingdom, assignor to British Nuclear Fuels plc, Warrington, England. Filed Oct. 16, 1992, Ser. No. 961,663.

Claims priority, application United Kingdom, Oct. 18, 1991, 9122147

Int. Cl.<sup>6</sup> G21F 9/00

U.S. Cl. 588—1

16 Claims

1. A method of decontaminating a cementitious surface contaminated with at least one radioactive substance, the method comprising:

- (a) applying a decontaminating agent to the contaminated cementitious surface, thereby treating the surface so as to release a material containing the radioactive substance, and
- (b) removing said released material from the surface, wherein said decontaminating agent is a micro-organism which is applied to the surface under conditions conducive to the growth of the micro-organism and wherein said surface is biodegraded by the micro-organism thereby releasing a material containing the radioactive material.

5,414,197

#### METHOD OF CONTAINING AND ISOLATING TOXIC OR HAZARDOUS WASTES

Lillian D. Wakeley, Judy C. Tom; Melvin C. Sykes; William N. Brabston, and Phillip G. Malone, all of Vicksburg, Miss., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 3, 1994, Ser. No. 254,004

Int. Cl.<sup>6</sup> G21F 9/00

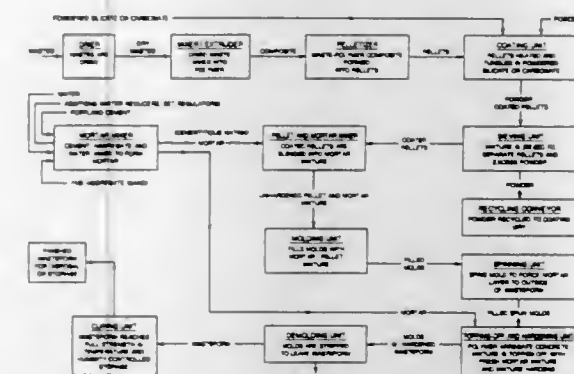
U.S. Cl. 588—3

18 Claims

1. A method of containing and isolating toxic or hazardous wastes comprising the steps of:

- removing liquid phase from a toxic or hazardous waste to form a dry waste salt;
- mixing said dry waste salt into a molten thermosetting polymer to form a first mixture;
- forming pellets of said first mixture;
- allowing said molten thermosetting polymer to thermoset;

heating and coating said pellets with a powdered material which is compatible with a cementitious mixture to form coated pellets;



mixing said coated pellets with said cementitious mixture to form a polymer-aggregate concrete; and allowing said polymer-aggregate concrete to harden.

5,414,198

#### DEGRADATION OF NITROCELLULOSE BY COMBINED CULTURES OF SCLEROTIUM ROLFII ATCC 24459 AND FUSARIUM SOLANI IFO 31093

Bruce W. Brodman, Stroudsburg; Anil Sharma, Yardley, both of Pa.; Thiruvengataswamy Shanmugasundaram, Flanders, and Ying-Zhi Zhang, Wharton, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 12, 1994, Ser. No. 289,813

Int. Cl.<sup>6</sup> C12N 1/00, 1/14

U.S. Cl. 588—202

21 Claims

- 1. A method for degrading nitrate esters which comprises:
  - a.) forming a suspension of a nitrate ester;
  - b.) providing a combination of at least one cellulolytic fungus and at least one denitrifying fungus on a culture growing medium;
  - c.) contacting the combination (b) with the suspension of nitrate ester and maintaining the contact for a sufficient time and under conditions sufficient to support lysis and denitrification of the nitrate ester.

5,414,199

#### APPARATUS AND METHOD FOR TWO-STAGE OXIDATION OF WASTES

Scott D. Fleischman, Aiken, S.C., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 28, 1993, Ser. No. 127,364

Int. Cl.<sup>6</sup> F26B 20/00

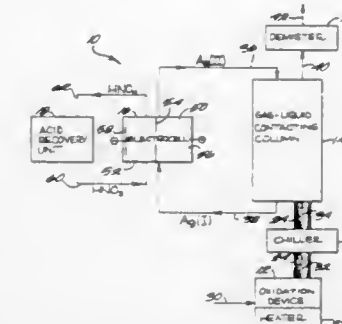
U.S. Cl. 588—204

8 Claims

1. An apparatus for oxidizing wastes, said apparatus comprising:

- a first container for said wastes, said first container having an interior, an entrance and an exit;
- means for heating said wastes in said container, oxidizing a first portion of said wastes, leaving unoxidized a second portion of said waste, said heating means producing an off-gas stream containing said first portion and said second portion of said waste;
- an off-gas stack having a first end in communication with said exit of said first container and a second end, said stack receiving said off-gas stream from said first container;
- a second container having an interior, an entrance in communication with said second end of said off-gas stack and an exit, said second container receiving said off-gas stream from said stack; and
- an oxidizing agent in said second container, said oxidizing

agent mixing with said second portion of said waste to oxidize said second portion, said oxidizing agent having a



higher and a lower valence state, said oxidizing agent being reduced from said higher state to said lower valence state as said oxidizing agent oxidizes said second portion.

5,414,200

#### NON-METALLIZED AND SUBSTOICHIOMETRIC METALLIZED REACTIONS WITH AMMONIA AND OTHER WEAK BASES IN THE DEHALOGENATION OF REFRIGERANTS

Robert W. Mouk, Westerville, and Albert E. Abel, Powell, both of Ohio, assignors to A.L. Sandpiper Corporation, Columbus, Ohio

Filed Mar. 7, 1994, Ser. No. 207,289

Int. Cl.<sup>6</sup> A63D 3/00

U.S. Cl. 588—205

22 Claims

16. In a method of chemically dehalogenating fluorocarbon refrigerants by reacting with a solution of solvated electrons formed by dissolving a reactive metal in liquid ammonia or other weak nitrogen-containing base, the improvement comprising the steps of:

- (a) providing a perhalogenated fluorocarbon refrigerant having at least one other halogen atom in addition to fluorine;
- (b) forming a solution of solvated electrons by dissolving in the liquid ammonia or other nitrogen-containing base a reactive metal in an amount about sufficient to partially reduce the perhalogenated refrigerant by removing only one halogen atom therefrom other than fluorine;
- (c) reacting the refrigerant of step (a) in the solution of solvated electrons of step (b), said reaction being conducted at temperatures sufficiently low as to retard reactions of the solvated electrons and liquid ammonia or other nitrogen-containing base with by-products of this reduction reaction, and
- (d) elevating the temperature of the reaction mixture of step (c) to initiate further dehalogenation by reacting with the liquid ammonia or other nitrogen-containing base.

5,414,201

#### COMBINED SORBENT/CATALYST SYSTEM

Howard L. Greene, Mogadore, Ohio, assignor to The University of Akron, Akron, Ohio

Filed Oct. 27, 1993, Ser. No. 144,128

Int. Cl.<sup>6</sup> C01B 7/00

U.S. Cl. 588—206

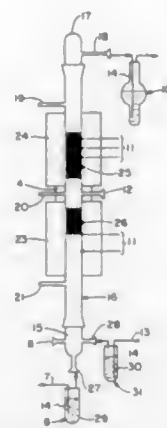
18 Claims

1. A process for the oxidation of halogenated organic compounds which comprises:

- (a) adsorbing at least one organic compound in at least a first catalyst capable of adsorbing the organic compound at an adsorption temperature;
- (b) heating at least one second catalyst downstream of the first catalyst from an initial temperature to an oxidation temperature, the second catalyst capable of oxidizing the



organic compound when heated to the oxidation temperature;  
 (c) heating the first catalyst to a desorption temperature at a rate which will permit the complete oxidation of the



desorbed organic compound by the second catalyst at the oxidation temperature;  
 (d) cooling the first catalyst to the first adsorption temperature; and  
 (e) cooling the second catalyst to the initial temperature.

5,414,202

# METHOD FOR RAPID DECOMPOSITION OF METHYL CHLOROMETHYL AND BIS(CHLOROMETHYL) ETHERS

Scott A. Berger, Horsham; Richard B. Wuchter, Huntington Valley, both of Pa., and Pietro A. Stefanelli, Albano S.A., Italy, assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed May 18, 1994, Ser. No. 245,393

Int. Cl.<sup>6</sup> A62D 3/00

U.S. Cl. 588—206

15 Claims

1. A method for decomposing chloromethyl ethers which comprises contacting a surface contaminated with chloromethylmethyl ether, bis-chloromethyl ether, or mixtures thereof, with an alkaline, aqueous solution containing A: one or more basic tertiary alkyl polyamines in which the alkyl groups are independently selected from C<sub>1</sub>–C<sub>6</sub> alkyl, and which are selected from the group consisting of N-alkyl-substituted ethylenediamines, N-alkyl-substituted trimethylenediamines, N-alkyl-substituted hexamethylenediamines, N-hydroxyalkyl-substituted ethylenediamines, N-hydroxyalkyl-substituted trimethylenediamines, N-hydroxyalkyl-substituted tetramethylenediamines, N-hydroxyalkyl-substituted pentamethylenediamines and N-hydroxyalkyl-substituted hexamethylenediamines, in which the alkyl and hydroxyalkyl substituents are C<sub>1</sub>–C<sub>6</sub> alkyl C<sub>1</sub>–C<sub>6</sub> hydroxyalkyl; and hexamethylenetetramine, B: one or more alkali metal hydroxides and C: one or more nonionic surfactants.

5,414,203

# TREATMENT OF PARTICULATE MATERIAL CONTAMINATED WITH POLYHALOGENATED AROMATICS

Robert D. Fox, Loudon, Tenn., assignor to International Technology Corporation, Torrance, Calif.

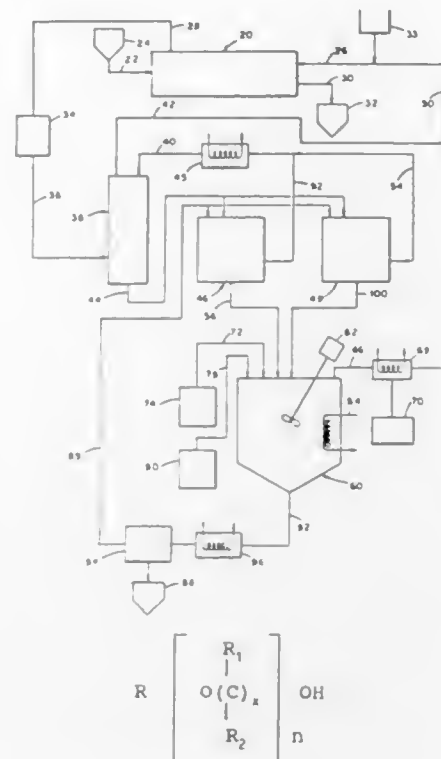
Filed Mar. 28, 1991, Ser. No. 676,896

Int. Cl.<sup>6</sup> B01D 49/00

U.S. Cl. 588—207

11 Claims

1. A method for treating particulate material contaminated with PHAs which comprises vaporizing the PHAs from the material, collecting the vaporized PHAs within a carrier gas, and contacting the carrier gas containing the vaporized PHAs with a solvent solution containing a glycol of the formula



wherein x is  $\geq 2$  and n is an integer of 2 to 400; R is a hydrogen, a straight or branched-chain C<sub>1</sub>–C<sub>20</sub> alkyl, aralkyl or acyl group, R<sub>1</sub> and R<sub>2</sub> are the same or different and are hydrogen, straight or branched-chain alkyl, unsubstituted or substituted by C<sub>5</sub>–C<sub>8</sub> cycloalkyl or aryl group, and wherein the contacting takes place under conditions such that the PHAs are condensed from the gas and dissolved in the glycol in the solution, and thereby separated from the carrier gas.

5,414,204

# METHOD OF TREATING REFRACTORY ACTIVATED CARBON BY EXPOSURE TO IONIZING RADIATION

Masakazu Hosono, Gunma; Hidehiko Arai, Saitama, and Teiji Mlyata, Gunma, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Continuation of Ser. No. 933,738, Aug. 24, 1992. This

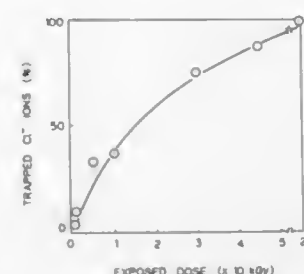
application Nov. 29, 1993, Ser. No. 158,816

Claims priority, application Japan, Aug. 23, 1991, 3-211957

Int. Cl.<sup>6</sup> B09B 3/00; B01J 19/12, 20/34, 37/34

U.S. Cl. 588—210

14 Claims



1. A method of decomposing an organochlorine compound adsorbed on an activated carbon, said organochlorine compound being selected from the group consisting of dioxin, PCBs, chlorophenol and organochlorine agrochemicals, said method comprising the steps of:

adding water to the activated carbon having the organochlorine compound adsorbed thereon in such a manner that the amount of water to be added is at least substantially

the same as the apparent volume of the activated carbon but does not exceed the apparent volume of the activated carbon by more than about 100 times; and  
 exposing the activated carbon to ionizing radiation, thereby decomposing and rendering harmless the organochlorine compound adsorbed on the activated carbon.

5,414,205

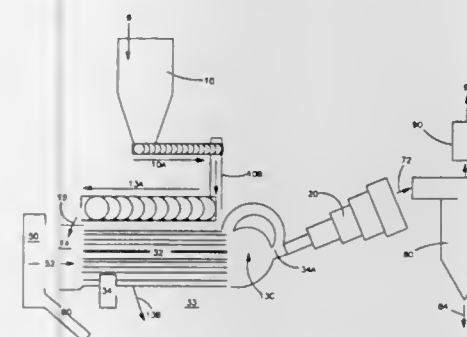
# METHOD FOR TREATING SOIL CONTAMINATED WITH HYDROCARBONS

Siegfried E. Tischler, Jakarta Selatan, Indonesia, assignor to P. T. Limbahasri Saktibunana, Jakarta, Indonesia, a part interest  
 Continuation-in-part of Ser. No. 44,578, Apr. 7, 1993, abandoned. This application May 27, 1993, Ser. No. 68,512  
 Claims priority, application Indonesia, Jun. 22, 1992, P-003381

Int. Cl.<sup>6</sup> A63D 3/00

U.S. Cl. 588—214

14 Claims



1. A method for treating soil contaminated with a mixture of organic compounds comprising the steps of:  
 passing the soil through a rotary air lock;  
 producing a stream of air preheated to sufficient temperature to initiate spontaneous combustion of a portion of the organic compounds;  
 combining the soil and said preheated air at a lower end of a fluidized bed oxidizer;  
 spontaneously combusting a portion of the organic compounds while generating heat for oxidizing substantially all of the remaining organic compounds and producing a mixture of treated solids and process gas and while pneumatically conveying the gas and the solids through the fluidized bed oxidizer in an upward direction and at a substantially constant gas velocity;  
 pneumatically removing the mixture of treated solids and process gas from an upper end of said fluidized bed oxidizer;  
 separating the treated solids from the process gas in a separator; and  
 producing the treated solids from the separator.

5,414,206

# METHOD AND PROCESS FOR RENDERING WASTE SUBSTANCES HARMLESS

Robert A. Ritter, 1705 Nelson Street, No. 108, Vancouver, British Columbia, Canada V6G 1M6

Continuation-in-part of Ser. No. 804,310, Dec. 9, 1991, Pat. No. 5,290,351. This application Apr. 10, 1992, Ser. No. 866,472

Int. Cl.<sup>6</sup> C04B 2/02

U.S. Cl. 588—226

15 Claims

1. A method for the treatment of hydrocarbon-contaminated soil by at least one of chemical hydrolysis and oxidation of said hydrocarbons in said hydrocarbon-contaminated soil, said method comprising:

1) conditioning lime with a fatty acid activator, said fatty acid activator comprising a liquid blend of a) a mixture of liquid fatty acids having from about 6 to about 12 carbon atoms, and b) a mixture of glycerides of fatty-acids having

from about 8 to about 18 carbon atoms, thereby to provide conditioned lime;

2) intimately blending said conditioned lime in a ratio of from about 1–6 to about 1–1 with physically-preconditioned, moist, hydrocarbon-contaminated soil, under conditions of high shear, the degree of blending being at least near microscopic level, thereby to provide blended conditioned lime/soil;

3) conveying a charge of said blended conditioned lime/soil to an enclosed reaction vessel and carrying out hydration of said lime in said blended conditioned lime/soil charge;

4) retaining the heat of said hydration reaction within said vessel, whereby hydrolysis of at least one of said fatty acid conditioner and said hydrocarbon contaminants in said soil is initiated;

5) substantially simultaneously introducing at least one of air and oxygen-enriched air into said reaction vessel together with at least one of steam and water, thereby to effect a flameless, intermediate-temperature oxidation of at least one of said hydrocarbons and hydrolysed degradation products of said hydrocarbons, thereby to provide decontaminated soil product;

6) discharging decontaminated soil product from said reaction vessel by passing said decontaminated soil product, in dry, dusty, hydrophobic form through a treating zone where it is sprayed with a surfactant, thereby to provide a surfactant-treated decontaminated soil solid and

7) passing said surfactant-treated decontaminated-soil solid to a blender where it is mixed with sufficient water, in an amount ranging from about 5% to about 25% based on the quantity of surfactant-treated decontaminated soil solid, thereby to provide a substantially dust-free product.

5,414,207

# METHOD FOR RENDERING WASTE SUBSTANCES HARMLESS

Robert A. Ritter, 1705 Nelson Street, No. 108, Vancouver, British Columbia, Canada V6G 1M6

Continuation-in-part of Ser. No. 866,472, Apr. 10, 1992, which is a continuation-in-part of Ser. No. 804,310, Dec. 9, 1991, Pat. No. 5,290,351. This application Apr. 19, 1994, Ser. No. 229,672

Int. Cl.<sup>6</sup> C04B 2/02

U.S. Cl. 588—226

21 Claims

1. A method for the treatment of hydrocarbon-contaminated soil by at least one of chemical hydrolysis and oxidation of said hydrocarbons in said hydrocarbon-contaminated soil, said method comprising:

a) treating lime with a fatty acid hydrophobizing agent, said fatty acid having of from about 6 to about 12 carbon atoms therein, and preheating said treated lime to a temperature of about 50° C. to about 80° C. thereby to provide conditioned lime;

b) intimately blending said conditioned lime, in a ratio of from about 1:16 to about 1:1, with physically-preconditioned moist, hydrocarbon-contaminated soil, under conditions of high shear, the degree of blending being at least near microscopic level, thereby providing blended, conditioned lime/soil;

c) conveying a charge of said blended conditioned lime/soil to an enclosed reaction vessel and carrying out hydration of said lime in said blended conditioned lime/soil charge;

d) retaining the heat of said hydration reaction within said vessel, whereby hydrolysis of at least one of said fatty acid hydrophobizing agent and hydrocarbon contaminants in said soil is initiated;

e) substantially simultaneously introducing at least one of air, and oxygen-enriched air, into said reaction vessel together with at least one of steam and water, thereby to effect a flameless, intermediate-temperature oxidation of at least one of said hydrocarbons and hydrolysed degradation products of said hydrocarbons;

f) contacting organic constituents and residues of incomplete oxidation as the products of step (e) with said conditioned

lime/soil charge at a progressively increasing temperature;

- g) discharging decontaminated soil product from said reaction vessel by passing said decontaminated soil product, in dry, dusty, hydrophobic form through a zone where it may be sprayed with a surfactant, thereby to provide treated decontaminated soil product; and
- h) passing said treated decontaminated soil product from step g) to a blender, where it is mixed with water in an amount ranging from about 5% to about 25, based on the quantity of said treated decontaminated soil product, thereby to provide a substantially dust-free product.

5,414,208

## FORMATION OF DENSIFIED MATERIAL

John E. Ramm, New South Wales, Australia, assignor to Australian Nuclear Science & Technology Organisation, Australia  
PCT No. PCT/AU91/00485, § 371 Date Jun. 10, 1993, § 102(e)  
Date Jun. 10, 1993, PCT Pub. No. WO92/07364, PCT Pub. Date Apr. 30, 1992

PCT Filed Oct. 18, 1991, Ser. No. 50,173

Claims priority, application Australia, Oct. 18, 1990, PK2858  
Int. Cl.<sup>6</sup> A62D 3/00

U.S. Cl. 588—249

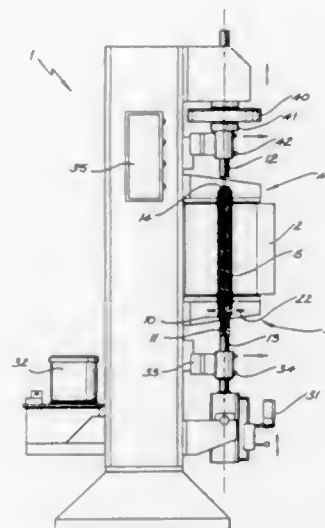
21 Claims

1. A method of forming a densified block of material from a particulate solid, the steps comprising:

- operating a vertically extending tubular furnace with open ends for providing an entry and a discharge for processing elements to be passed in a stream through the furnace;
- supplying the particulate solid in a plurality of canisters, each canister being formed to retain the solid and to compress axially with no substantial radial expansion in the process;
- supplying spacer elements to co-operate with the supplying of canisters whereby a stream of processing elements comprising canisters and spacer elements is formed as a vertical column extending through the furnace, each spacer element being dimensioned to move along the tubular furnace during the process and having end walls

each shaped to engage with an axial end wall of a canister for controlling the location of the canister so as to be spaced from the wall of the furnace and for controlling uniaxial compression of the canisters;

compressing the column at a high temperature to form a dense ceramic block from the particulate solid, and after sufficient residual time, displacing a processing element through the discharge end of the furnace;



removing applied pressure on the column from time to time and either or both (i) removing a processing element from the discharge end and (ii) inserting a new processing element at the entry end of the furnace;

activating holding means to support the column of processing elements to enable substitution of the lowermost processing element in the column.

## ELECTRICAL

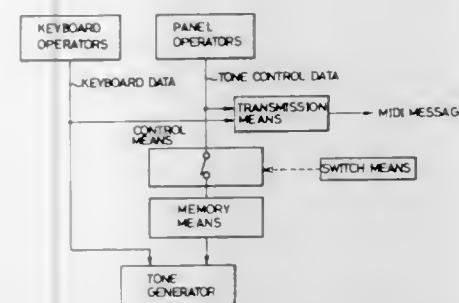
5,414,209

## ELECTRONIC MUSICAL INSTRUMENT

Shigehiro Morita, Hamamatsu, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Shizuoka, Japan  
Filed Mar. 1, 1994, Ser. No. 203,566  
Int. Cl.<sup>6</sup> G10H 1/06, 1/18, 7/00

U.S. Cl. 84—615

8 Claims



1. An electronic musical instrument comprising:
- keyboard operators for generating keyboard data;
- panel operators for generating tone control data;
- memory means for storing said tone control data;
- switch means for changing a normal mode to an interrupt mode, and vice versa;
- control means for, when tone control data is produced in accordance with an operation of said panel operators, writing said tone control data into said memory means in said normal mode, and inhibiting said tone control data from being written into said memory means in said interrupt mode;
- a tone generator for, when keyboard data is produced in accordance with an operation of said keyboard operators, producing a tone signal based on said keyboard data and said tone control data stored in said memory means; and
- transmission means for generating transmission data according to tone control data when the tone control data is produced in accordance with an operation of said panel operators, and transmitting said transmission data outside said electronic musical instrument, and for generating transmission data according to keyboard data when the keyboard data is produced in accordance with an operation of said keyboard operators, and transmitting said transmission data outside said electronic musical instrument.

5,414,210

## MULTIPLE OSCILLATOR ELECTRONIC MUSICAL INSTRUMENT HAVING A REDUCED NUMBER OF SUB-OSCILLATORS AND DIRECT-READ/WRITE OF MODULATION CONTROL SIGNALS

Yasushi Sato, Shizuoka, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Japan

Filed Oct. 29, 1993, Ser. No. 145,803

Claims priority, application Japan, Nov. 2, 1992, 4-315568; Nov. 2, 1992, 4-315569

Int. Cl.<sup>6</sup> G10H 1/057, 1/46

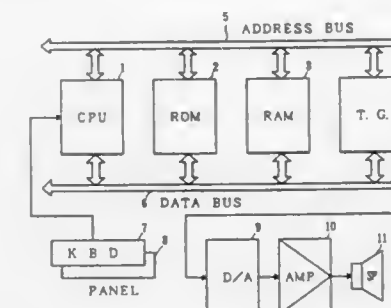
U.S. Cl. 84—627

4 Claims

1. An electronic musical instrument employing a given number of main oscillators to produce musical tones for the instrument, said main oscillators being capable of being modulated by a modulation frequency signal to provide sound effects to the musical tones, said musical instrument comprising:
- a plurality of sub-oscillators, the number of said sub-oscillators being less than the number of main oscillators, each of said sub-oscillators producing an output having a desired frequency;
- storage means for arranging the outputs of said sub-oscillators in consonance with their frequencies and for temporarily storing said outputs;

sub-oscillator selection memory means provided for each of said main oscillators; and

modulation means responsive to the sub-oscillator selection memory means for a given one of said main oscillators for



selecting the output of one of said sub-oscillators and for providing a modulation frequency signal for the given main oscillator having a modulation frequency corresponding to the output of the selected sub-oscillator.

5,414,211

## DEVICE AND METHOD FOR SHIELDING AN ELECTRICALLY CONDUCTIVE CABLE FROM ELECTROMAGNETIC INTERFERENCE

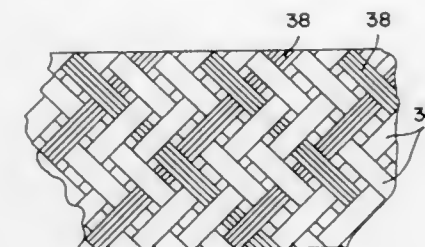
Edward K. C. Chan, Washington, D.C., assignor to E-Systems, Inc., Dallas, Tex.

Filed Dec. 21, 1992, Ser. No. 993,842

Int. Cl.<sup>6</sup> H01B 11/18

U.S. Cl. 174—36

20 Claims



1. A method of reducing the amount of unwanted electromagnetic energy transferred to and from an electrically conductive, longitudinally extended core in a cable covered with a tubular wire shield comprising the steps of:
- insulating a core in a cable so that the core can not be directly contacted along its longitudinal extent;
- applying a chromate conversion coating to aluminum wire so that bare aluminum wire is not exposed and so that the electrical resistance of the wire is not substantially increased; and
- braiding plural strands of the coated aluminum wire onto the insulated core in at least one layer to form a tubular wire shield comprising a mesh of multi-stranded ribbons that reduces the transfer of electromagnetic energy to and from the core and that is resistive to corrosion and galvanic reaction.
6. A tubular shield of braided wire for shielding an electrically conductive core in a cable from electromagnetic interference comprising a plurality of aluminum wires that are braided to form a tubular shield, each of said wires treated with a chromate conversion coating so that bare aluminum wire is not exposed and so that the electrical resistance of the wire is not substantially increased.



5,414,212

**SHIELDED "HERRINGBONE" HARNESS**

Pascal Clouet, Gregy sur Yverres; François Vaille, Corbeil Essonnes, and André Viaud, Crosne, all of France, assignors to Filotex, Draveil, France

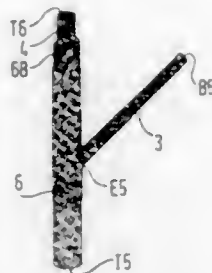
Filed Jan. 27, 1993, Ser. No. 9,997

Claims priority, application France, Jan. 29, 1992, 92 00951

Int. Cl.<sup>6</sup> H01B 7/34

U.S. Cl. 174—36

14 Claims



1. A shielded herringbone harness including a network of conductors all starting from a common point referred to as the point of origin and forming a trunk together with multiple branches along the trunk, thereby delimiting forks from the trunk at the starts of the branches, and segments of trunk between the forks, the diameter of the segments decreasing at each fork from the trunk, said harness further including shielding assemblies for shielding the trunk, the branches and the forks, wherein said shielding assemblies are constituted exclusively by shielding braids for shielding the branches and the trunk, and said shielding braids include firstly at least one first braid made over the length of each individual branch in question, with a first enlarged tab being made on the fork at the start of the branch and over an adjoining portion of at least one of the segments on either side of the fork, and secondly at least one second braid made substantially over the length of each individual segment, and, except for each second braid of the end segment which is the segment of smallest diameter, with a second enlarged tab being made over the end portion of the adjacent segment of smaller diameter, and covering the end of each second braid over the adjoining end portion of the adjacent segment as well as the first enlarged tab of each first braid of the branch at the start between the adjacent segments in question.

5,414,213

**SHIELDED ELECTRIC CABLE**

Ralph D. Hillburn, 8 Whispering Pines Dr., Wallingford, Conn. 06492

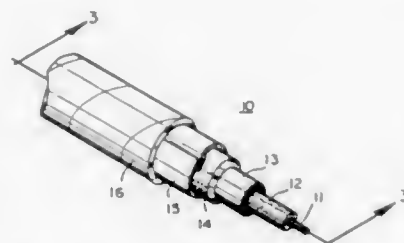
Continuation-in-part of Ser. No. 964,647, Oct. 21, 1992, Pat. No. 5,321,202. This application Oct. 5, 1993, Ser. No. 132,113

The portion of the term of this patent subsequent to Jun. 14, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> H01B 11/18, 13/22

U.S. Cl. 174—36

32 Claims



1. A shielded electric cable of predetermined diameter for assembly with a standard connector comprising a core comprising an insulated conductor, a first shielding member comprising an elongated ribbon of insulating material and a pair of elongated metallic foil strips arranged in a parallel relationship

with the ribbon and bonded to opposite sides of the ribbon, the first shielding member being applied longitudinally to the core and wrapped circumferentially around the core in a generally parallel relationship forming two concentric, substantially closed shielding layers, a layer of plastic material of predetermined thickness surrounding said first shielding member, and a second shielding member surround said layer of plastic material, said second shielding member being formed of non-braided metallic material to facilitate assembly of the cable with a standard connector.

18. A method of making a shielded electric cable of predetermined diameter for assembly with a standard connector said cable having a core comprising an insulated conductor including the steps of applying a first shielding member to the core, the first shielding member comprising an elongated ribbon of insulating material and a pair of elongated metal foil strips arranged in a parallel relationship with the ribbon and bonded to the opposite sides of the ribbon, the first shielding member being applied longitudinally to the core and wrapped circumferentially around the core in a generally parallel relationship forming two concentric substantially closed shielding layers, applying a layer of plastic material of predetermined thickness surrounding the first shielding member, applying a second shielding member surrounding the layer of plastic, the second shielding member being formed of non-braided metallic material to facilitate assembly of the cable with a standard connector, and applying an outer jacket of non-conductive material to the second shielded member to complete the shielded electric cable.

5,414,214

**RESISTANCE HEATED, SEALED MICROFABRICATED DEVICE PACKAGE METHOD AND APPARATUS**

Frederick Y.-T. Cho, Scottsdale; Michael J. Anderson, Phoenix, and Howard D. Knuth, Tempe, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

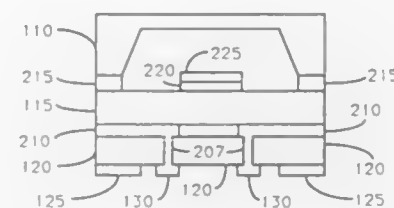
Continuation of Ser. No. 961,990, Oct. 16, 1992, abandoned.

This application Jun. 27, 1994, Ser. No. 265,985

Int. Cl.<sup>6</sup> H05K 5/06

U.S. Cl. 174—52.3

18 Claims



1. An apparatus for enclosing a microfabricated component, the apparatus including in combination:  
package base means for providing a plinth including interconnections;  
package lid means;  
seal means coupled to said package base means and to said package lid means, said seal means for sealing said package base means to said package lid means, said seal means comprising metallic material;  
conductive loop means disposed on said package lid means and thermally coupled to said seal means, said conductive loop means for preferentially heating said seal means; and  
means for conducting electrical energy to said conductive loop means to heat said conductive loop means and thereby to seal said package base means to said package lid means.

5,414,215

**HIGH FREQUENCY ELECTRIC CABLE**

Michel Dunand, Vigneux-sur-Seine, and François Vaille, Corbeil Essonnes, both of France, assignors to Filotex, Draveil, France

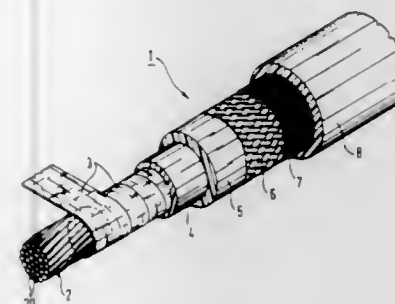
Filed Jan. 27, 1993, Ser. No. 9,990

Claims priority, application France, Jan. 28, 1992, 92 00869

Int. Cl.<sup>6</sup> H01B 7/00

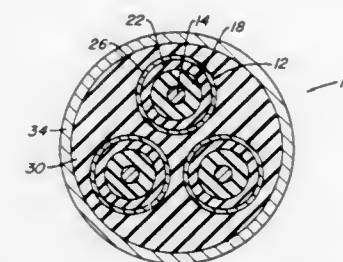
U.S. Cl. 174—113 R

16 Claims



1. A high frequency electric cable, including at least one inner electrical conductor comprising a twisted strand of conductive wires absent a central passage, and means for decreasing linear attenuation, comprising a metal tape taped with overlap directly around said strand.

having a hydrogen sulfide permeability rate which is substantially lower than that of the insulation layer, and



the other of the first and second layers being a metallic tape layer; and  
an outer armor layer surrounding the second layer.

5,414,218

**ARRANGEMENT FOR CABLE TENSILE STRAIN RELIEF**

Robert Nathan, Backnang, Germany, assignor to Alfred Karcher GmbH & Co., Winnenden, Germany

PCT No. PCT/EP91/01088, § 371 Date Dec. 7, 1992, § 102(e)

Date Dec. 7, 1992, PCT Pub. No. WO91/20111, PCT Pub.

Date Dec. 26, 1991

PCT Filed Jun. 11, 1991, Ser. No. 956,873

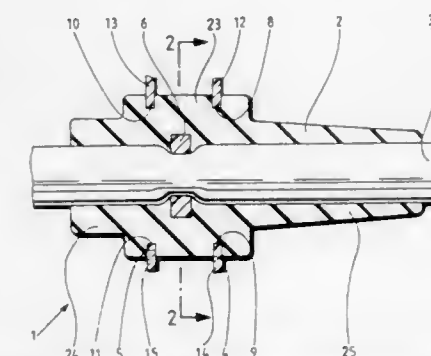
Claims priority, application Germany, Jun. 13, 1990, 40 18

905.9

Int. Cl.<sup>6</sup> H01B 17/16

U.S. Cl. 174—15.1

25 Claims



1. An arrangement for cable tensile strain relief comprising:  
a cable;  
a cable sheath;  
means for attaching the arrangement to a body through which the cable is to pass, for absorbing the tensile strain; and  
a clamping part for constricting the cable and fixing it relative to the sheath;  
wherein the clamping part rests against the cable and the sheath encloses the clamping part and a cable portion including a region constricted by the clamping part; and  
wherein said sheath is integrally formed onto the clamping part and the cable portion by spray-coating.

5,414,219

**PRINTED CIRCUIT BOARD CIRCUIT CONTROL DEVICE**

Curtis L. Huetson, Westminster, and Rick D. Jussel, Broomfield, both of Colo., assignors to AT&T Corp., Murray Hill, N.J.

Filed Apr. 22, 1994, Ser. No. 232,791

Int. Cl.<sup>6</sup> H05K 1/00

U.S. Cl. 174—250

20 Claims

1. A circuit control device for a printed circuit board comprising:  
a first foil pad secured to the circuit board and electrically connected to a first side of an electrical circuit to be selec-

5,414,217

**HYDROGEN SULFIDE RESISTANT ESP CABLE**

David H. Neuroth, Tulsa, and Thomson H. Wallace, Claremore, both of Okla., assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Sep. 10, 1993, Ser. No. 120,016

Int. Cl.<sup>6</sup> H01B 7/00, 7/18

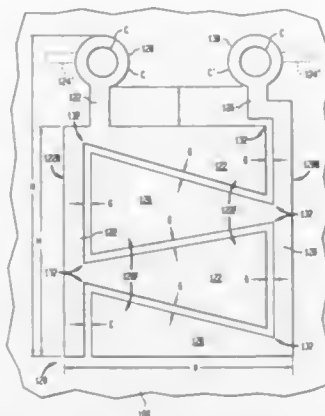
U.S. Cl. 174—120 R

19 Claims

1. An electrical cable for use in oil and gas wells containing hydrogen sulfide gas, comprising in combination:

- a copper conductor core;
- an electrical insulation layer surrounding the conductor core;
- a first layer surrounding the insulation;
- a second layer surrounding the first layer, one of the first and second layers being a polymeric, low permeable layer

tively opened and closed by said circuit control device; and  
a second foil pad secured to the circuit board and electrically connected to a second side of said electrical circuit to be selectively opened and closed by said circuit control device.



vice, said first and second foil pads being separated from one another by a gap which is bridged by solder during an automated solder processing of said printed circuit board to close said electrical circuit, said circuit control device being opened by removal of said solder and reclosed by replacement of said solder.

5,414,220

## FLEXIBLE WIRING CABLE

Yoshio Hanato; Toshio Hori; Hiromichi Tokuda, and Toshimi Kaneko, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

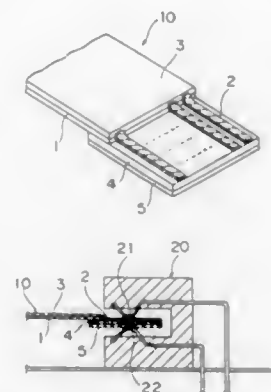
Filed Oct. 19, 1993, Ser. No. 139,543

Claims priority, application Japan, Oct. 19, 1992, 4-279839

Int. Cl.<sup>6</sup> H05K 1/00

U.S. Cl. 174—254

7 Claims



1. A flexible wiring cable being provided on at least one end portion with a connecting portion to be connected with a connector, said flexible wiring cable comprising:

- a base film;
- a wiring conductor being provided on said base film;
- a dielectric member having opposed first and second surfaces and being electrically connected on said first surface with said wiring conductor, said dielectric member being located in said connecting portion; and
- a ground electrode being electrically connected with said dielectric member on said second surface for forming a capacitor with said wiring conductor, said capacitor serving as an electromagnetic noise filter element when said connecting portion is connected to said connector.

5,414,221

## EMBEDDED GROUND PLANE AND SHIELDING STRUCTURES USING SIDEWALL INSULATORS IN HIGH FREQUENCY CIRCUITS HAVING VIAS

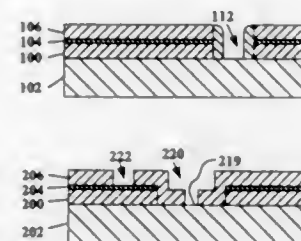
Donald S. Gardner, Mountain View, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 815,234, Dec. 31, 1991. This application Jul. 15, 1993, Ser. No. 93,266

Int. Cl.<sup>6</sup> H05K 9/00

U.S. Cl. 174—261

9 Claims



1. A multi-layer structure comprising:
  - a substrate having a top surface having first and second portions;
  - a first dielectric layer, an electrically conducting layer, and a second dielectric layer, formed in parallel on said first portion of said substrate leaving an aperture having substantially vertical sidewalls around said second portion of said substrate; and
  - an insulating layer extending along said substantially vertical sidewalls of said aperture from said substrate to a top surface of said second dielectric.

5,414,222

## MULTILAYER IC SEMICONDUCTOR PACKAGE

Bidyut K. Sen, Milpitas, and Eric S. Tosaya, Fremont, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif. Continuation of Ser. No. 881,955, May 12, 1992, Pat. No. 5,304,743. This application Aug. 17, 1993, Ser. No. 108,029

Int. Cl.<sup>6</sup> H05K 1/00

U.S. Cl. 174—262

4 Claims



1. An improved multilayer integrated circuit package, said package having a plurality of layers of conducting leads, at least one of said leads in a first layer connected to a lead in a second layer by a metal via, the improvement comprising said via having a cross-section such that said via is much larger in a first direction than in a second direction perpendicular to said first direction.

5,414,223

## SOLDER PAD FOR PRINTED CIRCUIT BOARDS

Edward D. Suski, Lake Forest; David J. Silva, Trabuco, both of Calif., and Glenn G. Miner, Weatherford, Tex., assignors to AST Research, Inc., Irvine, Calif.

Filed Aug. 10, 1994, Ser. No. 288,470

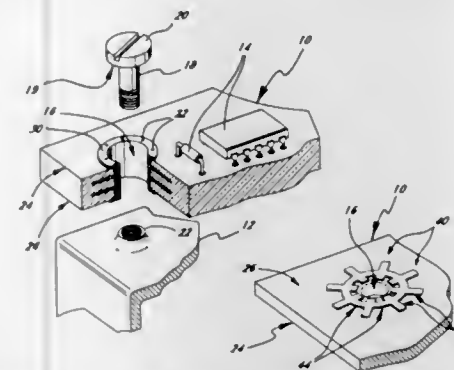
Int. Cl.<sup>6</sup> H05K 1/02

U.S. Cl. 174—262

14 Claims

1. A printed circuit board having at least one through-hole and comprising
  - a conductive ring disposed about and displaced from said through-hole through said printed circuit board,
  - a plurality of conductively plated via holes passing through

said printed circuit board at the location of said conductive ring, and  
a solder mask covering portions of said conductive ring adapted such that passing unmasked portions of said con-



ductive ring over a wave solder creates a solder pad comprising a plurality of spokes radiating outward from said through-hole, said spokes intersecting a circular ring concentric to said through-hole at approximately a perpendicular angle.

5,414,224

## MULTILAYER PRINTED CIRCUIT BOARD AND METHOD OF MANUFACTURING SAME

Vladimir I. Adasko, Moscow; Arnold K. Vardenburg, Istra; Alexandr L. Emelyanov, Moscow; Lev A. Seliverstov, Istra; Viktor L. Emelyanov, Moscow; Alexandr D. Slonimsky, Istra; Nikolai A. Sklyarov, Istra; Vladimir I. Tikhonov, Istra; Jury F. Rogozhin, Istra, and Pogos M. Piliposian, Istra, all of Russian Federation, assignors to Filial Vsesojuznogo Nauchno Issledovatel'skogo Instituta,

PCT No. PCT/SU91/00055, § 371 Date Jan. 29, 1993, § 102(e)

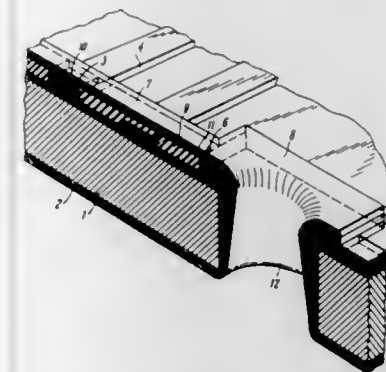
Date Jan. 29, 1993, PCT Pub. No. WO92/17994, PCT Pub. Date Oct. 15, 1992

PCT Filed Apr. 1, 1991, Ser. No. 972,450

Int. Cl.<sup>6</sup> H05K 1/00

U.S. Cl. 174—262

9 Claims



1. A multilayer printed circuit board comprising:
  - a metal base,
  - said base having a plurality of through holes in a pattern for accommodating leads of radio components,
  - an insulating layer applied to at least one side of said base and to walls of said holes, said insulating layer and said base having substantially the same thickness,
  - a first layer of electrically conductive material arranged in a pattern on said insulating layer and comprising a group of electrically conductive sections insulated from each other by insulating sections, said electrically conductive sections and said insulating section being of the same thickness,
  - said electrically conductive sections comprising a group of tracks and a group of connecting pads, each pad of said

group surrounding a corresponding through hole, some of said connecting pads being electrically coupled to other said connecting pads by tracks of said group,  
an insulating layer located on said pattern of said first layer of said conductive material and comprising a group of insulating sections and a group of electrically conductive sections in the form of a plurality of switching posts and connecting pads surrounding corresponding through holes of said group, said electrically conductive sections and said insulating sections being of identical thickness, said plurality of switching posts providing electrical connection of said tracks and said connecting pads in said pattern in said first layer of conductive material,  
an outer layer of conductive material arranged in a pattern on said insulating layer and including electrically conductive sections insulated from each other by insulating sections, said insulating sections and said electrically conductive sections being of the same thickness,  
said electrically conductive sections of the outer layer of the conductive pattern comprising a plurality of tracks and first and second groups of connecting pads, said first group of connecting pads surrounding corresponding through holes, said second group of connecting pads being connectable to surface-mounted radio components, the connecting pads surrounding the through holes having a thickness equal to the sum of the thicknesses of said layers of the conductive material and said insulating layers, and end faces of the superimposed connecting pads surrounding said through holes having projections, and end faces of corresponding insulating sections having indentations located opposite said projections and contacting the projections over the entire surface thereof.

5,414,225

## MOBILITY-DISABLED PORTABLE WEIGHING DEVICE

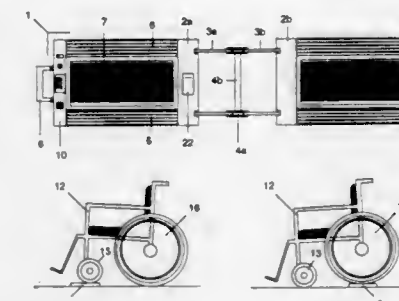
Moishe Garfinkle, P.O. Box 15855, Philadelphia, Pa. 19103

Filed May 7, 1993, Ser. No. 58,954

Int. Cl.<sup>6</sup> G01G 19/00, 21/28, 3/14

U.S. Cl. 177—199

12 Claims



1. A portable weighing device for the mobility-disabled comprising a pair of modules configured with weighing platforms and provided with

- a) mechanical means to slideably secure and rigidly align said modules, and
  - b) electronic means to register, calculate and display weights;
- whereupon said modules are laterally displaced on an essentially level floor for determining the weight of an occupant of a manually-operated wheelchair, said wheelchair supported by two conventional front caster wheels and two main conventional rear main wheels, said weighing platforms accommodating various treads and wheelbases of said caster and main wheels, said determination of said weight of said occupied wheelchair made in a sequence of steps comprising initially rolling said caster wheels onto said weighing platforms and subsequently rolling said main wheels onto said





members to neutral positions thereof in response to release of an operating force on said operating members, an insulating substrate positioned and fixed on the casing, a plurality of stationary contacts formed on said insulating substrate, a plurality of movable contacts resiliently biased toward said insulating substrate for independently contacting with and separating from said stationary contacts, slidably movable contact holders individually supporting each of said movable contacts and to which said operating members are connected for bringing said stationary and movable contacts into and out of contact with each other in a switching manner in response to the operation of said operating members, and a holder case disposed on said insulating substrate and having means for guiding the sliding movement of the contact holders in response to the operation of said operating members,

wherein said contact holder is provided with a body and projected portions which are projected from opposite sides of said body, said holder case being provided with a guide portion for guiding a sliding operation of said contact holder, said guide portion comprising side guide portions extending from a side of said insulating substrate in opposition to the projected portions, and an upper guide portion opposed to said contact holder body from a side thereof opposite to said insulating substrate, one of said projected portions and said guide portions being provided with a positioning projection projected therefrom, the other of said projected portions and side guide portions being provided with a positioning recess in which said positioning projection is fitted so as to hold the contact holder at a predetermined position relative to the holder case wherein the operating member in its neutral position can be inserted into the contact holder, and wherein a distance between said upper and side guide portions is set such that said positioning projection is disengaged from said positioning recess when said contact holder is brought into slide contact with said upper guide portions.

5,414,232

## NOISE ATTENUATION PANEL

Robert S. Wilson, Belfast, Northern Ireland, assignor to Short Brothers PLC, Belfast, Northern Ireland  
PCT No. PCT/GB92/00119, § 371 Date Apr. 13, 1993, § 102(e)  
Date Apr. 13, 1993, PCT Pub. No. WO92/12855, PCT Pub. Date Aug. 6, 1992

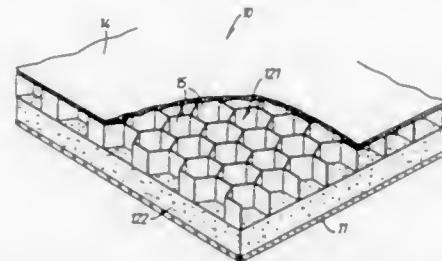
PCT Filed Jan. 21, 1992, Ser. No. 39,080

Claims priority, application United Kingdom, Jan. 22, 1991, 9101355

Int. Cl.<sup>6</sup> E04B 1/82

U.S. Cl. 181—292

17 Claims



1. A noise attenuation panel comprising a first cellular component part which has a front face and a rear face and which has wall portions which extend across the first cellular component part from the front face to the rear face and which provide bounding surfaces for an array of cells, a second cellular component part which has a front face and a rear face and which is a continuous body of material interspersed throughout with intercommunicating cells, a backing component part which is secured to or adjoins the rear face of one of the cellular component parts, the front face of which is secured to or adjoins the rear face of the other cellular component part and

a facing component part which is secured to or adjoins the front face of the other cellular component part, wherein the second cellular component part is made of a porous permeable powder sintered thermoplastics material.

5,414,233

## METHOD OF ELECTRICAL DISCHARGE MACHINING FOR MANUFACTURE OF BELLEVILLE SPRINGS

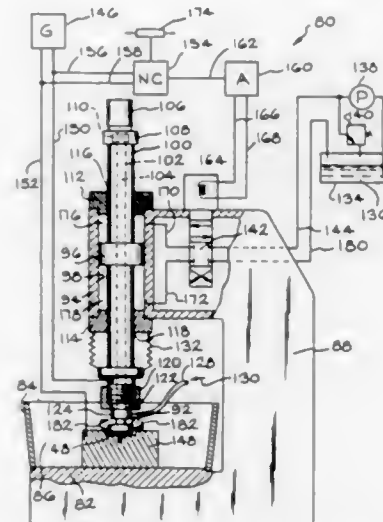
Glen C. Fuller, Kenmore, and Martin J. Halpin, Shortsville, both of N.Y., assignors to Figgie International Inc., Willoughby, Ohio

Filed Aug. 30, 1993, Ser. No. 113,018

Int. Cl.<sup>6</sup> B23H 1/00, 9/00

U.S. Cl. 219—69,17

19 Claims



1. An electrical discharge machining process for manufacturing a spring means, which comprises:

- providing an electrical discharge machining apparatus comprising: a frame means having a support pedestal means for supporting an electrode workpiece that is intended to be machined into the spring means, wherein the electrode workpiece has a first and second sides immersed in a pool of dielectric fluid; a reciprocating means attached to the frame means and movable along a work centerline towards and away from the support pedestal means and the electrode workpiece supported thereon; and first and second electrode tool means interchangeably attachable to the reciprocating means, the electrode tool means having respective first and second work surfaces providing the shape of the spring means;
- supporting the electrode workpiece on the support pedestal means with the first side of the workpiece aligned along the work centerline, facing the first work surface of the first electrode tool means attached to the reciprocating means;
- moving the reciprocating means along the work centerline, towards the electrode workpiece to provide a first clearance filled with the dielectric fluid between the first work surface and the first side of the electrode workpiece;
- applying an intermittent unidirectional voltage between the first electrode tool means and the electrode workpiece via the dielectric fluid to effect electrical discharge removal of material from the first side of the electrode workpiece and provide said first side having a shape similar to that of the first work surface;
- moving the reciprocating means to a position spaced from the electrode workpiece, wherein the first electrode tool means is replaced with the second electrode tool means attached to the reciprocating means and the electrode workpiece is repositioned supported on the support pedestal means;

tal means such that the second side of the electrode workpiece is aligned along the work centerline, facing the second work surface of the second electrode tool means attached to the reciprocating means;

- moving the reciprocating means along the work centerline, towards the electrode workpiece to provide a second clearance filled with the dielectric fluid between the second work surface and the second side of the electrode workpiece; and
- applying an intermittent unidirectional voltage between the second electrode tool means and the electrode workpiece via the dielectric fluid to effect electrical discharge removal of material from the second side of the electrode workpiece and provide said second side having a shape similar to that of the second work surface, thereby providing the spring means.

5,414,234

## STUD WELDING METHOD

Masaru Kito, Toyohashi, Japan, assignor to Emhart Inc., Newark, Del.

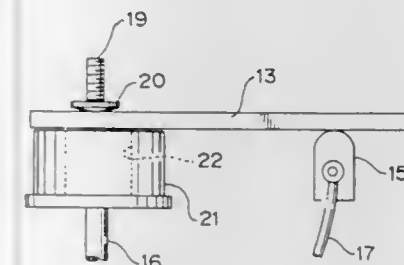
Filed Nov. 5, 1993, Ser. No. 148,053

Claims priority, application Japan, Nov. 6, 1992, 4-297368

Int. Cl.<sup>6</sup> B23K 9/20

U.S. Cl. 219—99

1 Claim



1. A stud welding method for welding a metal stud to a work piece at a location closely adjacent to an edge thereof and for providing a symmetrical weld bead co-axial with the stud comprising the steps of:

- placing the tip of a stud supported by a welding gun at a welding location adjacent to at least one edge of a work piece;
- producing an arc discharge across the stud and the work piece;
- melting the tip of the stud and a portion of the work piece by said discharge;
- providing a hollow cylindrical member having a larger inside diameter than the stud tip and being made of a magnetic permeable material;
- placing the cylindrical member during said arc discharge so that the hollow portion thereof is positioned on the work piece surface, at the side opposite to the, said member being positioned coaxially with the stud, and operating to constrain molten material of the work piece in a circular pool centered on the axis of the stud and maintaining said member at said location during arc discharging to permit the formation of a symmetrical weld bead about the tip of the stud after termination of the discharge; and
- plunging the stud into the center of the melted portion of the work piece to terminate arc discharging.

5,414,235

## GAS PLASMA GENERATING SYSTEM WITH RESONANT CAVITY

William Lucas, Cambridge, and James Lucas, Liverpool, both of England, assignors to The Welding Institute, Cambridge, United Kingdom

PCT No. PCT/GB91/02086, § 371 Date May 26, 1993, § 102(e)  
Date May 26, 1993, PCT Pub. No. WO92/10077, PCT Pub. Date Jun. 11, 1992

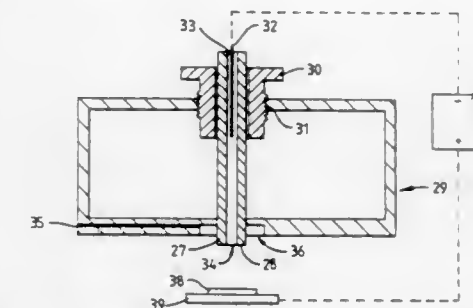
PCT Filed Nov. 26, 1991, Ser. No. 66,083

Claims priority, application United Kingdom, Nov. 27, 1990, 9025695

Int. Cl.<sup>6</sup> B23K 10/00

U.S. Cl. 219—121.43

29 Claims



1. A gas plasma generating system comprising a resonant cavity for connection to a source of very high frequency power; a plasma cavity defined by a wall of an electrically non-conductive material positioned within the resonant cavity for containing an ionisable gas such that in use a plasma is formed in the plasma cavity, the cavity having an exit opening to enable plasma to exit from the system, wherein the plasma cavity comprises a tubular member extending through opposed walls of the resonant cavity, the tubular member receiving at one end a plasma gas, in use, and plasma exiting from the other end; and a movable tuning member whose position can be adjusted to achieve the desired tuning condition, the tubular member defining the plasma cavity extending through the tuning member.

5,414,236

## PROCESS FOR HIGH QUALITY PLASMA ARC CUTTING OF STAINLESS STEEL AND ALUMINUM

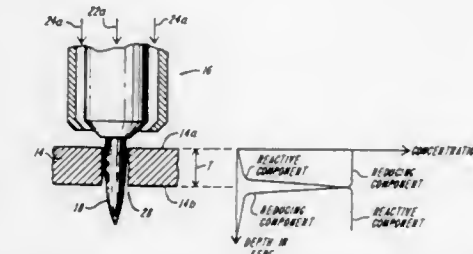
Richard W. Couch, Jr., Hanover, N.H.; Nicholas A. Sanders, Norwich, Vt.; Zhipeng Lu, and Lifeng Luo, both of Lebanon, N.H., assignors to Hypertherm, Inc., Hanover, N.H.

Filed Dec. 11, 1992, Ser. No. 989,183

Int. Cl.<sup>6</sup> B23K 10/00

U.S. Cl. 219—121.39

14 Claims



1. A plasma arc cutting process for producing a high quality kerf in stainless steel and non-ferrous workpieces that have an upper surface adjacent a plasma arc torch and a bottom surface opposite the torch, where the torch has a total gas flow including at least a plasma gas that forms the arc, the process comprising the steps of:

- forming a portion of the total gas flow from a reducing gas, and
- adjusting the ratio of said reducing gas flow to said total gas



flow based on thickness of the workpiece prior to cutting such that said reducing gas flow constitutes a value of between about 2 to 50 percent of said total gas flow, to thereby produce during cutting a predominantly reducing atmosphere through the kerf and a predominantly oxidizing atmosphere generally at the region defined by the bottom surface and the kerf.

# 5,414,237 PLASMA ARC TORCH WITH INTEGRAL GAS EXCHANGE

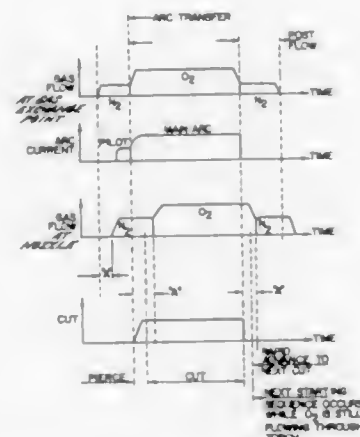
Donald W. Carkhuff, Florence, S.C., assignor to The ESAB Group, Inc., Florence, S.C.

Filed Oct. 14, 1993, Ser. No. 136,974

Int. Cl.<sup>6</sup> B23K 10/00

U.S. Cl. 219—121.51

13 Claims



1. A plasma arc torch, comprising:

- a torch body;
- a metallic electrode having a discharge end mounted within said torch body;
- an electrically conductive nozzle assembly mounted within said torch body, said nozzle assembly being spaced apart from said discharge end of said electrode;
- a gas plenum defined between said discharge end of said electrode and said conductive nozzle assembly;
- a first gas passageway for communicating a non-oxidizing gas into said plenum;
- a second gas passageway for communicating an oxidizing gas into said plenum;
- a first plenum inlet valve associated with said first gas passageway and a second plenum inlet valve associated with said second gas passageway, each said plenum inlet valve being mounted within said torch body in close proximity to said plenum and being operable between a closed position for preventing gas flow from said associated passageway into said plenum and an open position for allowing gas flow from said associated passageway into said plenum;

whereby one said plenum inlet valve may be opened substantially simultaneously with closing of the other said plenum inlet valve so as to selectively introduce either the oxidizing or non-oxidizing gas into said gas plenum and to rapidly purge a preexisting gas from the plenum.

# 5,414,238 RESONANT POWER SUPPLY FOR AN ARCJET THRUSTER

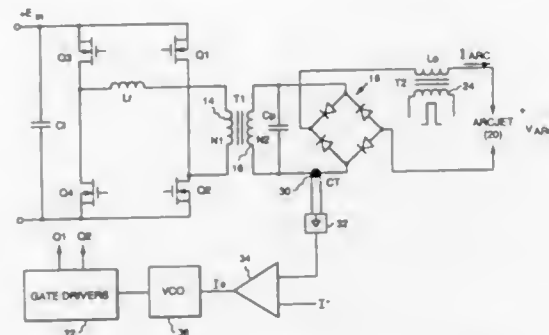
Robert L. Steigerwald, Burnt Hills, and John N. Park, Rexford, both of N.Y., assignors to Martin Marietta Corporation, East Windsor, N.J.

Filed Oct. 2, 1992, Ser. No. 956,130

Int. Cl.<sup>6</sup> B23K 9/073, 9/067

U.S. Cl. 219—121.54

2 Claims



1. A power supply for a thruster, comprising:

- a full-bridge resonant converter including a resonant tank circuit for stabilizing the load of said thruster; and
- control means for regulating the output current of said resonant converter substantially independent of an output voltage, the load quality factor of said resonant tank circuit varying in accordance with said output voltage and said output current so as to operate in a predetermined steady-state operating range, said steady-state operating range extending from a relatively low output voltage and a relatively high output current to a relatively high output voltage and a low output current.

# 5,414,239 OPTICAL APPARATUS FOR LASER MACHINING

Takao Terabayashi; Hideaki Sato; Hideaki Tanaka, all of Yokohama, and Yoshitada Oshida, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

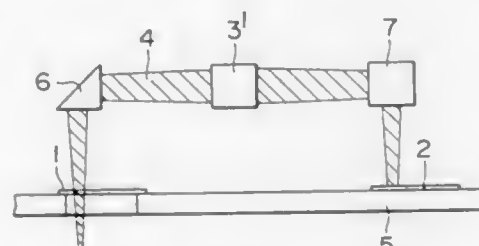
Filed Mar. 1, 1993, Ser. No. 24,643

Claims priority, application Japan, Mar. 18, 1992, 4-062077

Int. Cl.<sup>6</sup> B23K 26/06

U.S. Cl. 219—121.73

23 Claims



1. A laser-machining optical apparatus comprising:

- a laser head for oscillating laser light for working a specimen;
- a mask provided in the optical path of a beam of the laser light between the specimen and said laser head and having a working pattern formed on its surface;
- an objective provided in the optical path of the laser light beam between said mask and the specimen;
- a mechanism on which said mask and the specimen are placed so that an optical imaging relationship is maintained between the mask and the specimen with said objective interposed therebetween; and
- two-dimensional scanning means provided in the optical path of the laser light beam between said laser head and

said mask to two-dimensionally scan the surface of said mask with the laser light beam from said laser head.

# 5,414,240 ELECTRICALLY HEATABLE TRANSPARENCY

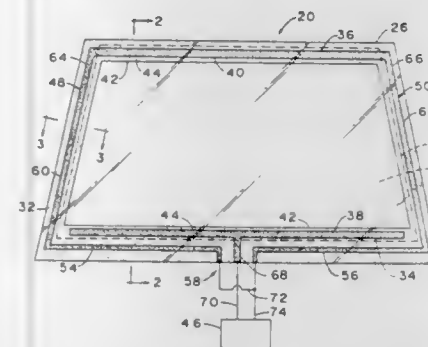
Thomas M. Carter, Allison Park; Charles R. Coleman; Russell C. Criss, both of Pittsburgh; Frank H. Gillery, Allison Park; Pamela L. Martino; Amy M. Roginski, both of New Kensington; John A. Winter, Pittsburgh; Terry L. Wolfe, Allison Park, and James J. Finley, Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 27, 1988, Ser. No. 290,225

Int. Cl.<sup>6</sup> H05B 3/00

U.S. Cl. 219—203

26 Claims



24. An electrically heatable transparency comprising:

- a rigid substrate;
- a ceramic border bonded to a surface of said substrate and extending along at least a portion of the periphery of said substrate;
- a pair of opposing electroconductive bus bars spaced from each other wherein at least one of said bus bars is bonded to a surface portion of said border such that an inner edge of said bus bar is positioned entirely along said border and an inner surface portion of said border is uncovered by said bus bar; and
- an electroconductive coating, having a predetermined surface resistance, interconnecting said bus bars such that a portion of said coating covers said inner surface portion of said border along the length of said at least one bus bar, wherein said inner surface border portion has a gloss equivalent of approximately 10 gloss units or more so as to provide a sufficient smoothness to maintain a surface resistance of said coating portion covering said inner surface portion of said border within a range of about 50% or less than said predetermined surface resistance.

# 5,414,241 HEATER, A METHOD OF MANUFACTURING THE SAME, AND AN ANTI-CONDENSATION MIRROR INCORPORATING THE SAME

Kelichi Ohashi, Shizuoka; Yoshinobu Ohara, Nara, and Fumitaka Ishimori, Kitakatsuragi, all of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, Japan

Filed May 3, 1993, Ser. No. 55,111

Claims priority, application Japan, May 11, 1992, 4-030617; May 11, 1992, 4-117722; Sep. 25, 1992, 4-256620

Int. Cl.<sup>6</sup> H05B 3/02

U.S. Cl. 219—219

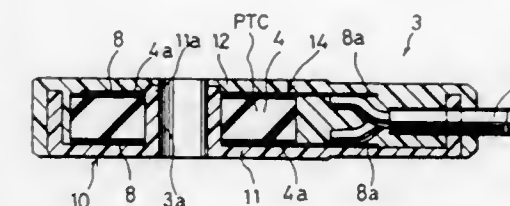
38 Claims

1. A heater comprising:

- a heating element made of a thermistor having a positive temperature coefficient of resistance;
- electrodes formed on upper and lower surfaces of said heating element;
- a pair of flat metallic terminals electrically connected to said electrodes;
- a pair of feeders electrically connected to inner surfaces of

said metallic terminals, said inner surfaces facing each other; and

an electrical insulating cover member for covering exposed portions of said heating element, said electrodes, and of said metallic terminals, and connections between said metallic terminals and said feeders so as to insulated them



from outside wherein said electrical insulating cover member comprises an insulating base section integrally formed in said electric insulating cover member which defines a holding position of a heating unit in said electric insulating cover member, said heating unit including said heating element, said electrodes and said metallic terminals connected to said feeders.

# 5,414,242 DEFROSTING MIRROR

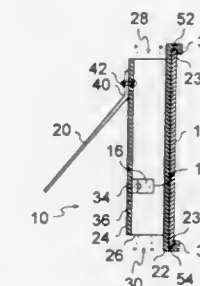
Ken K. Kwong, 18804 39th Ave. South, Seatac, Wash. 98188-5272

Filed May 24, 1994, Ser. No. 248,448

Int. Cl.<sup>6</sup> H05B 3/84

U.S. Cl. 219—219

4 Claims



1. A surroundings illuminating defrosting mirror, comprising:

- a) a mirror, said mirror having an image-reflecting surface and a back surface;
- b) a box structure having a front panel, a back panel, and two side panels, said mirror being disposed over said front panel of said box structure, said box structure having a top which is entirely open enabling a light source located inside said box structure to illuminate the surroundings; and
- c) a heat-generating light source, said light source being disposed inside said box structure and behind said mirror, said heat-generating light source being capable of generating sufficient heat to defrost said image-reflecting surface on said mirror and illuminate the surroundings.

5,414,243

## ELECTRIC TOASTING MACHINES WITH VARIABLE TIMING CIRCUIT

Julien Snell, Burgess Hill, and Leslie A. Gort-Barten, Dulwich Common, both of England, assignors to Maxmillian Gort-Barten, London, England

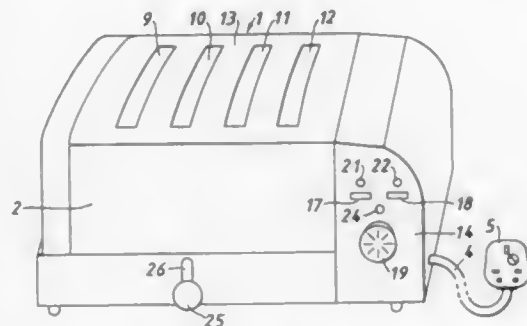
Continuation-in-part of Ser. No. 152,866, Nov. 12, 1993. This application May 17, 1994, Ser. No. 243,947

Claims priority, application United Kingdom, Nov. 13, 1992, 9223846; Feb. 11, 1993, 9302670

Int. Cl.<sup>6</sup> H05B 1/02

U.S. Cl. 219—492

9 Claims



1. A toaster machine comprising: heating means for toasting food products during a toasting cycle; switch means for initiating the toasting cycle; toast colour selection means for setting a selected time period for the toasting cycle; a timing circuit arranged to measure an elapsed time since a previous toasting cycle, the timing circuit including time booster means for providing a boost time period during a current toasting cycle; connection means for connecting the toaster machine to an electrical power supply so as to supply power to the heating means on initiation of the toasting cycle by the switch means; a temperature measuring device arranged to measure a temperature within the toaster machine and to provide a signal indicative thereof; and control means for controlling the time period of the current toasting cycle, the control means being connected to the toast colour selection means, the timing circuit, and the temperature measuring device, so that the current toasting cycle time period is increased over the selected time period by the boost time period both if the elapsed time since a previous toast cycle exceeds a predetermined elapsed time and on the first toasting cycle after connection of the connection means to the power supply, except that if the temperature as measured by the temperature measuring device exceeds a predetermined temperature then the control means acts in response to said signal so that it does not increase the selected time period by the boost time period.

5,414,244

## SEMICONDUCTOR WAFER HEAT TREATMENT APPARATUS

Issei Imahashi, Yamanashi, Japan, assignor to Tokyo Electron Limited, Tokyo, Japan

Filed Apr. 21, 1994, Ser. No. 230,793

Claims priority, application Japan, Apr. 21, 1993, 5-119156

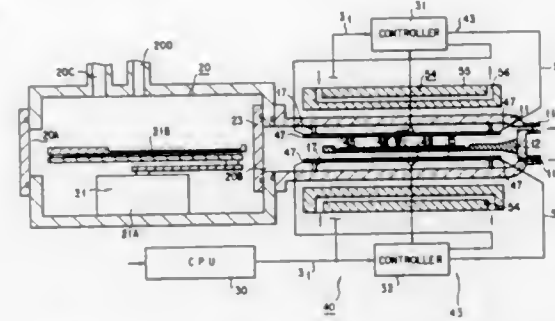
Int. Cl.<sup>6</sup> H05B 1/02

U.S. Cl. 219—497

14 Claims

1. A heat treatment apparatus for rapidly heating semiconductor wafers one by one, comprising: a process tube which permits transmitting heat rays; a holding member for holding a wafer to be treated in said process tube;

transfer means for moving wafers into and out of said process tube; a temperature regulation plate arranged close to the wafer held by said holding member in a manner to face said wafer for regulating the amount of the heat rays arriving at the wafer; heating means for heating said temperature regulation plate when the wafer is transferred into the process tube by said transfer means;



cooling means for cooling the wafer after the heating step performed by said heating means; temperature detecting means for detecting the temperature of the temperature regulation plate; and control means for controlling said heating means in the heating step based on temperature profiles (changes with time in temperature) of the temperature regulation plate and a dummy wafer, said temperature profiles being determined and stored in advance, and the detected temperature of the temperature regulation plate.

5,414,245

## THERMAL-INK HEATER ARRAY USING RECTIFYING MATERIAL

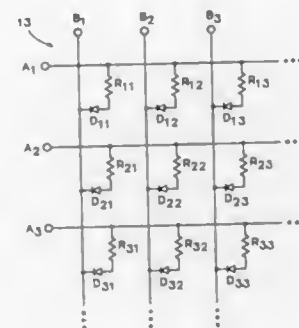
David E. Hackleman, Monmouth, Oreg., assignor to Hewlett-Packard Corporation, Palo Alto, Calif.

Filed Aug. 3, 1992, Ser. No. 925,355

Int. Cl.<sup>6</sup> H05B 3/10

U.S. Cl. 219—548

16 Claims



1. A heater array for heating ink in an ink jet printhead comprising: an insulating substrate; a first material layer atop the insulating substrate having a first predetermined pattern; a first insulating layer atop the first material layer having a plurality of contact windows above the first material layer pattern in corresponding desired heating locations; a second material layer atop the first insulating layer having a second predetermined pattern, the first and second material layers being in physical contact with each other through the contact windows in the first insulating layer; means for contacting the first material layer; and means for contacting the second material layer,

wherein each physical contact region between the first and second material layers forms a merged resistive diode junction at each desired heating location, the physical contact region of the resistive diode junction transferring conductive heat directly to ink in an ink jet printhead.

5,414,246

## APPARATUS FOR SCALELESS INDUCTION HEATING

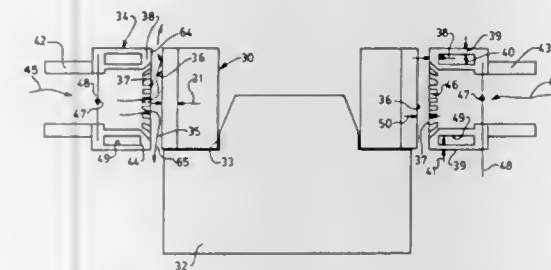
Mark G. Shapona, Canton, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1993, Ser. No. 172,771

Int. Cl.<sup>6</sup> H05B 6/10

U.S. Cl. 219—640

8 Claims



1. An integrated inductor-manifold-quench apparatus for heat treating a heated surface of a ferrous part, comprising: (a) a manifold having foramina, said manifold cooperating with the part to be heat treated to provide a space therebetween and to provide a path for fluids exiting from the manifold foramina to traverse the heated surface of the part; (b) an inductive heater carried by the manifold to be in close proximity to the heated surface of the part with the fluid path disposed therebetween; (c) selectively controllable electrical power supply for the heater to provide a power-on and a power-off condition of said heater; and (d) a fluid supply for introducing a diluted rapidly reacting combustible gas mixture, at least during the power-on condition of the heater, to the manifold and thence to said space, and for injecting a quenchant fluid during the power-off condition of the inductor, the injection being through the manifold foramina to follow said path.

5,414,247

## HOT MELT INDUCTION HEATER AND METHOD

Glenn A. Geithman, Renton; Duncan P. MacKinnon, Woodinville; Gary D. Benham, Snohomish; Babak Sayyadi, Bothell, and Robert T. Yankis, Redmond, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 29, 1993, Ser. No. 174,717

Int. Cl.<sup>6</sup> H05B 6/06

U.S. Cl. 219—667

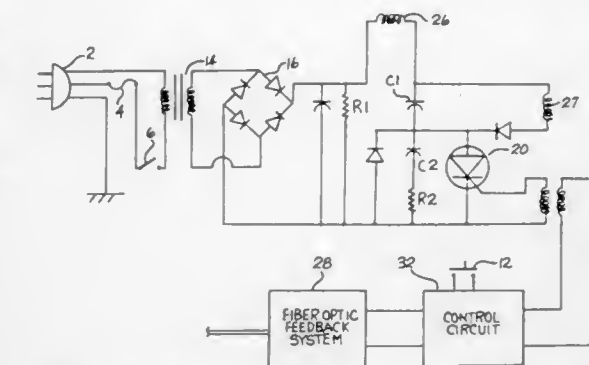
18 Claims

1. An induction heater for hot melt fasteners of a type including a thin flat base plate having an inner surface and an opposite outer surface with a thermal adhesive thereon, said heater comprising:

a heating head including a housing having at one end a flat base, an induction coil in said housing positioned adjacent to said base to be adjacent to the inner surface of the base plate of a hot melt fastener when said base is placed parallel to and at least closely adjacent to said inner surface, and a passageway in said housing having a first end opening through said base;

a fiber optic cable extending from a sensing end just inside said first end opening of said passageway, through said passageway to a control end, said sensing end being positioned to confront said inner surface of said base plate

when said base is parallel and closely adjacent to said inner surface; and a controller including a transducer connected to said control end of said fiber optic cable to convert infrared light emitted by said base plate and transmitted through said



cable into an electric signal, a power oscillator circuit connected to said coil to supply electromagnetic pulses thereto and thereby heat said base plate, and a control circuit for automatically adjusting the duty cycle of said pulses, and terminating said pulses, in response to said electric signal.

5,414,248

## GREASE AND MOISTURE ABSORBING INSERTS FOR MICROWAVE COOKING

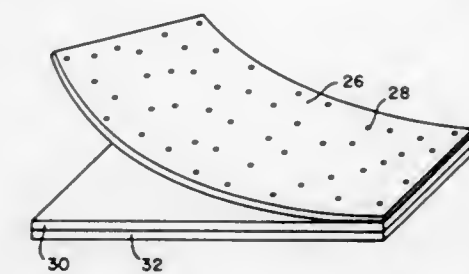
Bobby M. Phillips, Jonesborough, Tenn., assignor to Eastman Chemical Company, Kingsport, Tenn.

Continuation-in-part of Ser. No. 812,933, Dec. 24, 1991, abandoned. This application Nov. 25, 1992, Ser. No. 981,348

Int. Cl.<sup>6</sup> H05B 6/80

U.S. Cl. 219—730

49 Claims



1. An insert useful in a microwavable food container comprising first and second outer layers, and an intermediate layer between and bonded to said first and said second outer layers, wherein

said first layer comprises a plastic layer further comprising openings and is in position to be adjacent to food, said intermediate layer comprises an absorbent material comprising fibers, and said second outer layer is a substrate which is stable to microwave heating conditions, wherein said intermediate layer comprises at least one fiber having at least one continuous groove oriented axially along the fiber wherein said fiber satisfies the following equation:

$$(1 - X \cos \theta_a) < 0,$$

wherein

$\theta_a$  is selected from the group consisting of the advancing contact angle of water and the advancing contact of n-decane measured on a flat film made from the same mate-



rial as the fiber and having the same surface treatment, if any,  
X is shape factor of the fiber cross-section that satisfies the following equation:

$$X = \frac{P_w}{4r + (\pi - 2)D}$$

wherein

$P_w$  is the wetted perimeter of the fiber and  $r$  is the radius of the circumscribed circle circumscribing the fiber cross-section and  $D$  is the minor axis dimension across the fiber cross-section.

5,414,249

## AUTOMATIC GATE APPARATUS

Kozo Matsumoto, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

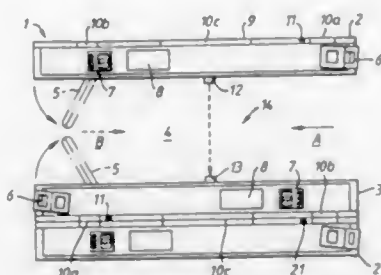
Filed Jul. 20, 1993, Ser. No. 93,755

Claims priority, application Japan, Jul. 20, 1992, 4-192345

Int. Cl. G06F 15/30

U.S. Cl. 235—384

7 Claims



1. An automatic gate system, including at least a first automatic gate apparatus having a pair of gate members defining a passageway therebetween, wherein a second automatic gate apparatus is capable of being arranged side-by-side to the first automatic gate apparatus, the first and second gate apparatuses are adapted to be installed at a station in a transit system, the first automatic gate apparatus including first transmission means and the second automatic gate apparatus including second transmission means for communicating with a wireless medium which is carried by a customer, the wireless medium including a memory capable of storing identification data therein and a transmitter capable of wirelessly transmitting the data stored in the memory when the wireless medium receives correspondence data specifying a correspondence between the wireless medium and the first automatic gate apparatus, the system comprising:

means for storing station name information representative of the location of the automatic gate system within the transit system;  
first generating means for generating a first signal for wirelessly transmitting data via the first transmission means to the wireless medium, the first signal being limited to a first communication area defined within the passageway;  
means for receiving the identification data transmitted by the wireless medium, the identification data being transmitted by the wireless medium in response to the reception of correspondence data provided in the first signal;  
means for judging whether the identification data transmitted by the wireless medium is proper based on the station name information stored in the storing means;  
second generating means for generating a second signal, for wirelessly transmitting identification data and the station name information to the wireless medium, wherein the wireless medium is capable of storing the identification data in the memory, the second signal being transmitted at a level so as to cover a second communication area, the second communication area including therein the first

communication area of the first automatic gate apparatus and a first communication area of the second automatic gate apparatus located adjacent to the first automatic gate apparatus;

means for switching from the first generating means to the second generating means when the judging means judges that the identification data transmitted by the wireless medium is proper; and  
means for allowing a customer to pass through the passageway when the judging means judges that the identification data is proper.

5,414,250

## METHOD AND APPARATUS FOR READING TWO-DIMENSIONAL BAR CODE EMPLOYING BIT-MAPPED IMAGING

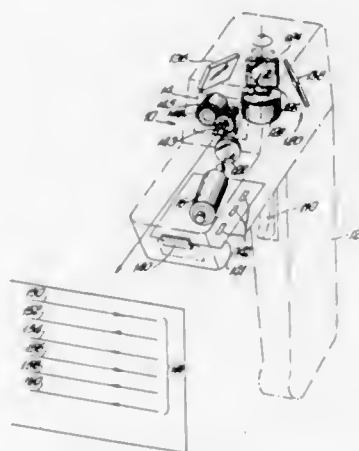
Jerome Swartz, Old Field, and Boris Metlitsky, Stony Brook, both of N.Y., assignors to Symbol Technologies, Inc., Bohemia, N.Y.

Continuation of Ser. No. 317,433, Mar. 1, 1989, abandoned. This application Jan. 4, 1993, Ser. No. 794

Int. Cl. G06K 7/10

U.S. Cl. 235—462

23 Claims



1. A method of reading a bar code symbol containing information comprising the steps of:

- directing a light beam in a scanning pattern over a symbol to be read at a first scanning angle;
- detecting at least a portion of light of variable intensity reflected off the symbol over a field of view and generating an electrical signal indicative of the detected light intensity;
- processing said electrical signal to produce digital representations of the detected light intensity;
- transferring said digital representations to a memory array having rows and columns;
- reading said memory array in a sequence of linear directional patterns until a sequence of said digital representations represents at least a portion of a possible bar code symbol is recognized; and, if a complete line of a possible bar code symbol is not recognized, changing said scanning of said light beam to another scanning angle and continuing to direct said beam in a different scanning pattern over said symbol, then repeating steps (b)–(e) until a complete bar code symbol is recognized, and thereafter
- processing said sequence of digital representations thereby determining the information contained in the symbol.

5,414,251

## READER FOR DECODING TWO-DIMENSIONAL OPTICAL INFORMATION

Dennis A. Durbin, Cedar Rapids, Iowa, assignor to Norand Corporation, Cedar Rapids, Iowa

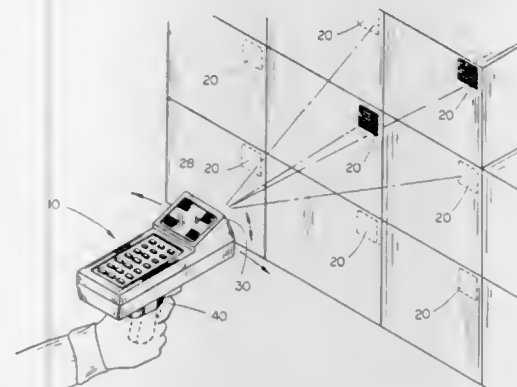
Continuation of Ser. No. 849,771, Mar. 12, 1992, abandoned.

This application Jul. 28, 1994, Ser. No. 284,883

Int. Cl. G06K 7/10

U.S. Cl. 235—462

21 Claims



1. An apparatus for reading two-dimensional optical information, comprising:

- a housing having an opening;
- a photosensitive array mounted within said housing;
- optical string means associated with said array and said opening of said housing for focusing optical information on said array;
- array and optical string control means for controlling said array and optical string;
- memory means for storing output from said array;
- pattern recognition means for assisting a user in recognizing and confirming the decodability of optical information;
- display means associated with said housing for displaying an image of said array output, as processed by said pattern recognition means, said display means further including optical information decodability indication means;
- user feedback means, providing user interface with said apparatus, for facilitating user control over said optical string means, array, and display means;
- decoding means for decoding optical information; and
- electrical power supply means for providing power for the operation of said apparatus.

5,414,252

## HIGH SPEED SCAN BAR CODE READER WHICH CAN READ MORE THAN ONE TYPE OF BAR CODE

Ichiro Shinoda; Tomoyuki Kashiwazaki; Akira Okawado; Kazumasa Moriya; Shinichi Sato; Motobiko Itoh; Mitsuo Watanabe, and Hiroaki Kawai, all of Kawasaki, Japan, assignors to Fujitsu Limited, Japan

Filed Feb. 10, 1992, Ser. No. 833,493

Claims priority, application Japan, Feb. 8, 1991, 3-016719; Feb. 18, 1991, 3-023228

Int. Cl. G06K 7/10

U.S. Cl. 235—463

25 Claims

1. A bar code reader using a high speed scanner, comprising: scanning means for scanning with a scanning beam a surface of an article on which a bar code comprised of a plurality of elements is printed, and outputting a signal with two levels, the levels are determined based on whether portions of the surface currently scanned are black or white with the levels having durations;

bar width detecting means for successively detecting and outputting widths of the respective durations where the levels are unchanged;

bar width storing means for storing the widths detected by the bar width detecting means;

address generating means for generating an address within the bar width storing means at which each of the widths is to be stored;

fast screening means for determining whether a set of successive widths successively detected by the bar width detecting means satisfies a predetermined condition for the set of widths constituting a complete bar code said fast screening means comprising:

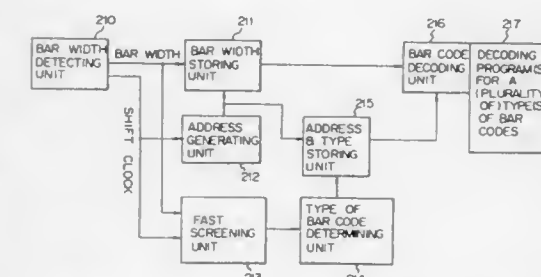
first margin detecting means for detecting a bar width corresponding to a first margin output from said bar width detecting means;

second margin detecting means for detecting a bar width corresponding to a second margin output from said bar width detecting means, following a bar width corresponding to one of the elements in said bar code;

both-side margin detecting means for detecting a sequence of the first and second margins by the detection of the bar width corresponding to said second margin after the detection of the bar width corresponding to said first margin;

interrupt generating means for generating an interrupt signal to be supplied to said bar code decoding means when said both-side margin detecting means detects the sequence of the bar width corresponding to said second margin after the detection of the bar width corresponding to said first margin; and

interrupt indicating means for indicating a number of said interrupt signals where the interrupt signals have been



generated by said interrupt generating means, and the bar codes corresponding to the interrupt signals have not been decoded by said bar code decoding means; and  
bar code decoding means for reading the set of successive widths from the addresses of the bar width storing means where the address is generated by the address generating means, and for decoding a bar code constituted by the set of successive widths when the fast screening means determines that the set of successive widths satisfies said predetermined condition.

11. A bar code reader using a high speed scanner, comprising:

scanning means for scanning with a scanning beam a surface of an article on which a bar code comprised of a plurality of elements is printed, and outputting a signal of two levels, the levels are determined based on whether portions of the surface currently scanned are black or white with the levels having durations;

bar width detecting means for successively detecting and outputting widths of the durations where the levels are unchanged;

bar width storing means for storing the widths detected by the bar width detecting means;

address generating means for generating an address within the bar width storing means at which each of the widths is to be stored;

fast screening means for determining whether a set of successive widths successively detected by the bar width detecting means satisfies a predetermined condition for the set of successive widths constituting a complete bar code;

type of bar code detecting means for detecting a type of the bar code, the widths of the elements of which are detected by the bar width detecting means, based on the detected widths when the fast screening means determines that the set of successive widths satisfies the predetermined condition;

address & type storing means for storing the type of bar code detected by the type of bar code detecting means together with the addresses generated by the address generating means for the widths of the bar code; and

bar code decoding means, provided with a plurality of specific type decoding means, for respectively decoding a plurality of types of bar codes.

5,414,253

## INTEGRATED CIRCUIT CARD

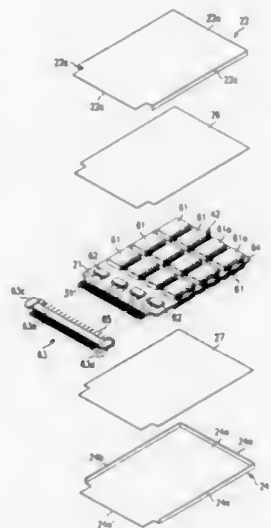
Daniel Boudouin, Missouri City, and Alton Carpenter, Houston, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 801,971, Dec. 3, 1991, abandoned. This application Feb. 18, 1994, Ser. No. 198,653

Int. Cl.<sup>6</sup> G06K 19/06

U.S. Cl. 235—492

10 Claims



1. An integrated circuit card, comprising: a substrate having top and bottom surfaces;
  - a plurality of first packaged semiconductor devices mounted on said top surface of said substrate;
  - a plurality of second packaged semiconductor devices mounted on said bottom surface of said substrate;
  - a housing bonded to and covering said first and second packaged semiconductor devices, said housing including a first metal cover having a planar surface bonded to at least selected ones of said first packaged semiconductor devices, a second metal cover having a planar surface bonded to at least selected ones of said second packaged semiconductor devices, metal sidewalls extending between said first and second metal covers, and a metal rear wall extending between said first and second metal covers, said first and second metal covers, metal sidewalls, and metal rear wall forming external surfaces of said integrated circuit card, said metal sidewalls including a first portion extending from said planar surface of said first metal cover and a second portion extending from said planar surface of said second metal cover and said metal rear wall including a first portion extending from said planar surface of said first metal cover and a second portion extending from said planar surface of said second metal cover; and
  - a connector attached to said substrate, said first metal cover having a lip that extends from and is substantially planar to said planar surface of said first metal cover bonded to a

top surface of said connector, said second metal cover having a lip that extends from and is substantially planar to said planar surface of said second metal cover bonded to a bottom surface of said connector.

5,414,254

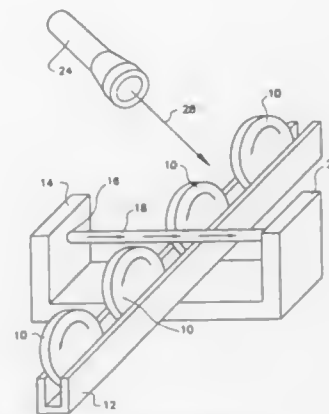
## OPTICAL SWITCH WITH TAMPER INDICATING FEATURE FOR DISCOURAGING THE USE OF AN EXTERNAL LIGHT SOURCE TO DEFEAT THE INTENDED OPERATION OF THE OPTICAL SWITCH

Ray W. Blasingame, Richardson, and James H. May, McKinney, both of Tex., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 22, 1993, Ser. No. 52,089  
Int. Cl.<sup>6</sup> G01J 1/32

U.S. Cl. 250—205

10 Claims



- I. An optical detector, comprising:
  - a light source;
  - a light sensitive component disposed at a position to receive light from said light source;
  - first means for comparing a first voltage at said light source to a first reference;
  - means for regulating the intensity of light emanating from said light source as a function of the intensity of light received by said light sensitive component;
  - second means for comparing a second voltage at said light source to a second reference;
  - first means for providing a first signal when said first voltage exceeds said first reference;
  - second means for providing a second signal when said second voltage is less than said second reference; and
  - means for delaying a change in the level of said second signal upon an increase of said second voltage following a period of time when said second voltage was less than said second reference.

5,414,255

## INTRUSION DETECTOR HAVING A GENERALLY PLANAR FRESNEL LENS PROVIDED ON A PLANAR MIRROR SURFACE

John G. Hampson, High Wycombe, England, assignor to Scantronic Limited, Greenford, England

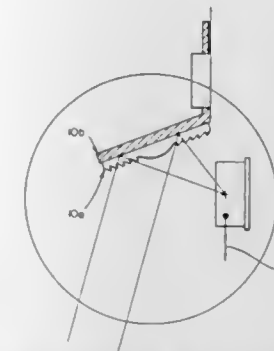
Filed Nov. 8, 1993, Ser. No. 148,362  
Int. Cl.<sup>6</sup> G01V 9/04

U.S. Cl. 250—221

17 Claims

- I. Intrusion detection means for detecting the presence of an intruder within at least one zone (Z) contained in a space to be monitored, comprising:
  - (a) a housing (3) adapted for mounting on a fixed surface at least partially defining said space, said housing containing a chamber and at least one wall opening (5) affording access to said chamber;
  - (b) a sensing element (7) arranged in said chamber; and

- (c) optical means (10) arranged in said chamber for reflecting and focusing on said sensing element radiant energy produced by an intruder in said zone and introduced into said chamber via said opening, said optical means including:
  - (1) a mirror (10b) having a generally planar mirror surface; and



- (2) a generally planar lens (10b) arranged adjacent said mirror surface;
- (3) said mirror and said lens being so arranged that said radiant energy successively passes through said lens, is reflected by said mirror surface, passes a second time through said lens, and is directed on said sensing element.

5,414,256

## APPARATUS FOR AND METHOD OF CONTROLLING A DEVICE BY SENSING RADIATION HAVING AN EMISSION SPACE AND A SENSING SPACE

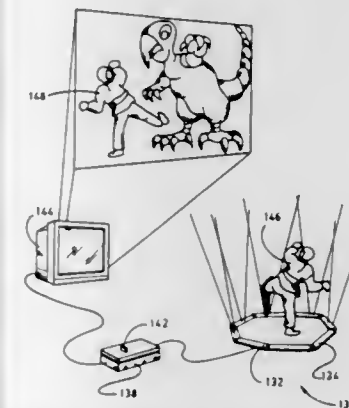
Asaf Gurner, Tel-Aviv, and Oded Y. Zur, Netanya, both of Israel, assignors to Interactive Light, Inc., Santa Monica, Calif.

Continuation-in-part of Ser. No. 1,058, Jan. 6, 1993, which is a continuation-in-part of Ser. No. 776,669, Oct. 15, 1991, abandoned. This application Jan. 6, 1994, Ser. No. 177,904  
Claims priority, application Israel, Feb. 19, 1992, 101016

Int. Cl.<sup>6</sup> G01V 9/04

U.S. Cl. 250—221

17 Claims



1. An apparatus for detecting an object, comprising:
  - a) a support;
  - b) emitter means supported by the support, and operative for transmitting radiation away from the support into an emission space;
  - c) sensor means supported by the support and having a sensing space, said sensor means being operative for receiving radiation directed by an object located in the sensing space to the sensor means, and for generating an

- electrical signal indicative of the presence of the object in the sensing space;
- d) at least one of said sensor means and said emitter means including means for shaping at least one of said spaces to have a generally thin, screen-like volume having a cross-sectional width and a cross-sectional thickness less than said width substantially throughout said volume; and
- e) means for determining a position of the object in said at least one of said spaces relative to the support, and for generating a control signal indicative of the object position.

5,414,257

## MOISTURE SENSOR FOR DETECTING MOISTURE ON A WINDSHIELD

Peter R. Stanton, North Manly, Australia, assignor to Introlab Pty Limited, North Manly, Australia

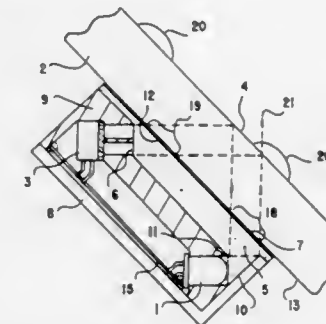
PCT No. PCT/AU92/00183, § 371 Date Oct. 19, 1993, § 102(e) Date Oct. 19, 1993, PCT Pub. No. WO92/18848, PCT Pub. Date Oct. 29, 1992

PCT Filed Apr. 23, 1992, Ser. No. 133,120

Claims priority, application Australia, Apr. 23, 1991, PK5736  
Int. Cl.<sup>6</sup> H01J 5/16, 40/14

U.S. Cl. 250—227.25

9 Claims



1. A moisture sensor comprising:
    - a housing and an internal body fitting within said housing;
    - a window means on a front portion of said housing composed of a material transparent to radiant energy and having an outer front surface adapted to be optically coupled to an inside surface of a windshield;
    - said window means having an inner surface formed in a stepwise shape with a first planar surface oblique to said outer front surface, a second surface extending from said first surface substantially parallel to said outer front surface, an oblique third planar surface extending from said second surface, and a planar side surface adjacent said oblique third planar surface; and;
    - said internal body having a front outer surface of a stepwise shape fitting to said inner surface of said window means, and having a radiant energy emitter with an emitter surface positioned at an oblique surface complementary to one of said window means oblique surfaces and a radiant energy sensor means positioned at another oblique surface complementary to the other of said window means oblique surfaces;
- such that when said internal body is fitted into said housing said window means provides an optical path between said radiant energy emitter means and said radiant energy sensor means passing internally through said window means and a windscreen optically coupled thereto, said optical path including internal reflections at an outer surface of said windscreen and at said planar side surface of said window means.



5,414,258

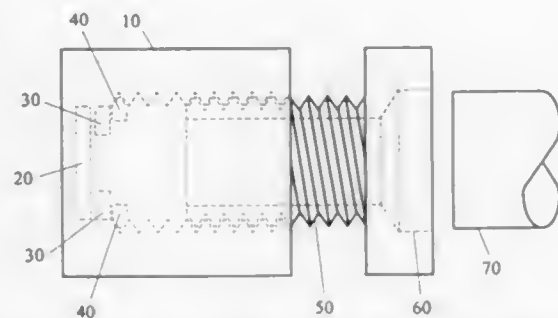
## APPARATUS AND METHOD FOR CALIBRATION OF FLUORESCENCE DETECTORS

Louis H. Liang, Los Altos, Calif., assignor to Angstrom Technologies, Inc., Florence, Ky.

Filed Nov. 22, 1993, Ser. No. 156,249

Int. Cl.<sup>6</sup> G01N 21/64

U.S. Cl. 250—252.1



1. An apparatus for calibration of fluorescence detectors using non-visible light, comprising

- a housing impervious both to said non-visible light and to said fluorescence to be detected, having at least one opening means to admit passage of said non-visible light and of said fluorescence,
- a standard target element enclosed within said housing, comprising
  - a predetermined combination of one or more predetermined fluorescent substances with one or more other substances,
- an aperture element enclosed within said housing and disposed between said standard target element and said at least one opening means,
- adapting means for adapting said housing to fit a fluorescence detector, and
- means for adjusting the distance between said adapting means and said standard target element, so that a predetermined intensity of said fluorescence is presented to a detector to be calibrated.

34. A method for preparing a standard target element for calibrating fluorescence detectors, comprising the steps of

- arranging a predetermined amount of a predetermined first fluorescent substance having a first fluorescent emission spectrum into a predetermined pattern on a background comprising one or more substances selected from the group consisting of
  - a non-fluorescent substance and
  - a second fluorescent substance having a second fluorescent emission spectrum differing from said first fluorescent emission spectrum,
- forming the resultant patterned combination into a predetermined shape having at least one first side including said pattern,
- if desired, covering at least said first side of said shape with material transparent both to non-visible light and to said first fluorescent emission spectrum, and
- covering a first portion of said first side to expose a second portion having a predetermined area, to complete the preparation of said standard target element.

5,414,259

## METHOD OF SPECIATED ISOTOPE DILUTION MASS SPECTROMETRY

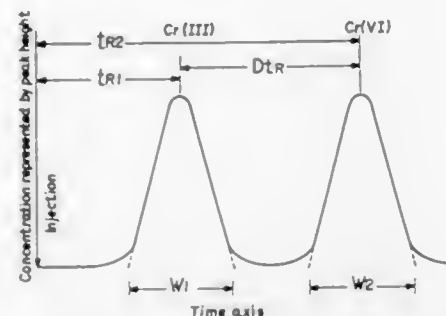
Howard M. Kingston, Evans City, Pa., assignor to Duquesne University of the Holy Ghost, Pittsburgh, Pa.

Filed Jan. 5, 1994, Ser. No. 177,783

Int. Cl.<sup>6</sup> B01D 59/44; H01J 49/00

34 Claims U.S. Cl. 250—283

19 Claims



1. A method of isotope dilution measurement of a sample comprising:
- providing at least one predetermined, stable isotope, converting said stable isotope to a speciated enriched isotope corresponding to the species to be measured in said sample,
  - spiking the sample containing said species to be measured, equilibrating said spiked species with said species to be measured, and
  - separating all said species from said sample and subsequently determining the concentration of the species to be measured by employing isotopic element specie ratios.

5,414,260

## SCANNING PROBE MICROSCOPE AND METHOD OF OBSERVING SAMPLES BY USING THE SAME

Kiyoshi Takimoto, Isehara; Katsunori Hatanaka, Yokohama; Kunhiro Sakai, Isehara; Masahiko Miyamoto, Tokyo; Hisaaki Kawade, Yokohama; Yasufumi Sato, Atsugi; Etsuro Kishi, Sagami, and Hideyuki Kawagishi, Ayase, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

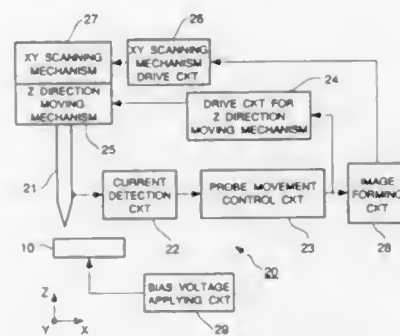
Filed Apr. 30, 1993, Ser. No. 54,133

Claims priority, application Japan, May 1, 1992, 4-112825

Int. Cl.<sup>6</sup> H01J 37/00

U.S. Cl. 250—306

18 Claims



1. A scanning probe microscope comprising:
- a probe arranged to oppose a surface of a sample;
  - scanning means for scanning the same portion of the surface of the sample forward and backward by using said probe;
  - detecting means for detecting a signal corresponding to a structure of the sample from said probe, said detecting means detecting a first signal during a period in which said probe scans the sample forward and a second signal during a period in which said probe scans the sample backward; and

correcting means for generating a corrected signal by replacing a portion of one of the first and second signals with a portion of the other signal.

being controlled to result in the conversion of said pulses into an infrared light replica of said image; and

5,414,261

## ENHANCED IMAGING MODE FOR TRANSMISSION ELECTRON MICROSCOPY

Mark H. Ellisman, Solana Beach; Gary G. Y. Fan; Jeff Price, both of San Diego, all of Calif., and Seichi Suzuki, Tokyo, Japan, assignors to The Regents of the University of California, Oakland, Calif.

Filed Jul. 1, 1993, Ser. No. 86,237

Int. Cl.<sup>6</sup> H01J 37/04

U.S. Cl. 250—311

3 Claims



1. A method for imaging a thick biological specimen and for filtering inelastically scattered electrons in a conventional transmission electron microscope having a first objective lens disposed in an optical axis downstream from said specimen, said first objective lens having a first back-focal plane, and an objective aperture disposed downstream from the first objective lens, the method comprising:

- removing the objective aperture;
- disposing a plurality of tilting coils upstream of said specimen for moving an electron beam with respect to said optical axis;
- disposing a plurality of image shift coils downstream from said first objective lens for re-aligning said electron beam with said optical axis;
- increasing a strength of a second objective lens disposed downstream from said first objective lens wherein said second objective lens creates a magnified second back-focal plane different from said first back-focal plane; and
- disposing an aperture along said optical axis at said magnified second back-focal plane.

5,414,262

## IMAGING DEVICE AND METHOD FOR DEVELOPING, DUPLICATING AND PRINTING GRAPHIC MEDIA

Andrew S. Filo, 22670 Oakcrest, Cupertino, Calif. 95014

Continuation of Ser. No. 902,611, Jun. 23, 1992, which is a

continuation of Ser. No. 598,266, Oct. 16, 1990, Pat. No.

5,151,595. This application Nov. 5, 1993, Ser. No. 148,759

The portion of the term of this patent subsequent to Sep. 29,

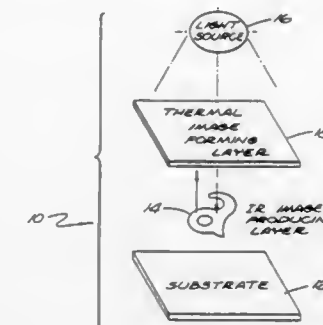
2007, has been disclaimed.

Int. Cl.<sup>6</sup> G03G 5/00

U.S. Cl. 250—316.1

56 Claims

1. Apparatus for reproducing an image, comprising:
- a substrate;
  - an image on the substrate, the image being responsive to visible light applied thereto for converting the applied visible light into infrared light;
  - means for applying pulses of visible light to the image on the substrate, the intensity and duration of the applied pulses



an image forming layer responsive to said infrared light replica to develop a visible replica of said image.

5,414,263

## INFRARED DETECTION SWITCHING CIRCUIT

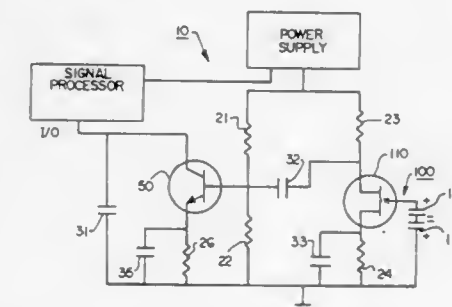
Gary M. Haslam, Graham, and David E. Van den Bout, Apex, both of N.C., assignors to Regent Lighting Corporation, Burlington, N.C.

Filed Feb. 24, 1994, Ser. No. 201,263

Int. Cl.<sup>6</sup> G01J 5/34

U.S. Cl. 250—338.1

13 Claims



1. A passive infrared detection and conversion circuit, comprising:

- a pyrosensor
- a current amplifier coupled with said pyrosensor;
- a capacitor coupled with said amplifier;
- a signal processor circuit coupled with said capacitor and being operable to charge said capacitor to a first voltage level and to measure a capacitor discharge time, said capacitor discharge time being the time required for said capacitor to discharge from said first voltage level to a second voltage level, and being further operable to generate an electrical control signal responsive to a variation in said capacitor discharge time which corresponds to a significant motion event.

5,414,264

## ENHANCED PATHLENGTH GAS SAMPLE CHAMBER

Jacob Y. Wong, Santa Barbara, Calif., assignor to Gaztech International Corporation, Goleta, Calif.

Filed Apr. 16, 1993, Ser. No. 49,033

Int. Cl.<sup>6</sup> G01N 21/61

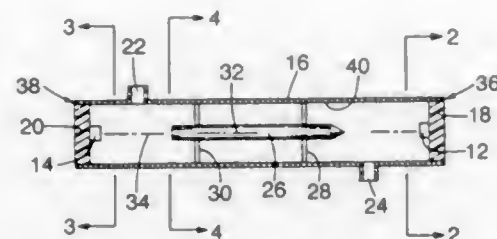
U.S. Cl. 250—343

8 Claims

1. An enhanced pathlength gas sample chamber for transmitting radiation through gases present in the chamber comprising in combination:

- an elongated hollow tube having an axis, having a first end and a second end, and having an inner surface that is specularly-reflective;
- a source of radiation;

- c) a detector of radiation;  
 d) means for mounting said source of radiation proximate the first end of said elongated hollow tube;  
 e) means for mounting said detector of radiation proximate the second end of said elongated hollow tube;



- f) an elongated reflective obstructing member having an axis extending in the direction of elongation; and,  
 g) means for mounting said elongated reflective obstructing member within said elongated hollow tube with the axis of said elongated reflective obstructing member collinear with the axis of said elongated hollow tube.

5,414,265

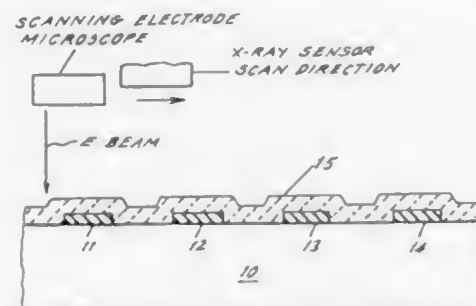
# LINE-WIDTH MEASUREMENTS OF METALLIZATION COATED WITH INSULATOR ON MICROELECTRONIC CIRCUITS USING ENERGY DISPERSIVE X-RAY ANALYSIS

Richard G. Sartore, Bradley Beach, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 9, 1993, Ser. No. 118,533  
 Int. Cl.<sup>6</sup> H01J 37/28

U.S. Cl. 250—310

9 Claims



9. Apparatus for measuring the line width of at least one line of conductive material on a silicon substrate surface comprising, in combination: support means for supporting said substrate; electron beam generating means for generating and scanning an electron beam across the surface of said substrate and across said conductive line on said substrate; said electron beam generating means generating electrons with sufficient energy to penetrate any passivation coating on said substrate and to excite x-ray radiation from said line of conductive material; x-ray monitor means for monitoring the x-rays emitted from said line of conductive material during an electron beam scan; and analyzing means connected to said x-ray monitor means to produce a measure of the width of said line.

5,414,266

# MEASURING SYSTEM EMPLOYING A LUMINESCENT SENSOR AND METHODS OF DESIGNING THE SYSTEM

Mei H. Sun, Los Altos, Calif., assignor to Luxtron Corporation, Santa Clara, Calif.

Filed Jun. 11, 1993, Ser. No. 75,680

Int. Cl.<sup>6</sup> G01K 15/00; G01N 21/64; G08C 13/00

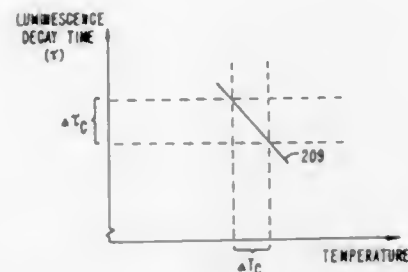
U.S. Cl. 250—459.1

5 Claims

1. A method of optimizing the performance of a plurality of replicated units of a parameter measuring system that each

have a combination of a luminescent material parameter sensor and an electro-optical module that measures a rate of decay of luminescence from the sensor that is related in a known manner to the parameter, wherein the sensor and electro-optical module optically communicate with each other for the purpose of measuring the parameter over a predetermined parameter range, comprising the steps of:

providing the electro-optical modules to provide, in response to receiving a plurality of individual values of rates of decay representing values of the parameter extending across said predetermined parameter range, a given range of measurements of the individual rate of decay values by either different ones of the plurality of modules or by one of said modules being operated under different environmental conditions,



selecting an acceptable range of variations in the measurement of the parameter throughout the predetermined parameter range,  
 determining the rate of decay of luminescence as a function of the parameter over said predetermined parameter range for each of a plurality of luminescent sensor materials having different chemical compositions, and  
 selecting for use in the sensors one of said plurality of luminescent materials whose rate of decay function is characterized by having a slope throughout the predetermined parameter range that is substantially equal to or higher than a ratio of said given range of measurements of the individual rate of decay values to said acceptable range of variations in the measurement of the parameter.

5,414,267

# ELECTRON BEAM ARRAY FOR SURFACE TREATMENT

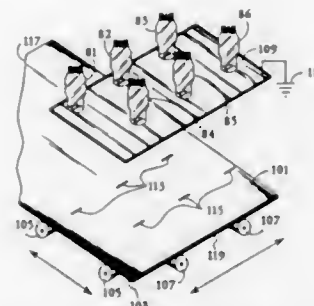
George Wakalopoulos, Pacific Palisades, Calif., assignor to American International Technologies, Inc., Torrance, Calif.

Filed May 26, 1993, Ser. No. 68,052

Int. Cl.<sup>6</sup> H01J 37/30

U.S. Cl. 250—492.3

25 Claims



1. An electron beam generating apparatus comprising,  
 a support plate mounting a plurality of electron beam tubes in an array, each tube emitting a stripe-like electron beam through an electron beam permeable, low-Z, gas impermeable window, the tubes arranged in the array so that the stripe-like electron beams form modular beam segments of a desired beam pattern directed away from the support

plate into an air atmosphere and onto a surface to be treated.

5,414,268

# LIGHT SCANNER WITH INTERLACED CAMERA FIELDS AND PARALLEL LIGHT BEAMS

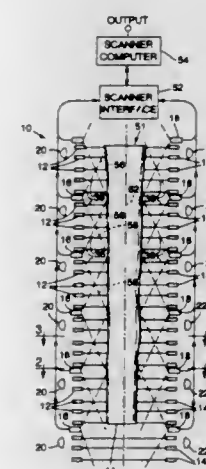
Arthur L. McGee, Lake Oswego, Oreg., assignor to The Coe Manufacturing Company, Portland, Oreg.

Filed Feb. 1, 1994, Ser. No. 189,797

Int. Cl.<sup>6</sup> G01N 21/30

U.S. Cl. 250—560

20 Claims



1. Light scanner apparatus for determining the configuration of an elongated object, comprising:

- a plurality of photo-detectors spaced apart across a scanning zone through which the elongated object is moved to scan the object, each photo-detector having an optical axis and a viewing field divided by said optical axis into a right field and a left field, and each of said right and left fields having a first field portion adjacent the optical axis and a second field portion separated from the optical axis by said first field portion;
- a plurality of laser light sources positioned between said photo-detectors and supported so that at least some of the laser light beams emitted by said laser light sources are located in the viewing fields of a pair of adjacent photo-detectors and the light beams extend substantially parallel to each other and to the optical axis of each of the photo-detectors;

mounting means for mounting the photo-detectors to cause the viewing fields of each pair of adjacent photo-detectors to overlap sufficiently so that the first field portion of one photo-detector overlaps the second field portion of the other photo-detector of said pair;

scan signal selection means for selecting portions of a scanning output signal produced by each photo-detector when the elongated object is moved through the scanning zone, giving preference to those scanning signal portions which correspond to the second field portions of its viewing field while rejecting portions of the scanning output signal which correspond to the first field portions of said viewing field unless there is no usable signal portion corresponding to the second field portion which overlaps the first field portion; and

signal processor means for producing an object configuration signal from the selected portions of the scanning signals of the photo-detectors which is of greater accuracy.

5,414,269

# CIRCUIT FOR DETECTING A PAPER AT A DESIRED POSITION ALONG A PAPER FEED PATH WITH A ONE SHOT MULTIVIBRATOR ACTUATING CIRCUIT

Yoshinori Takahashi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 967,057, Oct. 28, 1992, Pat. No. 5,250,813.

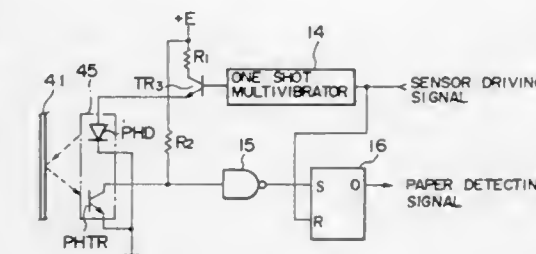
This application Jun. 21, 1993, Ser. No. 79,267

Claims priority, application Japan, Oct. 29, 1991, 3-11760

Int. Cl.<sup>6</sup> G01N 21/86

U.S. Cl. 250—561

5 Claims



1. A print paper detecting circuit for detecting the presence of a print paper at a desired position along a paper feed path, said circuit comprising:

- an optical sensor disposed at the desired position and having a light emitting diode for emitting light and a phototransistor for receiving the light and producing an output signal corresponding to the received light;
- a current supply circuit, including a switch circuit for supplying a high level of a driving current to said light emitting diode, when said switch circuit is actuated;
- an actuating circuit for selectively actuating said switch circuit for a predetermined duration in response to a control signal, with said actuating circuit comprising a one shot multivibrator; and
- an output circuit means for providing a paper detecting signal according to the output voltage from said phototransistor.

5,414,270

# METHOD AND APPARATUS FOR THE AUTOMATIC INSPECTION OF CIGARETTE RODS FOR SPOTS AND STAINS

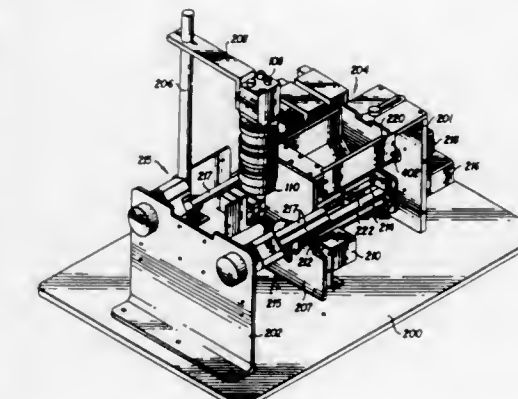
Calvin W. Henderson, Wallace R. Lassiter, and William R. Jarvis, all of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 14, 1993, Ser. No. 62,101

Int. Cl.<sup>6</sup> G01N 21/88

U.S. Cl. 250—572

30 Claims



1. A method for automatically inspecting the outer wrappers of cigarettes for spot and stain defects comprising the steps of:



storing a plurality of cigarettes to be inspected; providing a CCD camera and associated lens; presenting said at least one of said plurality of cigarettes for viewing by said CCD camera by sequentially rotating said at least one of said plurality of cigarettes; generating a video signal representative of at least one of said plurality of cigarettes; and analyzing said generated video signal to detect said spot and stain defects.

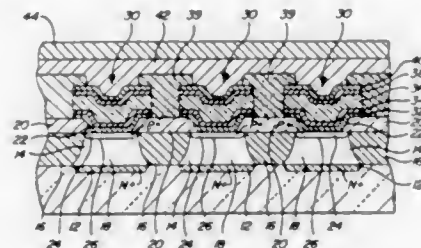
5,414,271

**ELECTRICALLY ERASABLE MEMORY ELEMENTS HAVING IMPROVED SET RESISTANCE STABILITY**  
Stanford R. Ovshinsky, Bloomfield Hills; Stephen J. Hudgens, Southfield; Wolodymyr Czubytyj, Warren; David A. Strand, Bloomfield Township, Oakland County, and Guy C. Wicker, Southfield, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.  
Continuation-in-part of Ser. No. 768,139, Sep. 30, 1991, and a continuation-in-part of Ser. No. 747,053, Aug. 19, 1991, Pat. No. 5,296,716, each is a continuation-in-part of Ser. No. 642,984, Jan. 18, 1991, Pat. No. 5,166,758. This application Nov. 7, 1991, Ser. No. 789,234

The portion of the term of this patent subsequent to Nov. 24, 2009, has been disclaimed.  
Int. Cl.<sup>6</sup> H01L 45/00

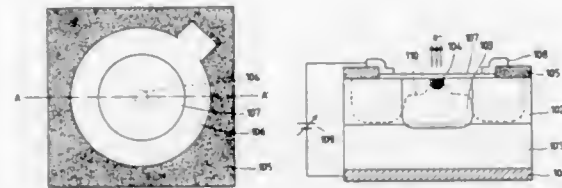
U.S. Cl. 257—3

32 Claims



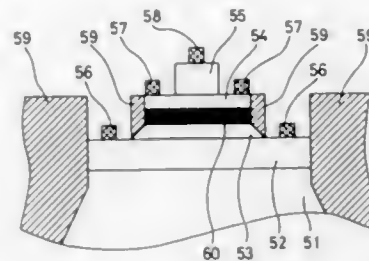
1. An improved electrically operated, directly overwritable, single-cell memory element comprising:  
a pair of spacedly disposed contacts, said contacts providing terminals for reading information stored in and writing information to said memory element;  
a volume of memory material defining a single cell memory element disposed between said contacts, said memory material constituting means for assuming a large dynamic range of electrical resistance values with the ability to be set directly to one of a plurality of resistance values within said dynamic range without the need to be set to a specific starting or erased resistance value, regardless of the previous resistance value of said material in response to a selected electrical input signal;  
said volume of memory material formed from a plurality of constituent atomic elements each of which is present throughout the entire volume of memory material; and  
said volume of memory material including compositional means adapted to substantially stabilize the resistance of said volume of memory material at a selected resistance value and said volume of memory material adapted to remain set at said selected resistance value without drift after the input signal has been terminated.

5,414,272  
**SEMICONDUCTOR ELECTRON EMISSION ELEMENT**  
Nobuo Watanabe, Gotenba; Masahiko Okunuki, Tokyo, and Takeo Tsukamoto, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 774,249, Oct. 10, 1991, abandoned.  
This application Apr. 7, 1994, Ser. No. 224,192  
Claims priority, application Japan, Oct. 13, 1990, 2-273911; Sep. 27, 1991, 3-249214  
Int. Cl.<sup>6</sup> H01L 29/48, 29/56, 29/64  
U.S. Cl. 257—10 16 Claims



1. A semiconductor electron emission element having a Schottky junction in a surface region of a semiconductor, comprising:  
a first region having a first dopant concentration, a second region having a second dopant concentration, and a third region having a third dopant concentration, all of which are located below an electrode forming the Schottky junction, the first, second, and third dopant concentrations satisfying a condition that the first dopant concentration of the first region is higher than the second dopant concentration of the second region and the second dopant concentration of the second region is higher than the third dopant concentration of the third region,  
said first, second, and third regions having a structure that at least one second region having the second dopant concentration is located inside said third region of the third dopant concentration, and at least one first region having the first dopant concentration is located inside said second region having the second dopant concentration, and wherein said first and second regions comprise a p-type semiconductor, and said third region comprises a semiconductor selected from the group consisting of a p-type semiconductor, an n-type semiconductor, an undoped semiconductor, and a semi-insulating semiconductor.

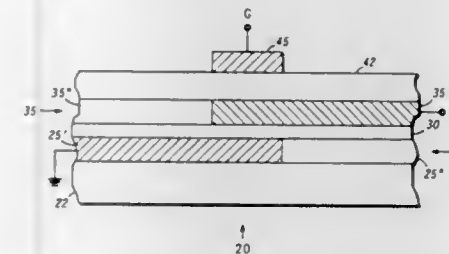
5,414,273  
**HETEROJUNCTION BIPOLAR TRANSISTOR**  
Teruyuki Shimura, and Naohito Yoshida, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 28, 1994, Ser. No. 202,583  
Claims priority, application Japan, Mar. 5, 1993, 5-044867  
Int. Cl.<sup>6</sup> H01L 27/12, 45/00, 29/161, 29/205  
U.S. Cl. 257—17 10 Claims



1. A heterojunction bipolar transistor including an emitter, a base, and a collector, said collector including a multiquantum barrier structure contacting said base, said multiquantum barrier structure having an energy band structure including an

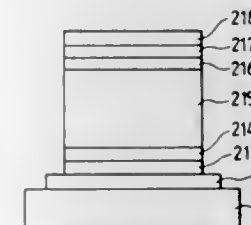
effective potential barrier increasing in steps from said base into said collector.

5,414,274  
**QUANTUM MULTIFUNCTION TRANSISTOR WITH GATED TUNNELING REGION**  
Herbert Goronkin, Tempe; Saied N. Tehrani, Scottsdale; Jun Shen, Phoenix, and Xiaodong T. Zhu, Chandler, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.  
Filed Jul. 26, 1993, Ser. No. 96,387  
Int. Cl.<sup>6</sup> H01L 29/205, 29/88, 29/772  
U.S. Cl. 257—25 17 Claims



1. A quantum multifunction transistor comprising:  
a substrate having a surface;  
a pair of conduction layers of semiconductor material supported on the surface of the substrate and having at least one tunnel barrier layer sandwiched therebetween, the pair of conduction layers each having a thickness so as to form a discrete energy level in each conduction layer, one energy level being in the conduction band and one energy level being in the valence band, and the plurality of conduction layers of semiconductor material being chosen so that the discrete energy levels therein are not aligned across the tunnel barrier layer in an equilibrium state;  
the plurality of conduction layers further being formed to define current channels, parallel with the surface of the substrate, with the current channels being non-overlapping except for portions of the current channels overlapping only in a defined gate area; and  
at least one of the portions of the current channels in the plurality of conduction layers having an external gate terminal coupled thereto for aligning the discrete energy levels in the plurality of conduction layers across the tunnel barrier layer in response to a voltage applied to the external gate terminal.

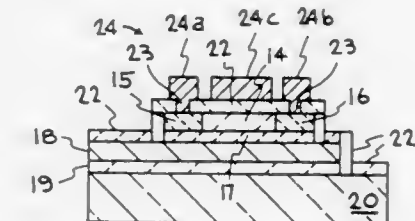
5,414,275  
**PHOTOELECTRIC CONVERTING DEVICE AND IMAGE PROCESSING APPARATUS UTILIZING THE SAME**  
Shigetoshi Sugawa, and Ichiro Gofuku, both of Atsugi, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 44,090, Apr. 6, 1993, abandoned, which is a continuation of Ser. No. 815,024, Dec. 31, 1991, abandoned.  
This application Dec. 6, 1993, Ser. No. 161,441  
Claims priority, application Japan, Jan. 11, 1991, 3-012595  
Int. Cl.<sup>6</sup> H01L 27/14 11 Claims



1. A photoelectric converting device with a PIN structure comprising: an amorphous I-type semiconductor layer; a pair

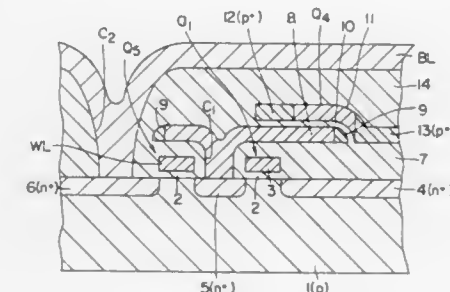
of charge injection blocking layers sandwiching said amorphous I-type semiconductor layer, wherein one of said charge injection blocking layers comprises an amorphous P-type semiconductor layer and the other comprises an amorphous N-type semiconductor layer; and at least one of an amorphous P-type semiconductor layer containing microcrystalline structure on said amorphous P-type semiconductor layer and an amorphous N-type semiconductor layer containing microcrystalline structure on said amorphous N-type semiconductor layer, whereby said photoelectric converting device is reversely biased in operation.

5,414,276  
**TRANSISTORS USING CRYSTALLINE SILICON DEVICES ON GLASS**  
Anthony M. McCarthy, Menlo Park, Calif., assignor to The Regents of the University of California  
Filed Oct. 18, 1993, Ser. No. 137,402  
Int. Cl.<sup>6</sup> H01L 29/04, 29/78  
U.S. Cl. 257—57 12 Claims



5. In a silicon-on-glass device using doped and activated areas in a first silicon layer, the improvement comprising:  
a layer of oxide covering at least the doped and activated areas of said first silicon layer;  
a layer of metal on the layer of oxide and any exposed areas of the first silicon layer; and  
a second silicon layer of amorphous silicon intermediate the layer of metal and a glass substrate and bonded directly to the glass substrate;  
whereby voltage and current causing bonding of the said second layer of silicon and the glass substrate does not pass through the doped and activated areas.

5,414,277  
**THIN FILM TRANSISTOR WHICH PREVENTS GENERATION OF HOT CARRIERS**  
Kenji Anzai, Sagami, Japan, assignor to Nippon Steel Corporation, Japan  
Division of Ser. No. 936,247, Aug. 27, 1992. This application May 2, 1994, Ser. No. 239,271  
Claims priority, application Japan, Aug. 28, 1991, 3-242616  
Int. Cl.<sup>6</sup> H01L 29/04, 29/78, 27/02, 49/00  
U.S. Cl. 257—69 14 Claims



1. A semiconductor transistor device comprising:  
(a) a gate electrode disposed over an insulating surface;

- (b) a gate insulating film covering said gate electrode;  
 (c) a first diffusion region spaced apart from one end of said gate electrode, and separated from said gate electrode by said gate insulating film, the first diffusion region extending vertically above said gate insulating film;  
 (d) a spacer element located at the one end of said gate electrode and covered by said gate insulating film, said spacer element and gate insulation films determining the distance between said gate electrode and first diffusion region, for reducing an electric field between said gate electrode and said first diffusion region; and,  
 (e) a second diffusion region disposed above said gate insulating film and having one end spaced from said first diffusion region.

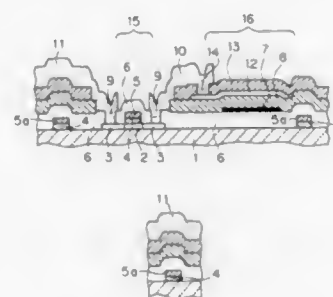
5,414,278

**ACTIVE MATRIX LIQUID CRYSTAL DISPLAY DEVICE**  
 Kazuhiro Kobayashi, Hiroyuki Murai, and Masahiro Hayama, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 904,272, Jun. 25, 1992, abandoned. This application Apr. 25, 1994, Ser. No. 231,774  
 Claims priority, application Japan, Jul. 4, 1991, 3-164140  
 Int. Cl.<sup>6</sup> G02F 1/13; H01L 29/00

U.S. Cl. 257-72

10 Claims



1. An active matrix liquid crystal display device comprising:  
 an active matrix liquid crystal display element having a plurality of gate lines for scanning lines, and a plurality of source lines for data lines intersecting said gate lines at crossing points;  
 a thin film transistor of polycrystalline Si film having a gate and a source which are respectively connected to said gate lines and said source lines in the vicinity of said crossing points, and having a drain;  
 a storage capacitor connected to said thin film transistor;  
 a first protecting film consisting essentially of a first insulating material on said thin film transistor for covering at least said thin film transistor and said gate lines at said crossing points;  
 an electrode for said storage capacitor;  
 an insulating film for said storage capacitor, for covering at least part of said electrode for said storage capacitor and said gate lines at said crossing points;  
 a pixel electrode formed of a transparent conductive film on said insulating film for said storage capacitor and connected to said thin film transistor;  
 a second protecting film consisting essentially of a second insulating material for covering at least said pixel electrode and said gate lines at said crossing points; and  
 drain lines, wherein  
 said drain lines and source lines are formed on said first and second protecting films and connected to said drain and said source of said thin film transistor respectively, through a first contact hole formed in said first protecting film, and  
 said drain lines are connected to said pixel electrode through a second contact hole formed in said second protecting film.

5,414,279

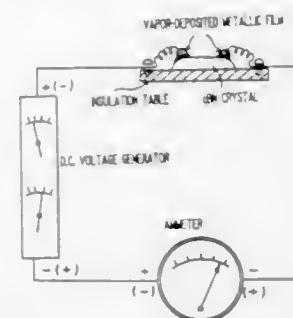
**CBN SEMICONDUCTOR DEVICE HAVING AN OHMIC ELECTRODE AND A METHOD OF MAKING THE SAME**  
 Koh Era, Tsukuba; Yoshiyuki Suda, Koganei; Satoshi Agawa, Omiya, and Osamu Mishima, Tsukuba, all of Japan, assignors to National Institute for Research in Inorganic Materials, Tsukuba, Japan

Filed Sep. 22, 1993, Ser. No. 124,754

Claims priority, application Japan, Sep. 28, 1992, 4-282444  
 Int. Cl.<sup>6</sup> H01L 23/48, 29/46, 29/62, 29/64

U.S. Cl. 257-76

6 Claims



1. A CBN semiconductor device of an n-type comprising a CBN crystal having an n-type doped region and an ohmic electrode consisting essentially of molybdenum deposited directly thereon.

5,414,280

**CURRENT DRIVEN VOLTAGE SENSED LASER DRIVE (CDVS LDD)**

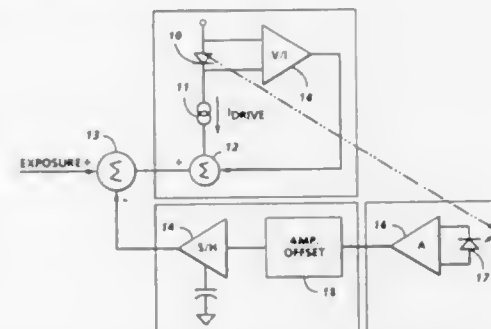
K. Girmay Girmay, La Mirada, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 27, 1993, Ser. No. 173,016

Int. Cl.<sup>6</sup> H01L 33/00

U.S. Cl. 257-80

1 Claim



1. A circuit for regulating the power of the light output of a laser means comprising:  
 a voltage controlled current generator for driving said laser means,  
 an outer loop comprising,  
 a) a light detector means for detecting the output power of said laser means and generating a power signal,  
 b) an outer loop summing means responsive to said light detector means for comparing said power signal to a predetermined value and generating a corrected power signal, and  
 c) an inner loop summing means for coupling said corrected power signal to said current generator, and  
 an inner loop comprising a voltage detector means for determining the voltage across said laser means, for generating a voltage correction signal, and applying said voltage correction signal to said inner loop summing means as an input to be added to said corrected power signal.

5,414,281

**SEMICONDUCTOR LIGHT EMITTING ELEMENT WITH REFLECTING LAYERS**

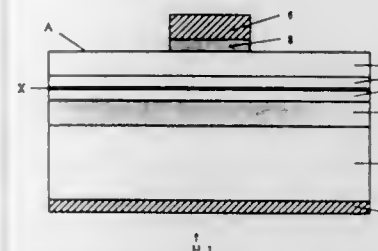
Shinichi Watabe; Tadatomo Kazuyuki, and Hiroaki Okagawa, all of Itami, Japan, assignors to Mitsubishi Cable Industries, Ltd., Hyogo, Japan

Filed Aug. 25, 1993, Ser. No. 111,508

Claims priority, application Japan, Aug. 25, 1992, 4-226189  
 Int. Cl.<sup>6</sup> H01L 33/00

U.S. Cl. 257-95

10 Claims



1. A semiconductor light emitting element having a light output surface, comprising a semiconductor substrate having thereon a lower electrode, a pn junction, a first light reflecting layer disposed between the substrate and the pn junction, an upper electrode, and a second light reflecting layer disposed between the pn junction and the upper electrode, the second light reflecting layer being of lesser extent than the light output surface and being capable of substantially reflecting light heading toward the upper electrode.

5,414,282

**SEMICONDUCTOR OPTOELECTRONIC SWITCH AND METHOD FOR DRIVING THE SAME**

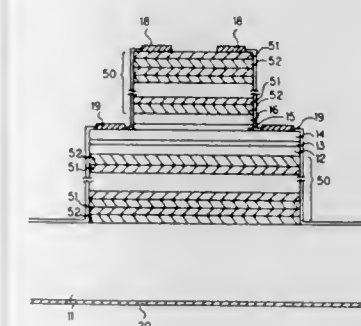
Ichiro Ogura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 20, 1993, Ser. No. 93,717

Claims priority, application Japan, Jul. 22, 1992, 4-216417  
 Int. Cl.<sup>6</sup> H01L 31/12, 31/16

U.S. Cl. 257-187

13 Claims



1. A heterostructure optoelectronic switching device exhibiting a switching operation in response to a light injection for a subsequent light emission, said switching device comprising:  
 a pair of first and second bipolar transistors made of semiconductors having a direct band-to-band transition, each of said first and second bipolar transistors comprising collector and emitter layers and a base layer having a narrower energy band gap than energy band gaps of said collector and emitter layers, said base layers of said first and second bipolar transistors being connected to said collector layers of said second and first bipolar transistors respectively to allow said device to have a positive feedback feature, said emitter layers of said first and second bipolar transistors being connected to a first terminal, said collector layers of said first and second bipolar transistors being connected respectively through first and second resistors to a second terminal to which a voltage is applied

which is higher than a voltage applied to said first terminal; each of said first and second bipolar transistors comprising:

- a first semiconductor multi-layer reflecting mirror formed on a first surface of a substrate made of n-GaAs;  
 an emitter layer made of n-AlGaAs formed on said first semiconductor multi-layer reflecting mirror;  
 a first n-AlGaAs graded layer formed on said n-AlGaAs emitter layer;  
 a base layer made of p-GaAs formed on said first n-AlGaAs graded layer;  
 a second n-AlGaAs graded layer formed on said p-GaAs base layer;  
 a collector layer made of n-AlGaAs formed on said second n-AlGaAs graded layer;  
 a second semiconductor multi-layer reflecting mirror formed on said n-AlGaAs collector layer;  
 a collector electrode formed on said second semiconductor multi-layer reflecting mirror, said collector electrode having a window through which light is injected;  
 a base electrode formed on said p-GaAs base layer; and  
 an emitter electrode formed on a second surface of said n-GaAs substrate.

5,414,283

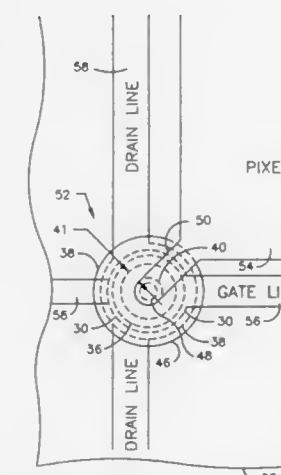
**TFT WITH REDUCED PARASITIC CAPACITANCE**  
 Willem den Boer, and Mohshi Yang, both of Troy, Mich., assignors to OIS Optical Imaging Systems, Inc., Troy, Mich.

Filed Nov. 19, 1993, Ser. No. 154,713

Int. Cl.<sup>6</sup> H01L 27/01, 27/13, 29/78

U.S. Cl. 257-59

22 Claims



1. A pixel for use in a liquid crystal display, comprising:  
 a layer of liquid crystal material sandwiched between two spaced substrates, one of said substrates having a pixel electrode mounted thereon which defines a pixel surrounded by, at least, drain lines, wherein said pixel electrode is electrically connected to a thin film transistor, said thin film transistor comprising:  
 a drain electrode adapted to be electrically connected to said drain line; a gate electrode adapted to be electrically connected to said gate line; and a source electrode electrically connected to said pixel electrode; wherein said source electrode is located on a semiconductor film and is substantially completely surrounded in substantially all lateral directions by said drain electrode, and wherein said drain electrode is disposed between said source electrode and at least a substantial portion of said pixel electrode so that said transistor has a reduced parasitic capacitance.



5,414,284

## ESD PROTECTION OF ISFET SENSORS

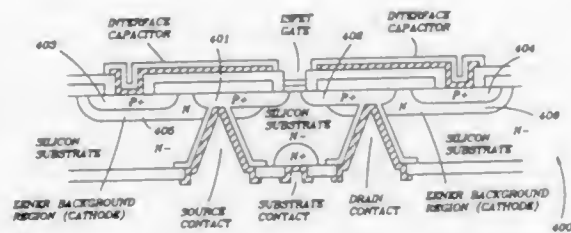
Ronald D. Baxter, Furlong; James G. Connery, Maple Glen; John D. Fogel, Schwenksville, and Spencer V. Silverthorne, Perkasi, all of Pa.

Filed Jan. 19, 1994, Ser. No. 183,733

Int. Cl.<sup>6</sup> H01L 29/66, 29/96

U.S. Cl. 257—253

13 Claims



1. Apparatus for selectively measuring ions in a liquid, comprising:

- (a) a measuring circuit including a chemically sensitive ion sensor in the form of an ion sensitive field effect transistor (ISFET) formed on a silicon substrate;
- (b) an electrostatic discharge (ESD) protection circuit integrated onto said substrate; and
- (c) interface means, integrated onto said substrate, for providing an interface between said protection circuit and said liquid, characterized in that said interface means provides a contact with said liquid without opening up paths for D.C. leakage currents between the ISFET and said liquid.

12. Apparatus for providing electrostatic discharge (ESD) protection to an ion sensitive field effect transistor (ISFET) based sensor chip used to measure ion activity in a liquid test sample, comprising:

- (a) means for building up charge in said test sample during an ESD event; and
- (b) means for transferring charge built up in said liquid test sample, as a result of said ESD event, to the source, drain and substrate of said ISFET.

5,414,285

## SEMICONDUCTOR DEVICE HAVING CLADDING LAYER AND PROCESS FOR PRODUCTION OF THE SAME

Toshiyuki Nishihara, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

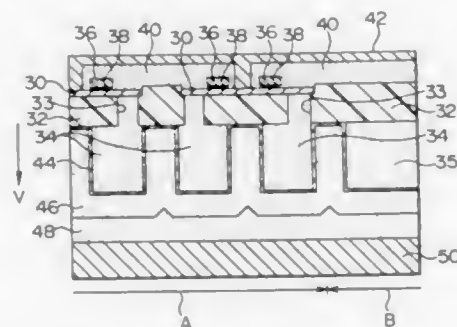
Filed Jan. 13, 1993, Ser. No. 3,598

Claims priority, application Japan, Jan. 27, 1992, 4-035687

Int. Cl.<sup>6</sup> H01L 29/68, 23/48

U.S. Cl. 257—301

9 Claims



1. A semiconductor memory device comprising:
- a semiconductor layer on a first insulating layer;
  - a capacitor including a capacitor electrode conductive layer formed in a projecting manner in a cell formation region on one surface of said insulating layer and in contact with

said semiconductor layer, a capacitor insulating film formed on the surface of said capacitor electrode conductive layer, and a capacitor counter electrode conductive layer formed on the surface of the capacitor insulating film;

a smoothing layer cladded to a supporting substrate being on the capacitor counter electrode conductive layer;

a thickness adjusting layer of a conductive material being formed in a cell nonformation region around said cell formation region between the insulating layer and the smoothing layer and having a thickness substantially the same as the thickness of said capacitor electrode conductive layer so that the smoothing layer has a thickness free of any steps;

said capacitor counter electrode conductive layer covering both said capacitor insulating film and said thickness adjusting layer; and

a second insulating layer being formed between said thickness adjusting layer and said capacitor counter electrode conductive layer, wherein a potential of said thickness adjusting layer being set to a predetermined value between a ground potential and a power source voltage of said semiconductor memory device.

5,414,286

## NONVOLATILE MEMORY, METHOD OF FABRICATING THE SAME, AND METHOD OF READING INFORMATION FROM THE SAME

Yoshimitsu Yamauchi, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

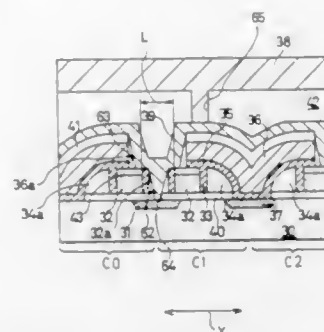
Filed Mar. 18, 1993, Ser. No. 33,560

Claims priority, application Japan, Mar. 19, 1992, 4-063867; Mar. 19, 1992, 4-063868

Int. Cl.<sup>6</sup> H01L 29/68

U.S. Cl. 257—315

12 Claims



1. A nonvolatile memory including a plurality of memory cells comprising:

- a semiconductor substrate provided with a first impurity diffused layer and a second impurity diffused layer;
- a first electrode formed over the semiconductor substrate;
- a floating gate formed adjacent the side wall of the first electrode, the floating gate and the first electrode being separated by a sidewall spacer; and
- a second electrode overlying at least the floating gate, the second electrode and the floating gate being separated by a spacer, wherein

the said memory cells are arranged in X and Y directions to form a matrix;

the first electrodes of memory cells which are arranged in the Y direction are connected in common in the Y direction, while the second electrodes thereof are connected in common in the Y direction;

a memory cell and one of its adjacent memory cells which are arranged in the X direction have a first impurity diffused layer in common;

the said memory cell and the other adjacent memory cell thereof have a second impurity diffused layer in common; and

and

the said first impurity diffused layers of the memory cells arranged in the X direction are further connected by a conductive layer.

5,414,287

## PROCESS FOR HIGH DENSITY SPLIT-GATE MEMORY CELL FOR FLASH OR EPROM

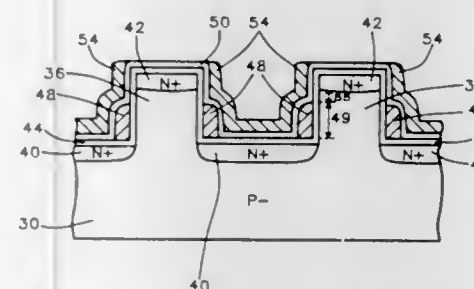
Gary Hong, Hsin-Chu, Taiwan, Prov. of China, assignor to United Microelectronics Corporation, HsinChu, Taiwan, Prov. of China

Filed Apr. 25, 1994, Ser. No. 231,812

Int. Cl.<sup>6</sup> H01L 29/68, 21/265

U.S. Cl. 257—316

21 Claims



1. A high density split-gate memory cell, for an erasable programmable read-only memory (EPROM) or flash-memory, comprising:

- a silicon island formed from a silicon substrate implanted with a first conductivity-imparting dopant;
- a first dielectric layer surrounding vertical surfaces of said silicon islands, whereby said first dielectric layer is a gate oxide;
- a first conductive layer formed over a portion of the vertical surfaces of said first dielectric layer, acting as a floating gate for said high density split-gate memory cell;

a source region in said silicon substrate, implanted with a second and opposite conductivity-imparting dopant, surrounding the base of said silicon island;

a drain region in the top of said silicon island, implanted with a second and opposite conductivity-imparting dopant to said first conductivity-imparting dopant;

a channel region between said source and drain regions, under the vertical surfaces of said silicon island, whereby said floating gate is coupled to only a first lower portion of said channel region;

a second dielectric layer over the top and side surfaces of said floating gate, acting as an interpoly dielectric; and

a second conductive layer formed over that remaining portion of said vertical surfaces of said first dielectric layer not covered by said first conductive layer, and surrounding said second dielectric layer, coupled to that portion of said channel region not coupled to said floating gate, whereby said second conductive layer is a control gate.

5,414,288

## VERTICAL TRANSISTOR HAVING AN UNDERLYING GATE ELECTRODE CONTACT

Jon T. Fitch; Carlos A. Mazuré, and Keith E. Witek, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill. Division of Ser. No. 979,073, Nov. 19, 1992, Pat. No. 5,324,673.

This application Feb. 16, 1994, Ser. No. 195,679

Int. Cl.<sup>6</sup> H01L 29/10, 29/78

U.S. Cl. 257—328

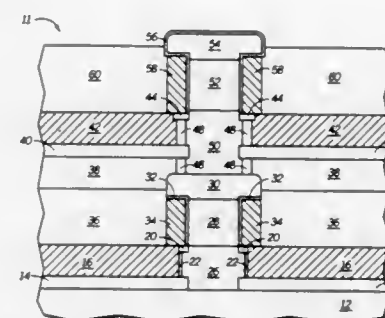
7 Claims

1. A transistor comprising:

- a substrate formed of a semiconductor material;
- a dielectric layer formed overlying the substrate and having a first portion of an opening which exposes a portion of the substrate to form an exposed substrate portion;
- a conductive interconnect layer formed overlying the di-

electric layer, the conductive layer having a second portion of an opening horizontally aligned with the first portion of the opening;

a vertically raised region made of the semiconductor material and overlying the exposed substrate portion and lying within the first portion and second portion of the opening, the vertically raised region having a first electrode, a second electrode overlying the first electrode, and a channel region separating the first electrode and the second electrode;



a gate electrode dielectric layer formed adjacent the channel region and overlying the conductive interconnect layer;

a gate electrode formed overlying the conductive interconnect layer and being laterally adjacent the gate electrode dielectric layer for selectively altering a current flow through the channel region in response to a voltage applied to the gate electrode; and

a contact region wherein a bottom portion of the gate electrode contacts a top portion of the conductive interconnect layer.

5,414,289

## DYNAMIC MEMORY DEVICE HAVING A VERTICAL TRANSISTOR

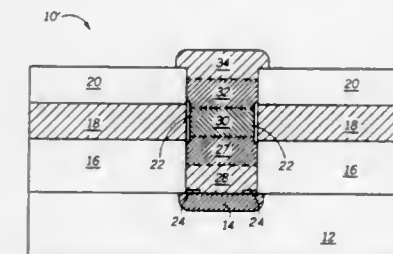
Jon T. Fitch, Austin, Tex.; Carlos A. Mazuré, Hopewell Junction, N.Y., and Keith E. Witek, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 9,205, Jan. 25, 1993, abandoned, which is a division of Ser. No. 844,038, Mar. 2, 1992, Pat. No. 5,208,172. This application Nov. 9, 1993, Ser. No. 150,328

Int. Cl.<sup>6</sup> H01L 29/10, 29/72

U.S. Cl. 257—329

30 Claims



1. A transistor comprising:

- a substrate having a surface and being of a first conductivity type;
- a first dielectric layer overlying the substrate and having a first portion of an opening;
- a control electrode conductive layer overlying and contacting the first dielectric layer and having a second portion of the opening horizontally aligned to the first portion of the opening, the second portion of the opening forming a sidewall of the control electrode conductive layer;

a second dielectric layer overlying the control electrode conductive layer and having a third portion of the opening horizontally aligned to the second portion of the opening, the first, second, and third portions of the opening

- forming a device opening that exposes a surface of the substrate;
- a sidewall dielectric laterally adjacent the sidewall of the control electrode conductive layer;
  - a first current electrode formed within said device opening, having a second conductivity type, and being laterally adjacent the first dielectric layer;
  - a channel region formed within said device opening, having the first conductivity type, and being laterally adjacent the sidewall dielectric and overlying the first current electrode, the channel region being physically isolated from the substrate by the first current electrode, the sidewall dielectric separating the channel region and the control electrode conductive layer; and
  - a second current electrode formed within said device opening, having the second conductivity type, being laterally adjacent the second dielectric layer, and overlying the channel region.

5,414,290

# IGBT WITH SELF-ALIGNING CATHODE PATTERN AND METHOD FOR PRODUCING IT

Friedhelm Bauer, Suhr, Switzerland, assignor to ABB Management AG, Baden, Switzerland

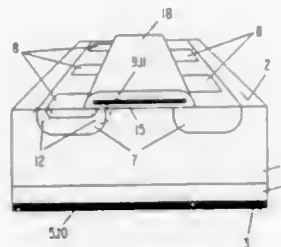
Filed Apr. 7, 1994, Ser. No. 224,300

Claims priority, application Germany, May 7, 1993, 43 178.7

Int. Cl.<sup>6</sup> H01L 27/02, 21/265

U.S. Cl. 257—341

15 Claims



1. An insulated-gate bipolar transistor comprising a semiconductor substrate of a first conduction type which is bounded by a first and a second main area;
- a cathode which is allocated to the first main area, and an anode which is formed by a metallization covering the second main area;
- an emitter layer of a second conduction type which is inserted into the semiconductor substrate from the anode-side main area;
- a plurality of collector regions of the second conduction type which are inserted into the semiconductor substrate from the cathode-side main area, the semiconductor substrate penetrating to the cathode-side main area between two adjacent collector regions;
- a gate electrode which is formed by a conducting layer which is arranged and insulated above the cathode-side main area and extends from a collector region over the semiconductor substrate penetrating to the surface to the adjacent collector region;
- a number of source regions of the first conduction type which are inserted into the collector regions and which exhibit a length L and at right angles thereto a width W in the direction of an adjacent collector region; wherein the length L of the source regions is selected such that there are at least two channel regions produced for each source region, the channel regions comprising a part of a collector region which penetrates to the cathode-side main area between the source region and semiconductor substrate and which is covered by the gate electrode,
- the width of the source regions is selected to be of the order of magnitude of microns such that holes which flow from the anode to the cathode underneath the

source regions polarize a PN-junction which is formed by the source regions and the adjacent collector regions in the forward direction, and such that a voltage drop across said PN-junction remains below the inbuilt forward voltage of the PN junction at any time.

5,414,291

# SEMICONDUCTOR DEVICE AND PROCESS FOR FABRICATING THE SAME

Hiroyuki Miwa, Kanagawa; Mamoru Shinohara; Takayuki Gomi, both of Tokyo, and Tomotaka Fujisawa, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

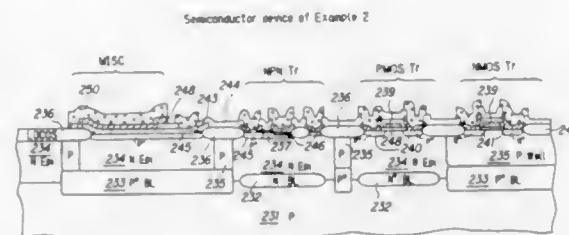
Filed Jan. 31, 1994, Ser. No. 189,191

Claims priority, application Japan, Jan. 30, 1993, 5-034871; Jan. 30, 1993, 5-034872; Feb. 28, 1993, 5-062979; Mar. 4, 1993, 5-044105; Mar. 31, 1993, 5-098788

Int. Cl.<sup>6</sup> H01L 27/02; H01G 4/06

U.S. Cl. 257—370

7 Claims



1. A semiconductor device comprising a capacitor having as the lower electrode, a diffusion layer having a first electrically conductive type formed inside a semiconductor substrate, wherein,

said lower electrode, which is a diffusion layer having a first electrically conductive type, is isolated using another diffusion layer having a conductive type opposite to that of the diffusion layer corresponding to the lower electrode;

said another diffusion layer having the opposite conductive type is further isolated using a diffusion layer for isolation having the first conductive type;

said diffusion layer for isolation having the first conductive type is earthed; and wherein

said diffusion layer having a first conductive type and corresponding to said lower electrode is a P type graft base of an NPN transistor;

said diffusion layer having the opposite conductive type is an N type epitaxially grown layer; and

said diffusion layer for isolation having the first conductive type is a buried P type layer and P type isolation layer, or a P type isolation monolayer.

5,414,292

# JUNCTION-ISOLATED FLOATING DIODE

Richard K. Williams, Cupertino, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Filed May 26, 1993, Ser. No. 67,372

Int. Cl.<sup>6</sup> H01L 29/764

U.S. Cl. 257—373

22 Claims

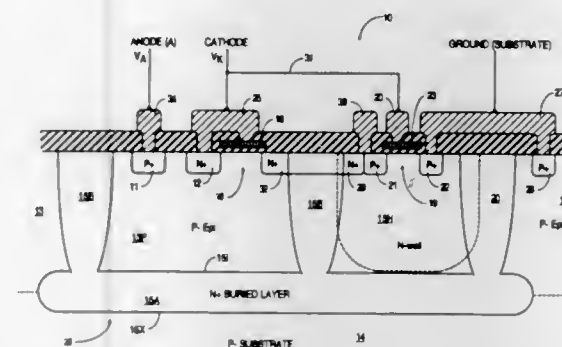
1. A junction-isolated diode formed in a semiconductor substrate of a first conductivity type, said diode comprising:

an isolation region of a second conductivity type enclosing an enclosed region of said substrate, said enclosed region being of said first conductivity type, said isolation region separating said enclosed region from a region of said substrate outside of said isolation region;

a cathode region and an anode region formed in said enclosed region;

first switching means for connecting said isolation region to

said cathode region when a voltage at said cathode region exceeds a first predetermined level; and



second switching means for connecting said isolation region to said substrate when the voltage at said cathode region falls below a second predetermined level.

5,414,293

# ENCAPSULATED LIGHT EMITTING DIODES

Ronald F. Broom, Zurich, Switzerland, assignor to International Business Machines Corporation, Armonk, N.Y.

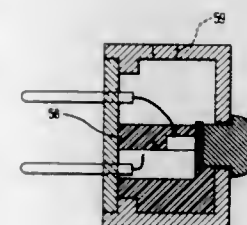
Filed Apr. 19, 1993, Ser. No. 47,989

Claims priority, application European Pat. Off., Oct. 14, 1992, 92810786

Int. Cl.<sup>6</sup> H01L 33/00, 27/14, 23/48, 23/02

U.S. Cl. 257—433

9 Claims



1. An optical module comprising: a semiconductor light emitting diode mounted on a base and having a light emitting facet that includes a light emitting portion; and means for encapsulating and sealing said diode, wherein a gap contiguous to the light emitting facet of said diode is formed in said means for encapsulating, wherein at least said light emitting portion of said light emitting facet is placed in a defined atmosphere and remains free from said means for encapsulating, and wherein said gap has a width between 5 μm and 100 μm.

5,414,294

REMOTE INDIUM BUMP CORRUGATED PV DIODES  
Russell D. Granneman, Goleta, and William O. McKeag, Santa Barbara, both of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Mar. 31, 1993, Ser. No. 40,710

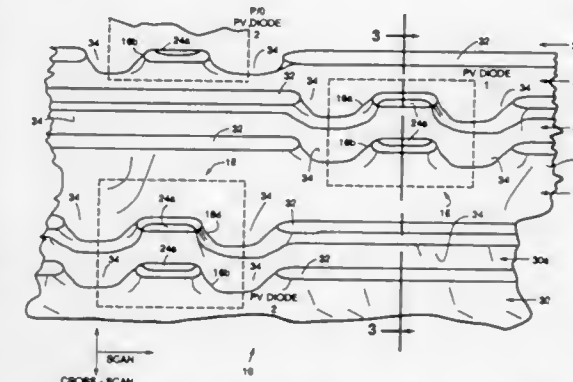
Int. Cl.<sup>6</sup> H01L 27/14, 31/00, 31/02

U.S. Cl. 257—443

17 Claims

1. A radiation detector, comprising: a first layer of semiconductor material having a first type of electrical conductivity;
- a mesa structure comprised of a plurality of sub-mesa structures, each of said sub-mesa structures comprising a portion of said first layer of semiconductor material having the first type of electrical conductivity, each of said sub-mesa structures being electrically coupled together by

said first layer and further comprising a second layer of semiconductor material overlying said portion of the first layer and in electrical contact therewith, said second layer having a second type of electrical conductivity and forming a p-n junction between said portion of said first layer and said second layer, at least two of said plurality of sub-mesa structures being separated by at least one trench that extends partially through said first layer; and



electrical contact means having a first portion disposed within said at least one trench between said plurality of sub-mesa structures and a second portion that extends upwardly from said at least one trench and over a sidewall of each of said sub-mesa structures so as to electrically contact said second region of each of said sub-mesa structures for electrically connecting each of the plurality of second regions one with another.

5,414,295

# AVALANCE DIODE INCORPORATED IN A BIPOLAR INTEGRATED CIRCUIT

Gérard Le Roux, Sappay-en-Chartreuse, and Jacques Le Menn, Grenoble, both of France, assignors to SGS-Thomson Microelectronics S.A., Genthilly, France

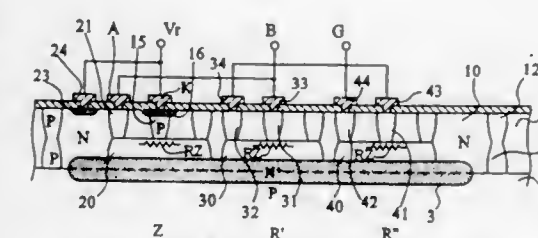
Filed Feb. 28, 1994, Ser. No. 202,919

Claims priority, application France, Mar. 1, 1993, 93 02617

Int. Cl.<sup>6</sup> H01L 29/72, 29/90

U.S. Cl. 257—577

12 Claims



1. A reference diode formed in an insulated well of a first conductivity type epitaxial layer that coats a substrate of a second conductivity type, comprising:

an avalanche diode including:

at the bottom of the insulated well, a second conductivity type deep region having a high doping level, beneath which is formed an overlapping buried layer of the first conductivity type,

a first deep diffused region of the second conductivity type contacting a central portion of said deep region,

a second deep diffused region of the second conductivity type contacting a periphery of said deep region,

a highly doped surface region of the first conductivity type coating a surface of the first deep diffused region and forming therewith an avalanche junction,



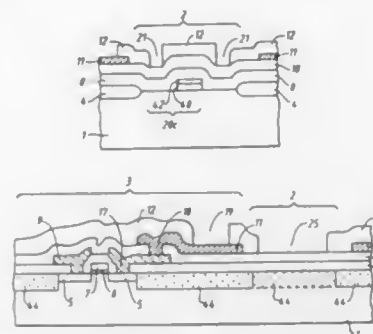
a first electrode contacting a surface of the surface region, and  
 a second electrode contacting a surface of the second deep diffused region;  
 at least one additional structure identical to the structure of said avalanche diode but without a first conductivity type surface region, a first electrode of the additional structure being in contact with an upper surface of a first deep diffused region of the additional structure, said additional structure forming, between its first and second electrodes, a resistor; and  
 means to serially connect the avalanche diode to the resistor(s).

5,414,297  
**SEMICONDUCTOR DEVICE CHIP WITH INTERLAYER INSULATING FILM COVERING THE SCRIBE LINES**  
 Naoyuki Morita, and Hiroaki Tsugane, both of Naganoken, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan  
 Continuation-in-part of Ser. No. 850,826, Mar. 13, 1992, Pat. No. 5,237,199, which is a division of Ser. No. 508,848, Apr. 12, 1990, Pat. No. 5,136,354. This application Aug. 11, 1993, Ser. No. 103,640

Claims priority, application Japan, Apr. 13, 1989, 1-94124; May 18, 1989, 1-124741; Jan. 8, 1990, 2-432  
 The portion of the term of this patent subsequent to Aug. 4, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> H01L 27/02, 21/302, 29/34  
 U.S. Cl. 257—620

33 Claims



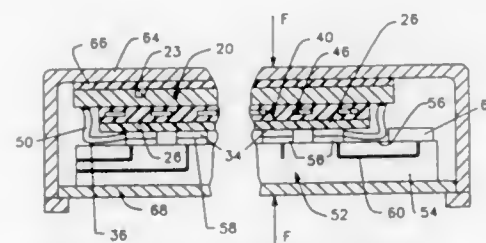
1. An integrated circuit wafer comprising a substrate having a surface carrying a plurality of circuit chips spaced from one another by scribe lines constituted by regions of the substrate surface along which the substrate will be cut in order to separate the chips from one another, each scribe line having two longitudinal edges, wherein each chip has at least one semiconductor element composed of a plurality of patterned layers of electrically conductive material and said wafer comprises at least one interlayer insulation film having portions which extend across each said chip and interposed between two of said layers of electrically conductive material to form a component part of each said element, said interlayer insulation film further having portions which extend across the entirety of said scribe lines at the time said substrate is cut along said scribe lines and which are contiguous with portions of said interlayer insulation film that extend across each said chip, and said substrate surface has an observable irregularity constituting a defined pattern located at a scribe line region and spaced inwardly of said two longitudinal edges.

5,414,298  
**SEMICONDUCTOR CHIP ASSEMBLIES AND COMPONENTS WITH PRESSURE CONTACT**  
 Gary Grube, Monroe; Igor Khandros, Peekskill, and Gaetan Mathieu, Carmel, all of N.Y., assignors to Tesser, Inc., Elmsford, N.Y.

Filed Mar. 26, 1993, Ser. No. 38,178  
 Int. Cl.<sup>6</sup> H01L 39/02

U.S. Cl. 257—690

53 Claims



1. A semiconductor chip assembly comprising:

5,414,296  
**VENETIAN BLIND CELL LAYOUT FOR RF POWER TRANSISTOR**

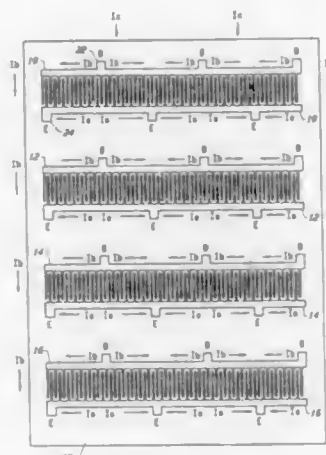
Howard D. Bartlow, West Linn, Oreg., assignor to Spectrian, Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 994,745, Dec. 22, 1992, Pat. No. 5,329,156, and a continuation-in-part of Ser. No. 995,286, Dec. 22, 1992, abandoned. This application May 2, 1994, Ser. No. 236,312

Int. Cl.<sup>6</sup> H01L 29/72

U.S. Cl. 257—579

10 Claims



1. A method of improving operating characteristics of a semiconductor RF power transistor device in which a plurality of alternating currents flow, said method comprising the steps of

- determining the location and direction of flow of said currents within said semiconductor transistor device, and
- providing a metal structure on a surface of said semiconductor transistor device including a plurality of current feed structures and interdigitated fingers arranged to establish current flow to obtain negative electromagnetic coupling.

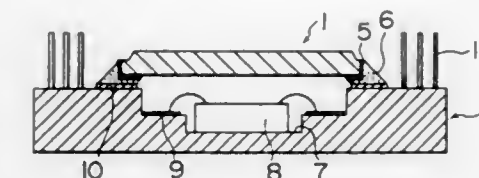
- a semiconductor chip having surfaces and a plurality of contacts;
- a plurality of terminals formed separately from said chip and overlying a first surface of said chip;
- flexible leads electrically interconnecting said contacts on said chip and said terminals so that said terminals are movable towards and away from said first surface of said chip, said leads being permanently connected to said contacts and said terminals;
- force means for biasing said terminals away from said first surface of said chip;
- a substrate having a top surface and a plurality of contact pads on said top surface; and
- means for permanently holding said chip and said substrate together so that said first surface of said chip faces toward said substrate and so that said terminals are disposed between said chip and said substrate and said terminals engage said contact pads under the influence of said force means.

5,414,300  
**LID FOR SEMICONDUCTOR PACKAGE AND PACKAGE HAVING THE LID**  
 Yoichi Tozawa, Yamaguchi; Shizuki Hashimoto, Asa, and Tetsuya Yamamoto, Mine, all of Japan, assignors to Sumitomo Metal Ceramics Inc., Yamaguchi, Japan  
 Filed Sep. 6, 1994, Ser. No. 301,186  
 Claims priority, application Japan, Dec. 10, 1993, 5-345754; Apr. 28, 1994, 6-126724

Int. Cl.<sup>6</sup> H01L 21/00

U.S. Cl. 257—704

4 Claims



1. A ceramic lid for a semiconductor package, for sealing a semiconductor device mount portion of a ceramic package substrate, characterized in that the lid includes a seal layer formed through an underlying metallized layer consisting of an Ag—Pt system metallized layer on a peripheral edge surface of said ceramic lid facing said ceramic package substrate, and said seal layer is formed by a solder comprising 2 to 15 wt % of Bi, 2.0 to 6.0 wt % of Sn, 0.5 to 2.0 wt % of In, 0.5 to 2.0 wt % of Ag and the balance of Pb.

5,414,299  
**SEMI-CONDUCTOR DEVICE INTERCONNECT PACKAGE ASSEMBLY FOR IMPROVED PACKAGE PERFORMANCE**

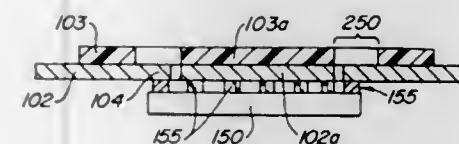
Tsing-Chow Wang, San Jose, and Louis H. Liang, Los Altos, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.

Filed Sep. 24, 1993, Ser. No. 126,288

Int. Cl.<sup>6</sup> H01L 23/48

U.S. Cl. 257—702

27 Claims



1. A semiconductor device interconnect package assembly for improving scratch protection, stress relief, and electrostatic discharge protection of an active surface of a semiconductor die, and for offering improved package performance, said assembly comprising:

- a flexible electrically non-conductive substrate film having a first surface and a second surface, the two surfaces being located on opposite faces of the substrate film;
- a pattern of electrically conductive material laminated to a first surface of said flexible electrically non-conductive substrate film;
- said pattern of material forming a plurality of electrically conductive leads having inner lead portions defining an inner perimeter therein and having outer lead portions, said inner lead portions being positioned suitably for attachment to said semiconductor die; and
- a central portion of material within said inner perimeter, said central portion of material being positioned relative to said die such that it provides surface protection to said active surface of said die, said central portion of material includes a portion of said electrically conductive material.

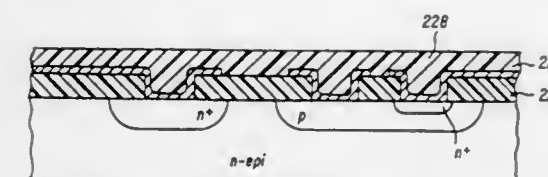
5,414,301  
**HIGH TEMPERATURE INTERCONNECT SYSTEM FOR AN INTEGRATED CIRCUIT**

Michael E. Thomas, Cupertino, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Continuation of Ser. No. 513,433, Apr. 23, 1990, abandoned, which is a continuation of Ser. No. 86,200, Aug. 18, 1987, Pat. No. 4,920,071, which is a continuation of Ser. No. 712,589, Mar. 15, 1985, abandoned. This application Feb. 16, 1994, Ser. No. 197,359

Int. Cl.<sup>6</sup> H01L 23/48, 29/40, 29/96, 29/62  
 U.S. Cl. 257—740

1 Claim



1. In a semiconductor integrated circuit device including a silicon substrate having a predetermined pattern of doped regions formed therein and contact regions disposed on a surface of said device, each contact region exposing at least a portion of an underlying doped region, means for electrically interconnecting said doped regions, said means comprising a system of electrical interconnects, consisting of a metal carbide material disposed directly on and into electrical contact with the underlying doped region, wherein said metal is selected from the group consisting essentially of tungsten, molybdenum, tantalum, titanium, niobium, zirconium, vanadium and chromium, which forms a stable thermodynamic couple with silicon and compounds thereof at temperatures exceeding approximately 500° C., which system electrically interconnects said doped regions through said contact regions in accordance with a predetermined pattern.

5,414,302

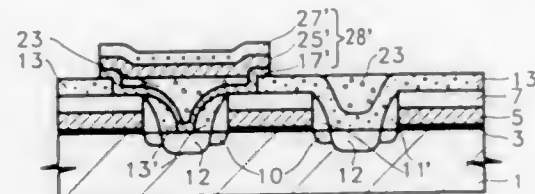
# SEMICONDUCTOR DEVICE WITH A MULTILAYERED CONTACT STRUCTURE HAVING A BORO-PHOSPHATE SILICATE GLASS PLANARIZING LAYER

Yun-seung Shin, and Sung-nam Chang, both of Kyunggi, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Kyunggi, Rep. of Korea

Continuation of Ser. No. 876,097, Apr. 30, 1992, abandoned. This application Jan. 28, 1994, Ser. No. 188,113

Claims priority, application Rep. of Korea, Mar. 4, 1992, 92-3559

Int. Cl.<sup>6</sup> H01L 23/48, 29/44, 29/52, 29/10  
U.S. Cl. 257-752 10 Claims



1. A semiconductor device having a contact pad structure located in a via of an inter-insulating layer for effectuating an electrical connection, said contact pad structure comprises: a first conductive layer which is formed within said via and has an upper end portion formed on a predetermined portion of said inter-insulating layer around the via; a planarizing material filling up the via, which is formed on said first conductive layer, said planarizing material being an insulating material; and a second conductive layer formed on said planarizing material and electrically connected with said first conductive layer through said upper end portion.

5,414,303

# LEAD-FREE, HIGH TIN, TERNARY SOLDER ALLOY OF TIN, BISMUTH, AND INDIUM

Stephen G. Gonya; James K. Lake, both of Endicott, N.Y.; Randy C. Long, Friendsville, Pa.; and Roger N. Wild, Owego, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 78,677, Jun. 16, 1993, Pat. No. 5,344,607. This application Mar. 2, 1994, Ser. No. 205,670

Int. Cl.<sup>6</sup> H01L 23/48, 29/46, 29/64  
U.S. Cl. 257-772 4 Claims

1. An integrated circuit chip module comprising a circuitized chip carrier, a semiconductor integrated circuit chip, and a ternary Sn-Bi-In solder alloy bond electrical interconnection between said circuitized chip carrier and said semiconductor integrated circuit chip, said solder alloy consisting essentially of 70 to 90 weight percent Sn, balance Bi, and In.

5,414,304

# DEVICE FOR SUPPRESSING VOLTAGE DROPS

Hans Loistl, Schwieberdingen, and Jochen Bach, Dusslingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

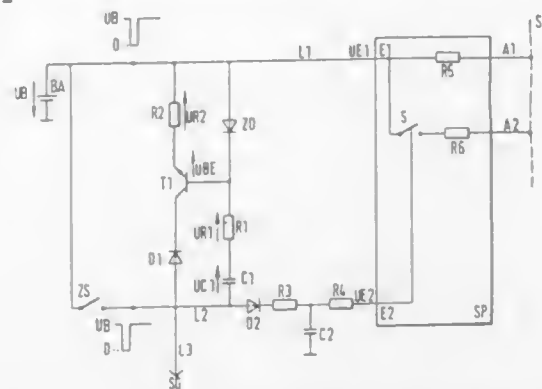
PCT No. PCT/DE92/00126, § 371 Date Nov. 23, 1992, § 102(e) Date Nov. 23, 1992, PCT Pub. No. WO92/16992, PCT Pub. Date Oct. 1, 1992

PCT Filed Feb. 21, 1992, Ser. No. 952,837  
Claims priority, application Germany, Mar. 23, 1991, 41 09 645.2

Int. Cl.<sup>6</sup> H02J 1/00 6 Claims

1. A device for suppressing voltage drops in apparatuses which can be connected with a battery, the device comprising at least two lines adapted to connect an apparatus with a battery for its voltage supply; and a circuit arrangement situated between said two lines so that a connection to a said second one of said lines is produced when a voltage drop occurs in a first one of said lines, said circuit arrangement including a

series connection of a Zener diode, a resistor and a capacitor which lie between said first line and second line, a series connection of another resistor, an emitter-collector junction of a transistor, a switching means which connects said second line



with the battery, and a diode which lies parallel to the former, a base of said transistor being connected with a cathode of said Zener diode, an anode of the Zener diode being connected with said first line, and the anode of the diode being connected with said second line.

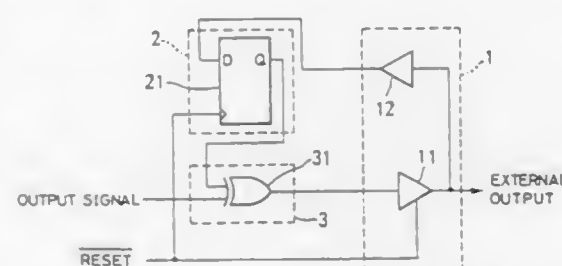
5,414,305

# OUTPUT CIRCUIT HAVING CAPABILITY OF KEEPING LOGIC STATE OF SIGNAL SENT BETWEEN LOGIC CIRCUITS

Makoto Nakamura, 2-17-3 Mukonosho, Amagasaki-shi, Hyogo-ken, and Takashi Nakajima, 608 Rapooru-Tenri, 2613-1 Ichinomoto-cho, Tenri-shi, Nara-ken, both of Japan

Filed Oct. 6, 1993, Ser. No. 132,363  
Claims priority, application Japan, Oct. 13, 1992, 4-273898  
Int. Cl.<sup>6</sup> H03K 5/153 5 Claims

U.S. Cl. 326-62



1. An output circuit arranged to output a signal fed from a first logic circuit to a second logic circuit and having an internal input terminal connected to said first logic circuit and an external output terminal connected to said second logic circuit, comprising: detecting means for detecting a logic level of said external output terminal when initializing said first logic circuit, said detecting means including a tri-state buffer to be controlled by a signal sent from the first logic circuit so that the tri-state buffer keeps its impedance high when initializing the first logic circuit, having an output terminal connected to said external output terminal and input terminal; means for holding said detected logic level; and means connected to said input terminal of said tri-state buffer for comparing said held logic level with a logic level of a signal fed from said first logic circuit through said internal input terminal and for determining a logic level of a signal to be fed to said second logic circuit based on the compared result.

5,414,306

# PROTECTING APPARATUS FOR ELECTRONIC DEVICE OF VEHICLE HAVING SOLAR BATTERY AND STORAGE BATTERY

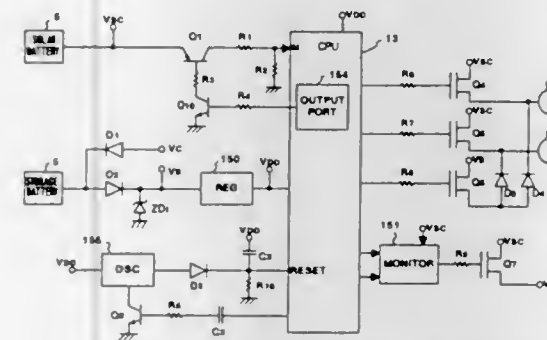
Yoshihisa Kanno; Shinshi Kajimoto, both of Hiroshima, and Masayuki Jinno, Higashihiroshima, all of Japan, assignors to Naldec Corporation and Mazda Motor Corporation, both of Hiroshima, Japan

Continuation of Ser. No. 797,918, Nov. 26, 1991, abandoned. This application Mar. 21, 1994, Ser. No. 216,248

Claims priority, application Japan, Nov. 30, 1990, 2-340094; Nov. 15, 1991, 3-300015

Int. Cl.<sup>6</sup> H02H 7/20 7 Claims

U.S. Cl. 307-87



1. A protecting apparatus for protecting an electronic device, the electronic device being provided on a vehicle having a storage battery and a solar battery, and being capable of operating under an output voltage supplied from outputs of the storage battery and the solar battery, the protecting apparatus comprising:

a reset circuit including means for monitoring normal operation of said electronic device determining whether or not the electronic device operates normally, and resetting the electronic device when it is determined that the electronic device does not operate normally;

an interruption circuit for interrupting a path on which the voltage is supplied from the solar battery to the electronic device; and

a control means in said electronic device responsive to said reset circuit for controlling said interruption circuit to interrupt the path from the solar battery to the electronic device when the electronic device is reset by the reset circuit, so that the electronic device may be protected.

5,414,307

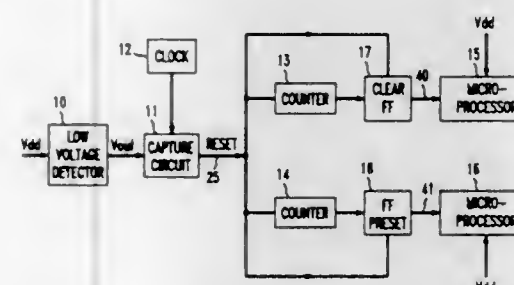
# POWER RESET CIRCUIT

Carolynn Brandmaier, Morris Township, Morris County, N.J., assignor to AT&T Corp., Murray Hill, N.J.

Filed Sep. 30, 1992, Ser. No. 954,718

Int. Cl.<sup>6</sup> H03K 19/02, 17/16 8 Claims

U.S. Cl. 327-143



1. A circuit comprising

a low voltage detector capable of providing an output when a threshold voltage is applied thereto;

means coupled to the detector for capturing the output of the detector and providing a reset pulse in response thereto;

means for providing clock pulses to the capturing means;

means for delaying the reset pulse for some predetermined number of clock pulses subsequent to the receipt of the detector output; and

a microprocessor coupled to the capture means.

5,414,308

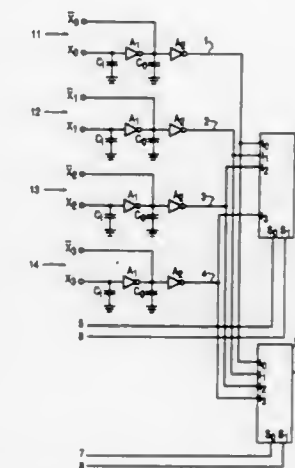
# HIGH FREQUENCY CLOCK GENERATOR WITH MULTIPLEXER

I-Shi Lee, Taipei; Tim H. T. Shen, Tao-Yuan; Stephen R. M. Huang, and Judy C. L. Kuo, both of Hsin Chu, all of Taiwan, Prov. of China, assignors to Winbond Electronics Corporation, Hsinchu, Taiwan, Prov. of China

Filed Jul. 29, 1992, Ser. No. 921,889

Int. Cl.<sup>6</sup> H03L 7/00; H03B 1/04

U.S. Cl. 327-293 15 Claims



1. A high frequency clock generator comprising: a plurality of clock oscillator circuits, each of said clock oscillator circuits including an output terminal for transmitting an output clock signal from the clock oscillator circuit;
- a first multiplexer comprising a plurality of input terminals coupled on a one-to-one basis to the plurality of output terminals of said plurality of clock oscillator circuits, said first multiplexer also comprising an output terminal providing an output clock signal at a first predetermined oscillation frequency; and
- a second multiplexer comprising a plurality of input terminals coupled on a one-to-one basis to the output terminals of said plurality of clock oscillator circuits, said second multiplexer also comprising an output terminal providing a second predetermined oscillation frequency, wherein said plurality of clock oscillator circuits and said first multiplexer and said second multiplexer are formed as an integrated circuit.



5,414,309

## CIRCUIT FOR APPLYING DIRECT CURRENT TO WINDING

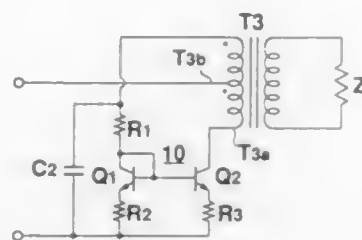
Syuzi Ichikawa, and Kazuhiro Umeda, both of Tokyo, Japan, assignors to Tokyo Tsuki Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1993, Ser. No. 176,086

Claims priority, application Japan, Oct. 19, 1993, 5-260836  
Int. Cl.<sup>6</sup> H03K 3/30

U.S. Cl. 327—110

7 Claims



1. A circuit for applying a direct current to a winding of a transformer or a coil, comprising:

- a current mirror circuit having a diode side circuit connected to one side of the winding and a transistor side circuit connected to another side of the winding, the winding having a center tap through which a signal current is input to the winding, the signal current containing a direct current component and an alternating current component, a current which flows in the transistor side circuit having a value of a predetermined mirror ratio times as much as a value of a current flowing in the diode side circuit; and
- a by-pass circuit connected to said winding for by-passing the alternating current component of the signal current input to the winding to outside of the current mirror circuit so that only the direct current component of the input signal current is input to current mirror circuit.

5,414,310

## ANALOG VOLTAGE MAXIMIZER AND MINIMIZER CIRCUITS

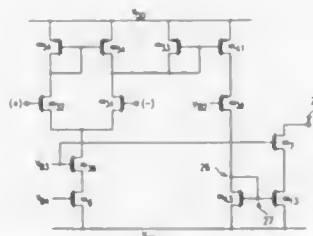
John W. Fattaruso, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 17, 1993, Ser. No. 62,878

Int. Cl.<sup>6</sup> H03K 5/153, 5/22

U.S. Cl. 327—62

8 Claims



1. A single-ended analog voltage maximizer circuit comprising:

- a plurality of high gain operational amplifiers wherein the number of operational amplifiers corresponds to the number of separate voltages from which a maximum voltage is to be determined;

each of said operational amplifiers receives a single-ended analog voltage at its non-inverting input; each output of said plurality of operational amplifiers being connected to a common output line where the maximum analog voltage output will be received; said common output line also being connected to the inverting input of each of said operational amplifiers; each operational amplifier having an operational amplifier circuit which is configured such that the operational amplifier goes into a completely off mode wherein there is a negligible amount of output current from an output terminal of the operational amplifier, wherein current is sourced from a positive supply rail to the output of the operational amplifier circuit from an open-drain driver, whereby only the amplifier with the maximum analog voltage at its input will be turned on and this particular maximum analog voltage will be seen at the common output terminal.

5,414,311

## SAMPLE AND HOLD CIRCUIT AND FINITE IMPULSE RESPONSE FILTER CONSTRUCTED THEREFROM

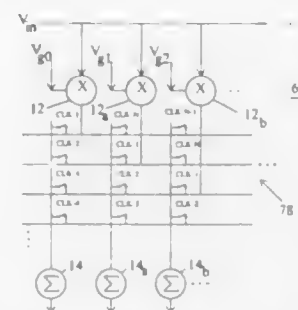
L. Richard Carley, Murrysville, Pa., assignor to Carnegie Mellon University, Pittsburgh, Pa.

Filed Sep. 14, 1993, Ser. No. 121,282

Int. Cl.<sup>6</sup> H03K 5/159, 5/00, 17/16

U.S. Cl. 327—94

4 Claims



1. A high speed sample and hold circuit, comprising: amplifier means for producing an output current which is a linear function of an input voltage; capacitor means responsive to said output current for producing an output voltage representative of the integral of said output current over a predetermined period of time; switch means for selectively connecting said amplifier means to said capacitor means during said predetermined period of time; discharge means connected to said capacitor means for discharging said capacitor means after said predetermined period of time; means for producing clock pulses for controlling the operation of said discharge means and said switch means.

5,414,312

## ADVANCED SIGNAL DRIVING BUFFER WITH DIRECTIONAL INPUT TRANSITION DETECTION

Myron W. Wong, San Jose, Calif., assignor to Altera Corporation, San Jose, Calif.

Filed Jul. 15, 1993, Ser. No. 92,350

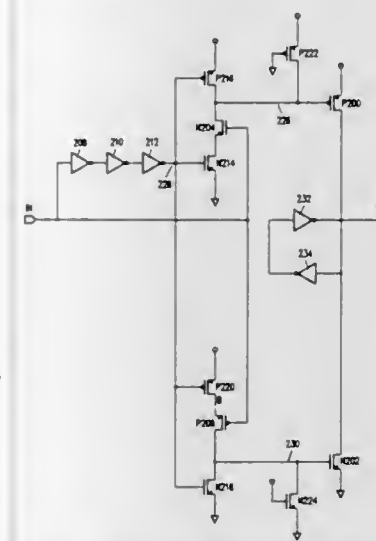
Int. Cl.<sup>6</sup> H03K 17/16

U.S. Cl. 326—83

14 Claims

1. A signal buffering circuit for driving a signal line, comprising:
  - a driver stage including a pull-up transistor and a pull-down transistor having a common output terminal coupled to the signal line;
  - a rising-edge detection circuit coupled to said pull-up transistor and the signal line, for detecting a rising transition of

- a signal on the signal line before said signal reaches a logical threshold level;
- a falling-edge detection circuit coupled to said pull-down transistor and the signal line, for detecting a falling transition on said signal before said signal reaches a logical threshold level; and



tristating means coupled to said driver stage for automatically deactivating said pull-up transistor and said pull-down transistor, a predetermined delay after full transition of said signal is complete.

5,414,313

## DUAL-MODE LOGARITHMIC AMPLIFIER HAVING CASCADED STAGES

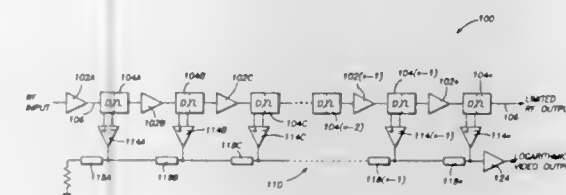
Emil J. Crescenzi, Jr., Cupertino; Jonathan K. Bamford, San Francisco; Titus J. Wandinger, Sunnyvale, and Michael A. O'Mahoney, Fremont, all of Calif., assignors to Watkins Johnson Company, Palo Alto, Calif.

Filed Feb. 10, 1993, Ser. No. 16,073

Int. Cl.<sup>6</sup> G06G 7/24

U.S. Cl. 327—351

18 Claims



1. A successive detection amplifier for providing an output signal corresponding to a logarithmic function of a RF input signal, comprising:

- cascaded amplification stages for amplifying said RF input signal along a RF signal path, said RF input signal being coupled to an input one of said stages;
- limiter means interposed between selected ones of said amplification stages for limiting RF signal energy propagating along said RF signal path so as to prevent saturation of succeeding ones of said amplification stages;
- detector means for providing a succession of detection signals corresponding to video envelopes of RF output signals produced by each of said amplification stages, said detector means including a plurality of differential detectors each of which is connected to an output of one of said amplification stages; and
- summing means for summing said succession of detection

signals in order to generate said output signal corresponding to said logarithmic function of said RF input signal.

5,414,314

## HIGH SWING INTERFACE STAGE

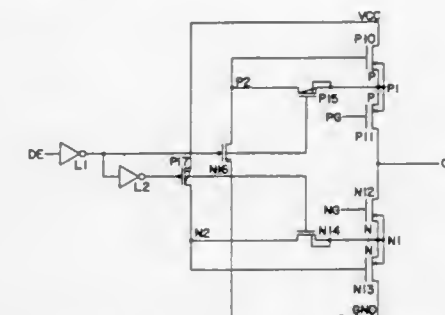
Charles R. Thurber, Jr., Sunnyvale, Calif., assignor to Maxim Integrated Products, Sunnyvale, Calif.

Filed Jun. 9, 1994, Ser. No. 257,194

Int. Cl.<sup>6</sup> H03K 19/0185

U.S. Cl. 327—427

10 Claims



1. An integrated CMOS high swing interface output stage comprising:

- first, second and third P-channel devices formed in a common P-channel well in a substrate, each having a gate to turn the devices on and off;
- first, second and third N-channel devices formed in another common N-channel well in the substrate, each having a gate to control the conduction there through;
- the first and second P-channel devices being coupled in series between a positive power supply terminal and an output terminal, respectively, the third P-channel device being coupled between the common connection of the first and second P-channel devices and the gate of the first P-channel device, the common connection of the first, second and third P-channel devices being connected to the respective common well;
- the first and second N-channel devices being coupled in series between the output terminal and a negative power supply terminal, respectively, the third N-channel device being coupled between the common connection of the first and second N-channel devices and the gate of the second N-channel device, the common connection of the first, second and third N-channel devices being connected to the common N-channel well;
- circuitry for holding the third P-channel and the third N-channel devices on when the interface is powered and not active, and for holding the first P-channel and the second N-channel devices on when the interface is powered and active so that the second P-channel and the first N-channel devices can be controlled to determine the high and low states of the output terminal.

5,414,315

## WATER DRAINING STRUCTURE FOR MOTORS

Katsumi Mineyama, Obu; Masaki Kushida, Toyota, and Masayuki Nishiguchi, Aichi, all of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu, Japan

Filed Nov. 1, 1993, Ser. No. 144,359

Claims priority, application Japan, Nov. 5, 1992, 4-296154

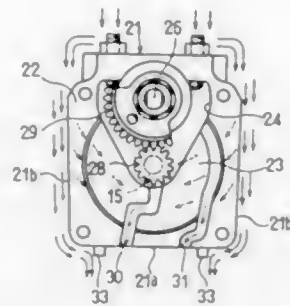
Int. Cl.<sup>6</sup> H02K 5/10, 5/00

U.S. Cl. 310—88

2 Claims

1. A water draining structure for a motor comprising a mounting member including a housing of a driven device and a casing attached thereto forming a confined chamber for a motor mounted on said mounting member, the casing having a water draining hole formed in a bottom surface thereof for providing communication between inside and outside of said confined chamber, said water draining structure comprising:

at least one water cutting rib for cutting off flow of water along outside surfaces of said casing to prevent such water from reaching said water draining hole in the bottom surface, said water cutting rib projecting outwardly from a surface of said casing in close proximity to said water draining hole and being formed such that water flowing



on said casing surface to said water cutting rib will drip from said casing before entering said water draining hole; wherein water cutting ribs are formed on the bottom surface of said casing at each of two opposed sides of said water draining hole, said ribs projecting downwardly between said water draining hole and respective side surfaces of said casing.

5,414,316

## MOTOR VEHICLE GEAR MOTOR DRIVE

Peter Michel, Kleinriederfeld, and Alfred Kümmel, Kitzingen, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

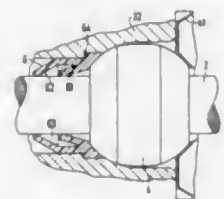
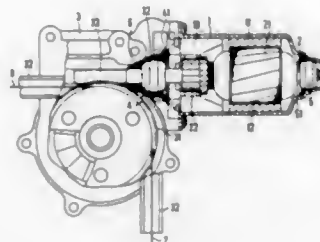
Filed Apr. 17, 1992, Ser. No. 870,548

Claims priority, application European Pat. Off., Apr. 18, 1991, 91106240; Mar. 10, 1992, 92104094; Germany, Mar. 10, 1992, 9203194 U; European Pat. Off., Mar. 19, 1992, 92104812

Int. Cl.<sup>6</sup> H02K 5/16

U.S. Cl. 310—90

14 Claims



1. A motor vehicle gear motor drive for a window drive, comprising:

- (a) a motor housing and a gear housing attached to said motor housing with a first seal disposed between said motor housing and said gear housing;
- (b) an electric motor drive shaft;
- (c) a cup bearing mounting attached to said gear housing and encircling said drive shaft; and
- (d) a double-lip seal located in said cup bearing mounting on the gear housing side of said cup bearing, encircling said drive shaft, and comprising two conical portions forming a lubricant depot between said two conical portions,

wherein said seal is pressed against said drive shaft and said cup bearing mounting by pressure exerted thereupon by said cup bearing.

5,414,317

## ELECTRIC MOTOR WITH BRUSH CARD ISOLATED FROM ENDFRAME

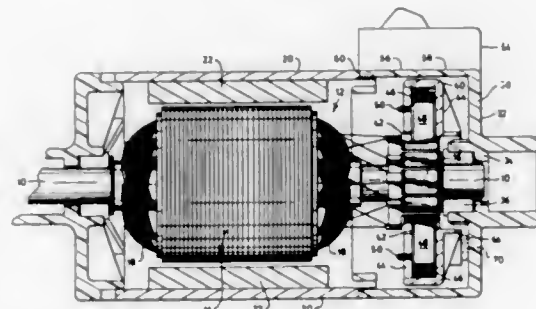
Dennis G. Reid, Lansing, and Michael T. Clarke, Lake Odessa, both of Mich., assignors to Eaton Stamping Company, Eaton Rapids, Mich.

Filed Oct. 29, 1993, Ser. No. 145,497

Int. Cl.<sup>6</sup> H02K 05/14, 05/24, 13/00

U.S. Cl. 310—239

12 Claims



1. An electric motor comprising:
  - a drive shaft,
  - an armature and commutator assembly fixed on said drive shaft,
  - a metal housing disposed around an armature portion of said assembly,
  - permanent magnet means disposed between said armature portion and said housing,
  - an endframe fixed to said housing, and
  - a discrete brush card mounted in said endframe, said brush card having
    - a cylindrical portion for retaining a commutator portion of said assembly, and
    - brush tubes extending radially outwardly from said cylindrical portion, said brush tubes being adapted to retain brushes for engaging said commutator portion, and brush springs for urging said brushes into engagement with said commutator portion,
  - said brush card having thereon tab portions with orifices therethrough and grommets mounted thereon, said grommets having openings extending therethrough and aligned, respectively, with said orifices,
  - said endframe having posts extending from an end wall thereof,
  - said grommet openings being configured to each receive one of said posts to lock said grommet onto said post, said grommets being at least in part disposed between said brush card and said endframe end wall to isolate said brush card from said endframe end wall.

5,414,318

## BRUSH DEVICE

Yutaka Shimizu, Maebashi, and Masami Kano, Kiryu, both of Japan, assignors to Mitsuba Electric Manufacturing Co., Ltd., Japan

Filed Feb. 3, 1994, Ser. No. 191,408

Claims priority, application Japan, Feb. 19, 1993, 5-011386 U

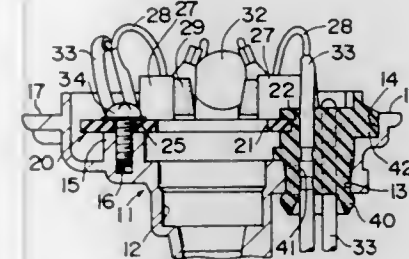
Int. Cl.<sup>6</sup> H02K 13/00

U.S. Cl. 310—239

11 Claims

1. A brush device for an electric motor, said brush device comprising:
  - a motor housing part,
  - a brush holder stay disposed in said motor housing part for mounting thereon brush holders, said stay being con-

structed to be fixed to said motor housing part by a single screw and having a commutator insertion hole; a grommet for inserting lead wires therethrough, said grommet being coupled to said brush holder stay; a recessed portion formed in said brush holder stay radially outwardly of said commutator insertion hole for coupling with said grommet; a screw insertion hole opened in said brush holder stay radially outwardly of said commutator insertion hole and



substantially on the opposite side of said commutator insertion hole from said recessed portion; a grommet insertion hole formed in said housing part adjacent said recessed portion of said brush holder stay and couplingly receiving a portion of said grommet; and a threaded hole formed in said housing part adjacent said screw hole of said brush holder stay, said single screw being screwed into said threaded hole through said screw insertion hole, so that said brush holder stay is fixed thereby to said housing part.

5,414,319

## DYNAMOELECTRIC MACHINE WITH BRUSH HAVING SLANTED CORE

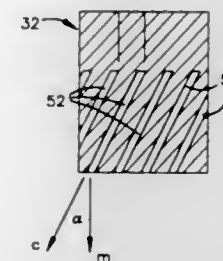
Henry B. Nowicki, Twinsburg, and Thomas J. Oelbracht, Mentor, both of Ohio, assignors to Lucas Aerospace Power Equipment Corporation, Aurora, Ohio

Filed Mar. 2, 1994, Ser. No. 204,771

Int. Cl.<sup>6</sup> H02K 13/00

U.S. Cl. 310—248

12 Claims



1. A dynamoelectric machine, which comprises:
  - a rotatable commutator having a cylindrical outer surface;
  - a wearable brush mounted adjacent to the commutator, the brush comprising a
    - plurality of cores arranged parallel to each other therein in a first direction, the cores comprising a core material;
  - means for urging the brush into contact with the commutator; and
  - means for allowing movement of the brush in a second direction into contact with the commutator as the brush wears, the first direction in which the cores are arranged forming an acute angle with the second direction, the position of the cores changing with respect to the commutator as the brush moves in the second direction to deposit core material on the commutator in different locations as the brush wears.

5,414,320

## ADJUSTING APPARATUS OF VIBRATING GYROSCOPE

Tasuku Mashio, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

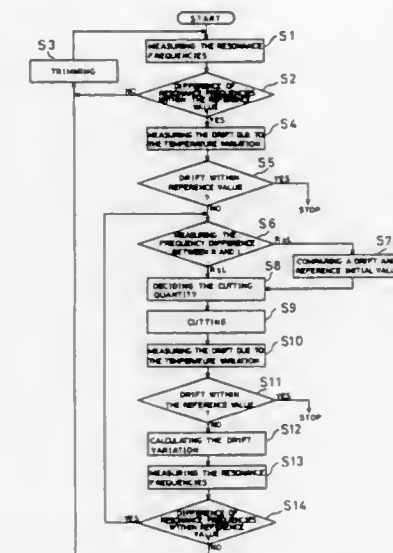
Filed Jun. 16, 1994, Ser. No. 260,781

Claims priority, application Japan, Jun. 21, 1993, 5-174787

Int. Cl.<sup>6</sup> H01L 41/08

U.S. Cl. 310—311

9 Claims



1. An adjusting apparatus of a vibrating gyroscope for adjusting the vibrating gyroscope utilizing vibration of a vibrating body, comprising:

heating means for heating said vibrating gyroscope; drift measuring means for measuring a drift due to a temperature variation obtained from said vibrating gyroscope by heating with said heating means; frequency measuring means for measuring resonance frequencies of multi-directional vibrations of said vibrating gyroscope; operation means for calculating a cutting quantity of said vibrating gyroscope from the drift due to the temperature variation measured by said drift measuring means and the resonance frequencies measured by said frequency measuring means; and cutting means for cutting said vibrating gyroscope responsive to the cutting quantity calculated by said operation means.

5,414,321

## SURFACE-WAVE ARRANGEMENT HAVING A STRUCTURE FOR PREVENTING INTERFERING ACOUSTIC WAVE COMPONENTS

Isidor Schropp, Ernsgraben; Kimon Anemogiannis, Munich, and Giuliano Visintini, Unterhaching, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

PCT No. PCT/EP92/00679, § 371 Date Sep. 28, 1993, § 102(e) Date Sep. 28, 1993, PCT Pub. No. WO92/17937, PCT Pub. Date Oct. 15, 1992

PCT Filed Mar. 26, 1992, Ser. No. 122,497

Claims priority, application Germany, Mar. 28, 1992, 41 10 401.3

Int. Cl.<sup>6</sup> H01L 41/08

U.S. Cl. 310—313 R

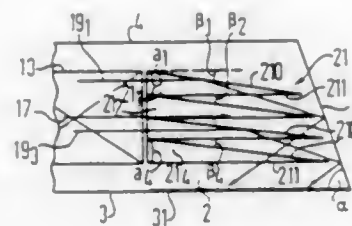
11 Claims

1. A surface wave arrangement on a piezoelectric substrate, comprising:

a surface structure for preventing acoustic wave components which cause interference in the surface-wave arrangement and are based on acoustic surface waves which run in a predetermined manner in a main wave propagation direction in the surface-wave arrangement,



said surface structure having at least one essentially straight boundary, which runs at an angle  $\beta$  to the main wave propagation direction and separates a first region of the surface structure from a second region, adjacent thereto, of a surface of the piezoelectric substrate, the surface wave having a first propagation speed ( $v_1$ ) in said first region of the surface structure, and a second propagation speed ( $v_2$ ) of the surface wave in the adjacent second region being different to  $v_1$ ,  
the angle  $\beta$  of said at least one essentially straight boundary being less than or equal to approximately  $0.8 \times \beta_g$ , where:



$$\cos \beta_g = v_2/v_1 \text{ if } v_2 \text{ is less than } v_1, \text{ and}$$

$$\cos \beta_g = v_1/v_2 \text{ if } v_1 \text{ is less than } v_2$$

the surface structure being arranged such that the surface waves strike said at least one essentially straight boundary in a region of lower speed of the surface wave and are totally reflected on said at least one essentially straight boundary.

5,414,322

# CRYSTAL RESONATOR WITH MULTIPLE SEGMENTED LATERAL-FIELD EXCITATION ELECTRODES

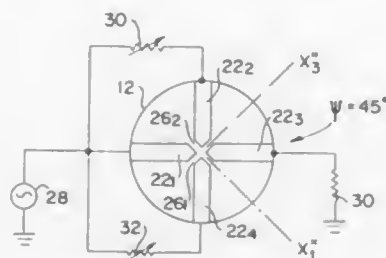
John A. Kosinski, Wall Township, Monmouth County; Arthur Ballato, Oceanport, and Yicheng Lu, Highland Park, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 19, 1994, Ser. No. 229,498

Int. Cl.<sup>6</sup> H01L 41/08

U.S. Cl. 310—366

20 Claims



1. A tunable crystal resonator, comprising:
  - a piezoelectric crystal plate having predetermined coordinate axes and at least one major face for supporting lateral-field excitation electrodes thereon;
  - at least three lateral-field excitation electrode segments formed on said one major face and being mutually separated by at least two gaps located centrally between the at least three lateral-field electrodes; and
  - means for applying varying excitation signals of predetermined magnitudes and phases to predetermined ones of said electrode segments wherein the varying excitation signals generate a varying lateral-field across at least one of said gaps and generate the lateral-field being oriented at variable angles with respect to said coordinate axes of the crystal plate for changing the lateral-field piezoelectric

coupling thereof so as to alter the electrical characteristics of the resonator including strength of excitation modes, lateral-field excitation antiresonance frequencies, and frequency-temperature behavior.

5,414,323

# IN-LINE TYPE ELECTRON GUN ASSEMBLY INCLUDING ELECTRODE UNITS HAVING ELECTRON BEAM PASSAGE HOLES OF DIFFERENT SIZES FOR FORMING AN ELECTROSTATIC LENS

Go Uchida; Shoji Shirai, both of Mobara, and Masayoshi Misono, Chiba, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

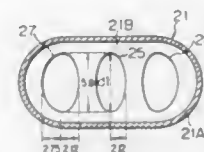
Filed Dec. 2, 1992, Ser. No. 984,332

Claims priority, application Japan, Dec. 2, 1991, 3-341785

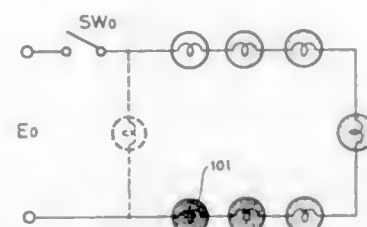
Int. Cl.<sup>6</sup> H01J 29/62

U.S. Cl. 313—414

16 Claims



a respective distinctive capability of each of said pair of lamps to emit light in response to the power supplied thereto,



wherein each of the gas-filled filament lamps has a distinctive respective gas, and wherein each of the gas-filled filament lamps has a distinctive respective filament shape.

5,414,327

### HIGH FREQUENCY DISCHARGE LAMP OPERATING CIRCUIT WITH FREQUENCY CONTROL OF THE IGNITION VOLTAGE

Jozef H. Reijnaerts, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

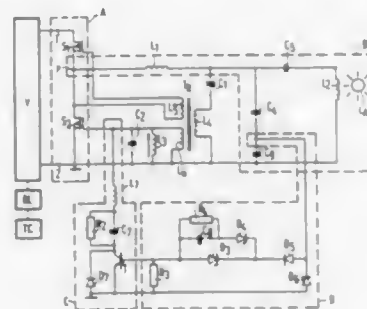
Filed Jun. 17, 1993, Ser. No. 79,299

Claims priority, application European Pat. Off., Jul. 20, 1992, 92202205

Int. Cl.<sup>6</sup> H05B 37/02

U.S. Cl. 315—219

8 Claims



1. A DC-AC converter circuit arrangement for igniting and operating a discharge lamp, comprising:

- a first branch circuit including terminals for connection to a DC voltage source and comprising at least one switching element which is alternately conductive and non-conductive for generating a current with alternating polarity at a frequency  $f$ ;
- a load branch circuit coupled to the first branch circuit and comprising inductive means, capacitive means, and means for coupling the discharge lamp to the load branch circuit;
- a control circuit for rendering the at least one switching element alternately conductive and non-conductive at the frequency  $f$  and comprising a resonant circuit which includes further inductive means and further capacitive means, wherein the control circuit includes means for limiting an amplitude of an ignition voltage, wherein the limiting means comprise;
- a second branch circuit comprising a series arrangement of a frequency-dependent impedance and a semiconductor element having impedance, wherein the series arrangement has first and second ends thereof coupled in parallel to the resonant circuit, wherein the semiconductor element includes a control electrode for influencing the impedance of the semiconductor element dependent upon a potential at the control electrode; and
- a third branch circuit coupled to the load branch circuit and to the control electrode of the semiconductor element for influencing the potential of the control electrode as a function of a voltage applied to the discharge lamp.

### 5,414,328 STAGE LIGHTING CONTROL CONSOLE INCLUDING ASSIGNABLE MACRO FUNCTIONS

Mark A. Hunt, Derby, and Keith J. Owen, Moseley, United Kingdom, assignors to Light & Sound Design, Ltd., Edinburgh, United Kingdom

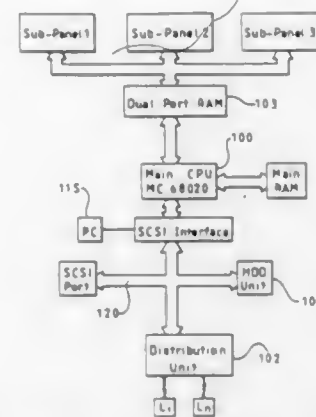
Filed Jun. 18, 1993, Ser. No. 77,862

Claims priority, application United Kingdom, Nov. 19, 1992, 9224287; Apr. 20, 1993, 9308070

Int. Cl.<sup>6</sup> H05B 37/00

U.S. Cl. 315—316

17 Claims



1. A stage lighting control console including a panel, a plurality of control elements mounted on said panel and including manually actuatable switch elements and manually adjustable control elements and an electronic control system controlled by said switch element and manually adjustable control elements for producing output signals for controlling a multiplicity of independently controllable functions of a plurality of remote lamp units, said electronic control system including function allocation means for determining which of the switch elements and manually adjustable control elements exercise control over each one of the functions of the lamp units, said function allocation means being under the control of a user of the console utilizing selected ones of the switch elements.

### 5,414,329 VOLTAGE VARIATION COMPENSATION ARRANGEMENT FOR SAMPLE AND HOLD CAPACITOR

John B. George, Carmel, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Mar. 28, 1994, Ser. No. 219,222

Int. Cl.<sup>6</sup> H01J 29/51

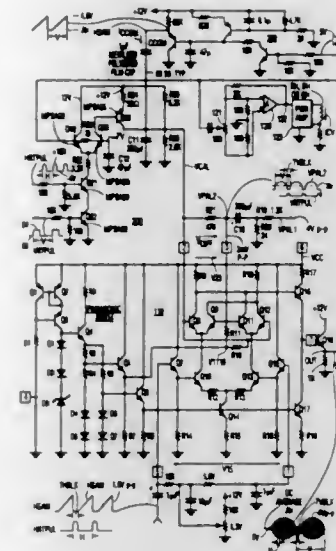
U.S. Cl. 315—368.23

9 Claims

1. A sample and hold arrangement of a video apparatus, comprising:

- a source of a synchronizing signal at a frequency that is related to a deflection frequency;
- a sampling and hold capacitance;
- a source of an input signal;
- switching means responsive to said synchronizing signal and to said input signal and coupled to said capacitance for developing a voltage in said capacitance that is indicative of a magnitude of said input signal during a given sampling interval, and for decoupling said input signal from said capacitance during a hold interval, said capacitance being coupled in a current path that bypasses said switching means;
- a source of a compensating signal at a frequency that is related to a deflection frequency; and
- means coupled to said capacitance and to said source of said

compensating signal for generating a current in said capacitance that prevents a current flowing in said capaci-



tance via said current path from changing a charge stored in said capacitance, during said hold interval.

### 5,414,330 CATHODE RAY TUBE CONTROL APPARATUS

Susumu Tsujihara, Neyagawa; Mitsuo Isobe, Osaka; Hiroyosi Shimosaka, and Hiroshi Taniguchi, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

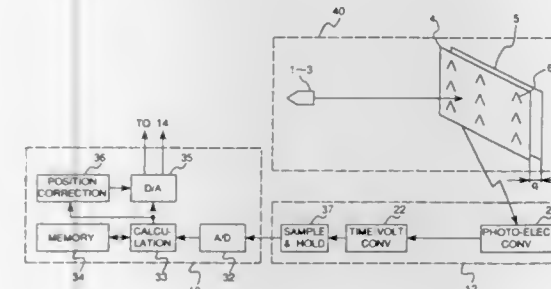
Filed Feb. 22, 1993, Ser. No. 20,567

Claims priority, application Japan, Feb. 20, 1992, 4-033093; Oct. 8, 1992, 4-269858

Int. Cl.<sup>6</sup> G09G 1/04; H01J 31/26, 29/10

U.S. Cl. 315—371

9 Claims



1. A cathode ray tube control apparatus comprising: a phosphor display screen;

first, second and third electron gun means for emitting an electron beam to the phosphor display screen; beam mask means placed between the electron gun means and the phosphor display screen; detection index means having at least two line elements diagonal to a horizontal scanning direction of the electron beam and arrayed at predetermined positions on the surface of the beam mask for generating a signal according to the electron beam scan; detecting means for detecting beam crossing points over said detection index means; correction circuit means for correcting the deflection of the electron beam based on the detected beam crossing points, said correction circuit means comprising an index number detection means for counting a number of detected index means and for generating an error signal when the counted index number is not equal to a predetermined number.

5,414,331

### DRIVE CIRCUIT FOR BRUSHLESS MOTOR

Hirokazu Izawa, Aichi; Jiro Egawa, Yokosuka, and Kenichi Komiya, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

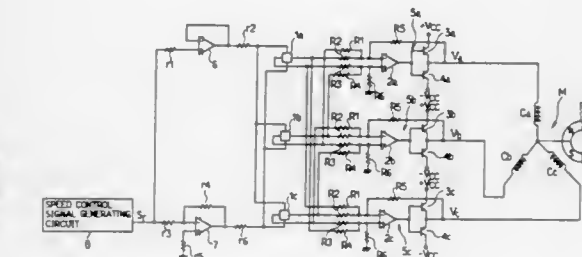
Filed Nov. 5, 1992, Ser. No. 971,953

Claims priority, application Japan, Nov. 6, 1991, 3-289629

Int. Cl.<sup>6</sup> H02K 23/00; H02P 1/18

U.S. Cl. 318—254

1 Claim



1. A drive circuit for a brushless motor having a rotor comprising a permanent magnet and a plurality of stator coils, the drive circuit comprising:

- a) a plurality of magnetic sensors each provided for sensing a rotational position of the rotor of the brushless motor to generate a voltage signal in accordance with a value of a magnetic flux density received from the rotor passing, each magnetic sensor comprising a Hall element having positive and negative input terminals to one of which terminals the current of the positive polarity is supplied, the other of the terminals being supplied with the current of the negative polarity;
- b) power amplifying means for converting the voltage signal from each magnetic sensor to a drive voltage having a predetermined phase and voltage value and supplying the drive voltage obtained to each corresponding stator coil;
- c) speed control signal generating means for generating a speed control signal for control of a rotational speed of the brushless motor; and



d) magnetic sensor control means comprising first and second amplifiers which convert the speed control signal to currents of a positive polarity and a negative polarity respectively, which currents are supplied to the positive and negative input terminals of each Hall element respectively.

5,414,332

Patent Not Issued For This Number

5,414,333

# SPEED CONTROL APPARATUS FOR ELEVATORS USING VARIABLE VOLTAGE AND VARIABLE FREQUENCY CONTROL

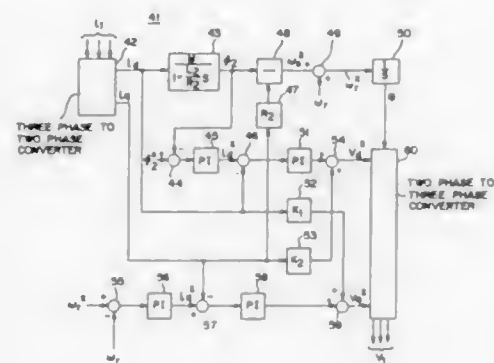
Toru Tanahashi, Gifu, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 666,220, Mar. 7, 1991, abandoned. This application Sep. 12, 1994, Ser. No. 304,208

Claims priority, application Japan, Mar. 8, 1990, 2-55087  
Int. Cl.<sup>6</sup> H02F 7/00

U.S. Cl. 318—268

6 Claims



1. A control apparatus for an elevator comprising:
  - (a) a conversion device for converting alternating current to direct current;
  - (b) an AC power source which communicates with said conversion device via a contactor and supplies an alternating current to said conversion device;
  - (c) an elevator driving motor driven by an output of said conversion device;
  - (d) a three-phase to two-phase converter connected to said conversion device, said three-phase to two-phase converter generating first and second current components  $i_d$  and  $i_q$ ;
  - (e) a first arithmetical means for calculating a secondary magnetic flux  $\Phi_2$  of said motor based on the first current component  $i_d$  when the contactor is opened and for outputting the value of the secondary magnetic flux  $\Phi_2$  as an initial-value of the secondary magnetic flux when the contactor is closed;
  - (f) a second arithmetical means for generating a first current component command value  $i_d^*$  based on the initial-value of the secondary magnetic flux;

- (g) a first subtracter for calculating a difference between the first current component command value  $i_d^*$  and the first current component  $i_d$ ;
- (h) a first coefficient unit for multiplying the second current component  $i_q$  by a constant  $K_2$  to produce a first interaction voltage;
- (i) a third arithmetical means for producing a first output voltage component command value  $V_d^*$  that is in phase with the first current component  $i_d$  responsive to the first current component command value  $i_d^*$  based on the difference calculated by said first subtracter and the first interaction voltage;
- (j) a fourth arithmetical means for calculating a second current component command value  $i_q^*$ ;
- (k) a second subtracter for calculating a difference between the second current component command value  $i_q^*$  and the second current component  $i_q$ ;
- (l) a second coefficient unit for multiplying the first current component  $i_d$  by a constant  $K_1$  to produce a second interaction voltage;
- (m) a fifth arithmetical means for producing a second output voltage component command value  $V_q^*$  that is in phase with the second current component  $i_q$  responsive to the second current component command value  $i_q^*$  based on the difference calculated by said second subtracter and the second interaction voltage;
- (n) a two-phase to three-phase converter for converting the first and second output voltage component command values  $V_d^*$  and  $V_q^*$  into a three-phase voltage; and
- (o) a control device responsive to the three-phase voltage output of said two-phase to three-phase converter and thereby controlling the speed of the elevator.

5,414,334

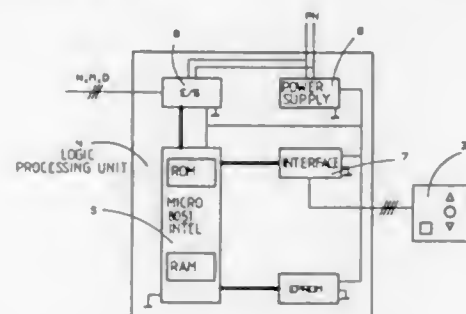
# CONTROL DEVICE FOR AN ASYNCHRONOUS ROLLER-BLIND MOTOR

Eric Cheron, Bonneville, France, assignor to Somfy, Cluses, France

Continuation-in-part of Ser. No. 804,120, Dec. 6, 1991, abandoned. This application Aug. 10, 1993, Ser. No. 104,774  
Claims priority, application France, Dec. 28, 1990, 90 16462  
Int. Cl.<sup>6</sup> H02P 19/00

U.S. Cl. 318—284

4 Claims



1. A control device for an asynchronous motor having two directions of rotation used for driving roller blinds, rolling shutters and doors, comprising a control panel (3) equipped with a manually operated raising contact (M), a lowering contact (D), a stop contact (S) and a reverse installation means.
  - a two directional motor (1),
  - a control box and a power supply unit containing a logic processing unit, switch means connected to said power supply and said motor,

said logic processing unit having memory means which memorizes the direction of rotation of said motor, said logic processing unit connected to said control panel raising contact, said power supply and said switch means wherein when said raising contact is activated, said power supply and switch means are activated to turn the motor in a first direction whether or not the motor is stopped or moving in a second direction, said logic processing unit connected to said control panel lowering contact, said power supply and said switch means wherein when said lowering contact is activated, said power supply and switch means are activated to turn the motor in said second direction whether or not the motor is stopped or moving in said first direction, said logic processing unit connected to said control panel stop contact, said power supply and said switch means wherein when said reverse installation means is activated a reverse order is identified by the logic processing unit and memorized; wherein a subsequent activation of the raising contact will cause the motor to turn in said second direction, until another activation of said reverse activation means, whether or not the motor is stopped or moving in said first direction and; wherein a subsequent activation of the lowering contact will cause the motor to turn in said first direction whether or not the motor is stopped or moving in said second direction until another activation of said reverse activation means.

5,414,335

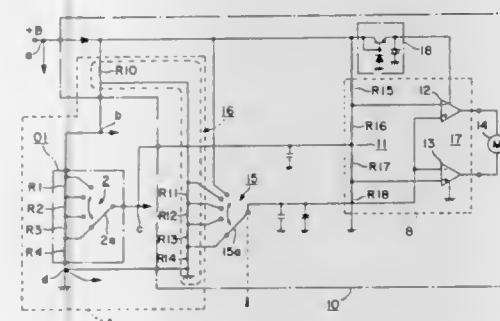
# DEVICE FOR CONTROLLING THE ANGLE OF THE OPTICAL AXIS OF A HEADLAMP LIGHT

Yoshihiro Sato, Tokyo, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 8, 1993, Ser. No. 44,981  
Int. Cl.<sup>6</sup> B60Q 1/076

U.S. Cl. 318—466

1 Claim



1. A device for controlling an angle of an optical axis of at least two headlamp lights comprising:
  - an operation switch which includes a first variable resistance means for setting a control voltage;
  - an optical axis angle controller for each of said at least two headlamp lights, each of said optical axis angle controllers comprising:
    - a motor which variably controls an angle of an optical axis of a headlamp based on said control voltage set by said operation switch;
    - an optical axis angle voltage generating means which includes a second variable resistance means and generates a voltage that corresponds to an angle of said optical axis of said headlamp which is variably controlled by said motor, said second variable resistance means of each of said optical axis angle controllers being equal in resistance and said second variable resistance means of each of said optical axis angle controllers and said first variable resistance means being connected in parallel; and
    - a comparative control means which compares an optical axis angle voltage generated by said optical axis angle

5,414,336

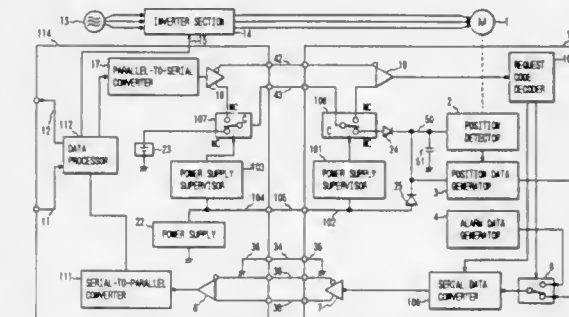
# SERVO CONTROL APPARATUS WITH BACK-UP POWER SUPPLY

Seisuke Tsutsumi, Yasushi Ikawa, and Akira Shima, all of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

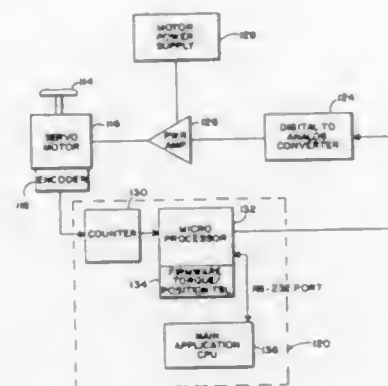
Filed Oct. 26, 1993, Ser. No. 141,053  
Claims priority, application Japan, Oct. 27, 1992, 4-288702  
Int. Cl.<sup>6</sup> G05B 11/01

U.S. Cl. 318—560

9 Claims



- a servo motor having said actuable member attached thereto;
- a position encoder in communication with said servo motor, said encoder having an index representing a reference position of said servo motor and said encoder providing position information of said servo motor relative to said reference position;
- a controller receiving said position information from said encoder;



- a store of force-position relation information accessible to said controller, said controller outputting at least one force value corresponding to said position information in accordance with said store of force-position relation information; and
- a drive signal source generating a drive signal to said servo motor in accordance with said at least one force value, said drive signal causing a force in said servo motor, said force providing said tactile feedback to said actuable member.

5,414,338

# METHOD AND APPARATUS FOR SUPPRESSING ELECTRICAL IMPULSE NOISE CREATED BY DC MOTORS

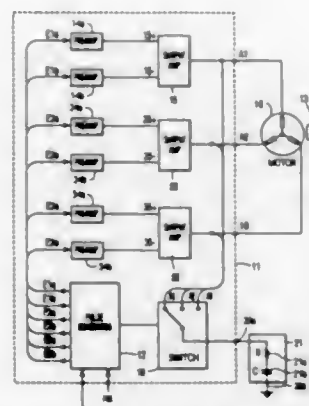
Günter Gleim, Villingen, Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Germany  
Filed Aug. 6, 1993, Ser. No. 102,879

Claims priority, application Germany, Mar. 8, 1991, 41 07 373.8

Int. Cl.<sup>6</sup> G05B 11/14

U.S. Cl. 318—562

9 Claims



1. Apparatus for driving a motor having a plurality of windings, which windings are respectively energized with a plurality of similar drive signals each having a different phase, said apparatus comprising:
- a drive signal generator having a plurality of output terminals for providing said plurality of drive signals;
- a plurality of amplifier circuits coupled to each of said drive

signals respectively, said amplifier circuits providing motor drive signals at respective amplifier output terminals for application to each of said plurality of windings; interference suppression means for extending signal transitions; and

switching means for switching said interference suppression means between respective amplifiers to reduce interference produced by said motor drive signals.

5,414,339

# ELECTRIC VEHICLE CONTROL SYSTEM

Ryoso Masaki, 21-23, Ogitsu-cho 1-chome, Hitachi-shi, Ibaraki 319-14; Nobuyoshi Mutoh, 27-20, Nishi-ohshima 1-chome, Katsuta-shi, Ibaraki 312; Tsutomu Ohmae, 21-2, Motomiya-cho 4-chome, Hitachi-shi, Ibaraki 317, and Toshiaki Okuyama, 1443-8, Suwama, Tokai-mura, Naka-gun, Ibaraki 319-11, all of Japan

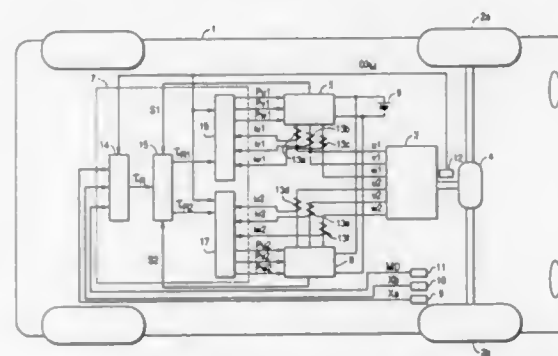
Filed Sep. 17, 1993, Ser. No. 122,295

Claims priority, application Japan, Sep. 17, 1992, 4-247582

Int. Cl.<sup>6</sup> H02P 7/00

U.S. Cl. 318—800

34 Claims



1. Control system for controlling an electric vehicle powered by an electric motor, said control system comprising:
- at least two power converters coupled to supply electric power to said electric motor;
- a control unit for controlling each of said at least two power converters to cooperate to supply an electric current to said electric motor, having a magnitude which achieves a desired torque output of said motor according to a torque command value; and
- means for detecting a failure of any of said at least two power converters and for providing converter failure signals indicative thereof;
- said control unit including means for disabling any of said at least two power converters in response to said converter failure signals indicative of failure thereof, and for adjusting power output of at least one remaining power converter other than a disabled power converter in response to said converter signals.

5,414,340

# FEEDBACK CIRCUIT FOR HIGH EFFICIENCY LINEAR DC POWER SUPPLY

Henry M. Gannon, 2026 10th St., Boulder, Colo. 80302

Filed Feb. 22, 1994, Ser. No. 199,109

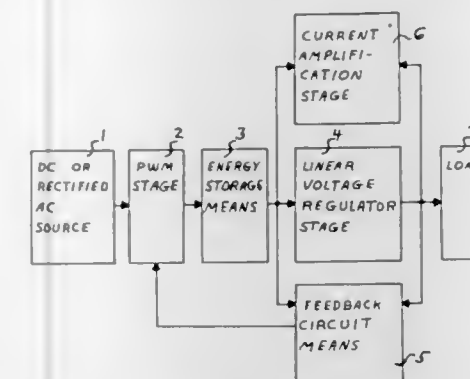
Int. Cl.<sup>6</sup> G05F 1/44

U.S. Cl. 323—266

4 Claims

1. A high efficiency linear DC power supply comprising:
- a source of DC input voltage;
- a pulse width modulator coupled to said source of DC input voltage for transforming said DC input voltage to a lower DC operating voltage;
- energy storage means coupled to said pulse width modulator for filtering and storing said DC operating voltage;
- a linear voltage regulator coupled to said energy storage

means for receiving said DC operating voltage and for providing a regulated DC output voltage to a load; and feedback circuit means shunted directly across said linear voltage regulator and having an output coupled to said



pulse width modulator, said feedback circuit means being operative for controlling said pulse width modulator to maintain a desired fixed voltage across said linear voltage regulator.

5,414,341

# DC-DC CONVERTER OPERABLE IN AN ASYNCHRONOUS OR SYNCHRONOUS OR LINEAR MODE

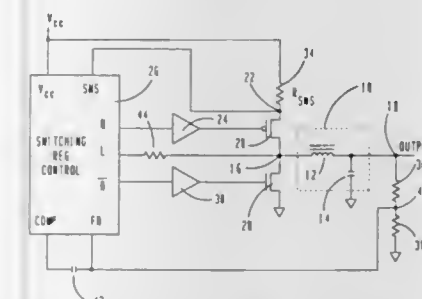
Alan E. Brown, Austin, Tex., assignor to Benchmark Microelectronics, Inc., Carrollton, Tex.

Filed Dec. 7, 1993, Ser. No. 163,477

Int. Cl.<sup>6</sup> G05F 1/44

U.S. Cl. 323—268

10 Claims



1. An adaptive DC-DC converter, comprising:
- an output reactive circuit having an input connected to an input node and an output, with a series inductor disposed between said input and output and a capacitor disposed between said output and ground to provide on the output thereof a regulated voltage;
- a first switch connected between a positive supply and said input node;
- a second switch connected between said input node and ground;
- a first diode disposed between said input node and ground with the anode thereof connected to ground and the cathode thereof connected to said input node;
- a regulation control circuit for operating in a synchronous mode and in an asynchronous mode, said control circuit operable in said synchronous mode to drive both said first and second switches in accordance with a synchronous mode of regulation wherein said first and second switches are switched at a synchronous rate with said first and second switches operated in a complement manner, and in said asynchronous mode to drive only said first switch at an asynchronous rate in accordance with an asynchronous mode of regulation with said second switch disposed in a non-conductive state; and
- a monitoring circuit for monitoring the efficiency of regula-

tion provided by said regulation control circuit in the associated modes of operation and determine which of said modes of operation of said regulation control circuit are most efficient in accordance with predetermined efficiency parameters, said monitoring circuit operable to switch to the most efficient mode of operation.

5,414,342

# VOLTAGE MODE PULSE WIDTH MODULATION CONTROLLER

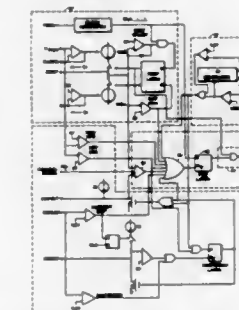
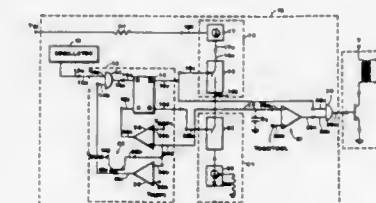
Robert A. Mammano, Costa Mesa, Calif., and Larry Wofford, Cary, N.C., assignors to Unitrode Corporation, Billerica, Mass.

Filed Apr. 29, 1993, Ser. No. 54,843

Int. Cl.<sup>6</sup> G05F 1/44

U.S. Cl. 323—288

13 Claims



8. A feedforward circuit comprising:
- a current source having an input terminal and an output terminal, said current source for providing a predetermined amount of current in response to a predetermined input voltage level provided to the input terminal;
- a first switching device having an input terminal, an output terminal and a control terminal wherein the input terminal of said switching device is coupled to the output terminal of said current source;
- an integration circuit having a first terminal coupled to the output terminal of said first switching device at a feedforward node;
- a second switching device having an input terminal, an output terminal and a control terminal wherein the input terminal of said second switching device is coupled to the first terminal of said integration circuit for providing a discharge signal path to said integration circuit;
- a current sink coupled to the output terminal of said second switching device;
- a gating circuit having an input port coupled to the feedforward node and having a pair of output ports, each of said gating circuit output ports coupled to a corresponding one of the control terminals of said first and second switching devices, said gating circuit for providing control signals to each of said first and second switching devices to alternately charge and discharge said integration circuit in response to a voltage level at the feedforward node.



5,414,343

## PERMANENTLY INSTALLED CABLE SYSTEM WITH INTEGRATED MULTI-CABLE TESTER

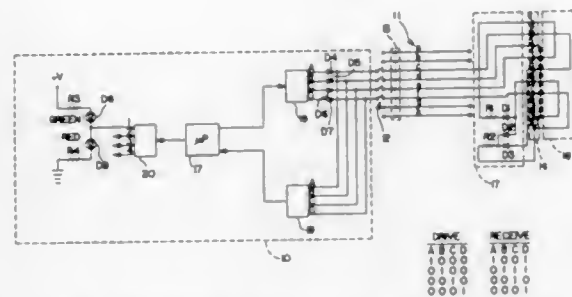
Samuel J. Flaherty, 605 Oak St., Telford, Pa. 18969, and James P. Ashbaugh, Harleysville, Pa., assignors to Samuel J. Flaherty, Telford, Pa.

Filed Jul. 28, 1992, Ser. No. 922,025

Int. Cl.<sup>6</sup> G01R 31/02

U.S. Cl. 324—66

20 Claims



1. A test apparatus for identifying cabling problems in a system interconnected by a plurality of multiconductor cables providing cabling in a radiating configuration between a main operating unit and a plurality of terminal devices, each coupled separately through respective ones of the cables, the system having at least one port at a terminal connection remote from the main operating unit for each said terminal device in said radiating configuration, the port having a plurality of contacts, the test apparatus comprising:

central control means, coupleable to the cables for each of the terminal devices, the central control means being operable to generate a test signal on certain conductors of the cables coupled to the contacts to selectively test the respective ones of the cables coupling to each said port, and the central control means also including means coupled to the conductors of said port for receiving a response signal from the conductors;

permanently installed shunting means for electrically connecting selected pairs of the plurality of contacts of each said port, said shunting means being engaged with the contacts when the terminal device is not coupled to the port and automatically displaced to disengage from the contacts when the terminal device is coupled to said port, the shunting means establishing characteristic current paths among the contacts such that the test signal output by the central control means produces an expected pattern in the response signal received at the central control means, determined by said shunting means, provided the cabling is free of faults including at least one of short circuits, open circuits and grounded conductors, and an unexpected pattern in the event of such faults, whereby a cabling fault applicable to said port can be determined; and,

means coupled to the central control means for indicating a fault when the response signal is not in the expected pattern.

5,414,344

## NON-CONTACT APPARATUS FOR SENSING ENERGIZATION OF HIGH VOLTAGE SIGNAL LINE

Robert S. Chinn, 119 - 10th Ave. S., No. 507, Seattle, Wash. 98104

Filed Aug. 3, 1993, Ser. No. 101,374

Int. Cl.<sup>6</sup> G01R 31/02; H02H 3/00

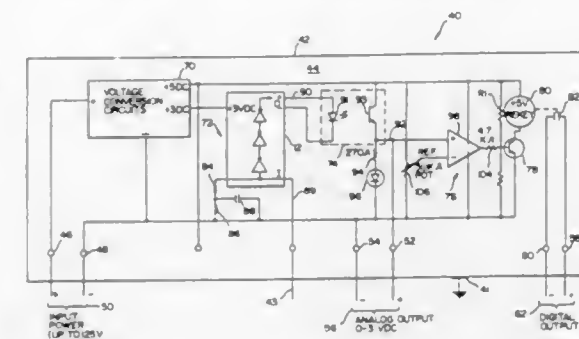
U.S. Cl. 324—72

8 Claims

1. A non-contact apparatus for sensing activity of a high voltage signal line, comprising:  
a grounded housing for shielding internal circuitry from an E-field of the high voltage signal line;  
a conductive wire protruding from the housing for sensing

the E-field, an input signal induced upon the conductive wire from the E-field;

means for amplifying the input signal to be within a given voltage range to generate an amplified signal;



means for comparing the amplified signal to a reference signal to generate a control signal.

5,414,345

## APPARATUS AND METHOD FOR LOW COST ELECTROMAGNETIC FIELD SUSCEPTIBILITY TESTING

Wesley A. Rogers, Grosse Pointe Park, Mich., assignor to Electronic Development, Inc., Grosse Pointe Park, Mich.

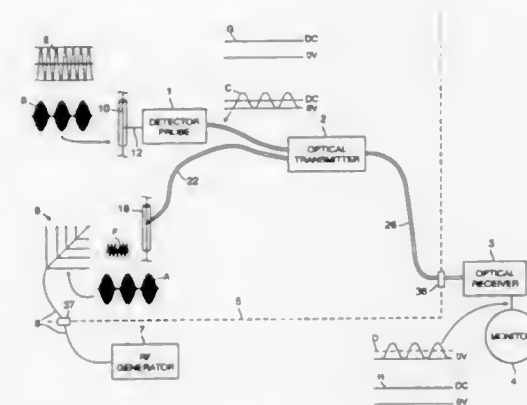
Continuation-in-part of Ser. No. 692,719, Apr. 29, 1991,

abandoned. This application Apr. 7, 1993, Ser. No. 44,219

Int. Cl.<sup>6</sup> G01R 31/00

U.S. Cl. 324—72.5

22 Claims



1. Apparatus for testing the susceptibility of a system to electromagnetic fields in the form of a controlled signal, comprising:

a detector diode having first and second terminals, the first of said terminals for connection to a wire of said system, to thereby detect the level of signal in said system at said connection;

a first electrically overdamped conductor, substantially transparent to electromagnetic fields, connected to said second terminal, for transmitting the signal level detected by said detector diode;

a second electrically overdamped conductor, substantially transparent to electromagnetic fields, connected to a ground of said system, for transmitting a ground return signal; and

a monitor operatively connected to said first and second overdamped conductors for receiving said signal level detected by said detector diode and said ground return signal;

wherein said apparatus is substantially electrically transpar-

ent and does not inject electromagnetic signals into said system being tested.

5,414,346

## ADJUSTABLE PIERCING PROBE TIP

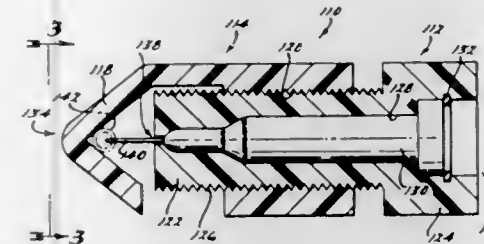
Philip V. Mohan, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 24, 1993, Ser. No. 158,133

Int. Cl.<sup>6</sup> G01R 31/02

U.S. Cl. 324—72.5

10 Claims



1. An adjustable safety grip having a front end and a rear end, said grip for gripping wires of a variety of diameters for a test probe, said grip comprising:

a female part having a ring portion, the ring portion including a threaded bore extending from a front bore end to a rear bore end, the female part having a hook portion hooking over the front end of the said bore; and a male part,

means for moving said male part closer to said female part wherein said male part includes a threaded cylindrical outer surface screwably received by said threaded bore to adjustably couple said male part and said female part, said male part extending from a front screw end to a rear screw end, said front screw end opposing said hook, so that when said male part is pivoted and a wire is located between said hook and said front screw end, said wire is securely trapped between said hook and said front screw end,

wherein said male part includes an inner bore and a probe cap residing within said inner bore wherein said probe cap includes a needle extending therefrom and through an opening in said male part,

wherein said needle is hollow to receive a probe tip therein.

5,414,347

## METHOD AND APPARATUS FOR MISSILE INTERFACE TESTING

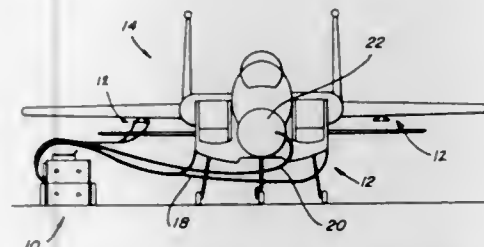
Ronald W. Monk; David P. Van Cleve; Joseph A. Crisafulli; Robert J. Curry; Dennis G. Carpenter; Gerald T. Emmert; David L. Fowler, and David A. Milani, all of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 912,442, Jul. 13, 1992, abandoned. This application Jul. 8, 1994, Ser. No. 272,441

Int. Cl.<sup>6</sup> G01R 1/04

U.S. Cl. 324—73.1

12 Claims



1. An apparatus for testing an aircraft launcher system of the type including a plurality of missile stations and a radar trap for receiving a radio frequency signal, the apparatus comprising:  
a portable control unit having an overall size capable of

being transported to an aircraft, the control unit including a plurality of data ports;

a plurality of missile umbilical cables, each of the plurality of missile umbilical cables including a first end having a first electrical connector adapted to electrically attach to one of the data ports and a second end having a second electrical connector adapted to electrically attach to one of the plurality of missile stations;

processing means mounted in the control unit for receiving and processing data from the plurality of missile stations including a first signal generated by the aircraft;

simulation means mounted in the control unit for simulating signals that ordinarily would be provided if actual missiles were present at the missile stations in response to the first signal generated by the aircraft;

a radar umbilical cable including a first end having a first electrical connector adapted to electrically attach to one of the data ports and a second end having a second electrical connector adapted to electrically attach to the radar trap; and

means for receiving a post-launch information signal from the radar trap, the means for receiving being mounted in the control unit and coupled to one of the data ports.

5,414,348

## MEASUREMENT DEVICE WITH COMMON MODE CURRENT CANCELLATION

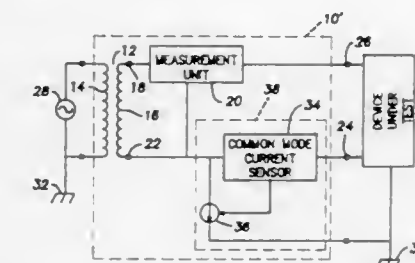
James A. Niemann, 169 Pinehurst Rd., Monroe Falls, Ohio 44262

Filed Feb. 26, 1993, Ser. No. 23,600

Int. Cl.<sup>6</sup> G01R 1/20; H04B 3/28

U.S. Cl. 324—127

2 Claims



1. A method for cancelling common mode current in an electrical measurement device having a low test terminal and a high test terminal, said method comprising:

providing an isolation transformer having a primary winding connected to a line supply and a secondary winding having a low terminal;

providing a measurement means powered from said secondary winding, said measurement means measuring between said high test terminal and said low terminal;

connecting a device under test between said test terminals; connecting a current sensor in series between said low terminal and said low test terminal and sensing a current between said low terminal and an earth ground; and

connecting a current source in parallel with said low test terminal and said earth ground, said current source providing a current to said device under test that cancels said sensed current.

5,414,349

## ELECTRONIC WATTHOUR METER

Shunichi Kobayashi, Kanagawaken, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 20, 1992, Ser. No. 979,214

Claims priority, application Japan, Nov. 21, 1991, 3-305787

Int. Cl.<sup>6</sup> G01R 1/04

U.S. Cl. 324—142

3 Claims

1. An electronic watt-hour meter comprising:  
a first Hall-effect element supplied with a current propor-





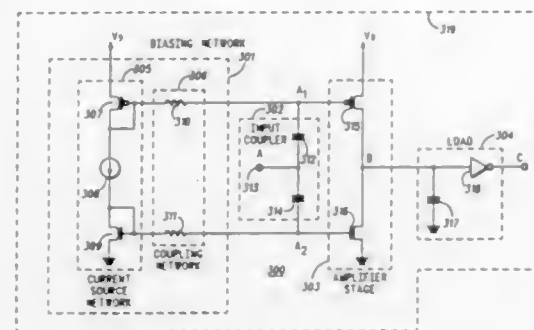
5,414,354

**APPARATUS AND METHOD FOR GENERATING A SUBSTANTIALLY RECTANGULAR OUTPUT SIGNAL**  
Michael L. Bushman, Hanover Park, and Kenneth C. Fuchs, Winfield, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 9, 1993, Ser. No. 103,843  
Int. Cl.<sup>6</sup> H03K 12/00

U.S. Cl. 327—184

16 Claims



1. A squaring amplifier circuit comprising:
  - a biasing network including:
    - a common current source;
    - a coupling network operably coupled to the common current source to provide a first bias voltage and a second bias voltage;
  - an amplifier stage having a first transistor and a second transistor, with the first bias voltage coupled to the first transistor and the second bias voltage coupled to the second transistor to provide push-pull operation;
  - an input signal coupling network, including a first coupling component and a second coupling component, that a.c. couples an a.c. input signal to the first transistor and the second transistor, respectively;
  - a load coupled to the amplifier stage having an electrical reactance to provide a substantially rectangular output signal retaining input signal duty cycle of the a.c. input signal.

5,414,355

**MAGNET CARRIER DISPOSED WITHIN AN OUTER HOUSING**

Robert M. Davidson, Freeport; William E. Eaton, Stockton; Gregory R. Furlong, Freeport; Scott E. Michelhaugh, Cedarville; James W. Rowley, German Valley; Gordon F. Ross; Danny R. Schoening, both of Freeport; Daryl L. Tessmann, Ridott, and David W. Ulz, Freeport, all of Ill., assignors to Honeywell Inc., Minneapolis, Minn.

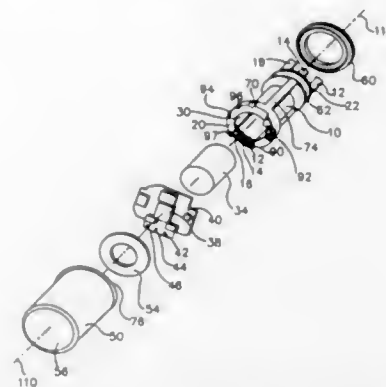
Filed Mar. 3, 1994, Ser. No. 205,668  
Int. Cl.<sup>6</sup> G01B 7/30; G01P 3/488; H05K 5/00

U.S. Cl. 324—207.2

13 Claims

1. A magnetic sensor, comprising:
  - a carrier having a front end, a back end and an opening formed within said carrier, said opening extending into said carrier from said front end;
  - a plurality of electrical conductors, said plurality of electrical conductors being molded within the body of said carrier and extending from said front end of said carrier to said back end of said carrier, each of said plurality of electrical conductors being bent at two places to dispose its ends in parallel and nonaligned relationship with each other;
  - a permanent magnet disposed within said opening formed within said carrier;
  - a magnetically sensitive component disposed at said front end of said carrier within a magnetic field of said permanent magnet, said magnetically sensitive component being connected in electrical communication with at least one of said plurality of electrical conductors;

a housing having an internal cavity, said housing being shaped to receive said carrier within said internal cavity; sealing means, disposed between said carrier and said housing, for preventing contaminants from entering said cavity of said housing in the vicinity of said magnetically sensitive component;



spacer means, disposed within said cavity of said housing, for preventing electrical communication between said magnetically sensitive component and said housing; and a substrate disposed in contact with said front end of said carrier, said magnetically sensitive component being attached to said substrate.

5,414,356

**FLUXMETER INCLUDING SQUID AND PICKUP COIL WITH FLUX GUIDING CORE AND METHOD FOR SENSING DEGREE OF DETERIORATION OF AN OBJECT**

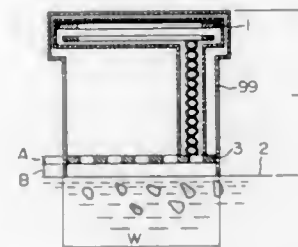
Toshihiko Yoshimura, Ibaraki; Tasuku Shimizu, Hitachi; Yulchi Ishikawa, Mito; Masahiro Otake, Hitachi, all of Japan; Yuko Koguchi, Solwez, Zambia; Kunio Enomoto, Ibaraki, Japan; Kunio Hasegawa, Katsuta, Japan; Makoto Hayashi, and Kazuo Takaku, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 333,276, Apr. 5, 1989, abandoned, and a continuation-in-part of Ser. No. 247,414, Sep. 21, 1988, Pat. No. 5,059,903. This application Jul. 30, 1991, Ser. No. 738,240

Claims priority, application Japan, Sep. 21, 1987, 62-234828; Nov. 4, 1987, 62-277445; Dec. 4, 1987, 62-305656; Apr. 6, 1988, 63-82966

Int. Cl.<sup>6</sup> G01R 33/12, 33/035; G01N 27/72; H01F 17/04  
U.S. Cl. 324—239

38 Claims



1. A fluxmeter comprising:
  - means for applying a magnetic field to an element of a plant;
  - a superconducting quantum interference element for measuring a change in at least one magnetic characteristic selected from a group of magnetic characteristics of said element of a plant, said group of magnetic characteristics includes a residual flux density, a coercive force, a magnetic hysteresis loop area and a magnetic hysteresis figure; and
  - a flux transmitting circuit including:

5,414,358

**METHOD OF IMPROVING FAT SATURATION DURING MRI**

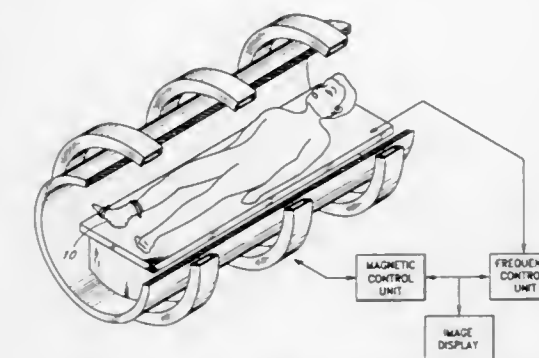
Steven S. Eilenberg, Solana Beach; Jack DeFranco; Mark Walters, both of San Diego, and W. Dean Kirkland, El Cajon, all of Calif., assignors to Alliance Pharmaceutical Corp., San Diego, Calif.

Continuation-in-part of Ser. No. 928,953, Aug. 11, 1992, Pat. No. 5,339,033. This application Aug. 5, 1993, Ser. No. 102,580. The portion of the term of this patent subsequent to Aug. 16, 2011, has been disclaimed.

Int. Cl.<sup>6</sup> G01N 3/00

U.S. Cl. 324—309

34 Claims



1. A method of improving fat saturation during magnetic resonance imaging, comprising:
  - placing nonaqueous solid or liquid fat saturation enhancing material in a container that is placed against a portion of tissue to be imaged with a magnetic resonance imaging system;
  - imaging said tissue with a magnetic resonance imaging system.

5,414,359

**MAGNETIC RESONANCE IMAGING METHOD AND DEVICE FOR REDUCING IMAGE ERRORS IN A MAGNETIC RESONANCE IMAGE**

Antoon F. Mehlkopf, and Johannes H. Den Boef, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

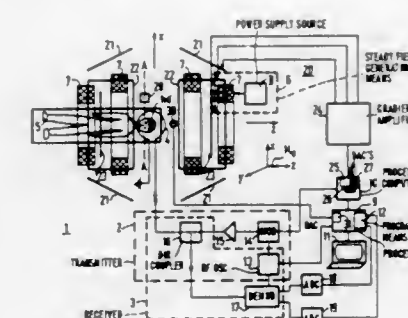
Continuation of Ser. No. 823,918, Jan. 22, 1992, abandoned. This application May 31, 1994, Ser. No. 252,133

Claims priority, application Netherlands, Jan. 28, 1991, 9100138

Int. Cl.<sup>6</sup> G01V 3/00

U.S. Cl. 324—309

8 Claims



1. A nuclear magnetic resonance magnetometer probe comprising:
  - a single bottle containing a single radical solution having at least one electronic resonance at a predetermined frequency;
  - a single radio frequency resonator formed around the bottle, the resonator having a resonance frequency tuned to the predetermined electronic resonance frequency;
  - a single radio frequency generator connected to said resonator and exciting the resonator at the predetermined electronic resonance frequency;
  - first and second windings surrounding the bottle and the resonator, said first and second windings being identical in shape and positioned facing one another, and being electrically connected in series to simultaneously excite the single radical solution; and
  - a differential amplifier having two direct and reverse inputs respectively connected to the first and second windings.

mined from magnetic resonance signals which are generated in an object under examination by means of successive measuring sequences, which object is situated in a uniform, steady magnetic field, said method comprising:

- applying the successive measuring sequences, each of said measuring sequences including a phase encoding gradient whose area over time is varied by phase encoding steps from one measuring sequence to another in response to the input phase encoding profiles;
- prior to or during application of the measuring sequences, determining deviations of actual phase encoding gradient areas produced in gradient coil control signals relative to integrals over time of the phase encoding profiles; and
- obtaining a k-space data matrix from the magnetic resonance signals which k-space data matrix contains k-space data that has been corrected on the basis of said deviations.

5,414,360

## GRADIENT COILS FOR THERAPY TOMOGRAPHIS

Michael Westphal, Offenbach, and Günther Laukien, Rheinstetten, both of Germany, assignors to Bruker Analytische Messtechnik GmbH, Germany

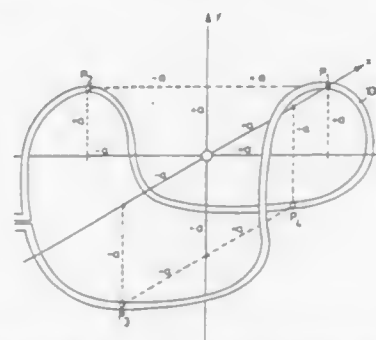
Filed Sep. 8, 1993, Ser. No. 118,005

Claims priority, application Germany, Sep. 9, 1992, 42 30 145.9

Int. Cl.<sup>6</sup> G01V 3/00

U.S. Cl. 324—318

29 Claims



1. A nuclear spin resonance (NMR) measuring device comprising:

- a main field magnet, having a main field coil with a gap g, the main field magnet, in a measuring volume having a center coinciding with a coordinate origin of a Cartesian x, y, z coordinate system, producing a homogeneous static magnetic field  $B_0$  in the direction of the z-axis of the coordinate system, and with a tesseral gradient coil system for the production, in a direction perpendicular to the z-axis within the measuring volume, of largely linear magnetic gradient fields, the gradient coil system comprising at least four largely identical saddle-like partial coils, having windings, which are arranged symmetrically, with radial and axial separations, from the coordinate origin, the partial coils each exhibiting a radially inner and a radially outer electrically conducting partial coil segment which extend in an azimuthal direction about the z-axis, the inner segment having a radial separation  $r_1$  and the outer segment having a radial separation  $r_2 > r_1$  from the z-axis, wherein each partial coil exhibits a plurality of windings, and both partial coil segments exhibit an axial separation from each other with the partial coil outer segment being axially closer to the coordinate origin than the partial coil inner segment and both partial coil segments being connected to each other via conducting sections and being located on a common surface  $r(z)$ , the surface having one of a rotational and an ellipsoidal symmetry.

5,414,361  
METHOD OF MEASURING VERY SMALL QUANTITY OF IMPURITY IN GAS

Tadahiro Ohmi, 2-1-17-301, Komegafukuro, Aoba-ku, Sendai-city, Miyagi-prefecture; Yoshio Ishihara, Tsuchiura, and Ryosuke Fukushima, Kyoto, all of Japan, assignors to Horiba, Ltd., Kyoto; Nippon Sanso Corporation, Tokyo and Tadahiro Ohmi, Miyagi, all of Japan

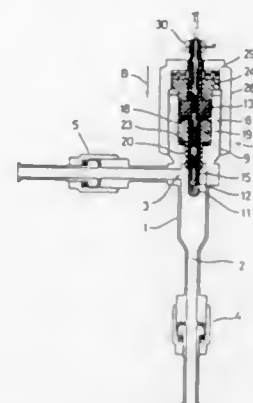
Filed Jun. 5, 1992, Ser. No. 893,722

Claims priority, application Japan, Jun. 6, 1991, 3-163661

Int. Cl.<sup>6</sup> G01N 27/42, 35/08

U.S. Cl. 324—439

6 Claims



1. A method of measuring a very low level of impurities in a substance that is normally gaseous at room temperature and pressure and is used in the manufacture of semiconductor chips (LSI) after being tested, comprising the steps of:

- providing a gas sample comprising a substance that is a gas at room temperature and atmospheric pressure;
- providing a test cell having two electrodes for receiving the gas sample;
- liquefying the gas sample by cooling below room temperature or pressurizing above atmospheric pressure;
- introducing the liquefied gas sample into the test cell;
- measuring the temperature of the liquefied gas sample;
- applying an alternating voltage to a first test cell electrode through a fixed resistance and at a predetermined frequency;
- connecting a second test cell electrode to ground;
- receiving, from the first electrode, an alternating output signal representative of the electrical conductivity;
- sampling the alternating output signal to provide a square wave of lesser width, thereby avoiding a leading edge of the output signal;
- determining the level of impurities in the liquefied gas sample by reference to the conductivity at a given temperature.

5,414,362

DEVICE FOR VERIFYING THE WIRING OF AN ELECTRICAL RECEPTACLE FOR A TOWED VEHICLE

Don Gramling, 3306 Hwy. 135 N., and L. T. Botkins, 2910 Oak Dr., both of Paragould, Ark. 72450

Filed Jan. 18, 1994, Ser. No. 181,817

Int. Cl.<sup>6</sup> G01R 31/02

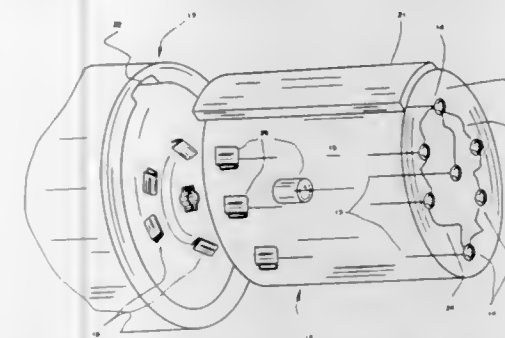
U.S. Cl. 324—503

3 Claims

1. A device for testing a multi-terminal electrical service receptacle on a towing vehicle, said device comprising:

- a) an electrically insulative body of elongated circular cylindrical shape having a rearward face extremity, and a substantially flat forward face extremity orthogonally disposed to the axis of elongation of said insulative body and having an upraised tab configured to mate with said service receptacle to ensure accurate interengagement of said device with said receptacle,

- b) a series of electrical contacts disposed in slots recessed in said forward face extremity and spaced apart and configured to engage the corresponding terminals of said receptacle, one of said contacts being a ground contact,
- c) a series of light-emitting members disposed in said rearward face extremity corresponding to the electrical contacts in said forward face extremity, said light-emitting members having negative terminals, all of which are connected by a ground wire that joins said ground contact, and
- d) electrical conductors disposed within said insulative body in communication between each electrical contact on said forward face extremity and corresponding light-emitting member in said rearward face extremity, thereby forming electrical circuits when including electrical features of said towing vehicle.



- connected by a ground wire that joins said ground contact, and
- d) electrical conductors disposed within said insulative body in communication between each electrical contact on said forward face extremity and corresponding light-emitting member in said rearward face extremity, thereby forming electrical circuits when including electrical features of said towing vehicle.

5,414,363

METHOD FOR THE ELECTRICAL TESTING OF EQUIPOTENTIAL LINES

Gilles Charmoille, Guyancourt, and Didier Desprin, Chatillon, both of France, assignors to Thomson-CSF, Paris, France

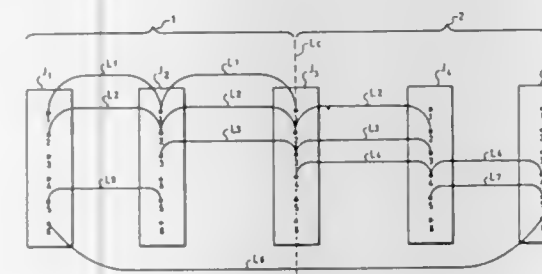
Filed Mar. 2, 1994, Ser. No. 206,095

Claims priority, application France, Mar. 12, 1993, 93 02866

Int. Cl.<sup>6</sup> G01R 31/00

U.S. Cl. 324—537

7 Claims



1. A method for electrical testing of equipotential lines, each line containing at least two testing points, at least one cut-off line separating the testing points, the testing points of a first side of the cut-off line being grouped together in a first set, and the testing points of the other side being grouped together in a second set, the testing points of the cut-off line belonging to both sets, some of said equipotential lines having their test points entirely in one set, and others of said equipotential lines having their test points in both sets, the electrical testing being carried out, in a first step, between the testing points of the first set and, in a second step, between the testing points of the second set, a testing point of the first side that is connected directly by an equipotential line to a testing point of the second side is grouped with the points of the second set, while at the same time, remaining in the first set, to ensure the continuity of

the electrical testing between the testing points of the first set and the testing points of the second set.

5,414,364

APPARATUS AND METHOD FOR MEASURING PROGRAMMED ANTIFUSE RESISTANCE

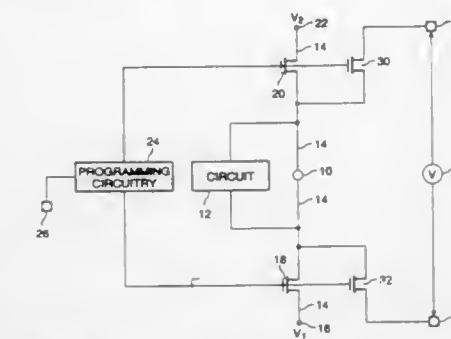
John L. McCollum, Saratoga, Calif., assignor to Actel Corporation, Sunnyvale, Calif.

Filed Sep. 8, 1993, Ser. No. 117,955

Int. Cl.<sup>6</sup> G01R 31/02; G11C 17/16

U.S. Cl. 324—550

4 Claims



1. In an integrated circuit having a plurality of antifuses disposed thereon, each of said antifuses having a first electrode and a second electrode, and further having antifuse programming circuitry disposed thereon for selectively configuring a programming path between the first and second electrodes of a selected one of the plurality of antifuses and a source of programming potential, a circuit for determining the resistance of a programmed one of said antifuses comprising:

- a first voltage-sensing I/O pad;
- a second voltage-sensing I/O pad;
- antifuse selection means for selecting one of said antifuses;
- first circuit path means, responsive to said selection means, for creating a first voltage-sensing circuit path from said first voltage-sensing I/O pad to the first electrode of an antifuse selected by said selection means, said first voltage-sensing circuit path independent from said programming path;
- second circuit path means, responsive to said selection means, for creating a second voltage-sensing circuit path from said second voltage-sensing I/O pad to the second electrode of said antifuse selected by said selection means, said second voltage-sensing circuit path independent from said programming path.

5,414,365

DIAGNOSTIC APPARATUS FOR TESTING AN ANALOG CIRCUIT

Timothy R. Coggins, Winter Park; Michael Dalbey, Edgewater; Joseph Groszek, Winter Park; Charles A. Contarino, Casselberry, and George L. Roth, Apopka, all of Fla., assignors to Martin Marietta Corporation, Bethesda, Md.

Filed Sep. 25, 1992, Ser. No. 950,693

Int. Cl.<sup>6</sup> G01R 1/04

U.S. Cl. 324—607

26 Claims

1. A diagnostic apparatus for testing an analog circuit, comprising:

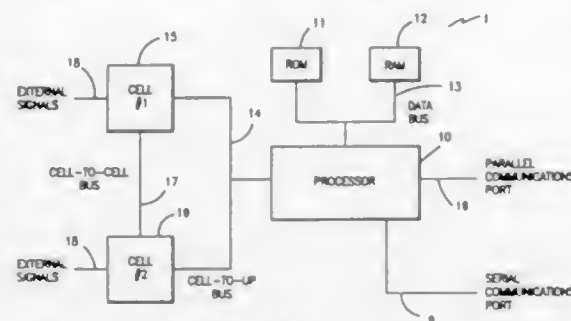
- a processor for generating control signals and for performing arithmetic operations;
- a first cell having cell control means responsive to processor control signals for autonomously controlling the first cell, and input/output means for coupling to at least one external analog signal node;
- a second cell having cell control means responsive to processor control signals for autonomously controlling the second cell, and input/output means for coupling to at least one external analog signal node;



a processor-cell bus including data and control lines, for coupling the processor to the cell control means of the first and second cells; and

a cell-to-cell bus including data and control lines for coupling the first cell to the second cell;

wherein each cell inputs an analog signal from the at least one external analog signal node in response to a first control signal from the processor, and outputs an analog signal to the at least one external analog signal node in response to a second control signal from the processor,



and wherein further the first cell sends a coordinating control signal that is received by the second cell by means of the cell-to-cell bus, the first cell's sending and the second cell's receiving of the coordinating control signal being in response to respective third and fourth control signals from the processor, wherein the receipt of the coordinating control signal by the second cell causes processing in the second cell to coordinate with processing in the first cell so as to produce a predetermined measurement of at least one analog signal.

5,414,366

# ELECTROMAGNETIC FIELD SUSCEPTIBILITY TEST APPARATUS AND METHODS

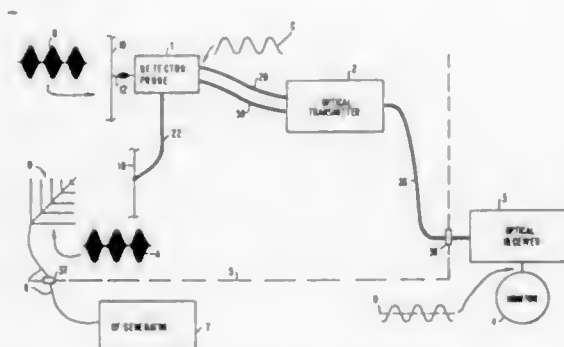
Wesley A. Rogers, Grosse Pointe Park, Mich., assignor to Electronic Development, Inc., Grosse Pointe Park, Mich.  
Continuation of Ser. No. 692,719, Apr. 29, 1991, abandoned.

This application Nov. 17, 1993, Ser. No. 153,502

Int. Cl.<sup>6</sup> G01R 31/00

U.S. Cl. 324-627

56 Claims



1. Apparatus for testing the susceptibility of a system to electromagnetic fields in the form of a modulated signal, comprising:

- a detector diode having first and second terminals, the first of said terminals for connection to a wire of said system, to thereby detect the modulation of said modulated signal;
- an electrically overdamped conductor, substantially transparent to electromagnetic fields, connected to said second terminal, for transmitting the modulation detected by said detector diode; and
- a monitor operatively connected to said overdamped con-

ductor for receiving said modulation detected by said detector diode;

wherein said apparatus is substantially electrically transparent and does not inject electromagnetic signals into said system being tested.

5,414,367

# APPARATUS FOR DETECTING ALCOHOL CONCENTRATION IN A MIXED FUEL

Kenji Ogawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

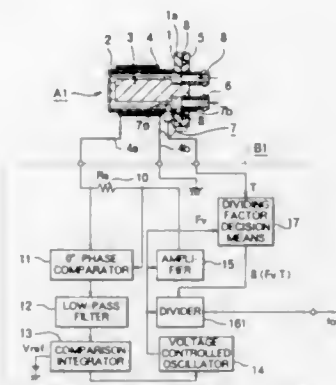
Filed Mar. 11, 1994, Ser. No. 209,102

Claims priority, application Japan, Mar. 15, 1993, 5-054105

Int. Cl.<sup>6</sup> G01R 27/26; G01N 27/00

U.S. Cl. 324-663

4 Claims



1. An apparatus for detecting the concentration of alcohol in a mixed fuel in which an arbitrary content of alcohol is mixed with gasoline or light oil, said apparatus comprising:

- dielectric constant detection means for providing a resonance frequency corresponding to the dielectric constant of alcohol-mixed fuel whose alcohol concentration is to be detected;

resonance frequency detection means which detects said resonance frequency provided by said dielectric constant detection means so as to provide a first frequency output signal having the same frequency as said resonance frequency;

a frequency divider which divides said first frequency output signal provided by said resonance frequency detection means by a variable frequency dividing factor;

fuel temperature detection means which detects the temperature of said alcohol-mixed fuel so as to provide a second frequency output signal representing said temperature; and

dividing factor decision means for determining said frequency dividing factor based on said first frequency output signal provided by said resonance frequency detection means and said second frequency output signal provided by said fuel temperature detection means; wherein the alcohol concentration is determined by the output frequency of said frequency divider.

5,414,368

# DIELECTRIC CONSTANT DETECTING APPARATUS

Kenji Ogawa, and Hiroyoshi Suzuki, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 10, 1992, Ser. No. 942,853

Claims priority, application Japan, Sep. 10, 1991, 3-230014

Int. Cl.<sup>6</sup> G01R 27/26; G01N 27/22, 33/22

U.S. Cl. 324-675

6 Claims

1. An apparatus for detecting a dielectric constant of liquid, said apparatus comprising:

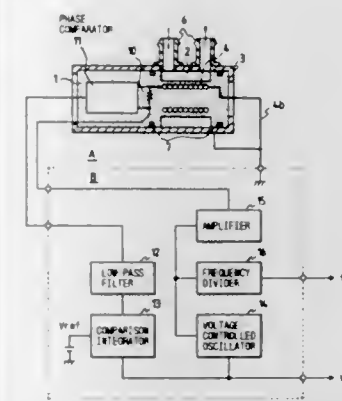
- phase shifting means for creating a shifted high frequency voltage signal by shifting a phase of an unshifted high

frequency voltage signal by an amount corresponding to said dielectric constant of said liquid;

applying means for applying said unshifted high frequency voltage signal to said phase shifting means;

a resistor having a first end and a second end, wherein said first end of said resistor is connected to said phase shifting means and said second end of said resistor is connected to said applying means;

detecting means connected across said resistor for detecting a phase shift between said shifted high frequency voltage signal created by said phase shifting means and said unshifted high frequency voltage signal applied from said applying means;



control means for adjusting said unshifted high frequency voltage signal from said applying means to adjust said phase shift detected by said detecting means toward a predetermined phase shift value,

wherein said dielectric constant of said liquid is represented by at least one of a first dielectric signal produced by said control means which is based on said phase shift detected by said detecting means and a second dielectric signal produced by said applying means which is based on said adjusted unshifted high frequency voltage signal; and

an insulator for integrally covering said phase shifting means, said resistor and at least one part of said detecting means.

5,414,369

# COIL SPRING-PRESSED NEEDLE CONTACT PROBE MODULES WITH OFFSET NEEDLES

Toshio Kazama, Nagano, Japan, assignor to NHK Spring Co., Ltd., Japan

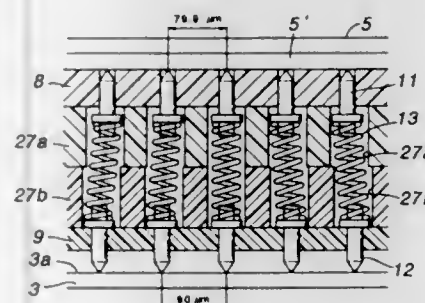
Filed Nov. 8, 1993, Ser. No. 148,488

Claims priority, application Japan, Nov. 9, 1992, 4-323574

Int. Cl.<sup>6</sup> G01R 1/04

U.S. Cl. 324-758

9 Claims



1. A contact probe assembly, comprising a plurality of contact probe modules, each module comprising:

a first electroconductive needle member having a forward end and a rear end;

a second electroconductive needle member having a forward end and rear end;

an electrically insulative holder having bores for slidably receiving said needle members therein with said rear ends thereof opposing each other;

a coil spring interposed between said rear ends of said needle members and received in said holder bores, for urging said needle members so as to elastically project said forward end of each of said needle members from a corresponding end of said holder bores;

said holder comprising a plurality of layers of primary insulator members each having through hole for receiving said coil spring therein, a secondary insulator member, placed over a first external surface of said primary insulator members, and having a first opening for allowing said forward end of said first needle member to project therefrom, and a tertiary insulator member placed over a second external surface of said primary insulator members, and having a second opening for allowing said forward end of said second needle member to project therefrom;

an inner diameter of each of said first and second openings being large enough to allow said forward end of said corresponding needle member to project therefrom but small enough to prevent passage of said rear end of said corresponding needle member,

said through holes and said openings defining said bores;

at least one of said bores being offset from at least between two adjacent ones of said through holes of said primary insulator members, said first opening of said secondary insulator member, and said second opening of said tertiary insulator member; and

wherein the density of the arrangement of said first needle members is greater than the density of the arrangement of said second needle members.

5,414,370

# BURN-IN APPARATUS AND METHOD WHICH INDIVIDUALLY CONTROLS THE TEMPERATURE OF A PLURALITY OF SEMICONDUCTOR DEVICES

Tatsuya Hashinaga, and Masanori Nishiguchi, both of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 914,559, Jul. 17, 1992, Pat. No. 5,327,075.

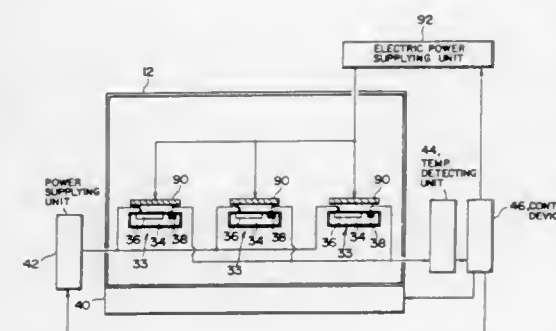
This application Feb. 4, 1994, Ser. No. 191,539

Claims priority, application Japan, Jul. 19, 1991, 3-179774; Jul. 29, 1991, 3-189019; Jul. 31, 1991, 3-192307; Jul. 31, 1991, 3-192310; Jul. 31, 1991, 3-192312

Int. Cl.<sup>6</sup> G01R 31/28

U.S. Cl. 324-760

2 Claims



1. A burn-in apparatus comprising:

at least one burn-in board having a plurality of sockets mounted thereon, each of said sockets being adapted to receive a semiconductor device having a semiconductor chip incorporated therein;

a burn-in test chamber for accommodating said at least one burn-in board;

measuring means for detecting electric characteristics of temperature sensors which are built in the respective

semiconductor chips for individually determining junction temperatures of the semiconductor chips, and for generating signals corresponding to said junction temperatures;

heating members provided in said respective sockets for heating the respective semiconductor devices which are received in said sockets on said burn-in boards positioned in said burn-in test chamber, each of said heating members being heated by supplying an electric power, and each of said heating members contacting a portion of a surface of the semiconductor device received in the associated socket; and

control means for selectively controlling the electric power supplied to said heating members, based on outputs from said measuring means, so that a selected one of said heating members heats each semiconductor device which has a junction temperature below a predetermined temperature to maintain junction temperatures of the respective semiconductor devices equal to or above said predetermined temperature.

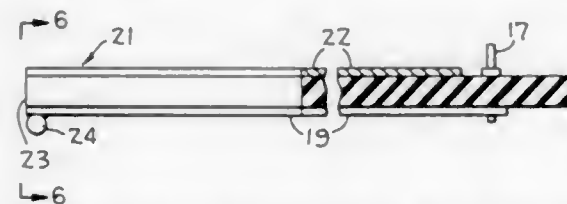
**5,414,371**  
**SEMICONDUCTOR DEVICE TEST PROBE RING**  
**APPARATUS AND METHOD OF MANUFACTURE**

George L. Isaac, Santa Clara, Calif., assignor to Probes Associates, Inc., Santa Clara, Calif.

Filed Mar. 25, 1993, Ser. No. 37,012  
Int. Cl.<sup>6</sup> G01R 1/073

U.S. Cl. 324-762

17 Claims



1. A semiconductor test probe ring for use in contacting a test pad pattern on a semiconductor device to be tested, comprising:

an insulation layer having a predetermined thickness and enclosing an opening therein;  
a plurality of electrically separate conductors attached to said insulation layer on a conductor side of the probe ring, said conductors each having outer ends and having inner ends terminating at the periphery of said opening;  
an electrically conductive ground plane member attached to said insulation layer on the side opposed to the conductor side for providing mechanical support for said insulation layer and said plurality of conductors, said ground plane having a ground plane opening aligned with said insulation layer opening;

a plurality of layered fingers comprising insulation, conductor inner end and ground plane layers, said fingers having free ends extending to the edge of said aligned insulation layer and ground plane openings;  
said insulation, conductor inner end and ground plane layers on said layered fingers being attached to said insulation layer, ones of said electrically separate conductors and said electrically conductive ground plane member respectively;

connector means for terminating the outer ends of said conductors; and

a cylindrical contact having a cylindrical peripheral surface and a cylindrical axis, said cylindrical contact being attached to the free end of each of said plurality of conductors along a portion of said cylindrical peripheral surface parallel to said cylindrical axis, whereby said cylindrical contacts form a substantially co-planar contact pattern in registration with the test pad pattern, and whereby said

plurality of conductors have substantially uniform predetermined impedance at high test signal frequency.

**5,414,372**  
**REUSABLE TEST APPARATUS FOR INTEGRATED**  
**CIRCUIT CHIPS**

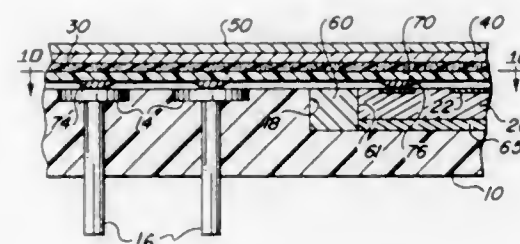
Paul S. Levy, Chandler, Ariz., assignor to VLSI Technology, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 82,117, Jun. 23, 1993. This application Mar. 25, 1994, Ser. No. 218,089

Int. Cl.<sup>6</sup> G01R 31/02, 1/073

U.S. Cl. 324-765

14 Claims



1. A reusable test apparatus for integrated circuit chip die, wherein said chip die have a first predetermined thickness, first predetermined width and a first predetermined length, with bonding pad contacts located on one face thereof, said test apparatus including in combination:

an insert member having said first predetermined thickness, a second predetermined width greater than said first predetermined width, a second predetermined length greater than said first predetermined length, and having an aperture therethrough of said first predetermined width and said first predetermined length;

a reusable carrier member with upper and lower planar surfaces and having a cavity for receiving said insert member in the upper surface thereof, said cavity having a depth substantially equal to said predetermined thickness of said insert member and having a width and a length slightly greater than said second predetermined width and said second predetermined length, respectively, of said chip die for releasably holding said insert member with said chip die therein, so that said one face of said chip die is located in substantially the same plane as the plane of the upper surface of said reusable carrier member;

a thermal cushion pad placed in the aperture in said insert member under said chip die in the cavity in said carrier member;

an array of contact pads on the upper surface of said carrier member arranged in a predetermined pattern around said cavity;

electrical connector pins connected with said contact pads of said carrier member and protruding from the lower surface of said carrier member; and

a flexible, bumped polyamide film circuit member having conductive protrusions thereon electrically interconnected in a predetermined pattern and releasably placed over the upper surface of said reusable carrier such that selected conductive protrusions thereon make electrical contact with selected bonding pad contacts on said integrated circuit chip die and selected contact pads on the upper surface of said reusable carrier.

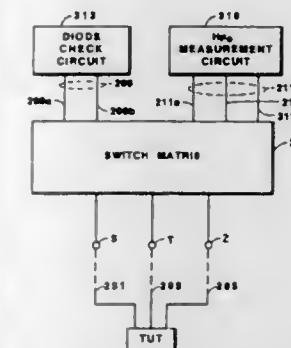
**5,414,373**  
**AUTOMATIC TRANSISTOR CHECKER**  
Paul T. Schreiber, Fort Worth, Tex., and Douglas R. Curtis, Los Gatos, Calif., assignors to Tandy Corporation, Fort Worth, Tex.

Continuation of Ser. No. 858,860, Mar. 27, 1992, Pat. No. 5,355,082. This application Feb. 14, 1994, Ser. No. 195,149

Int. Cl.<sup>6</sup> G01R 1/04

U.S. Cl. 324-768

5 Claims



1. An automatic transistor checker for determining a value of  $H_{FE}$  of a transistor under test having a first terminal, a second terminal and a third terminal comprising:

connector means for selectively connecting a plurality of test signal lines to the first terminal, the second terminal and the third terminal in an automatic sequence;

diode check means for performing diode checks between the first terminal and the second terminal, and the second terminal and the third terminal by sequencing test signals through one or more of the test signal lines, said diode check means including:

- base terminal identification means for identifying which of the first, second or third terminals is a base terminal based on the results of the diode checks; and
- collector terminal identification means for identifying which of the first, second or third terminals not previously identified as the base terminal is a collector terminal; and

an  $H_{FE}$  measurement circuit means for determining a value for  $H_{FE}$ ;

wherein the diode check means varies the sequence of test signals applied to the test signal lines in response to the terminals and the transistor type identified by the base terminal identification means and thereafter by the collector terminal identification means and the  $H_{FE}$  measurement circuit determines  $H_{FE}$  based on the identified terminals.

**5,414,374**  
**METHOD FOR PARTICLE BEAM TESTING OF**  
**SUBSTRATES FOR LIQUID CRYSTAL DISPLAYS (LCD)**  
Matthias Brunner, Kirchheim, and Reinhold Schmitt, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Division of Ser. No. 882,657, May 13, 1992, Pat. No. 5,268,638.

This application Sep. 20, 1993, Ser. No. 123,218

Claims priority, application Germany, Jul. 15, 1991, 41 23 415.4

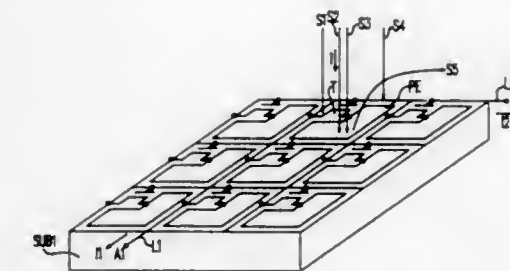
Int. Cl.<sup>6</sup> G01R 31/00

U.S. Cl. 324-770

5 Claims

1. A method for particle beam testing of substrates for liquid crystal displays comprising the steps of: providing a substrate for a liquid crystal display that has a plurality of picture elements, each of said picture elements having a switch element, the substrate having on a surface thereof a plurality of plane electrodes, switch elements of picture elements and control lines such that respectively one plane electrode of the plurality of plane electrodes is connected via at least one switch element to control lines; supplying a first current to a predetermined

plane electrode by means of a first particle beam within a respective setting time interval, the first current being conducted by parasitic elements and a respective switch element associated with the predetermined plane electrode so that a potential is established by the predetermined plane electrode; detecting secondary electrons triggered by one of the first particle beam or a second particle beam and thereby measuring



the potential of the predetermined plane electrode within a respective measuring time interval; and comparing the measured potential to a respective rated potential and forming therefrom a test result of a picture element such that a picture element is identified as faulty when a value of the measured potential substantially deviates from a value of the respective rated potential.

**5,414,375**  
**CMOS OUTPUT CIRCUIT WITH OPEN DRAIN**  
**TRANSISTOR**

Toshihide Tsuboi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

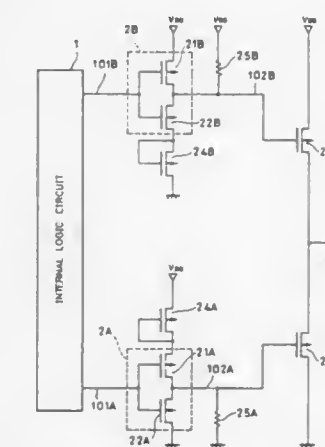
Filed Sep. 1, 1993, Ser. No. 114,245

Claims priority, application Japan, Sep. 3, 1992, 4-235766

Int. Cl.<sup>6</sup> H03K 17/16, 19/0175

U.S. Cl. 326-30

8 Claims



7. A semiconductor integrated circuit having a complementary MOS structure, comprising:

first and second output buffer control portions of a complementary MOS inverter structure for inputting mutually opposite polarities of logical outputs of an internal logic circuit;

said first output buffer control portion comprising a first input terminal supplied with one of said logical outputs of the internal logic circuit, a first output terminal, a first MOS transistor of a first conductive type having a gate connected to said first input terminal and a drain connected to said first output terminal, and a second MOS transistor of a second conductive type having a gate connected to said first input terminal and a drain connected to said first output terminal;



said second output buffer control portion comprising a second input terminal supplied with the other of said logical outputs of the internal logic circuit, a second output terminal, a third MOS transistor of said first conductive type having a gate connected to said second input terminal and a drain connected to said second output terminal, and a fourth MOS transistor of said second conductive type having a gate connected to said second input terminal and a drain connected to said second output terminal; mutually opposite conductive types of first and second output buffering MOS transistors having gates connected to said first and second output terminals, respectively, and drains connected in common for externally outputting a logical output;

a first level shifting means connected between a first power source and a source of said second MOS transistor, for causing level shift of a source potential of said second MOS transistor to be lower than a potential of said first power source in a magnitude corresponding to a threshold value of said second MOS transistor; and

a second level shifting means connected between a second power source and a source of said third MOS transistor, for causing level shift of a source potential of said third MOS transistor to be higher than a potential of said second power source in a magnitude corresponding to a threshold value of said third MOS transistor.

5,414,376

# PROGRAMMABLE LOGIC DEVICE MACROCELL HAVING EXCLUSIVE LINES FOR FEEDBACK AND EXTERNAL INPUT, AND A NODE WHICH IS SELECTIVELY SHARED FOR REGISTERED OUTPUT AND EXTERNAL INPUT

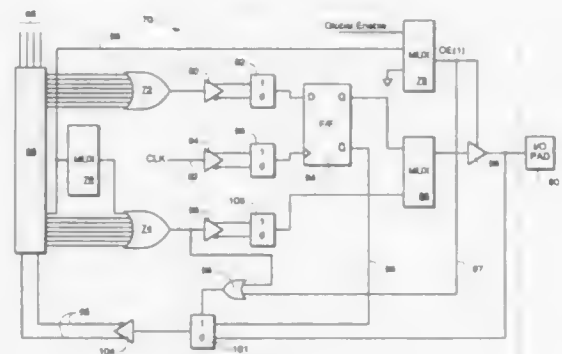
Mark A. Hawes, Boise, Id., assignor to Micron Semiconductor, Inc., Boise, Id.

Continuation-in-part of Ser. No. 175,162, Dec. 28, 1993. This application Aug. 12, 1994, Ser. No. 289,960

Int. Cl.<sup>6</sup> H03K 19/177, 19/0175

U.S. Cl. 326—40

9 Claims



1. A programmable logic device comprising:

- an AND array having multiple inputs and multiple product term outputs;
- first and second OR arrays, each OR array receiving, as inputs, product term outputs from the AND array, each OR array having a single sum-of-products output; and
- an output macrocell having
  - a first input for receiving the sum-of-products output from the first OR array;
  - a second input for receiving the sum-of-products output from the second OR array;
  - a third input for receiving a single product term output from the AND array;
  - means for generating a registered signal, said means for generating having a first input coupled to the sum-

of-products output of said first OR array, and a second input coupled to a clock signal;

- a first multiplexer having a first input for receiving the registered signal, and a second input for receiving a non-registered signal derived from the sum-of-products term output of said second OR array, said first multiplexer having an output, and being operable so as to select between the registered signal and the non-registered signal, and providing the signal so selected at its output;
- a tri-statable buffer which either couples the selected signal to an input/output terminal or decouples the selected signal from the input/output terminal, said tri-statable buffer being controlled by said single product term output from the AND array;
- a logic gate having an output, a first input coupled to the sum-of-products term output of said second OR array, and a second input coupled to the single product term output from the AND array; and
- a second multiplexer having an output coupled to at least one of said inputs of said AND array, said second multiplexer also having first and second inputs, said first input being coupled to said means for generating, and said second input being coupled to the input/output terminal, said second multiplexer being controlled by the output of said logic gate.

5,414,377

# LOGIC BLOCK WITH LOOK-UP TABLE FOR CONFIGURATION AND MEMORY

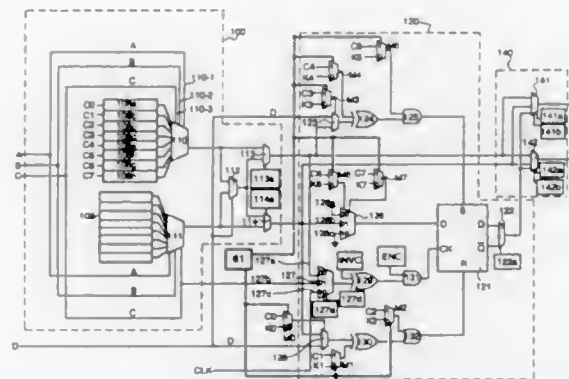
Philip M. Frelidin, Sunnyvale, Calif., assignor to Xilinx, Inc., San Jose, Calif.

Continuation of Ser. No. 994,002, Dec. 21, 1992. This application Oct. 18, 1994, Ser. No. 324,858

Int. Cl.<sup>6</sup> H03K 19/177

U.S. Cl. 326—41

3 Claims



1. A logic block for a configurable logic array integrated circuit comprising:

- a first memory unit (111) having a first plurality of memory bits (109) for generating a first function in response to a first plurality of inputs (A, B, C);
- a second memory unit (110) having a second plurality of memory bits (108a-108h) for generating a second function in response to a second plurality of inputs (A, B, C);
- at least one multiplexer (M0-M7) which supplies a control signal to a controllable element (i.e. 124, 126) to cause said controllable element to alternatively have a default configuration (set by K0-K7) and a selected configuration (set by C0-C7) configurable by a corresponding at least one memory bit (108a-108h) from said second plurality of memory bits; and
- means (S1) for selecting between said default configuration and said selected configuration.

5,414,378

# METHOD OF DETECTING VOLTAGE TRANSIENTS

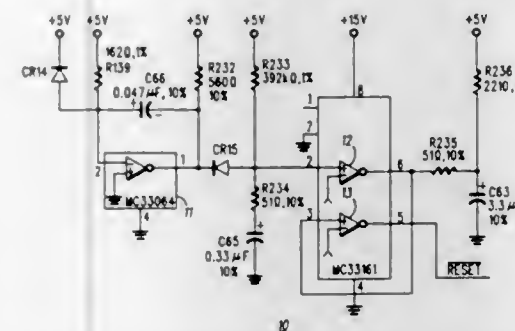
Gregory A. Edgar, Richland Hills, and Dan Huslig, Bedford, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 4, 1992, Ser. No. 894,304

Int. Cl.<sup>6</sup> H03L 5/02

U.S. Cl. 327—143

5 Claims



1. A method for resetting an electronic device in response to a voltage transient, such method comprising the steps of: detecting, with a voltage sensing device, a supply voltage transient; initiating a reset pulse in response to the supply voltage transient by the voltage sensing device; clamping an input of the voltage sensing device to an output through a clamping capacitor; charging the clamping capacitor to a voltage sensing device threshold value; unclamping the input of the voltage sensing device when an input voltage reaches a threshold voltage; and, terminating the reset pulse by the voltage sensing device when the input to the voltage sensing device is unclamped.

5,414,379

# OUTPUT BUFFER CIRCUIT FOR INTEGRATED CIRCUIT

Geoun T. Kwon, Bubaleub, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Kyoungkido, Rep. of Korea

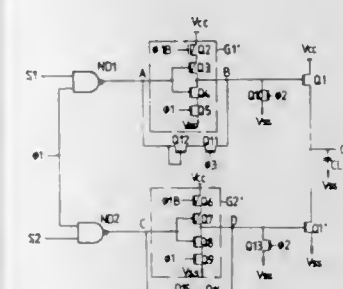
Filed Dec. 27, 1993, Ser. No. 174,384

Claims priority, application Rep. of Korea, Dec. 30, 1992, 1992-26866

Int. Cl.<sup>6</sup> H03K 5/12, 17/16

U.S. Cl. 327—170

4 Claims



1. An output buffer circuit for an integrated circuit comprising first and second NANDing means, said first NANDing means having a first input terminal for inputting a first input signal and a second input terminal for inputting a first control signal, said second NANDing means having a first input terminal for inputting a second input signal and a second input terminal for inputting a second control signal, said first and second input signals having the opposite phases, and first and second output drive transistors coupled to provide an output, wherein the improvement comprises:

first inversion means connected to an output terminal of said first NANDing means for inverting an output signal from said first NANDing means in response to said first control

signal and a second control signal, said second control signal being an inverted one of said first control signal; second inversion means connected to an output terminal of said second NANDing means for inverting an output signal from said second NANDing means in response to said first and second control signals;

- a third transistor connected to a first node, said first node connecting said first inversion means to said first output drive transistor, said third transistor having a gate connected to a third control signal, said third control signal going "high" under the condition that said first control signal is "low", to cause the output signal from said first NANDing means to become "low";
- a fourth transistor having a source connected to said third transistor and a gate and a drain connected in common to the output terminal of said first NANDing means;
- a fifth transistor having a drain connected to said first node, a source connected to a ground voltage and a gate connected to a fourth control signal, said fourth control signal going "high" earlier than said third control signal under the condition that said first control signal is "low", to cause output signals from said first and second inversion means to become "low";
- a sixth transistor connected to a second node, said second node connecting said second inversion means to said second output drive transistor, said sixth transistor having a gate connected to said third control signal;
- a seventh transistor having a source connected to said sixth transistor and a gate and a drain connected in common to the output terminal of said second NANDing means; and
- an eighth transistor having a drain connected to said second node, a source connected to the ground voltage and a gate connected to said fourth control signal.

5,414,380

# INTEGRATED CIRCUIT WITH AN ACTIVE-LEVEL CONFIGURABLE AND METHOD THEREFOR

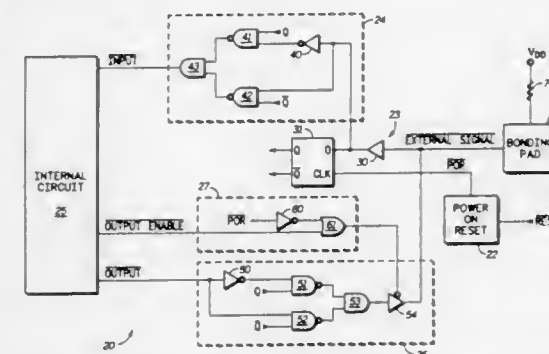
Jeffery A. Floyd, Round Rock, and Lloyd P. Matthews, Buda, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 19, 1993, Ser. No. 47,895

Int. Cl.<sup>6</sup> H03K 19/003

U.S. Cl. 327—198

20 Claims



1. An integrated circuit with an active-level configurable pin, comprising:

- a bonding pad for receiving an input signal;
- latching means coupled to said bonding pad, for latching a logic state of said input signal in response to an inactivation of a reset signal, and for providing a first signal indicative of said latched logic state;
- input pin configuration means coupled to said latching means, for providing an internal input signal as a selected one of said input signal or a complement of said input signal selected in response to said first signal; and
- an internal circuit for receiving said selected one of said input signal or said complement of said input signal.

5,414,381

## METHOD OF ADJUSTING FOR CLOCK SKEW

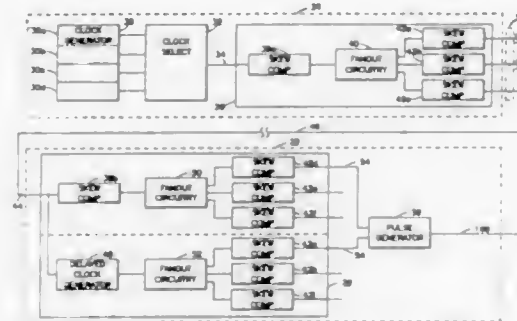
Stephen E. Nelson, Chippewa Falls; David L. Duxstad, Eau Claire, and Galen C. Flunker, Menomonie, all of Wis., assignors to Cray Research, Inc., Eagan, Minn.

Division of Ser. No. 465,947, Jan. 16, 1990, Pat. No. 5,258,660. This application Jul. 28, 1993, Ser. No. 98,503

Int. Cl.<sup>6</sup> H03H 11/26

U.S. Cl. 327—262

3 Claims



1. A method of adjusting clock skew for a computer system, the computer system comprised of a clock generator for generating a clock signal, at least one logic module, and a clock distribution network for carrying the clock signal from the clock generator to the at least one logic module, said clock generator including a plurality of clock output skew compensators, said at least one logic module including an input skew compensator and a plurality of output skew compensators, the method comprising the steps of:

- deskewing the at least one logic module by programming the plurality of output skew compensators to eliminate skew variation between the input to said input skew compensator and outputs from said plurality of skew compensators; and
- deskewing the distribution network between the clock generator and the at least one logic module by providing distribution paths of substantially uniform delay and by programming the clock output skew compensators to decrease skew variation between adjacent distribution paths.

5,414,382

## IMPEDANCE BUFFER FOR DRIVING CAPACITIVE LOADS

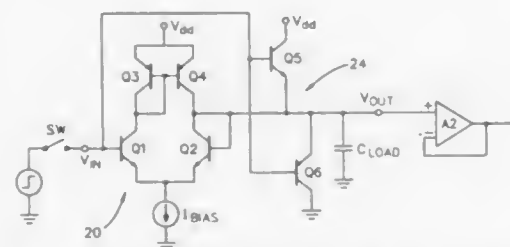
Tony R. Larson, and Raymond S. Taylor, both of Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 30, 1993, Ser. No. 130,058

Int. Cl.<sup>6</sup> G06G 7/12

U.S. Cl. 327—561

27 Claims



1. An impedance buffer circuit having an input voltage signal and an output voltage signal, said circuit comprising: input means for accepting said input voltage signal; output means for producing said output voltage signal; differential amplifier means having a first analog input coupled to said input means and a second analog input coupled to said output means for maintaining said output

voltage signal in a predetermined equilibrium with said input voltage signal; and emitter-follower means having an emitter-follower input coupled to said input means and an emitter-follower output coupled to said output means for supplying to said output means an output current corresponding to the ratio of said input voltage signal to said output voltage signal.

5,414,383

## FOUR QUADRANT MULTIPLIER CIRCUIT AND A RECEIVER INCLUDING SUCH A CIRCUIT

Anthony R. Cusdin, Horley, and Paul A. Moore, Seaford, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

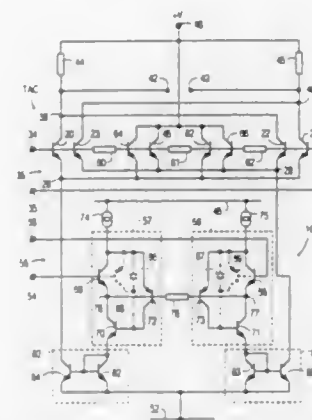
Filed Feb. 24, 1994, Ser. No. 202,139

Claims priority, application United Kingdom, Apr. 8, 1993, 9307384

Int. Cl.<sup>6</sup> H03K 5/00

U.S. Cl. 329—304

10 Claims



1. A four quadrant multiplier circuit comprising first and second input ports and first and second circuits coupled respectively to the first and second input ports, said second circuit converting voltages applied at the second input port to currents which are supplied to the first circuit, characterized in that the first circuit comprises a dual transconductance amplifier whose transconductance is linearly proportional to currents supplied by the second circuit, the dual transconductance amplifier comprising transistors of a first conductivity type, and in that the second circuit comprises first and second folded Darlington circuits, each folded Darlington circuit comprising first and second transistors of a first conductivity type whose emitter-collector paths are connected in series, and a third transistor of a second conductivity type having its emitter collector path connected between the collector of the first transistor and the base of the second transistor, the junction of the emitter of the first transistor and the collector of the second transistor being connected to the base electrode of the third transistor, the second input port being connected to the base electrodes of the first transistors, and a resistive element connected between the base electrodes of the third transistors, wherein the currents supplied to the dual transconductance amplifier are derived by way of respective current mirror circuits from the emitter currents of the respective second transistors.

5,414,384

## DEMODULATOR FOR RADIO DATA SIGNALS

Wilhelm Hegeler, Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

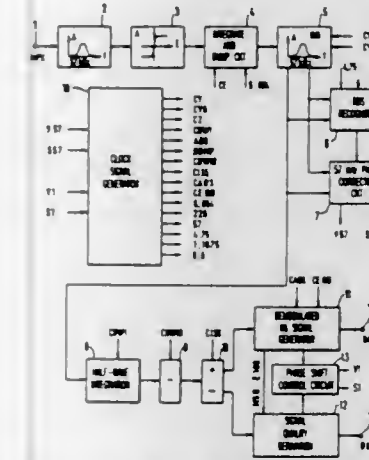
Filed May 16, 1994, Ser. No. 243,201

Claims priority, application Germany, Jun. 4, 1993, 43 18 643.2

Int. Cl.<sup>6</sup> H04L 27/20

U.S. Cl. 329—304

11 Claims



1. A demodulator for radio data signals, where transmission of these signals is carried out through phase shifting of suppressed subcarrier, where a multiplex signal, which contains a signal with the frequency of the subcarrier passes through a band-pass filter and an amplitude limiter, wherein the amplitude limited signal with the subcarrier frequency is sampled at a sampling frequency that is a multiple of the frequency of the subcarrier, and wherein the sampling values are summed over a preset portion of one period of the subcarrier, and wherein the summed sampling values are supplied to a digital signal processing circuit (5 through 13; 147).

5,414,385

## DUAL MODE FM QUADRATURE DETECTOR

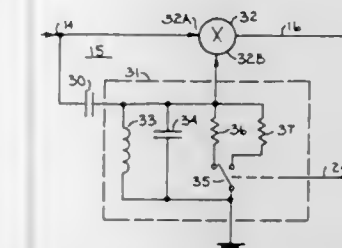
James A. Worsham, Jr., Duluth, Ga., assignor to Matsushita Communication Industrial Corporation of America, Peachtree City, Ga.

Filed Feb. 22, 1994, Ser. No. 199,681

Int. Cl.<sup>6</sup> H03D 3/06

U.S. Cl. 329—337

15 Claims



7. A method responsive to a mode control signal for demodulating an input frequency modulated (FM) signal to provide a demodulated output signal, comprising the steps of: responding to said mode control signal being in a first state for providing a phase shifted input FM signal having a first phase shift, and responding to said mode control signal being in a second state for providing said phase shifted input FM signal having a second phase shift; providing a product signal by multiplying said input FM signal and said phase shifted input FM signal; and

providing said demodulated output signal by removing undesired signals from said product signal.

5,414,386

## MUTING APPARATUS IN CAR AUDIO SYSTEM

Hiroo Adachi, and Mitsuo Nakazato, both of Kawagoe, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

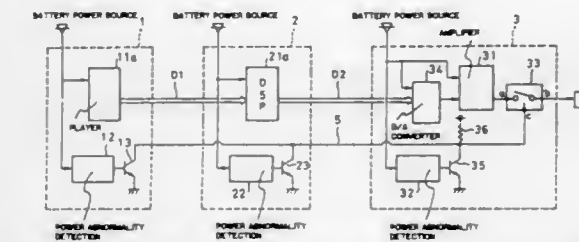
Filed Feb. 15, 1994, Ser. No. 196,779

Claims priority, application Japan, Feb. 15, 1993, 5-025577

Int. Cl.<sup>6</sup> H05F 1/26

U.S. Cl. 330—51

2 Claims



1. A muting apparatus for use in a car audio system including a plurality of audio component units in which a digital audio signal is transmitted therebetween, each of said plurality of audio components receiving a voltage level from a power source, a D/A converter for converting a digital signal into an analog signal, said digital signal being transmitted from one of said audio component units, and an electro-acoustic transducer means for converting said analog audio signal into acoustic energy, the apparatus comprising:

- a power abnormality detection means for separately monitoring the voltage level of the power source supplied to the plurality of audio component units, and for generating a power abnormality detection signal when the voltage level supplied to one of said audio component units drops to a value lower than a predetermined value;
- a muting signal generator means for issuing a muting signal when said power abnormality detection signal appears in any one of said audio component units; and
- a muting means for muting said analog audio signal in response to said muting signal.

5,414,387

## DISTRIBUTED AMPLIFIER AND BIDIRECTIONAL AMPLIFIER

Kazuhiko Nakahara, and Yoshinobu Sasaki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

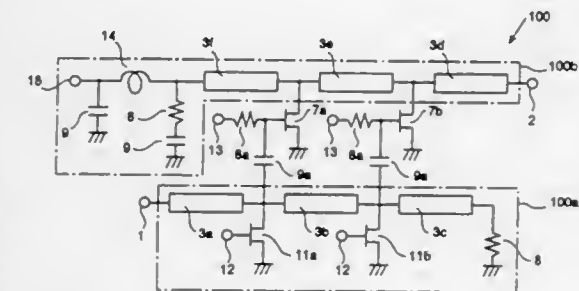
Filed Jun. 13, 1994, Ser. No. 258,831

Claims priority, application Japan, Jul. 14, 1993, 5-173907

Int. Cl.<sup>6</sup> H03F 3/60

U.S. Cl. 330—54

12 Claims

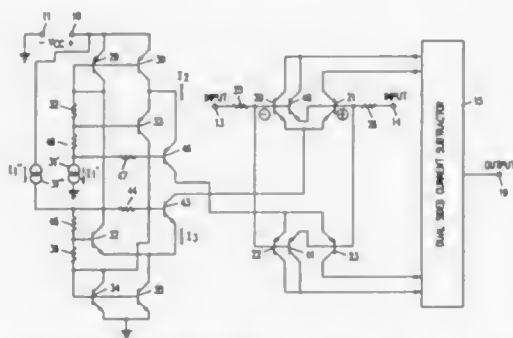


1. A distributed amplifier comprising: an input side circuit including a plurality of distributed constant lines connected in series between an input terminal



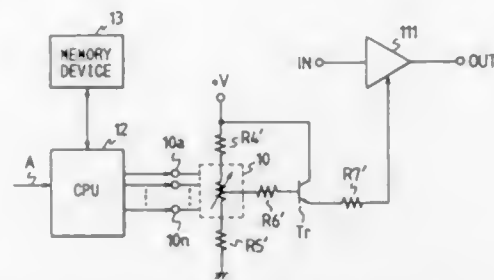
and ground, and a plurality of source-grounded FETs for switching operation, each source-grounded FET for switching having a drain connected to a respective junction of said distributed constant lines;  
 an output side circuit including a plurality of distributed constant lines connected in series between an output terminal and ground; and  
 a plurality of source-grounded amplifier FETs, each amplifier FET having a gate connected to a respective junction of said distributed constant lines of said input side circuit via a capacitor and a drain connected to a respective junction of said distributed constant lines of said output side circuit.

**5,414,388**  
**RAIL TO RAIL OPERATIONAL AMPLIFIER INPUT STAGE**  
 Don R. Sauer, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.  
 Filed Mar. 3, 1994, Ser. No. 205,530  
 Int. Cl.<sup>6</sup> H03F 3/45  
 U.S. Cl. 330—252



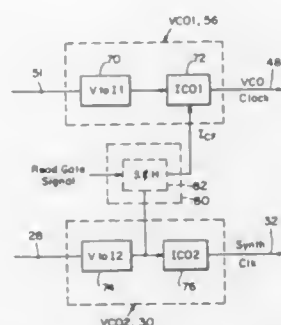
1. An operational amplifier input stage circuit having a pair of differential input terminals and positive and negative supply rails connectable to a source of operating power, said circuit comprising:  
 a pair of first and second NPN transistors connected as a first long-tailed pair to employ a first tail current;  
 a pair of first and second PNP transistors connected as a second long-tailed pair to employ a second tail current;  
 first coupling means for coupling the base of said first transistor of said pair of NPN transistors and said first transistor of pair of PNP transistors to said first differential input terminal;  
 second coupling means for coupling the base of said second transistor of said pair of NPN transistors and said second transistor of said pair of PNP transistors to said second differential input terminal;  
 a biasing circuit including constant current means, first output current means for producing said first tail current, and second output current means, complementary to said first output current means, for providing said second tail current, said biasing circuit including means for controlling said first output current means and said second output current means to maintain constant the sum of said first tail current and said second tail current;  
 a first cascode connected transistor, coupled between said biasing circuit first output current means and said pair of NPN transistors, that supplies said first tail current to said pair of NPN transistors; and  
 a second cascode connected transistor, coupled between said biasing circuit second output current means and said pair of PNP transistors, that supplies said second tail current to said pair of PNP transistors.

**5,414,389**  
**ATTENUATOR CIRCUIT**  
 Takashi Watanabe, and Atsushi Saitoh, both of Kanagawa, Japan, assignors to Mitsumi Electric Co., Ltd., Tokyo, Japan  
 Filed Apr. 18, 1994, Ser. No. 228,703  
 Claims priority, application Japan, Apr. 28, 1993, 5-028003 U; Nov. 30, 1993, 5-068888 U  
 Int. Cl.<sup>6</sup> H03G 3/20  
 U.S. Cl. 330—279 20 Claims



1. An attenuator circuit for electrically controlling an amount of attenuation of an input signal, the attenuator circuit comprising:  
 a main attenuator circuit including:  
 a memory device for storing a plurality of amounts of attenuation corresponding to predetermined parameters;  
 a control circuit for reading one of the parameters from the memory device to output a control signal according to the parameter being read;  
 a potentiometer having a plurality of control terminals, the potentiometer for providing a control voltage which is varied in steps according to the control signal applied to the control terminals; and  
 an automatic gain control (AGC) amplifier for attenuating an input signal by controlling a gain in response to the control voltage provided by the potentiometer to attenuate the input signal so as to vary the amount of attenuation in steps,  
 said control circuit being devoid of an output signal from said AGC amplifier.

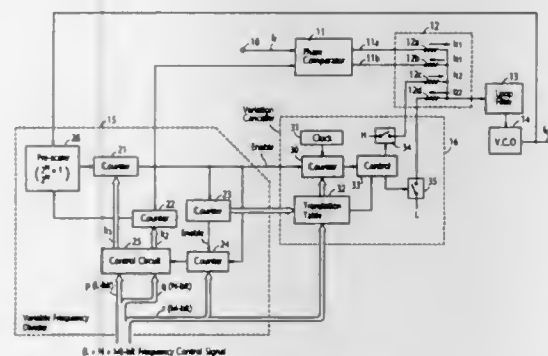
**5,414,390**  
**CENTER FREQUENCY CONTROLLED PHASE LOCKED LOOP SYSTEM**  
 Janos Kovacs, North Andover, and Ronald Kroesen, Harvard, both of Mass., assignors to Analog Devices, Inc., Norwood, Mass.  
 Filed Sep. 12, 1994, Ser. No. 304,248  
 Int. Cl.<sup>6</sup> H03L 7/07, 7/10, 7/18; G11B 20/10  
 U.S. Cl. 331—2 3 Claims



1. A center frequency controlled phase locked loop (PLL) system, comprising:  
 a primary PLL having a first voltage controlled oscillator including a first voltage to current converter whose out-

put current drives a first current controlled oscillator to produce the primary clock signal to be locked on to an input signal;  
 a second PLL having a second voltage controlled oscillator including a second voltage to current converter whose output circuit drives a second current controlled oscillator to produce the synthesized clock signal whose frequency is approximately that of the input signal or an integral multiple thereof; and  
 a current copier circuit for copying the output current from said second voltage to current converter and delivering it to said first current controlled oscillator to maintain the center frequency of said first voltage controlled oscillator at approximately the output frequency of said synthesized clock signal.

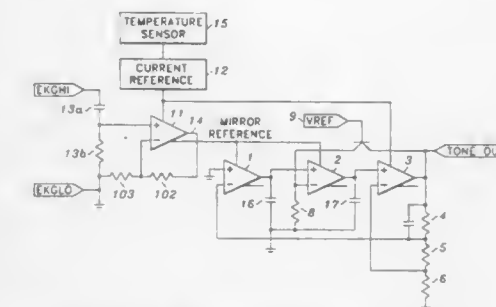
**5,414,391**  
**FREQUENCY SYNTHESIZER WITH FREQUENCY-DIVISION INDUCED PHASE VARIATION CANCELER**  
 Hidetosi Hori, Tokyo, Japan, assignor to NEC Corporation, Japan  
 Filed May 31, 1994, Ser. No. 251,785  
 Claims priority, application Japan, May 28, 1993, 5-148241  
 Int. Cl.<sup>6</sup> H03L 7/08, 7/193, 7/197  
 U.S. Cl. 331—16 10 Claims



1. A frequency synthesizer comprising:  
 a loop filter;  
 a voltage-controlled oscillator connected to the loop filter;  
 a variable frequency divider for dividing the frequency of input clock pulses from the voltage controlled oscillator according to a frequency control parameter and producing output clock pulses of reduced frequency, said variable frequency divider comprising means for dividing the frequency of said input clock pulses with a first scaling factor during a first integral multiple of the interval between successive ones of said output clock pulses and with a second scaling factor during a second integral multiple of said interval, said first and second integral multiples being a function of said frequency control parameter;  
 a phase comparator for detecting a phase difference between the output clock pulses of the variable frequency divider and reference frequency pulses and producing output pulses of period corresponding to the detected phase difference;  
 counter means for counting the output clock pulses of the variable frequency divider during said first and second integral multiples of the interval of said output clock pulses of the variable frequency divider and producing therefrom a successive count value;  
 canceling means for producing a canceling pulse of period variable as a function of said count value and as a function of said frequency control parameter; and  
 combiner means connected between the phase comparator

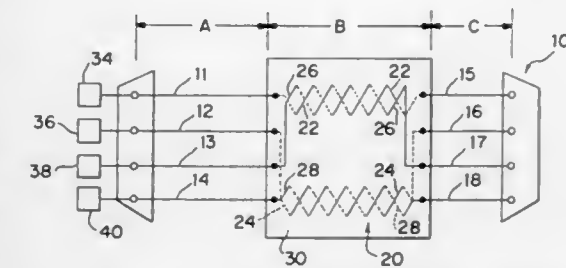
and the loop filter for combining the output pulses of the phase comparator with said canceling pulse.

**5,414,392**  
**AMPLIFIER CIRCUIT**  
 Leonard Schupak, Irving, Calif., assignor to MedCom Electronics, Beverly Hills, Calif.  
 Filed Aug. 26, 1993, Ser. No. 112,194  
 Int. Cl.<sup>6</sup> H03C 3/00  
 U.S. Cl. 332—118 31 Claims



1. An electrical circuit comprising:  
 means for receiving an input signal for amplification; amplification means including a transconductance amplifier for amplifying the input signal;  
 means for having the input signal modulate the amplification means by varying the transconductance of the amplification means to provide a 360° phase shift to the input signal at a predetermined frequency;  
 feedback means for the amplification means for sustaining oscillation at the predetermined frequency;  
 means for providing an output signal at the predetermined frequency; and  
 means for receiving a mirror reference signal, the mirror reference signal being for controlling a relative degree of phase shift of the amplification means, the mirror reference signal being a function of the input signal and a current reference signal.

**5,414,393**  
**TELECOMMUNICATION CONNECTOR WITH FEEDBACK**  
 William J. Rose, West Hartford, and Robert Aekins, Stratford, both of Conn., assignors to Hubbell Incorporated, Orange, Conn.  
 Continuation-in-part of Ser. No. 932,194, Aug. 20, 1992. This application Jan. 15, 1993, Ser. No. 2,871  
 Int. Cl.<sup>6</sup> H03H 7/00; H04M 1/74  
 U.S. Cl. 333—1 24 Claims



1. A connector for communications systems, comprising:  
 first, second, third and fourth input terminals arranged in a first ordered array;  
 first, second, third and fourth output terminals arranged in a second ordered array; and  
 circuit means, formed on a substrate, for electrically coupling each of said input terminals to the respective output

terminal and for canceling crosstalk induced across adjacent ones of said terminals, said circuit means including first, second, third and fourth conductive paths between the respective pairs of terminals, each of said conductive paths having a section including a plurality of conductive strips arranged in a zig-zag pattern with alternating strips thereof mounted on opposite sides of said substrate and connected end-to-end by conductive means passing through said substrate, said first and third paths being in relatively close proximity with said conductive strips of said first path crossing said conductive strips of said third path on opposite sides of said substrate to simulate a twisted wiring pair, said second and fourth paths being in relatively close proximity with said conductive strips of said second path crossing said conductive strips of said fourth path on opposite sides of said substrate to simulate another twisted wiring pair.

5,414,394

# MICROWAVE FREQUENCY DEVICE COMPRISING AT LEAST A TRANSITION BETWEEN A TRANSMISSION LINE INTEGRATED ON A SUBSTRATE AND A WAVEGUIDE

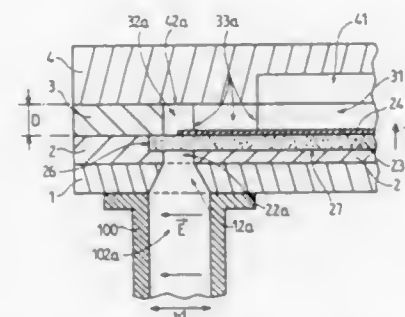
Patrice Gamand, Yerres, and Christophe Cordier, Limeil-Brevannes, both of France, assignors to U.S. Phillips Corporation, New York, N.Y.

Filed Dec. 15, 1993, Ser. No. 167,379

Claims priority, application France, Dec. 29, 1992, 92 15837 Int. Cl.<sup>6</sup> H01P 5/107

U.S. Cl. 333—26

16 Claims



1. A microwave frequency device for forming a transition between a transmission line, comprising a conductive strip supported on an electrically insulating substrate, and a waveguide end having an opening with a predefined cross-sectional area defining an end of a longitudinally extending cavity of the waveguide, said device comprising:

- a first portion defining a first cavity extending in a first direction and having a first cross-sectional area, a first length of said transmission line being disposed in said first cavity and extending in said first direction;
- a second portion defining a second cavity extending in a second direction transverse to the first direction from an electrically open end having the predefined cross-sectional area for coupling with the waveguide end to an electrically shorted end having a second cross-sectional area which is smaller than the predefined cross-sectional area;
- a third portion defining a third cavity communicating with the first and second cavities, said third cavity extending in the first direction and having a third cross-sectional area which is smaller than the first cross-sectional area; said transmission line extending in the first direction through the third cavity and ending in an electrically open probe portion disposed in the electrically shorted end of the second cavity.

5,414,395

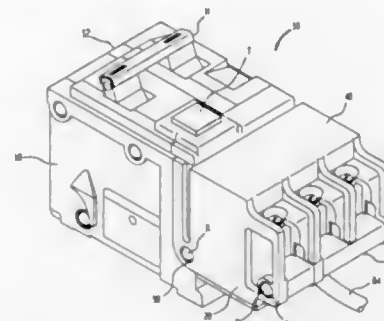
# ELECTRONIC HOUSING FOR TWO-POLE GROUND FAULT CIRCUIT INTERRUPTER

Charles D. Garnto, Tucker, and Stephen D. Cella, Stooie Mountain, both of Ga., assignors to Siemens Energy & Automation, Inc., Alpharetta, Ga.

Filed Feb. 14, 1994, Ser. No. 195,634 Int. Cl.<sup>6</sup> H01H 73/00

U.S. Cl. 335—18

15 Claims



1. A housing for a circuit breaker, said circuit breaker having: contacts capable of being in an open state or a closed state, of movement between said open and closed states, and of generating a hot gas in consequence of said movement, and a control unit for controlling movement of said contacts from said closed state to said open state, and said housing comprising: a first portion housing said contacts; and a second portion housing said control unit; each of said first and second housing portions having one of an elongated, interlocking hook and groove on adjoining respective faces thereof, which define an axis and wherein said interlocking hook and groove prevent separation of said housing portions in directions generally perpendicular to said axis.

5,414,396

# SHUNT TRIP DEVICE

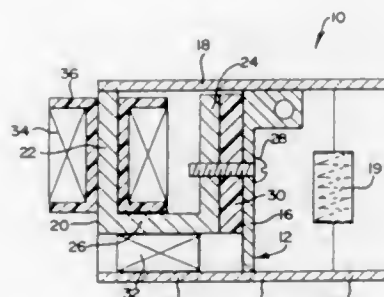
Dante Bagalini, Johannesburg, South Africa, assignor to Circuit Breaker Industries Limited, Johannesburg, South Africa

Filed Sep. 13, 1993, Ser. No. 120,667

Claims priority, application South Africa, Sep. 14, 1992, 92/7004 Int. Cl.<sup>6</sup> H01H 9/00

U.S. Cl. 335—179

12 Claims





eddy currents induced by the time varying magnetic fields produced by the gradient coil; and  
 a plurality of slits on each end plate radiating inward from an inside diameter of the rose shim to a point within a smallest diameter of the gradient coil.

5. An open access MRI magnet comprising:

(a) a substantially open ferromagnetic frame including an upper end plate and a lower end plate and at least two support posts for supporting the end plates with a patient receiving area between the end plates accessible for additional medical equipment and personnel;

(b) a superconducting coil assembly attached to the upper and lower end plates respectively with each superconducting coil assembly including a toroidal vacuum tight cryostat vessel, insulation and one or more temperature shields mounted within the cryostat vessel, a helium container mounted within the cryostat vessel connected to a source of liquid helium, and a coil of superconducting wire mounted in the helium container for cooling to a temperature below a superconducting transition temperature with the superconducting wire disposed along a coil plane generally parallel to the upper and lower end plates and formed of a material that has substantially zero resistance to electrical flow below a superconducting transition temperature;

(c) a control means for the superconducting coil assemblies including a power source for initiating a flow of current through each superconducting coil and a persistent switch for maintaining a flow of current through the superconducting coils such that a magnetic flux field is generated along a vertical polar axis in the patient receiving area with a return path provided by the frame;

(d) magnetic flux shaping means for shaping the magnetic field to provide a substantially uniform magnetic flux field in a (DSV) located in the patient receiving area and including rose shims mounted to the upper and lower end plates; and

(e) a plurality of radial slits in each end plate located within the rose shims with the positioning of the slits on each end plate substantially symmetrical to one another for reducing an eddy current path in each end plate.

5,414,400

# ROGOWSKI COIL

Jean-Paul Gris, and Jean-Pierre Dupraz, both of Lyons, France, assignors to GEC Alsthom T&D SA, Paris, France

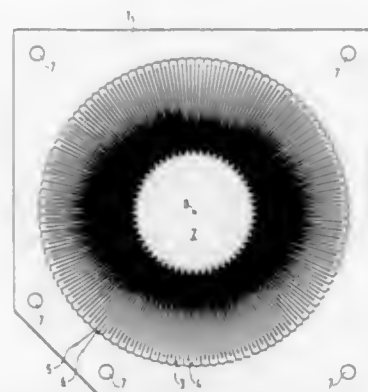
Filed May 28, 1993, Ser. No. 67,628

Claims priority, application France, Jun. 5, 1992, 92 06859

Int. Cl.<sup>6</sup> H01F 27/28, 40/00

U.S. Cl. 336—174

10 Claims



1. A Rogowski coil in combination with a wire, said coil being provided for measuring a current in said wire comprising at least one printed circuit plate provided with a circular cutout, the coil being implemented by rectilinear metal deposits on each of the two faces of the plate and extending along radii such that geometrical projections thereof intersect in the cen-

ter of said cutout, electrical connections between the radii on one face and those on the opposite face being implemented by plated through holes that pass through the thickness of the plate, wherein the coil is constituted by the radially-extending portions and by the holes, including a go path and a return path disposed around the circular cutout, with an inlet and an outlet on the same face of the plate, said inlet and outlet being separated by a distance of a few tenths of a millimeter, and wherein the wire extends through said cutout.

5,414,401

# HIGH-FREQUENCY, LOW-PROFILE INDUCTOR

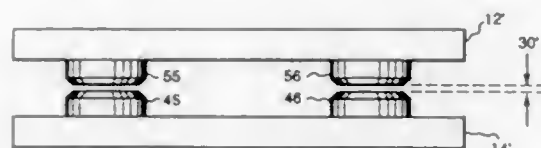
Waseem A. Roshen, Clifton Park, and Alexander J. Yerman, Scotia, both of N.Y., assignors to Martin Marietta Corporation, East Windsor, N.J.

Filed Feb. 20, 1992, Ser. No. 838,656

Int. Cl.<sup>6</sup> H01F 17/06, 27/30

U.S. Cl. 336—178

13 Claims



1. A low-profile magnetic component, comprising:

a Z-folded film including an elongated dielectric film defining first and second ends and a length dimension between said ends, and first and second edges, said dielectric film having a predetermined width between said first and second edges, said dielectric film supporting an electrical conductor having at least a first portion defining a second width which is less than said predetermined width, said first portion of said electrical conductor extending in a zig-zag manner from said first end of said dielectric film to a location near said second end of said dielectric film, said elongated dielectric film also defining a plurality of pairs of core apertures, each said pair of core apertures including first and second core apertures spaced apart from each other and from said first and second edges of said dielectric film, said pairs of first and second core apertures being spaced in a regular pattern along said length of said dielectric film, said regular pattern being selected so that, when said dielectric film is Z-folded to form said Z-folded film, said first and second core apertures of each of said pairs of core apertures are registered with corresponding ones of said first and second core apertures of the other pairs of core apertures, said first core apertures of each of said pairs of core apertures being located adjacent said first portion of said electrical conductor, and between said first portion of said electrical conductor and said first edge of said dielectric film, and said second core apertures of each of said pairs of core apertures being located adjacent said first portion of said electrical conductor, and between said first portion of said electrical conductor and said second edge of said dielectric film;

a thin, fiat, magnetically permeable top plate defining at least one peripheral edge;

a thin, fiat, magnetically permeable bottom plate defining at least one peripheral edge, and lying substantially parallel to, and spaced away from said first plate by a predetermined separation;

a first magnetically permeable core post having a length less than said predetermined separation, and extending through said first core apertures of said Z-folded film, and between said top and bottom plates, so as to be magnetically coupled to said top and bottom plates at first locations spaced away from said peripheral edges of said top and bottom plates, whereby said first core post is magnetically coupled to said top and bottom plates by a magnetic

path including a first gap resulting from the difference between said predetermined separation and said length of said first core post;

a second magnetically permeable core post having a length less than said predetermined separation, and extending through said second core apertures of said Z-folded film, and between said top and bottom plates, so as to be magnetically coupled to said top and bottom plates at second locations spaced away from said peripheral edges of said top and bottom plates, whereby said second core post is magnetically coupled to said top and bottom plates by a magnetic path including a second gap resulting from the difference between said predetermined separation and said length of said second core post;

whereby, when electrical current flows through said first portion of said electrical conductor, the magnetic flux direction through said first and second apertures, and through said first and second core posts, respectively, extending therethrough, is mutually parallel but oppositely directed.

5,414,402

# MULTI-LAYER SUBSTRATE

Harufumi Mandai, Noboru Kato, and Atsushi Tojyo, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

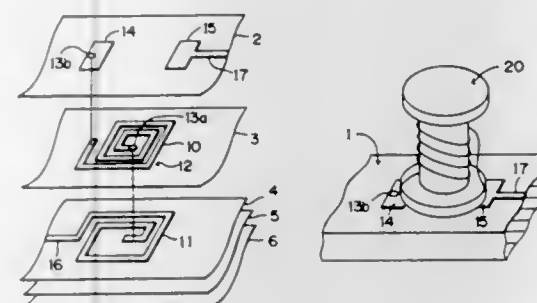
Filed Nov. 16, 1993, Ser. No. 152,382

Claims priority, application Japan, Nov. 19, 1992, 4-309875

Int. Cl.<sup>6</sup> H01F 5/02

U.S. Cl. 336—200

4 Claims



1. A multi-layer substrate for use with an inductor which has a bobbin formed about an axis, the multi-layer substrate comprising:

a first insulating sheet which has an electrode for electrical connection with the inductor; and

a second insulating sheet having a conductor which forms an internal coil with a axis extending along said axis of the inductor to generate a magnetic field in a same direction as a magnetic field generated by the inductor, said conductor being electrically connected with the inductor in series, the internal coil having such an inductance that a total inductance of the internal coil and the inductor is a specified value, said first and second insulating sheets being piled up in a body with the conductor and the electrode being electrically connected through a via hole in the first insulating sheet.

5,414,403

# CURRENT-LIMITING COMPONENT

Felix Greuter, Rütihof, Claus Schüler, Widen, and Ralf Strümppler, Baden, all of Switzerland, assignors to ABB Research Ltd., Zurich, Switzerland

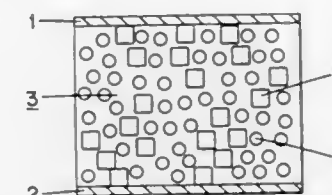
Filed Jun. 4, 1993, Ser. No. 70,937

Claims priority, application Germany, Jun. 29, 1992, 42 21 309.6

Int. Cl.<sup>6</sup> H01C 7/10

U.S. Cl. 338—22 R

24 Claims



1. A current-limiting component which has an electrical resistance body arranged between two contact terminals and contains first resistance material, which material has PTC behavior and a low cold resistivity below a first temperature and forms at least one current-carrying path extending between the two contact terminals and which material has a high hot resistivity compared with its cold resistivity above the first temperature, wherein the resistance body additionally contains second resistance material having a resistivity which is between the cold resistivity and the hot resistivity of the first resistance material and wherein the second resistance material has been brought into intimate electrical contact with the first resistance material and forms at least one resistance connected in parallel with at least one subsection of the at least one current-carrying path, the magnitude of the resistivity of the second resistance material being approximately 3-10<sup>4</sup> times the magnitude of the cold resistivity of the first resistance material.

5,414,404

# SEMICONDUCTOR DEVICE HAVING A THIN-FILM RESISTOR

Chang B. Jeong, and Chang S. Song, both of Seoul, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

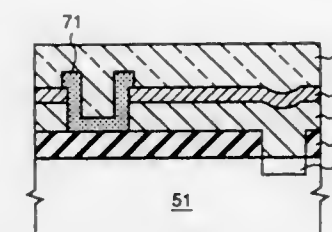
Filed Feb. 19, 1993, Ser. No. 20,071

Claims priority, application Rep. of Korea, Apr. 8, 1992, 1992-5819

Int. Cl.<sup>6</sup> H01C 1/012

U.S. Cl. 338—307

6 Claims



1. A thin film resistor comprising:

(a) a semiconductor substrate having a contact region;

(b) an insulating layer formed over said semiconductor substrate, wherein said insulating layer contains a contact opening over said contact region, thereby leaving a portion of said contact region exposed;

(c) a two part metal layer formed over said insulating layer, wherein a first part of said metal layer contacts said contact region through said contact opening and said first and second parts of said metal layer are spaced apart and

- thereby electrically isolated from each other, said first and second metal parts of said metal layer including first and second end portions, respectively;
- (f) a resistor layer formed between said first and second metal layer parts, thus establishing an electrical path between said first and second metal layer parts;
- (g) an interlayer formed over each of said first and second end portions such that each interlayer is formed between each metal layer end portion disposed below said interlayer and a corresponding resistor portion formed above said interlayer; and
- (h) a passivation layer formed over said interlayer.

5,414,405

## PERSONNEL IDENTIFICATION DEVICES

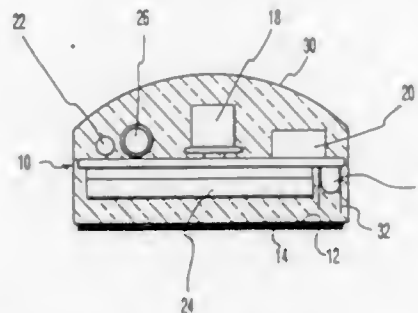
Robin I. T. Hogg, London, and Geoffrey S. Edwards, Cumbria, both of England, assignors to Colebrand Limited, London and Oxley Developments Company Limited, Cumbria, both of England

Filed Feb. 10, 1993, Ser. No. 16,083

Claims priority, application United Kingdom, Mar. 7, 1992, 9205052; Jun. 24, 1992, 9213390; Dec. 11, 1992, 9225946  
Int. Cl.<sup>6</sup> G08B 1/00, 5/22

U.S. Cl. 340—321

4 Claims



1. A device for an object to be identified in the dark, comprising:
- a waterproof housing;
  - means for enabling the housing to be secured removably to the object to be identified in the dark;
  - at least one infrared light emitting diode disposed within the housing for emitting infrared light to be detected for object identification purposes, said housing having an infrared transparency portion to enable said infrared light to be emitted therethrough;
  - a reed switch for causing said infrared light emitting diode to be actuated on and off;
  - a battery for electrically energizing the infrared light emitting diode through said reed switch;
  - said infrared light emitting diode, said reed switch, and said battery all being disposed within said waterproof housing;
  - a magnet; and
  - mounting means recessed into said waterproof housing without perforating it for receiving said magnet;
- wherein said mounting means enables said magnet to be placed in the vicinity of said reed switch for activating the reed switch to cause said infrared light emitting diode to be coupled to the battery for electrical energizing purposes.

5,414,406

## SELF-TUNING VEHICLE HORN

Melburn J. Baxter, Deland, Fla., assignor to Spartan Corporation, Jackson, Mich.

Filed Apr. 21, 1992, Ser. No. 871,718

Int. Cl.<sup>6</sup> G08B 3/00

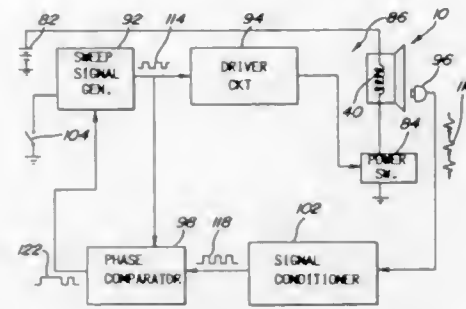
U.S. Cl. 340—388.1

7 Claims

1. In a horn for an automotive vehicle, said horn being of the type comprising a housing having a diaphragm and a magnetic pole piece mounted thereon, a coil for magnetizing the pole

piece, a magnetic plunger mounted on the diaphragm in magnetic circuit with the pole piece, said diaphragm and the mass carried thereby having a resonant frequency of mechanical vibration, an electronic power switch connected in series with said coil, and a control circuit for applying a horn input signal to the input of said switch for turning it off and on, the improvement wherein said control circuit comprises:

- a variable frequency pulse generator having an output coupled with the input of said switch and generating a variable frequency horn input signal having a frequency range including said resonant frequency,



a transducer circuit responsive to the vibration of said diaphragm for producing a horn output signal having a frequency corresponding to the actual frequency of said mechanical vibration,

and phase comparison means responsive to said horn input signal and said horn output signal for inhibiting change of frequency of the pulse generator when the phase difference between said horn input and horn output signals is substantially zero.

5,414,407

## TURN SIGNAL MONITOR CIRCUIT

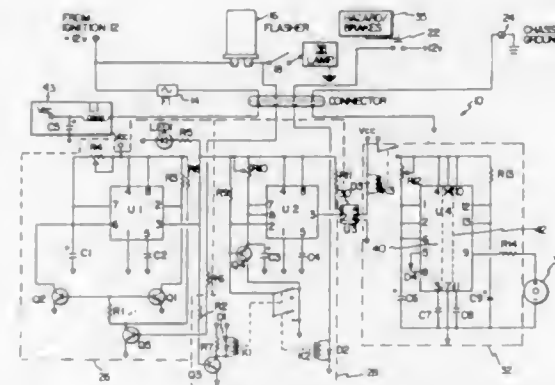
A. Wilbur Gerrans, Marysville, and Galen N. Cameron, Snohomish, both of Wash., assignors to Turn Signal, Eden Prairie, Minn.

Filed May 10, 1993, Ser. No. 59,778

Int. Cl.<sup>6</sup> B60Q 1/34

U.S. Cl. 340—475

29 Claims



15. A non-obtrusive turn signal monitor and reminder circuit for monitoring a turn signal in a vehicle and reminding an operator after a set time period, the turn signal monitor and reminder circuit comprising:
- a turn signal circuit activated to provide a pulsating signal;
  - a converter coupled to the turn signal circuit for converting the pulsating signal into a direct current output signal while the turn signal is activated, wherein the converter has a post-installation, operator controlled calibration circuit to calibrate the turn signal and reminder circuit;

- a first timer for providing a first timer output signal wherein the first timer is coupled to the converter and wherein the first timer is powered by the converter output signal, the first timer comprising:
  - a first adjustable delay circuit for providing a delay time period before providing the timer output signal; and
  - a reset circuit for suspending the first adjustable delay circuit upon the occurrence of a specified event;
- a second timer directly coupled to the first timer for providing an intermittent alarm driver signal in response to the first timer output signal, the intermittent driver signal having an on time and an off time independent of the frequency of the turn signal circuit pulsating signal, the second timer comprising:
  - a first timing portion for adjustably setting the off time period of the alarm driver signal; and
  - a second timing portion for setting the duration of the on time of the alarm driver signal; and
- an audible alarm coupled to the second timer for providing an audible tone in response to the on time of the alarm driver signal.

5,414,408

## EMERGENCY ACTION PLAN DISPLAY

John Berra, 333 N. Belt, Ste. 230, Houston, Tex. 77060

Continuation-in-part of Ser. No. 549,955, Jul. 9, 1990, Pat. No. 5,280,271. This application Jan. 14, 1994, Ser. No. 181,675  
Int. Cl.<sup>6</sup> G08B 25/00

U.S. Cl. 340—525

20 Claims



1. An emergency action plan for coordinating the activities of emergency action teams during an emergency condition comprising:
- a display;
  - an emergency icon supported by said display, said emergency icon for the identification of said emergency condition;
  - a plurality of action lines extending downwardly on a surface of said display relative to said emergency icon, said action lines for directing the steps to be carried out in said emergency condition;
  - a plurality of team member blocks supported by said display and connected to said action lines on said display, said team member blocks for identifying the emergency action team for a particular task in said emergency condition;
  - a plurality of action indicators connected by said action lines from said team member blocks, said action indicators positioned on said display for informing of the particular tasks to be performed by an emergency action team during said emergency condition; and
  - a plurality of position areas positioned on said display, said

plurality of position areas having some of said action indicators arranged thereon.

5,414,409

## ALARM SYSTEM FOR DETECTING AN AUDIO SIGNAL WHEN GLASS BREAKAGE OCCURS

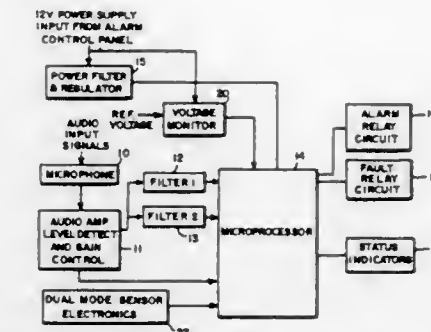
Robert C. Voosen, Randolph, and Christopher Hentschel, Kingston, both of Mass., assignors to International Electronics, Inc., Canton, Mass.

Filed Jul. 23, 1992, Ser. No. 919,031

Int. Cl.<sup>6</sup> G08B 13/22

U.S. Cl. 340—541

21 Claims



1. An alarm detection system for detecting the presence of an audio signal when glass breakage occurs, said system comprising
- amplifier means responsive to an input audio signal for providing an amplified audio output signal;
  - filter means responsive to said audio output signal for providing one or more filtered audio signals;
  - processing means responsive to said one or more filtered audio signals for determining when said filtered audio signals represent an audio input signal that has been generated due to glass breakage;
  - means responsive to said determination for providing an alarm signal when said filtered audio signals represent an audio input signal that has been generated due to glass breakage;
  - means for supplying a power supply voltage for use in said alarm detection system;
  - means for monitoring the level of said power supply voltage; and
  - means responsive to said monitoring means for determining when the level of said power supply voltage is below a selected level;
  - said processing means being responsive to said determining means for providing an indicator signal when said power supply voltage level is below the selected level; and
  - visual indicator means which is turned off when said power supply voltage level is above the selected level and which is responsive to said indicator signal for turning on said indicator means when said power supply voltage is below the selected level to provide a visual indication of a false alarm condition.

5,414,410

## METHOD AND SYSTEM FOR DETECTING A MARKER

Daffyd G. Davies, Andrew Dames, and Michael D. Crossfield, all of Cambridge, United Kingdom, assignors to Esselte Meto International GmbH, Heppenheim, Germany

Filed Feb. 10, 1994, Ser. No. 194,285

Claims priority, application United Kingdom, Feb. 11, 1993, 9302757

Int. Cl.<sup>6</sup> G08B 13/187

U.S. Cl. 340—551

14 Claims

1. A method of detecting articles containing or carrying markers with a non-linear magnetic characteristic by passing





number to  $n$  and which are connected to said first through said  $m$ -th sets of the first through the  $n$ -th internal paths so that a  $k$ -th one of the first through the  $m$ -th switch units is connected to  $(m-1)$  sets except a  $k$ -th one of the first through the  $m$ -th sets of the first through the  $n$ -th internal paths, where  $k$  is a natural number between one and  $m$ , both inclusive; and

output connecting means for connecting said output ports extended from the first through the  $m$ -th switch units to the first through the  $m$ -th elementary switch modules to form said additional route.

5,414,416

# TEMPERATURE DEPENDENT CONTROL MODULE CLUSTER UNIT FOR MOTOR VEHICLE

Hiroshi Yamakita, Kariya; Katsuhiko Ina, Okazaki; Kazuhiko Higuchi; Akira Uchida, both of Kariya, and Katsuhisa Tsuji, Kozakal, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

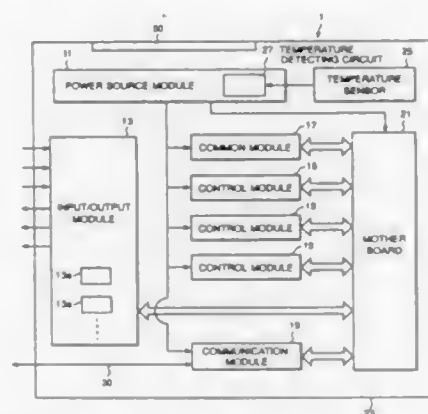
PCT No. PCT/JP92/01122, § 371 Date Apr. 28, 1993, § 102(e) Date Apr. 28, 1993, PCT Pub. No. WO93/04896, PCT Pub. Date Mar. 18, 1993

PCT Filed Sep. 2, 1992, Ser. No. 50,112

Claims priority, application Japan, Sep. 3, 1991, 3-223086 Int. Cl.<sup>6</sup> H04Q 9/00; B60R 16/02

U.S. Cl. 340—825

5 Claims



1. A control module cluster unit adapted for use in a motor vehicle, comprising:

- a plurality of control modules having specialized control functions for controlling a plurality of equipment mounted on the motor vehicle;
- a mother board for connecting said control modules so that communication may occur between said control modules; and
- an input/output module connected to said mother board, for inputting data to, and outputting data from, at least one of said plurality of equipment to be controlled;
- said plurality of control modules, said mother board, and said input/output module being collectively mounted in one casing;
- a temperature detecting means for detecting temperature in said casing; and
- a function stop control means for stopping secondary functions in favor of primary functions within said cluster when the detected temperature in said casing exceeds a specific value; and
- a fail safe mechanism for preventing temperature rise within said casing.

## 5,414,417 AUTOMATIC INPUT/OUTPUT TERMINAL VARYING CIRCUIT

Man H. Heo, Daegu, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

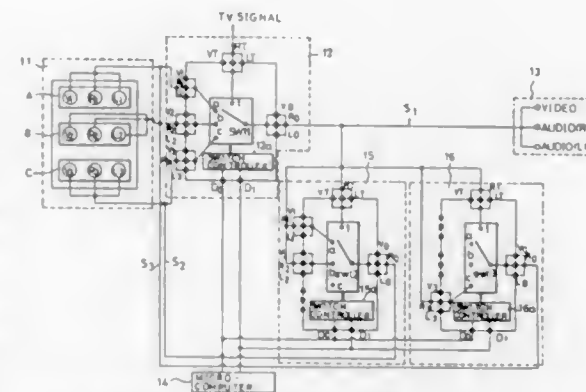
Filed Feb. 18, 1993, Ser. No. 19,070

Claims priority, application Rep. of Korea, Feb. 18, 1992, 2340/1992

Int. Cl.<sup>6</sup> H04Q 1/00

U.S. Cl. 340—825.25

2 Claims



1. An automatic input/output terminal varying circuit comprising:

input/output terminal means including a plurality of input/output terminals for inputting signals from external signal sources and outputting signals to external systems; input signal selection means for selecting one of the signals inputted through said input/output terminal means and a television signal in response to select data from a microcomputer and outputting the selected signal to a signal processor; and

a plurality of output signal selection means for outputting the selected signal from said input signal selection means to ones of the input/output terminals of said input/output terminal means other than one of the input/output terminals of said input/output terminal means through which the selected signal is inputted, in response to the select data from said microcomputer, said plurality of output signal selection means including:

first output signal selection means including first to third external signal input terminals and a television signal input terminal, for inputting an output signal from said input signal selection means commonly through its television signal input terminal and its first and second external signal input terminals, performing the same signal selection as that of said input signal selection means in response to the select data from said microcomputer and outputting the selected signal to one of the input/output terminals of said input/output terminal means corresponding to its third external signal input terminal of free state; and

second output signal selection means including first to third external signal input terminals and a television signal input terminal, for inputting the output signal from said input signal selection means commonly through its television signal input terminal and its third external signal input terminal, performing the same signal selection as that of said input signal selection means in response to the select data from said microcomputer and outputting the selected signal commonly to ones of the input/output terminals of said input/output terminal means corresponding to its first and second external signal input terminals of free state.

## 5,414,418 METHOD AND APPARATUS FOR PRE-PROGRAMMING AND SUBSEQUENTLY DESIGNATING A RESPONSE CHARACTERISTIC OF A SELECTIVE CALL RECEIVER

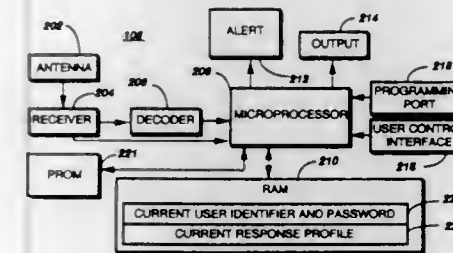
Richard P. Andros, Jr., Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 3, 1993, Ser. No. 55,091

Int. Cl.<sup>6</sup> G08B 5/22

U.S. Cl. 340—825.44

25 Claims



1. A method of pre-programming and subsequently designating a response characteristic of a selective call receiver having a memory and a user control interface, the method comprising the steps of:

- pre-programming the memory to store a plurality of user names and corresponding response profiles, each response profile comprising a selective call address and response options associated therewith;
- thereafter requesting designation of a user name;
- designating in response thereto a user name through the user control interface; and
- controlling the selective call receiver to respond in accordance with the pre-programmed response profile corresponding to the designated user name.

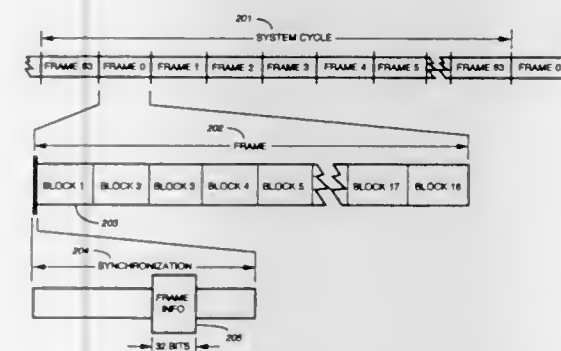
## 5,414,419 BATTERY SAVING METHOD FOR SELECTIVE CALL RECEIVERS

Robert J. Schwendeman, Pompano Beach; Leon Jasinski, Ft. Lauderdale, and William J. Kuznicki, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 823,037, Jan. 13, 1992, abandoned, which is a continuation of Ser. No. 445,211, Dec. 4, 1989, abandoned. This application Apr. 4, 1994, Ser. No. 222,561 Int. Cl.<sup>6</sup> G08B 5/22

U.S. Cl. 340—825.44

10 Claims



1. A method for controlling operation of a plurality of selective call receivers each of which comprises a receiver portion, responsive to a signal comprising a plurality of frames, each frame comprising a synchronizing portion and a plurality of blocks following the synchronizing portion containing messages, the method comprising steps of:

- designating a first group of selective call receivers for receiving messages in any of the plurality of frames;
- designating a second group of selective call receivers for

receiving messages only in at least one particular block of each frame;

- inserting a frame information indicator in the synchronizing portion for each frame;
- the first and second groups of selective call receivers activating their receiver portions during the synchronizing portion for each frame; and
- assigning values to said frame information indicator for indicating to the first and second groups of selective call receivers whether a message designated for their reception is contained in an associated frame and whether the first and/or second group of selective call receivers should maintain their receiver portions powered-up for at least a portion of the associated frame.

## 5,414,420 SWITCH INTERCONNECT FOR POSITION ENCODER SYSTEM

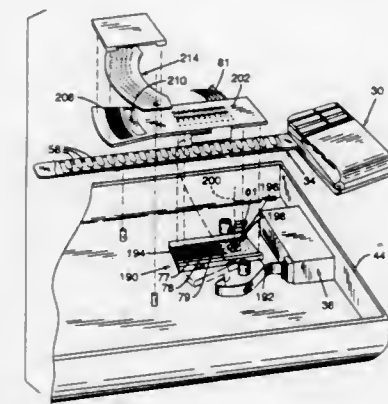
Robert B. E. Puckette, and Timothy J. Jondrow, both of Corvallis, Oreg., assignors to Hewlett-Packard Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 856,436, Mar. 23, 1992. This application Jul. 24, 1992, Ser. No. 919,483

Int. Cl.<sup>6</sup> H03K 17/94

U.S. Cl. 341—20

12 Claims



1. A switch interconnect system, comprising a switch that is positionable between an open state and a closed state;
- a link having a first conductor portion and a second conductor portion and attached to the switch so that the first and second conductor portions are connected whenever the switch is in the closed state, and so that the first and second conductor portions are disconnected whenever the switch is in the open state;
- a base to which the link is mounted to move relative to the base, the base carrying a third conductor capacitively coupled to the first conductor portion, the base also carrying a fourth conductor that is capacitively coupled to the second conductor portion;
- drive means connected to the third conductor for applying a drive signal to the third conductor on the base; and
- detection means connected to the fourth conductor for detecting on the fourth conductor the presence of the drive signal capacitively coupled from the second conductor portion, whereby the presence of the signal in excess of a predetermined level is indicative of the switch being in the closed state.
5. A switch interconnect system, comprising a movable handle having a switch mounted thereto and the switch being positionable in a closed state and an opened state;
- a link connected to the handle for movement therewith;
- a carrier member, the link being mountable to the carrier member for movement relative to the carrier member; and

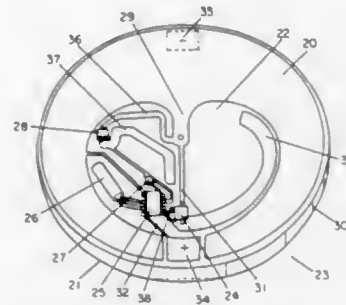




-continued-

11 11 1111 0001	= 24
11 11 1111 0010	= 25
...	...
11 11 1111 1110	= 37
11 11 1111 1111 0000	= 38
11 11 1111 1111 0001	= 39
etc.	

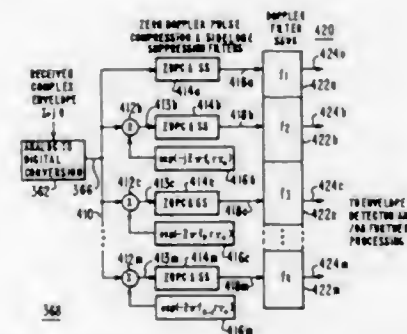
5,414,427  
**DEVICE FOR INFORMATION TRANSMISSION**  
 Staffan Gunnarsson, Svärdsfjellvägen 62, S-162 43 Vällingby, Sweden  
 PCT No. PCT/SE91/00479, § 371 Date Jan. 21, 1993, § 102(e)  
 Date Jan. 21, 1993, PCT Pub. No. WO92/01953, PCT Pub. Date Feb. 6, 1992  
 PCT Filed Jul. 5, 1991, Ser. No. 961,939  
 Claims priority, application Sweden, Jul. 24, 1990, 9002493  
 Int. Cl.<sup>6</sup> G01S 13/80  
 U.S. Cl. 342—51 20 Claims



1. A device for information transmission for receiving a first microwave signal, remodulating and coding said first microwave signal to produce a transponder signal, and retransmitting said transponder signal as a second microwave signal, said device comprising:

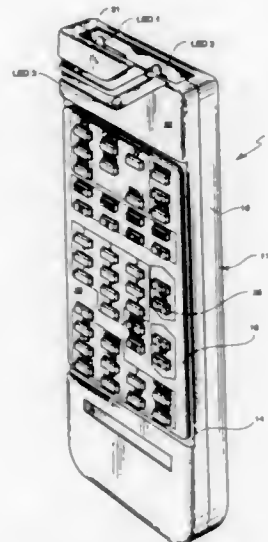
- a ground plane;
- at least one microstrip antenna including an antenna layer acting towards said ground plane, said antenna layer and said ground plane having substantially equal areas; and
- a reflex means, arranged adjacent to or at a distance of less than 1/6 of the air wave length of the first microwave signal from the radiating edges of said antenna layer, said reflex means arranged to reflect the second microwave signal radiating from the radiating edges of said antenna layer and edges of said ground plane so as to generate an antenna lobe, directional from said microstrip antenna comprising a directly transmitted microwave signal and a reflected microwave signal.

5,414,428  
**RADAR SYSTEM WITH PULSE COMPRESSION AND RANGE SIDELobe SUPPRESSION PRECEDING DOPPLER FILTERING**  
 John J. Gallagher, Turnersville, N.J., and Harry Urkowitz, Philadelphia, Pa., assignors to Martin Marietta Corp., Moorestown, N.J.  
 Continuation-in-part of Ser. No. 103,027, Aug. 6, 1993. This application May 6, 1994, Ser. No. 239,051  
 Int. Cl.<sup>6</sup> G01S 13/28  
 U.S. Cl. 342—132 7 Claims



1. A Doppler radar system, comprising:  
 transmitting means for transmitting a plurality of sets of

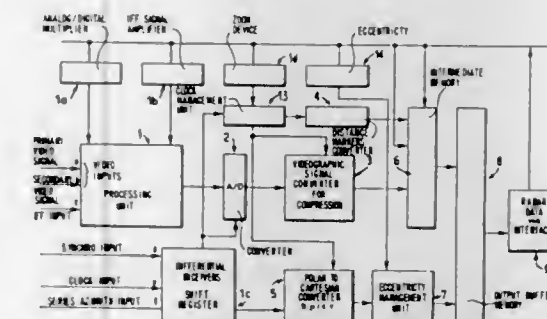
5,414,426  
**FAVORITE KEY MACRO COMMAND AND CHAINED MACRO COMMAND IN A REMOTE CONTROL**  
 Frank A. O'Donnell, Clearwater, Fla.; Qiuju Luo, Orange, and Kimthoa T. Nguyen, Yorba Linda, both of Calif., assignors to Universal Electronics Inc., Twinsburg, Ohio  
 Continuation-in-part of Ser. No. 586,957, Sep. 24, 1990, abandoned, which is a continuation of Ser. No. 127,999, Dec. 2, 1987, Pat. No. 4,959,810, which is a continuation-in-part of Ser. No. 109,336, Oct. 14, 1987, abandoned. This application Dec. 11, 1992, Ser. No. 990,862  
 Int. Cl.<sup>6</sup> H04L 17/02  
 U.S. Cl. 341—176 13 Claims



1. A remote control comprising:
- a microprocessor including a CPU and memory means;
  - a keyboard coupled to said microprocessor and including a set of keys including at least one MACRO key;
  - IR lamp driver circuitry coupled to said microprocessor;
  - light emitting means for generating and emitting IR signals coupled to said IR lamp driver circuitry;
  - code data stored in said memory means for creating the IR signals, which are sent by said light emitting means to a controlled device to cause the controlled device to perform specific command functions;
  - a macro entry/definition program in said memory means for enabling a user of said remote control to define a macro for selecting at least one favorite channel by entry of a series of keystroke commands on said keyboard; and,
  - a macro playback program in said memory means for enabling an operator of said remote control to effect rapid selection of at least one favorite channel upon subsequent depression of said at least one MACRO key.

- dispersed pulses of electromagnetic radiation toward scatterers to generate returns;
- receiving means coupled for receiving said returns from said scatterers and for generating sets of received complex envelope signals therefrom;
- a bank of pulse-to-pulse Doppler filtering means including a second plurality of inputs and said second plurality of outputs, for filtering signals applied to each of said inputs about the center frequency of one of a plurality of frequency bins, to thereby produce a plurality of signals, each having a frequency spectrum related to that of the associated bin;
- a plurality, equal to said second plurality, of complex exponential signal generating means, each of which generates a complex exponential signal, the frequency of which is centered at the negative of the frequency of an associated one of said frequency bins;
- a plurality, equal to said second plurality, of multiplying means, each of which is coupled to said receiving means and to one of said complex exponential signal generating means, each of said multiplying means being for multiplying said sets of received complex envelope signals by one of said complex exponential waveforms, to thereby convert said sets of received signals into a baseband signal component at the output of said multiplying means, whereby said plurality of multiplying means produces a plurality of baseband signal components;
- a plurality, equal in number to said second plurality, of identical cascades, each of said cascades including the cascade of range sidelobe suppression means and pulse compression means, each of said cascades being coupled to the output of one of said and to said input of a corresponding one of said pulse-to-pulse Doppler filter means of said Doppler filter bank, each of said cascades being for processing one of said baseband signal components to reduce range sidelobes, to thereby produce a plurality of range sidelobe suppressed signals at said inputs of said pulse-to-pulse Doppler filter means, whereby each set of transmitted and received signals results in a set of signals at the outputs of said Doppler filter bank.

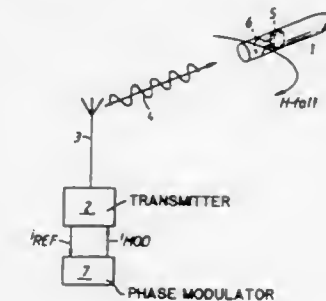
5,414,429  
**DEVICE FOR CONVERTING OUTPUT DATA OF A RADAR FOR THE DISPLAY THEREOF ON A TELEVISION SCREEN**  
 Bernard C. Giraudy, Taverny, France, assignor to Soplelem-Sofretec, Bezons, France  
 Filed Apr. 21, 1993, Ser. No. 50,884  
 Claims priority, application France, Jun. 18, 1992, 92 07423  
 Int. Cl.<sup>6</sup> G01S 7/531  
 U.S. Cl. 342—185 2 Claims



1. A device for converting data from a radar for display on at least one screen of a television monitor associated with a videographic memory, the radar signals comprising at least one videographic signal and scanning data, said device including:
- processing means, said processing means for processing said radar videographic signal;

- digitizing means, connected to said processing means for digitizing said videographic signal;
- videographic signal converting means connected to said digitizing means for compressing said digitized videographic signal;
- intermediate memory means, connected to said videographic signal converting means for receiving and storing said compressed videographic signal;
- distance marker generating means, receiving radar data through differential amplifier means and clock management means, for generating distance markers said distance marker generating means connected to said intermediate memory means, said intermediate memory means receiving outputs from both said videographic signal converter means and said distance marker generating means;
- polar to cartesian converting means for receiving radar data through differential receiver means, and converting said data from polar coordinates to cartesian coordinates;
- output buffer memory means, connected to said polar to cartesian converting means receiving and storing output of said polar to cartesian converting means and output of said intermediate memory means said intermediate memory means containing said compressed videographic signal and said distance markers;
- a radar data interface means connected to said output buffer memory means, for transmission of control orders to a converting means for controlling said videographic memory associated with said television monitor, as a function of the data contained in said output buffer memory means;
- after glow processing means connected to said radar data interface means and also connected to said videographic memory; said after glow processing means being adapted to control selected zones of said video memory based on a mathematical treatment formula, to produce a pseudo after glow phenomenon of selected points of said image display on said television monitor.

5,414,430  
**DETERMINATION OF ROLL ANGLE**  
 Ake Hansén, Karlstad, Sweden, assignor to Bofors AB, Karlstad, Sweden  
 Continuation of Ser. No. 907,578, Jul. 2, 1992, abandoned. This application Sep. 8, 1993, Ser. No. 117,649  
 Claims priority, application Sweden, Jul. 2, 1991, 9102056  
 The portion of the term of this patent subsequent to Nov. 17, 2009, has been disclaimed.  
 Int. Cl.<sup>6</sup> F41G 7/30  
 U.S. Cl. 342—188 11 Claims



1. A system for an unambiguous determining of the roll angle attitude of a rotating projectile, grenade, missile or the like with the aid of a linearly polarized electromagnetic radiation, said system comprising a transmitter for emitting a position-determining linearly polarized radiation (space wave) in the direction of the projectile and a receiver arranged in the projectile for receiving the emitted radiation and determining said roll angle attitude from said received space wave, the emitted space wave is formed from a continuous carrier wave reference with frequency  $f_1$ ; which has been phase-modulated by modulating said carrier wave reference with an essentially



sinusoidal modulation frequency  $f_2$ , prior to being emitted by said transmitter and wherein  $f_2$  is  $< f_1$  and wherein  $f_2$  forms a submultiple of the carrier wave frequency  $f_1$ .

5,414,431

## SATELLITE COMMUNICATION SYSTEM

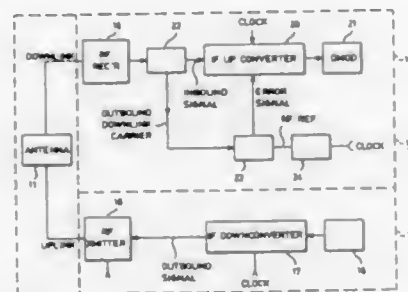
John S. McCoskey, Derwood, Md., assignor to GTE Spacenet Corporation, McLean, Va.

Filed Jan. 2, 1990, Ser. No. 460,202

Int. Cl.<sup>6</sup> H04B 7/185

U.S. Cl. 342—352

8 Claims



1. A satellite communication system comprising:
  - a satellite having means for receiving a signal on an uplink carrier frequency, frequency translating, and transmitting said signal at a downlink carrier frequency, said downlink carrier frequency differing from said uplink carrier frequency by a standard frequency offset and a frequency offset error;
  - a terminal earth station for transmitting to said satellite an inbound signal on said uplink carrier frequency; and
  - a hub earth station including:
    - means for continually transmitting to said satellite an outbound signal on said uplink carrier frequency;
    - means for receiving from said satellite said outbound signal at said downlink carrier frequency;
    - means for stripping the outbound signal from said downlink carrier frequency;
    - means for providing a reference carrier;
    - means for comparing said stripped downlink carrier frequency to said reference carrier and for providing a frequency offset error signal corresponding to the frequency offset error;
    - means for receiving from said satellite said inbound signal at said downlink carrier frequency, and
    - means for adjusting the processing of said inbound signal in response to said offset frequency error signal to compensate for said offset frequency error, said satellite communication system not requiring a pilot signal synchronization between the hub earth station and the terminal earth station.

5,414,432

## POSITION LOCATING TRANSCIEVER

Robert E. Penny, Jr., Gilbert, and Thomas J. Mihm, Jr., Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill. Continuation of Ser. No. 845,904, Mar. 4, 1992, abandoned. This application Apr. 22, 1993, Ser. No. 51,584

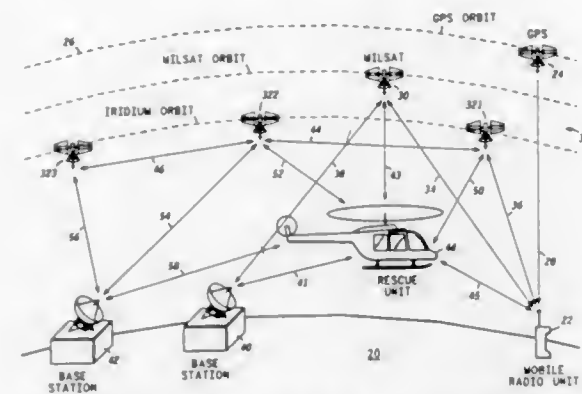
Int. Cl.<sup>6</sup> G01S 1/02, 3/02

U.S. Cl. 342—357

21 Claims

1. A transceiver, said transceiver being a portable radio transceiver, said transceiver comprising:
  - a first radio receiver for receiving first signals from a satellite providing geolocation and timing information;
  - processor means coupled to said first radio receiver, said processor means for determining, based in part on said first signals, an estimated time window when a listening satellite communication system receives access messages,

said processor means providing an access message having a predetermined format including an index; transmitter means coupled to said processor means, said transmitter means for sending a predetermined sequence of repetitions of said access message to said satellite communication system at least partially during said estimated access time window, each access message of said predetermined sequence having a different index; and



an input device for indicating an alert condition, said input device coupled to said processor means and to said transmitter means, said input device for detecting said alert condition and, when said alert condition is detected, reporting said alert condition and geolocation information describing location of said radio to said satellite communication system.

5,414,433

## PHASED ARRAY RADAR ANTENNA WITH TWO-STAGE TIME DELAY UNITS

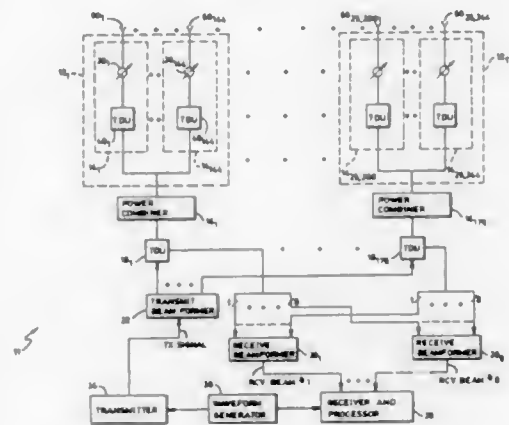
Kaichang Chang, Northborough, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Feb. 16, 1994, Ser. No. 197,041

Int. Cl.<sup>6</sup> H01Q 3/22

U.S. Cl. 342—375

35 Claims



1. A phased array antenna comprising:
  - a plurality of antenna radiating elements for providing a directed beam of electromagnetic energy said radiating elements being arranged in groups to form a plurality of time steered subarrays;
  - means in each of said radiating elements for phase steering the direction of said beam of electromagnetic energy;
  - means in each of said radiating elements coupled to said phase steering means for providing a time delay at each of said elements for a partial compensation to a wavefront of

said electromagnetic energy produced by said plurality of time steered subarrays; means coupled to each of said subarrays for collimating said electromagnetic energy of transmit output signals or receive input signals of said radiating elements; means coupled to each of said collimating means for providing a predetermined subarray time delay for optimum range resolution at a predetermined scan angle; and means coupled to each of said subarray time delay means for collimating said electromagnetic energy of said subarray time delay means to and from said phased array antenna.

5,414,434

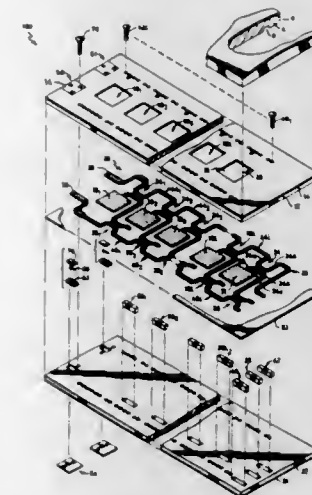
PATCH COUPLED APERTURE ARRAY ANTENNA  
James B. Conant, Brighton, Mass.; Joseph S. Pleva, Londonderry, N.H.; Norbert Sa, Burlington, Mass.; Edward G. Churchwell, Pepperell, Mass., and Matthew Fassett, Billerica, Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Aug. 24, 1993, Ser. No. 111,245

Int. Cl.<sup>6</sup> H01Q 1/38

U.S. Cl. 343—700 MS

13 Claims



1. An antenna comprising:
  - (a) a first dielectric substrate having a first and second surface;
  - (b) a first sheet of conductive material disposed on the first surface of the first dielectric substrate, the first sheet of conductive material having a plurality of apertures;
  - (c) a plurality of patch radiator elements disposed adjacent the second surface of the first dielectric substrate, each one of the plurality of patch radiator elements having a strip conductor feed and disposed diametrically opposed a corresponding one of the plurality of apertures;
  - (d) a second dielectric substrate having a first and a second surface;
  - (e) a second sheet of conductive material disposed on the first surface of the second dielectric substrate;
  - (f) strip conductor circuitry connected to the strip conductor feed of each one of the plurality of patch radiator elements and coupled to an RF connector; and
  - (g) a bonding layer disposed between the second surface of the first dielectric substrate and the second surface of the second dielectric substrate, the bonding layer comprising a material capable of withstanding a temperature greater than 500 degrees Fahrenheit.

5,414,435

## SPACE FRAME SATELLITE DISH AND AIMER SUPPORT

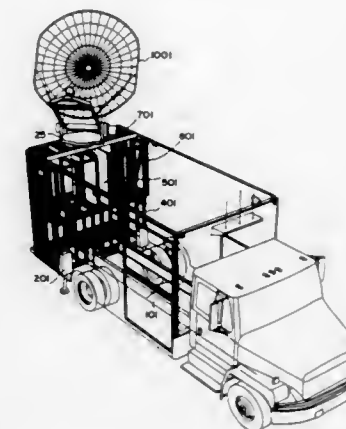
James S. Wolf, Sturbridge, Mass., assignor to Wolf Coach, Inc., Auburn, Mass.

Filed Mar. 8, 1994, Ser. No. 207,930

Int. Cl.<sup>6</sup> H01Q 1/32, 1/12

U.S. Cl. 343—713

4 Claims



1. In a communications vehicle having a chassis, two side walls, a rear wall, and a roof, a support structure for a satellite dish assembly, comprising:
  - a rear enclosure assembly mounted on said chassis, said rear enclosure assembly comprising a bulkhead wall and top and bottom horizontal sections each secured to said bulkhead wall;
  - jack means mounted on said rear enclosure assembly;
  - a pair of vertical dish supports secured to said top horizontal section of said rear enclosure;
  - a first rack assembly secured to said top horizontal section of said rear enclosure and to one of said vertical dish supports;
  - a second rack assembly spaced from said first rack and secured to said top horizontal section of said rear enclosure and to the other of said vertical dish supports;
  - a dish area roof frame supported on said pair of vertical dish supports, said first and second racks, and said rear and side walls; and
  - a satellite dish assembly mounted on said dish area roof frame.

5,414,436

## ELECTRIC EXTENSIBLE CAR ANTENNA

Masaki Shinkawa, and Misao Kimura, both of Kanagawa, Japan, assignors to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 26, 1993, Ser. No. 97,668

Int. Cl.<sup>6</sup> H01Q 1/32, 1/10, 1/14

U.S. Cl. 343—715

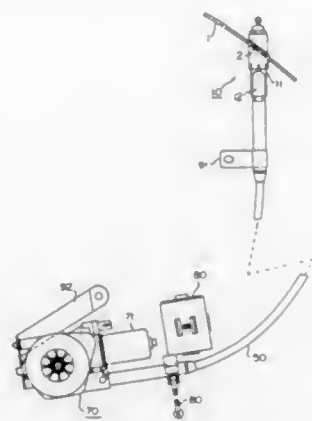
4 Claims

1. An electric extensible car antenna comprising:
  - an antenna attachment base mountable to an antenna attachment hole of a car body panel and provided with a cylindrical support member and an antenna power supply member, said support member piercing out of said car body panel when said antenna attachment base is mounted to said car body panel;
  - an antenna element supporting cylinder having an antenna element insertion hole at a center thereof, said antenna element supporting cylinder being detachable to an end of said cylindrical support member of said antenna attachment base, and said end protruding out of said car body panel;
  - a conductive contact element, one part thereof protruding as a flexible contact member into said antenna element insertion hole of said antenna element supporting cylinder and

another part of said contact element being located so as to provide a continuity with said antenna power supply member;

a single small-diameter rod antenna element forming an antenna mast movably inserted in said antenna element insertion hole of said antenna element supporting cylinder, an outer surface of said antenna element being in contact with said contact portion of said conductive contact element;

an antenna element guiding tube provided in a curved fashion between a proximal end of said antenna attachment base and a prescribed portion of an interior of a car body, so as to guide a proximal end of said antenna element in a



prescribed direction toward proximal end of said antenna element supporting cylinder;

a flexible rope equipped with a rack so as to move said antenna element, a first end of said rope is connected to proximal end of said antenna element guided by said antenna element guiding tube; and

an electric mechanism containing a pinion which engages with said rack of a second end of said flexible rope so as to move said flexible rope, said electric mechanism extending and retracting said antenna element by pushing said rope toward a distal end and pulling said rope toward a proximal end of said antenna element supporting cylinder near an opening which is provided at a proximal end of said antenna element guiding tube.

5,414,437

DUAL FREQUENCY INTERLEAVED SLOT ANTENNA

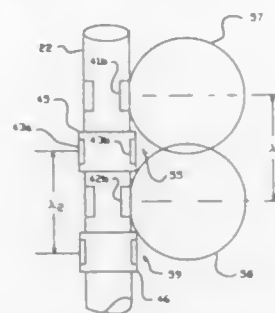
Ali R. Mahnad, 5063 Olive Oak Way, Carmichael, Calif. 95608

Filed Jun. 28, 1993, Ser. No. 84,285

Int. Cl.<sup>6</sup> H01Q 13/12

U.S. Cl. 343—770

2 Claims



1. A radio frequency antenna for simultaneously radiating a pair of first and second radio frequency signals comprising: a vertical antenna mast having first and second slot radiation pairs vertically spaced on said mast the wavelength of said first frequency signal, said first and second slot pairs having a radiation pattern with a null area between them; third and fourth slot radiation pairs respectively included in

a pair of collars positioned around said mast and vertically spaced the wavelength of said second frequency signal, said collars being located in said null area.

5,414,438

SPACE LATTICE PASSIVE REPEATER

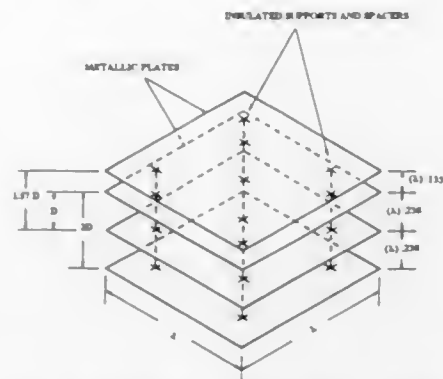
John A. Dooley, P.O. Box 161, East Marion, N.Y. 11939

Filed Sep. 13, 1993, Ser. No. 120,861

Int. Cl.<sup>6</sup> H01Q 15/02, 15/24

U.S. Cl. 343—910

1 Claim



1. A space lattice passive repeater for redirecting radio frequency waves in two directions, directly opposite to each other and both perpendicular to the original path of radio wave propagation, said repeater comprising four square thin metallic plates, each of said plates aligned above each other and insulated from each other, the flat wide surfaces of the plates being oriented parallel to the earth's surface, the lengths of said plates being  $\lambda$ , the vertical spacing from the bottom plate to the second plate being  $0.238\lambda$ , the vertical spacing from the second plate to the third plate being  $0.238\lambda$ , and the vertical spacing from the third plate to the top plate being  $0.135\lambda$ , where  $\lambda$  is the wavelength of the radio carrier frequency, and insulated spacers and supports being located between said plates, whereby the repeater redirects radio waves from multipoint to multipoint.

5,414,439

HEAD UP DISPLAY WITH NIGHT VISION ENHANCEMENT

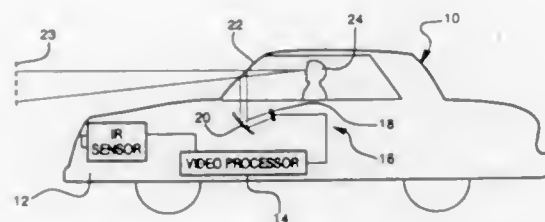
Doyle J. Groves, Kokomo; William G. Shogren, Noblesville, and Joseph E. Harter, Jr., Fishers, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Jun. 9, 1994, Ser. No. 257,310

Int. Cl.<sup>6</sup> G09G 5/00

U.S. Cl. 345—7

10 Claims



1. A night vision system for a motor vehicle comprising: an infrared camera mounted on the vehicle for viewing a roadway scene in front of the vehicle and producing a video signal representing the thermal pattern of the scene; a head up display comprising a combiner in the field of view of a vehicle operator, a video display for emitting an

image, and an aspheric mirror for reflecting the image onto the combiner for viewing by the operator as a virtual image;

the video display being responsive to the video signal for displaying the thermal pattern as a visible image; and the video display and aspheric mirror together affording a one-to-one size ratio of the virtual image to the real roadway scene observed by the operator.

5,414,440

ELECTRO-OPTICAL ADDRESSING STRUCTURE HAVING REDUCED SENSITIVITY TO CROSS TALK

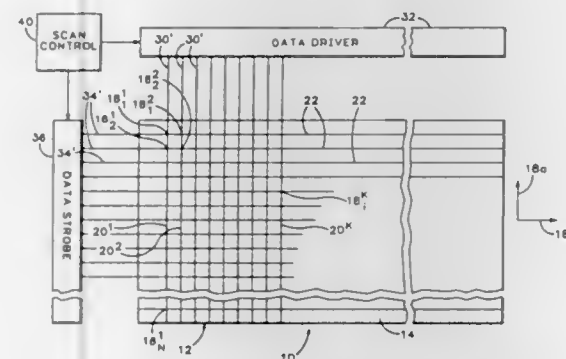
Kevin J. Ilcisin; Thomas S. Buzak, both of Beaverton, Oreg., and Paul C. Martin, Vancouver, Wash., assignors to Tektronix, Inc., Wilsonville, Oreg.

Continuation of Ser. No. 26,367, Mar. 4, 1993, abandoned. This application Jun. 21, 1994, Ser. No. 263,166

Int. Cl.<sup>6</sup> G09G 3/36

U.S. Cl. 345—58

14 Claims



1. A method of reducing sensitivity to cross talk and to direct current voltages and reducing operating voltage requirements in an electro-optical display having an addressing structure for addressing and delivering data drive signals to each of plural display elements arranged at address locations within an array during a row addressing period that defines an addressing frequency, the display elements having incidental electrical couplings that carry incidental data components having voltage values, comprising:

delivering data drive signals to display elements including a nematic liquid crystal material having a long molecular axis and characterized by an optical anisotropy less than about 0.085, a positive dielectric anisotropy less than about 5, a dielectric constant perpendicular to the long molecular axis less than about 5, and a threshold voltage in a range from about 3 volts to about 5 volts, thereby causing an image rendered on the display to be relatively unaffected by the incidental data components.

5,414,441

TEMPERATURE COMPENSATION APPARATUS FOR LIQUID CRYSTAL DISPLAY

Kazem Memarzadeh; Robert L. Protheroe, and John F. Crooks, all of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 640,189, Jan. 11, 1991, abandoned. This application Jul. 5, 1991, Ser. No. 726,321

Int. Cl.<sup>6</sup> G09G 3/36

U.S. Cl. 345—87

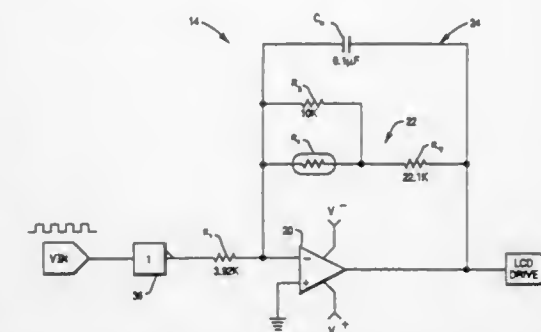
13 Claims

1. Apparatus for generating a contrast control voltage for a liquid crystal display comprising: a driver for generating a periodically pulsed driving signal; an output terminal for supplying said contrast control voltage to a liquid crystal display; an operational amplifier having an input side connected for receiving said periodically pulsed driving signal from said

driver and an output side connected to said output terminal;

a capacitive feedback path connected between said output side and said input side; and

a resistive feedback path connected between said output side and said input side;



said resistive feedback path comprising a thermistor for causing said contrast control voltage to vary with temperature in a manner which enables said contrast control voltage to drive a liquid crystal display at substantially different temperatures with no substantial variation in observed contrast.

5,414,442

ELECTRO-OPTICAL DEVICE AND METHOD OF DRIVING THE SAME

Shunpei Yamazaki, Tokyo; Akira Mase, Aichi; Masaaki Hiroki, and Yasuhiko Takemura, both of Kanagawa, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

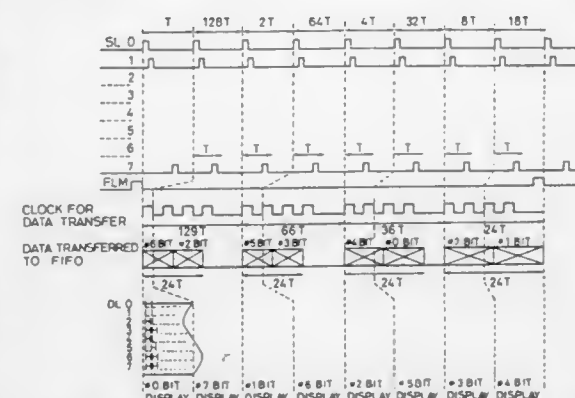
Filed Jun. 12, 1992, Ser. No. 897,669

Claims priority, application Japan, Jun. 14, 1991, 3-169306; Jul. 27, 1991, 3-209869

Int. Cl.<sup>6</sup> G09G 3/36

U.S. Cl. 345—89

17 Claims



1. A method of driving an electro-optical device comprising the steps of:

applying pulses to a signal line at intervals, wherein said intervals are  $T_1$  between the  $i$ -th pulse and the  $(i+1)$ -th pulse,  $2^N T_1$  between the  $(i+1)$ -th pulse and the  $(i+2)$ -th pulse,  $2T_1$  between the  $(i+2)$ -th pulse and the  $(i+3)$ -th pulse, and  $2^N T_1$  between the  $(i+3)$ -th pulse and the  $(i+4)$ -th pulse where  $N$  is a natural number,  $i$  is a natural number and  $T_1$  is a constant period.



5,414,443

## DRIVE DEVICE FOR DRIVING A MATRIX-TYPE LCD APPARATUS

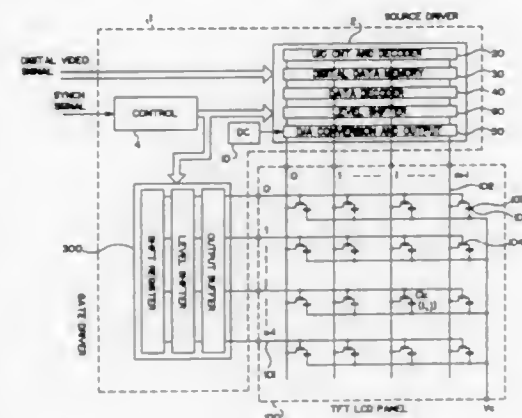
Yoshiharu Kanatani, Nara; Hirofumi Fukuoka, Osaka, and Sbigeyuki Uehira, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 504,353, Apr. 4, 1990, abandoned. This application Sep. 11, 1992, Ser. No. 944,025

Claims priority, application Japan, Apr. 4, 1989, 1-85526; Sep. 1, 1989, 1-227943; Sep. 1, 1989, 1-227944; Dec. 6, 1989, 1-318269 Int. Cl.<sup>6</sup> G09G 3/36

U.S. Cl. 345—95

10 Claims



1. In a drive device for driving a display apparatus having a display unit, said display unit including a plurality of signal electrodes arranged in juxtaposition and at least one counter electrode,

said drive device comprises:

- a voltage signal supply means for outputting a plurality of voltage signals with different levels, said plurality of voltage signals having alternately positive and negative levels with respect to an AC reference voltage applied to said counter electrode, said AC reference voltage being approximately 180 degrees out-of-phase with said plurality of voltage signals; and
- a signal electrode drive means for selecting one of said plurality of voltage signals in accordance with an input digital video signal, and for supplying said selected voltage signal to one of said signal electrodes.

5,414,444

## PERSONAL COMMUNICATOR HAVING ORIENTABLE VIDEO IMAGING ELEMENT

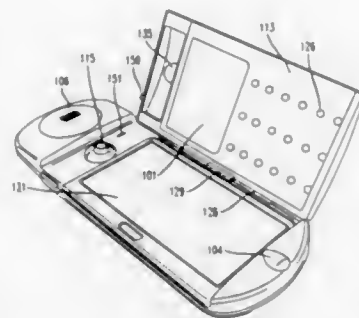
David M. Britz, Rumson, assignor to AT&T Corp., Murray Hill, N.J.

Filed Mar. 30, 1994, Ser. No. 221,152

Int. Cl.<sup>6</sup> G09G 3/02

U.S. Cl. 345—156

7 Claims



1. A personal communicator for radiotelephone communication with in a wireless communication system, comprising: a support housing including a keyboard input mounted on a

cover member connected by a hinge to the housing, a visual information display for information output positioned under the cover member and exposed when the cover member is open and a video image input module located adjacent the visual information display and accessible for visual input through a video camera aperture in the cover member when the cover member is closed; the video image input module comprising: a rotatable support mounted on a shaft defining a tilt axis and attached to the communicator housing; a focusing lens mounted in a lens housing of the rotatable support; an imaging collector mounted to receive images focused on it by the focusing lens; a signal conductor for coupling the imaging collector to circuitry within the communicator housing; a position reset lever connected to the rotatable support for adjusting an angular position of the rotatable support; the cover member including means for engaging the position reset lever when the cover member is closed and positioning the video image module so that the focusing lens is aligned to receive images through the video camera aperture.

5,414,445

## ERGONOMIC POINTING DEVICE

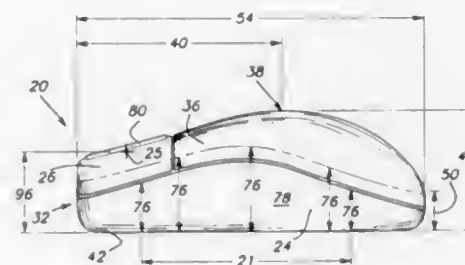
Steven T. Kaneko, and Aditha M. Adams, both of Seattle, Wash., assignors to Microsoft Corporation, Redmond, Wash.

Filed Oct. 7, 1992, Ser. No. 957,682

Int. Cl.<sup>6</sup> G09G 3/02

U.S. Cl. 345—163

32 Claims



1. A pointing device for inputting commands into a computer comprising:

- a body;
- a key coupled to the body; and
- wherein the body is 4.25 to 4.5 inches long as measured along a bottom surface from a front end to a back end, the key being coupled to the body such that it forms a portion of the front end and of a top surface, the top surface sloping upwards from the front end to a high point, the top surface sloping downwards from the high point to the back end, the high point being 2.65 to 2.75 inches from the front end and a height of the back end being 0.0 to 0.5 inch, as measured from a back edge to the bottom surface, whereby the height of the back end allows a user to position a lower palm of the user's right hand or left hand on a work surface, a size of the user's right hand or left hand falling within a range of a 5th percentile female to a 95th percentile male of North American adults, and the top surface of the pointing device provides a support for the hand plane of the user's right hand or left hand, the hand plane being a region defined by the second to fifth metacarpals, the metacarpals being numbered 1-5, beginning with the thumb, and allows a finger of the user's right hand or left hand to rest in a neutral posture along the top surface of the pointing device such that the keys may be activated by the finger of the user, thereby allowing the user to grasp and actuate the pointing device with either

the right hand or the left hand in a biomechanically neutral position.

5,414,446

Patent Not Issued For This Number

5,414,447

## FRAME BUFFER, METHOD AND CIRCUIT

Louis J. Izzi, Plano, Tex., and Richard E. Downing, Hoffman Estates, Ill., assignors to Texas Instruments Incorporated, Dallas, Tex.

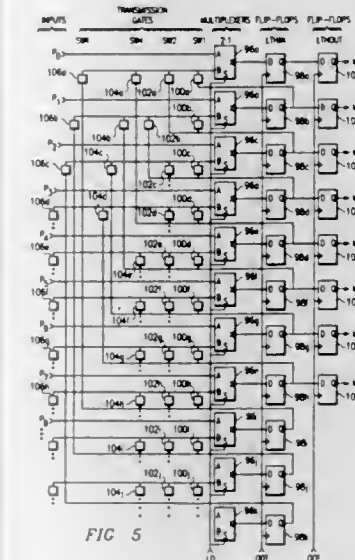
Division of Ser. No. 723,342, Jun. 28, 1991, Pat. No. 5,309,173.

This application Oct. 26, 1993, Ser. No. 143,333

Int. Cl.<sup>6</sup> G09G 1/02

U.S. Cl. 345—190

4 Claims



1. A method for transmitting a digital data word in n cycles, said digital data word having n subwords, each subword having k bits, k and n being integers, comprising the steps of:

- providing a sequential array of the product of k and n one-bit input latches arranged in n sequential sets, each set having k latches;
- providing a sequential array of k one-bit output latches, said output latches having an input coupled to an output of a respective one of a first set of input latches;
- latching a digital data word into said input latches; and
- for each cycle of said n cycles, performing the following steps:
  - for the first set of input latches, transferring a bit stored therein to the corresponding one of said output latches; and
  - for each subsequent set of input latches, transferring a bit stored therein to a corresponding input latch of a next prior set of input latches.

5,414,448

## CHARACTER/PATTERN GENERATOR AND INFORMATION PROCESSING SYSTEM

Hiroshi Wada, Fujisawa; Yoshiaki Kitazume, Sayama; Kazuko Hasegawa; Shinji Wakisaka, both of Yokohama, and Tsuneo Sato, Tanashi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

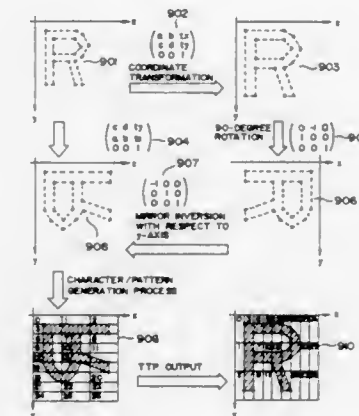
Filed Sep. 1, 1992, Ser. No. 938,760

Claims priority, application Japan, Sep. 3, 1991, 3-223139

Int. Cl.<sup>6</sup> G09G 5/24

U.S. Cl. 345—194

15 Claims



1. In a character/pattern generator wherein at least either items of characters and patterns are to be processed, and wherein bit map data expressing any of the items in a dot form is generated from vector data which is outline information expressing an outline of the item in a vector form and is delivered as an output:

a character/pattern generator comprising:

- coordinate transformation means for coordinate-transforming said vector data;
- bit map data generation means for generating said bit map data of said dot form from the vector data coordinate transformed by said coordinate transformation means;
- said coordinate transformation means including a coordinate transformation function of subjecting said vector data to any of at least two sorts of coordinate transformations by the use of coordinate transformation parameters externally given from an associated processor unit, and a coordinate transformation selection function of selecting any of said at least two sorts of coordinate transformations on the basis of information externally given;
- a coordinate transformation circuit which coordinate-transforms said vector data, the coordinate transformation circuit including,
  - a coordinate transformation mode register in which a value for designating a coordinate transformation method is set from an associated processor unit,
  - a coordinate transformation execution unit which executes coordinate transformation calculations in conformity with the designated coordinate transformation method, and
  - a coordinate transformation controller which controls the operation of said coordinate transformation circuit;
- memory means for storing the coordinate transformation parameters received from the associated processor unit;

wherein said coordinate transformation function includes, at least, a case where the coordinate transformation represented by:

$$efunc \begin{pmatrix} X' \\ Y' \\ 1 \end{pmatrix} = \begin{pmatrix} a & b & tx \\ c & d & ty \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} X \\ Y \\ 1 \end{pmatrix}$$

(where X and Y denote coordinate values before said coordinate transformation, while X' and Y' denote coordinate values after said coordinate transformation as correspond to said values X and Y, respectively) is performed by the use of the following coordinate transformation parameters externally given:

$$\begin{pmatrix} a & b & tx \\ c & d & ty \\ 0 & 0 & 1 \end{pmatrix}$$

and a case where the coordinate transformation represented by:

$$\begin{pmatrix} X' \\ Y' \\ 1 \end{pmatrix} = \begin{pmatrix} c & d & ty \\ a & b & tx \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} X \\ Y \\ 1 \end{pmatrix}$$

(where X and Y denote coordinate values before said coordinate transformation, while X' and Y' denote coordinate values after said coordinate transformation as correspond to said values X and Y, respectively) is performed by the use of the following coordinate transformation parameters externally given:

$$\begin{pmatrix} c & d & ty \\ a & b & tx \\ 0 & 0 & 1 \end{pmatrix}$$

a central processing unit, and at least one sort of output engine;  
said central processor unit including information bestowal means for giving said character/pattern generator the

information which corresponds to an address allocation of said output engine to-be-used;  
said coordinate transformation selection function selecting any of said at least two sorts of coordinate transformations on the basis of said information given by said information bestowal means; and  
a coordinate transformation execution unit including,  
a first register file in which coordinate transformation parameters are stored,  
a second register file in which coordinate transformation parameters are stored,  
a multiplier which multiplies the coordinate value stored in said first register file and the corresponding coordinate transformation parameter stored in said second register file,  
a first latch circuit and a second latch circuit in which multiplication results of said multiplier are accumulated,  
an adder/subtractor which executes a first addition/subtraction between the content of said first latch circuit and that of said second latch circuit, and a second addition/subtraction between a last addition/subtraction result and the corresponding coordinate transformation parameter stored in said second register file,  
selectors which select either of said first addition/subtraction and said second addition/subtraction so as to execute the selected addition/subtraction by means of said adder/subtractor,  
a third latch circuit which stores a result of said addition/subtraction of said adder/subtractor, and  
local biases which connect the aforementioned constituents.

5,414,449

## THERMAL TRANSFER PRINTING APPARATUS

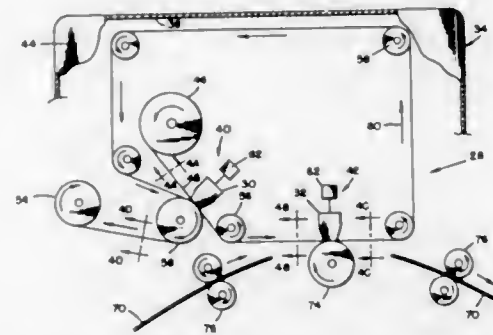
Danilo P. Buan, Easton; Albert C. Chiang, Danbury, and Donald T. Dolan, Ridgefield, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 251,013, Sep. 27, 1988, abandoned, which is a continuation of Ser. No. 584, Jan. 6, 1987, abandoned. This application Jan. 28, 1991, Ser. No. 649,222

Int. Cl.<sup>6</sup> B41J 2/325

U.S. Cl. 347—217

54 Claims



1. In printing apparatus of a type which includes means for thermally transferring ink from a ribbon to a workpiece, wherein the ribbon includes a backing layer and an ink donor layer supported by the backing layer, a printing process comprising the steps of:

- transferring a first portion of the ink from the ink donor layer to the backing layer, and thereafter
- feeding the ribbon to a spool; and
- transferring a second portion of the ink from the ink donor layer to the workpiece.

5,414,450  
HEAD PRESSING MECHANISM OF A THERMAL PRINTER

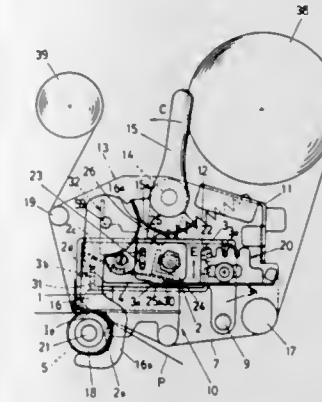
Genzi Oshino, and Isamu Suzuki, both of Miyagi, Japan, assignors to Tohoku Richo Co., Ltd., Miyagi, Japan

Filed Dec. 3, 1992, Ser. No. 985,202

Claims priority, application Japan, Dec. 6, 1991, 3-322232  
Int. Cl.<sup>6</sup> B41J 25/304, 25/312, 25/308, 25/316

U.S. Cl. 342—197 PH

7 Claims



1. In a thermal printer comprising a platen having a shaft and a line type thermal head which is arranged substantially in parallel with the shaft of the platen, said thermal printer further comprising:

- positioning members mounted on both ends of the shaft of the platen, each of said positioning members having a circular-arc edge portion center whose is in common with the shaft of the platen at least at a part of an outer circumference thereof,
- contacting members integrally formed with the thermal head for allowing a printing line of the thermal head to face a given position on an outer circumferential surface of the platen when the contacting members contact the edge portions of the positioning members,
- a head supporting means including means for resiliently supporting the thermal head so that the thermal head is movable toward or away from the platen while the contacting members contact the edge portions of the positioning members,
- a means for applying a pressure to the thermal head so that the thermal head is movable toward the platen, and
- swinging restriction means respectively provided on the head supporting means at a position corresponding to both longitudinal ends of the platen for restricting swinging of the thermal head about a longitudinal central portion of the thermal head.

5,414,451

## THREE-DIMENSIONAL RECORDING AND REPRODUCING APPARATUS

Hisataka Sugiyama, Kodaira; Takeshi Maeda; Kiyoshi Matsumoto, both of Kokubunji; Motoyasu Terao, Tokyo; Shigenori Okamine, Kodaira; Tetsuya Nishida, Hachioji, and Harukazu Miyamoto, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 8, 1992, Ser. No. 958,162

Claims priority, application Japan, Oct. 11, 1991, 3-263561

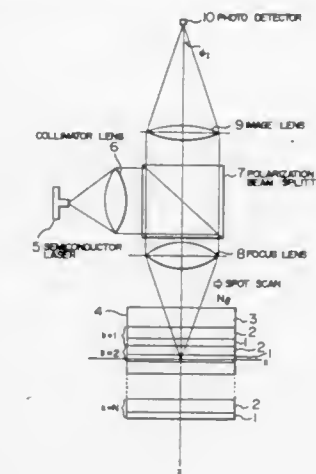
Int. Cl.<sup>6</sup> B41J 2/435

U.S. Cl. 347—258

12 Claims

1. Three dimensional recording and reproducing apparatus comprising:
- a recording medium having N number of recording layers on a substrate;
  - a laser light source;
  - an optical system including a focus lens for focusing a light emitted from said laser light source on a k<sub>th</sub> layer of said

recording layers; separating means for separating the light reflected from said recording layer from said emitted light; and an image lens for converging said reflected light; and  
photo detector disposed on a focal plane of said optical system and having an effective diameter D given by:



$$D = \lambda / \text{NAI}$$

where  $\lambda$  represents the wavelength of said emitted light, and NAI the numerical aperture of said image lens.

5,414,452

## RECOGNITION OF INK EXPIRY IN AN INK JET PRINTING HEAD

Andrea Accatino, Romano Canavese, and Angelo Arca, Cascinette, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

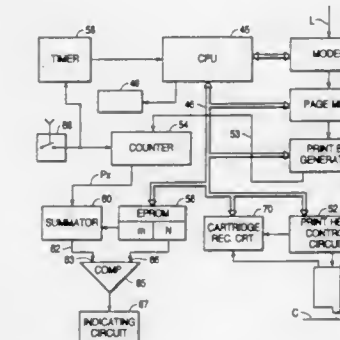
Filed May 27, 1993, Ser. No. 68,121

Claims priority, application Italy, Jun. 8, 1992, TO92A0485

Int. Cl.<sup>6</sup> B41J 2/175

U.S. Cl. 347—7

16 Claims



1. A method for recognition of expiry of ink in a reservoir (16) of an ink jet printing head in which drops of ink are expelled from a nozzle in response to electrical pulses, comprising the steps of:

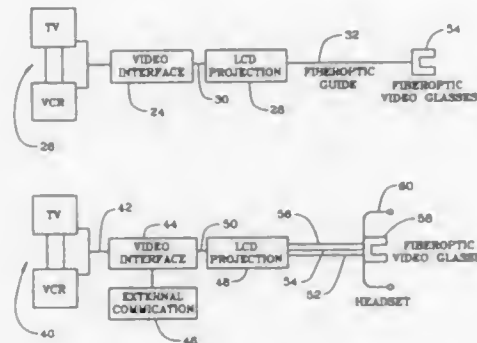
- counting a number of drops progressively expelled in response to the pulses;
- adding to said number a second number of drops (m) equivalent to ink evaporated from the reservoir to obtain a total number of drops; and
- generating an ink expiry signal when the total number of drops is equal to or exceeds a known volume of ink in said reservoir, expressed as a number of equivalent drops (N).



1. A display system providing visual stimuli to a patient

while lying in a horizontal position within a Magnetic Resonance Imaging (MRI) apparatus, said system comprising:

- a video interface having at least one input and at least one output, said input available for coupling to at least one video device capable of providing an NTSC output;
- at least one projector coupled to said output of said video interface converting said output into a visual image;
- at least one flexible fiber optic image guide coupled to said projector;
- means for coupling said visual image from the output of said projector into a first end of at least one said image guide; and
- facial mounted glasses coupled to a second end of at least one said fiber optic image guide available for positioning directly over each eye providing visual stimuli discernable thereto as transferred through said image guide, said glasses comprising:



a U-shaped hollow housing having at least one input end and a first and second display end;

- means for coupling each said input end to said fiber optic image guide;
- a first and second diffuser faceplates;
- mirror means disposed in each said first and second display end for reflecting said visual image respectively directed through said first and second diffuser faceplates; and
- a first and second combiner lens having an inner surface for reflection of said visual image respectively reflected from said first and second mirror means, one said combiner lens and one corresponding said mirror means being available for positioning directly over each eye of a human providing visual stimuli discernable thereto through said first and second display end whereby said visual image is viewable.

#### 5,414,460 MECHANICAL APERTURE FOR CONTROLLING ILLUMINATION LEVEL

Thomas Nierit, Webster; James D. McKay, Penfield; Raymond L. Dewolf, and Richard J. Sandor, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed Jun. 8, 1993, Ser. No. 73,820  
Int. Cl.<sup>6</sup> H04N 5/253, 5/238

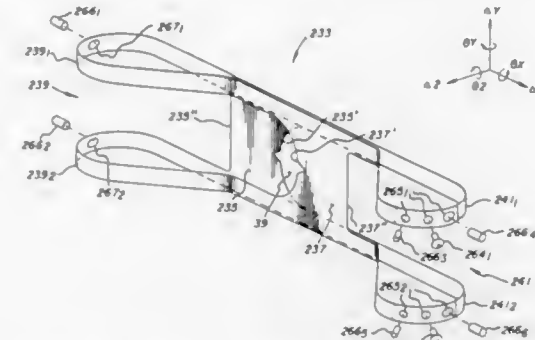
U.S. Cl. 348—97

21 Claims

1. In an illumination system for a film telecine scanner, of the type adapted to illuminate the image frames of a film and to derive video image frame data from the illuminated image frames within a predetermined frame scanning time interval, comprising an illumination light source which is adapted to provide a light beam along an optical path in said system, and means located in said optical path for receiving said light beam from said light source and for illuminating the image frames of the film with diffuse, uniform illumination, aperture setting apparatus for selectively adjusting the amount of light entering said illuminating means in response to a drive signal comprising:

aperture defining means selectively locatable in a plurality of aperture defining positions in said optical path for selectively decreasing or increasing the diameter of said gener-

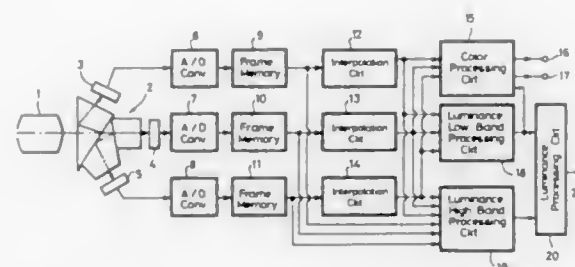
ally circular light beam to interrupt more or less of said light beam and thereby selectively adjust the amount of light entering said illuminating means, said aperture defining means comprising first and second movable light blocking means formed in a single continuous band having low mass and high structural stiffness sufficient for achieving a selected aperture defining position from any other of said plurality of aperture defining positions within the time span of scanning a single image frame of the film; and





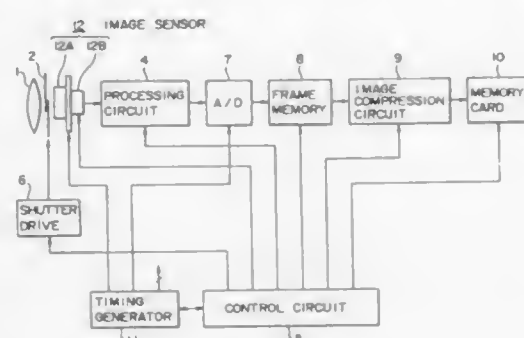
- a video output terminal (1) for receiving one of (i) the output video signal from said camera means and (ii) the reproduced video signal from said recording/reproducing means and (2) for feeding the received video signals to an external apparatus;
- a control signal terminal (1) for receiving one of (i) the aspect ratio control signal from the generating means and (ii) the reproduced control signal from the recording/reproducing means and (2) for feeding the received control signal to the external device;
- signal switching means connected to said camera means, said recording/reproducing means, and said output video terminal and control signal terminal for selectively (1), in a camera mode, feeding the output video signal from said camera means to said recording/reproducing means and said video output terminal and the aspect ratio control signal from the generating means to the control signal terminal and (2), in a reproduction mode, feeding said reproduced video and control signals from said recording/reproducing means to said video output and control terminals, respectively.

5,414,465  
LUMINANCE SIGNAL GENERATOR WITH INTERPOLATION  
Yasumasa Kodama, and Yoshlyukl Sekine, both of Kanagawa, Japan, assignors to Sony Corporation, Japan  
Filed Jan. 3, 1994, Ser. No. 176,463  
Claims priority, application Japan, Jan. 14, 1993, 5-004939  
Int. Cl.<sup>6</sup> H04N 9/09  
U.S. Cl. 348—236 7 Claims



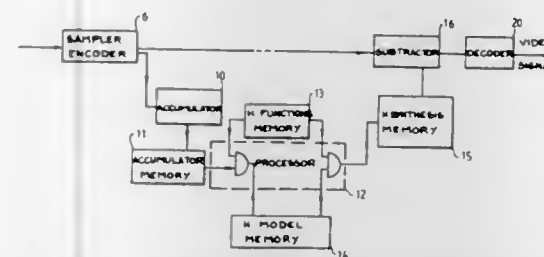
1. A luminance signal generating apparatus comprising:
  - a first CCD device;
  - a second CCD device disposed at a position obliquely displaced relative to a spatial position of said first CCD device;
  - interpolating means for interpolating the output from said second CCD device;
  - low band luminance signal generating means for generating a low band luminance signal on the basis of the output from said interpolating means;
  - high band luminance signal generating means for generating a high band luminance signal on the basis of output signals from said first and second CCD devices and the interpolation signal from said interpolating means; and
  - luminance signal generating means for generating a luminance signal on the basis of said low band luminance signal and said high band luminance signal from said low band luminance signal generating means and said high band luminance generating means.
2. A luminance signal generating apparatus comprising:
  - first and second CCD devices;
  - a third CCD device disposed at a position displaced by a 1/2 pixel in the horizontal and vertical directions relative to spatial positions of said first and second CCD devices;
  - interpolating means for interpolating the output signal from said third CCD device;
  - low band luminance signal generating means for generating a low band luminance signal on the basis of the output signal from said interpolating means;
  - high band luminance signal generating means for generating a high band luminance signal on the basis of output signals from said second and third CCD devices and the interpolation signal from said interpolating means; and
  - luminance signal generating means for generating a luminance signal on the basis of said low band luminance signal and said high band luminance signal from said low band luminance signal generating means and said high band luminance signal generating means.

5,414,464  
IMAGE SENSOR AND ELECTRONIC STILL CAMERA WITH AN ADDRESSABLE IMAGE PICKUP SECTION AND AN ANALOG PRODUCT SUM CALCULATION SECTION  
Tadao Sasaki, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
Filed Apr. 5, 1994, Ser. No. 223,235  
Claims priority, application Japan, Apr. 9, 1993, 5-083316  
Int. Cl.<sup>6</sup> H04N 5/228  
U.S. Cl. 348—222 10 Claims



1. An image sensor, comprising:
  - a control circuit for controlling an operation of said image sensor;
  - an image pickup section for detecting an image and non-destructively reading out picture element signals representing the image according to address signals supplied by said control circuit; and
  - a product sum calculation section for receiving said picture element signals selectively and successively read out from said image pickup section according to said address signals supplied by said control circuit, for multiplying the picture element signals by predetermined coefficients and for adding signals obtained by the multiplication to obtain an output picture element signal.

5,414,466  
DEVICE FOR THE CORRECTION OF IMAGES FROM A SENSOR CAUSING A PERIODIC NOISE, AND IMPLEMENTATION METHOD  
Xavier Noreve; Michel Terre, both of Paris, and Luc Fety, Viels-Maisons, all of France, assignors to Thomson-TRT Defense, Paris, France  
Continuation of Ser. No. 695,452, May 3, 1991, abandoned. This application Feb. 1, 1993, Ser. No. 13,205  
Claims priority, application France, May 15, 1990, 90 06034  
Int. Cl.<sup>6</sup> H04N 5/335, 3/14  
U.S. Cl. 348—241 5 Claims



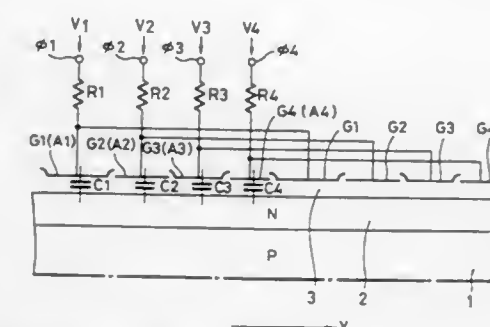
1. A method for the correction of striping in a thermal image wherein the striping defect results from the analysis of said image and in the bands of a plurality of lines, now number, by means of a matrix sensor and prompts the appearance, on said image, of zones wherein, at each pixel, the luminance values due to the defect superimposed on the luminance values of said image, all of these zones comprising a striped space, wherein said method comprises the steps of:
  - converting a thermal image into electrical signals by employing a matrix thermal sensor;
  - storing in a memory numerical values indicative of an image received from said matrix thermal sensor;
  - determining from said stored values, contained in said memory, of the image containing said striped space, an identification of the luminance value of the striping; with the taking of values by a global polynomial functions of a vector space of functions generated by a base of decorrelated and normed functions of said stored values of said image;
  - modelizing the striping in said space of polynomials, by determining the coefficients of distribution of the striping of each function of the base from the luminance values of the stored image and from the values of each of the functions of said base;
  - synthesizing the striping by determining luminance values of the striping from the coefficients of correlation and from the values of the functions of said base by said processor;
  - subtracting the synthesized striping from the initial image by subtracting the synthesized striping from the luminance values of the initial image; and
  - outputting a video signal indicative of the corrected video image for further display.

5,414,467  
CHARGE TRANSFER DEVICE WHEREIN THE TIME CONSTANT BETWEEN THE CLOCK MEANS AND THE TRANSFER GATE ELECTRODES ARE SUBSTANTIALLY EQUAL  
Eiji Komatsu, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
Continuation of Ser. No. 44,503, Apr. 9, 1993, abandoned. This application Aug. 17, 1994, Ser. No. 291,493  
Claims priority, application Japan, Apr. 13, 1992, 4-093027  
Int. Cl.<sup>6</sup> H04N 5/335  
U.S. Cl. 348—322 6 Claims

5. A charge transfer device formed on a semiconductor substrate comprising:
  - a channel region formed on the semiconductor substrate;
  - a plurality of transfer gate electrodes of variable sizes formed over the channel region through an insulating

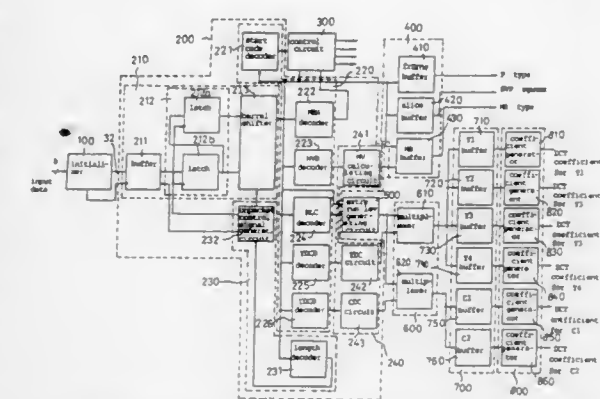
layer, each transfer gate electrodes formed adjacent to each other and insulated from each other, each transfer gate electrode at least partially overlapping adjacent transfer gate electrodes and spacing a same distance from the channel region;

clock means for providing the transfer gate electrodes with multiple clock pulses; and



a plurality of resistors each of which is provided between each transfer gate electrode and the clock means, said resistors having respective resistances so that the products of the resistance of each of said resistors and the capacitance of each of said transfer gates are equal, thereby charge transfer efficiency of said charge transfer device is improved.

5,414,468  
APPARATUS FOR DECODING VARIABLE LENGTH CODES  
Heung Soon Lee, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea  
Filed May 14, 1993, Ser. No. 61,667  
Claims priority, application Rep. of Korea, May 19, 1992, 8454/1992  
Int. Cl.<sup>6</sup> H04N 7/133, 7/137  
U.S. Cl. 348—402 3 Claims



1. An apparatus for decoding variable length codes formed of different code types having different code lengths comprising:
  - an initializer for detecting a picture start code of compressed video data received from a channel and outputting a control signal for informing of the start of a decoding operation;
  - decoding means for aligning the video data from the initializer and decoding said variable length codes by said code types, according to the control signal from the initializer; and providing decoded motion vector information, decoded luminance information, decoded color information, and decoded run length information;
  - a control circuit for controlling the operation of the apparatus.

tus in response to the code types decoded by the decoding means;

a picture buffering circuit for buffering the video data from the decoding means, to output buffer signals indicating whether full information or difference information is present, and for receiving and outputting motion vector information decoded in the decoding means as horizontal/vertical motion vector information;

an extra run level generating circuit for generating extra data corresponding to a shortage of data, based on the run length information outputted from the decoding means;

a multiplexing circuit for composing an extra run level signal from the extra data from the extra run level generating circuit, said decoded luminance information from the decoding means and said decoded color information from the decoding means;

a data buffering circuit for buffering luminance signals and color signals outputted from the multiplexing circuit; and

a coefficient generating circuit for detecting discrete cosine transform coefficients from the luminance signals and color signals from the data buffering circuit and outputting the detected coefficients.

5,414,469

# MOTION VIDEO COMPRESSION SYSTEM WITH MULTIREOLUTION FEATURES

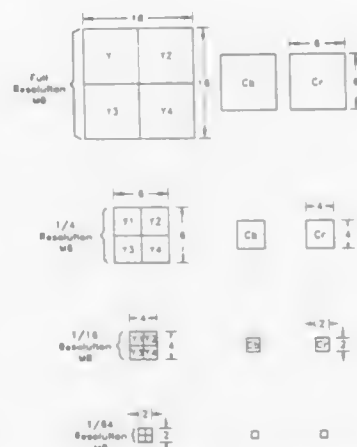
Cesar A. Gonzales, Katonah, N.Y.; Dov Ramm, Menashe, Israel, and Eric Viscito, Danbury, Conn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1991, Ser. No. 786,233

Int. Cl.<sup>6</sup> H04N 7/13

U.S. Cl. 348—408

10 Claims



1. A method of decoding a moving image at a target spatial resolution scale from compressed video information containing data for a hierarchy of spatial resolution scales, comprising the steps of:

- decompressing macroblock attributes and transform coefficient data from a base spatial resolution scale;
- decompressing refinements to the macroblock attributes and additional transform coefficient data for the next higher spatial resolution scale in the hierarchy;
- repeating step (b) for progressively higher spatial resolution scales in the hierarchy until the target spatial resolution scale is reached; and
- combining the transform coefficient data which have been decompressed to produce a transform representation of the moving image.

## 5,414,470 SYNC SIGNAL GENERATOR FOR GENERATING A SECOND SYNC SIGNAL SYNCHRONIZED WITH A FIRST SYNC SIGNAL

Nobutaka Hotta, Fujisawa; Kazuhiko Ooyagi, Yokohama, and Keiro Shinkawa, Hiratsuka, all of Japan, assignors to Hitachi, Ltd.; Hitachi Video Engineering, Incorporated and Hitachi Automotive Engineering Co., Ltd., all of Tokyo, Japan

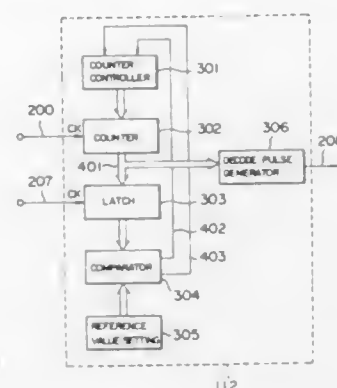
Filed Jan. 28, 1991, Ser. No. 646,434

Claims priority, application Japan, Jan. 26, 1990, 2-014959

Int. Cl.<sup>6</sup> H04N 5/04

U.S. Cl. 348—530

18 Claims



1. A sync signal generator to generate a second sync signal synchronized with an inputted first sync signal, comprising:
  - a phase reset signal detector for receiving the first sync signal and outputting a timing pulse whose phase fluctuation is smaller than a phase fluctuation of the first sync signal; and
  - a sync generator for receiving the timing pulse and generating the second sync signal having the same phase as that of the timing pulse;
 wherein the phase reset signal detector comprises:
  - a reference clock generator for independently generating a reference clock related to a standardized sync signal, and
  - a phase controller responsive to the first sync signal and the reference clock for frequency dividing the reference clock into arbitrary periods such that a phase difference between the first sync signal and the said timing pulse is reduced by only an arbitrary set value for ones of said arbitrary periods during which a phase difference exists and for producing a timing pulse at a corresponding timing within each arbitrary period.

5,414,471

# MOVABLE CURSOR FOR SELECTING AND EXCHANGING MAIN PICTURE AND SUB PICTURE IN MULTI-PICTURE DISPLAY DEVICE

Mitsumasa Saitoh; Shigeyuki Sano, and Katsumi Kuwabara, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 29, 1993, Ser. No. 11,420

Claims priority, application Japan, Feb. 18, 1992, 4-061021

Int. Cl.<sup>6</sup> H04N 5/45

U.S. Cl. 348—565

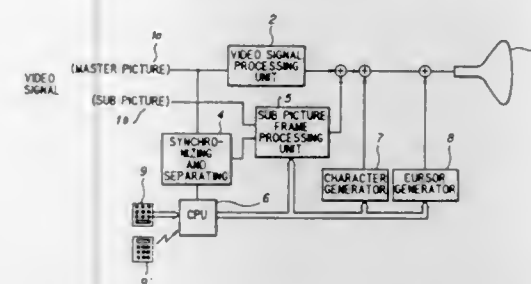
3 Claims

1. A picture selector for use in a display device in which a main picture frame and one of a channel figure table and a plurality of additional picture frames are simultaneously displayed on a screen, comprising:
  - character generating means for generating and displaying on the screen the channel figure table comprising channel figures identifying at least some of the plurality of additional picture frames;
  - marking means for marking a specific symbol on either a

desired one of the plurality of additional picture frames or a desired channel figure displayed on the screen;

position monitoring means for monitoring positions of one of the displayed channel figures or the displayed plurality of additional picture frames, as well as positions of the marked symbol;

picture selecting means for selecting one of the desired



channel figures or one of the plurality of additional picture frames on the basis of the presence of the marked symbol within the channel figure table or within the desired frame; and

picture exchange means for exchanging a current main picture frame for the picture frame selected by said picture selecting means on the basis of position information monitored by said position monitoring means.

5,414,472

# METHOD FOR ELIMINATING AN IMPULSE NOISE OF VIDEO SIGNAL AND APPARATUS THEREFOR

Humor Hwang, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyungki-Do, Rep. of Korea

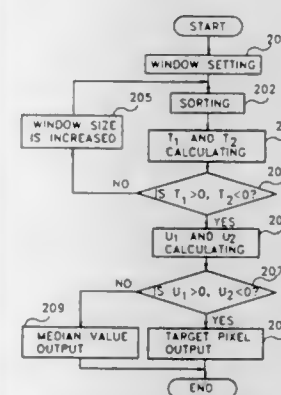
Filed Nov. 1, 1993, Ser. No. 144,319

Claims priority, application Rep. of Korea, Oct. 30, 1992, 92-20268

Int. Cl.<sup>6</sup> H04N 5/213

U.S. Cl. 348—616

16 Claims



1. A method for eliminating an impulse noise from digital video signal by median-filtering pixel data using ranked order based adaptive median-filtering, said method comprising the steps of:

- making a window of a predetermined size in response to receiving a number of pixels including a target pixel, which target pixel has a potential to be median-filtered, and a plurality of neighboring pixels;
- sorting respective values of said pixels forming said window in magnitude order to thereby produce sorted pixel values;
- calculating a median value in response to said sorted pixel values;
- checking whether or not a possibility that an included impulse noise is present in said median value;
- changing the size of said window when said possibility

that said included impulse noise exists in said median value and repeating said steps (b) through (d);

(f) checking whether or not a possibility that a pixel impulse noise is present in a target pixel value of said pixel values when said possibility of said included impulse noise is not present in said median value during said checking step (d);

(g) providing said median value as said target pixel value when there is said possibility that said pixel impulse noise is present during said checking step (f); and

(h) providing said target pixel value when said possibility that said pixel impulse noise is not present at said checking step (f).

5,414,473

# APPARATUS AND METHOD FOR ENHANCING TRANSIENT EDGE OF VIDEO SIGNAL

Sung H. Hong, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

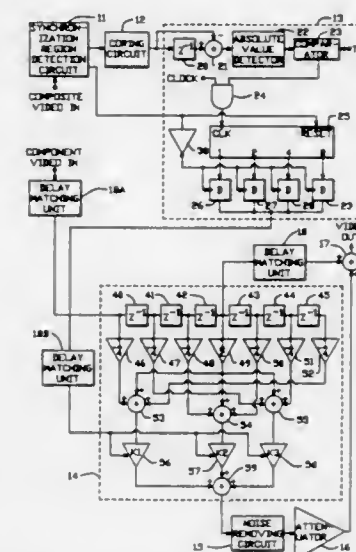
Filed Aug. 2, 1993, Ser. No. 101,892

Claims priority, application Rep. of Korea, Aug. 3, 1992, 13947/1992

Int. Cl.<sup>6</sup> H04N 5/208

U.S. Cl. 348—625

4 Claims



1. An apparatus for enhancing a transient edge of a video signal, comprising:

- synchronization region detection means for detecting a synchronization region from the video signal and extracting a synchronization signal therefrom and outputting a resultant synchronization region detection signal;
- coring means for removing upper and lower level noise components of the synchronization region detection signal to form a noise-removed synchronization signal;
- transient width detection means for detecting a transient width of a transient edge of the noise-removed synchronization signal;
- enhancement means for varying a frequency band of the video signal according to the transient width to enhance a transient edge of the video signal to form an enhanced video signal;
- attenuation means for attenuating the enhanced video signal to form an attenuated video signal;
- delay matching means for delaying the video signal by a predetermined time period to match the attenuated video signal and form a delayed video signal; and
- adding means for adding the delayed video signal and the attenuated video signal to provide a resultant video signal.



5,414,474

## MOVING BODY RECOGNITION APPARATUS

Hiroshi Kamada; Morito Shiohara; Yoshiyuki Ohta, all of Kawasaki, and Hideki Yanagishita, Kanagawa, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

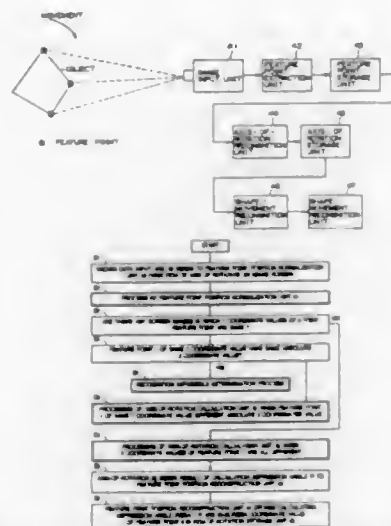
Filed Mar. 4, 1993, Ser. No. 26,685

Claims priority, application Japan, Mar. 4, 1992, 4-047238; Mar. 4, 1992, 4-047239; Mar. 5, 1992, 4-048449

Int. Cl.<sup>6</sup> H04N 7/137

U.S. Cl. 348-700

39 Claims



27. A moving body recognition apparatus, comprising image input means for receiving an image of a moving body, feature point extraction means for extracting feature points from said image and feature point storage means for storing said extracted feature points, for recognizing a shape and movement of a moving body based on position data of the feature points in an orthogonal projection image of the moving body, comprising:

feature point position normalization means for providing normalized coordinates of the feature points in the XYZ coordinate system stored in the feature point storage means by determining an image plane of the moving body in the image input means as the XY plane, the direction of the orthogonal projection image of a rotation axis of the moving body formed on the image plane as the Y axis and a direction of an image capture operation by the image input means as the Z axis perpendicular to said XY plane; shape and movement calculating means for calculating the shape and movement of the moving body in a virtual rotation state of the moving body when the rotation axis of the moving body is made in parallel to the YZ plane to permit the rotation axis of the moving body to match with the Y axis based on the output from the feature point position normalization means and a depression angle PSI between the rotation axis of the moving body and the Y axis, thereby obtaining the shape and movement of the moving body in the actual rotation state of the moving body based on said calculation result.

5,414,475

## METHOD OF OPERATING A LOW STANDBY POWER SYSTEM FOR A TELEVISION RECEIVER

William A. Trzyna, Elgin, and Carl E. Walding, Barrington, both of Ill., assignors to Zenith Electronics Corp., Glenview, Ill.

Filed Aug. 11, 1993, Ser. No. 105,231

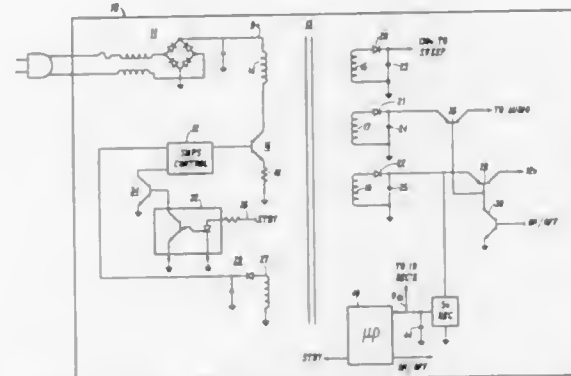
Int. Cl.<sup>6</sup> H04N 5/63

U.S. Cl. 348-730

6 Claims

1. A method of providing standby power for a television receiver having a power supply that is inefficient when supplying small amounts of power, wherein a portion of said television receiver is supplied with operating power from said power

supply that is electrically disconnected from said power supply when said television receiver is off, comprising the steps of: disabling said power supply when said television receiver is turned off; supplying said standby power to said television receiver from an energy storage source; enabling said power supply to replenish said energy storage source when its energy level falls below a predetermined level; disabling said power supply when the energy level of said energy storage source reaches said predetermined level; and replenishing said energy storage source from said power supply when its energy level falls below a predetermined



level to return the energy level of said energy storage device to said predetermined level.

5. An energy efficient switched mode power supply system for a television receiver comprising:

a microprocessor for controlling operation of said switched mode power supply and of said television receiver; a storage capacitor coupled between said microprocessor and said switched mode power supply for providing power for said microprocessor when said television receiver is off; and said microprocessor activating said switched mode power supply to charge said capacitor when the voltage thereon falls to a predetermined level while said television receiver is off.

5,414,476

## OPHTHALMIC DEVICE USING A SINGLE LINEARLY POLARIZING ELEMENT

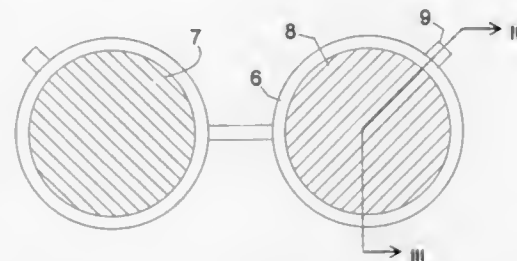
Richard Pavelle, 23 Berkshire Dr., Winchester, Mass. 01890, and Paul Burstein, 19 Glengarry, Winchester, Mass. 01890

Filed Apr. 26, 1993, Ser. No. 53,172

Int. Cl.<sup>6</sup> G02C 7/12

U.S. Cl. 351-49

4 Claims



1. An ophthalmic device comprising: a frame having a pair of eye apertures, a single linear polarizing element for each aperture, and means for mounting linear polarizing elements at the apertures such that only the single linear polarizing ele-

ment is in a line of sight of each eye of a user and wherein the means for mounting the linear polarizing elements include means for mounting the at least one of the linear polarizing elements for rotation relative to the frame and independent of the other element.

5,414,477

## COLORED CONTACT LENS HAVING VERY NATURAL APPEARANCE

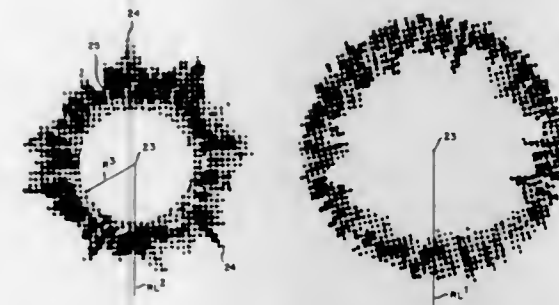
Richard L. Jahnke, Villa Park, Ill., assignor to Wesley-Jessen Corporation, Chicago, Ill.

Continuation of Ser. No. 704,260, May 22, 1991, abandoned, which is a continuation of Ser. No. 430,222, Nov. 1, 1989, abandoned. This application Dec. 3, 1992, Ser. No. 984,817

Int. Cl.<sup>6</sup> G02C 7/04

U.S. Cl. 351-162

26 Claims



1. A colored contact lens comprising a non-opaque pupil section, an iris section surrounding said pupil section, and a colored, opaque intermittent pattern over said entire iris section, that leaves a substantial portion within the interstices of the pattern non-opaque, said pattern covering at least about 25 percent of the area of said iris section, the elements of said pattern being undiscernible to the ordinary viewer, wherein a first portion of the elements of said pattern are of a first shade and a second portion of the elements of said pattern are of a second shade different from said first shade, wherein said first portion is located generally on the outside of said iris section and said second portion is located generally on the inside of said iris section, and a jagged border separates said first and second portions, wherein the minimum distance of said jagged border from the outer perimeter of said iris section is from about 5% to about 45% of the radial width of said iris section, and the maximum distance of said jagged border from the outer perimeter of said iris section is from about 45% to about 95% of the radial width of said iris section, thereby providing a lens capable of changing the apparent color of the iris of a person wearing the lens and imparting a very natural appearance.

5,414,478

## APPARATUS AND METHOD FOR DETERMINING CONTACT LENSES

Herman van Gelderen, Doorniksestraat 4, The Hague, Netherlands 2587 XL

Continuation of Ser. No. 973,433, Nov. 9, 1992, abandoned, which is a continuation of Ser. No. 446,851, Dec. 6, 1989, abandoned. This application Sep. 22, 1993, Ser. No. 124,855

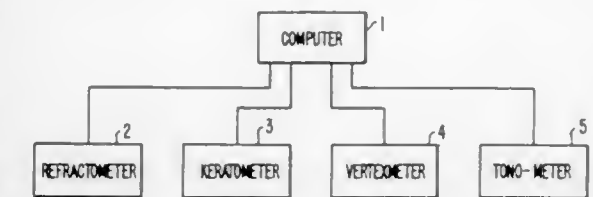
Int. Cl.<sup>6</sup> A61B 3/10

U.S. Cl. 351-212

10 Claims

1. An apparatus for prescribing contact lenses, comprising: a refractometer for taking a first measurement of a patient's eye and producing a first output signal representative thereof; a keratometer for taking a second measurement of the patient's eye and producing a second output signal representative thereof;

means for inputting personal data of the patient relevant to prescription of contact lenses; and



processing means for processing said first output signal, said second output signal, and said personal data to prescribe contact lenses.

5,414,479

## SPATIAL FREQUENCY AND CONTRAST SENSITIVITY TEST CHART AND PROTOCOL

Arthur P. Ginsburg, 130 Ryan Industrial Ct., #105, San Ramon, Calif. 94583

Filed Dec. 17, 1990, Ser. No. 628,786

Int. Cl.<sup>6</sup> A61B 3/02

U.S. Cl. 351-239

13 Claims



1. Vision sensitivity evaluation apparatus including: means for presenting a perceivable multiplicity of distinctly separated information areas; each of said information areas comprising a grating employing successively alternated light and dark regions between successive edges of said information areas, the regions of which have a substantially linear character and the contrast level and/or spatial frequencies or size of occurrence of which differ in different information areas; the edges of each information area tapered in said contrast level and/or frequency and/or size of occurrence to a surround; the surround of said information areas having a value of mean luminance which is the mean luminance of the information area being interrogated; indicia immediate the boundary of the location of each information area against said surround for indicating to the subject or system being tested the location of the information area for interrogation; and whereby successive information areas are presented in a range of contrasting luminance and spatial frequency or size of occurrence therein of the light and dark regions which upon observation by a person or system may be used as an accurate basis for determining the sensitivity and range of perception.

5,414,480

## OVERHEAD PROJECTOR

Masaaki Morizumi, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Saitama, Japan

Filed Mar. 7, 1994, Ser. No. 206,184

Claims priority, application Japan, Mar. 5, 1993, 5-071186

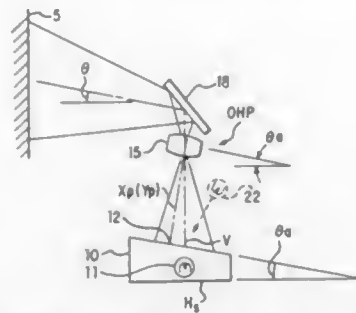
Int. Cl.<sup>6</sup> G03B 21/00

U.S. Cl. 353-119

2 Claims

1. An overhead projector for projecting an image of a sheet material on a remote screen standing almost vertically, said overhead projector comprising:

a stage having a sheet material placed on its stage surface and having a normal line inclined, at an angle of inclination, relative to a vertical line;  
a light source for illuminating said sheet material;  
a projection lens system, having an optical axis aligned with said normal line, for projecting an image of said sheet material; and



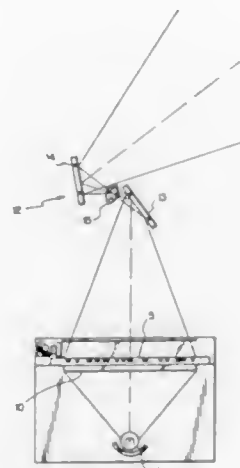
a reflection mirror, disposed above said projection lens system at an angle of 45 degrees, for directing said image toward said screen at a desired angle of elevation which is equal to said angle of inclination, said reflection mirror being rotatable so as to change said angle of elevation, wherein said stage surface is reflective and said light source is disposed above said stage surface and offset from said optical axis.

**5,414,481**  
**IMAGE PROJECTOR AND IMAGE FORMING APPARATUS FOR IMAGE PROJECTION**  
Tetsuya Fujioka, Yokohama, and Hiroshi Takahashi, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 18, 1994, Ser. No. 210,296  
Claims priority, application Japan, Mar. 18, 1993, 5-058639; Mar. 18, 1993, 5-058640

Int. Cl.<sup>6</sup> G03B 21/28  
U.S. Cl. 353—122

8 Claims



1. An image projector, comprising:  
a transparent support;  
an optically responsive film disposed below said transparent support;  
a scanner, disposed between said transparent support and said optically response film, which scans an image of an object on said transparent support to said optically responsive film;  
a light projector disposed under said optically response film; and  
an optically assembly, disposed above said transparent support, which directs and focuses light projecting out of said

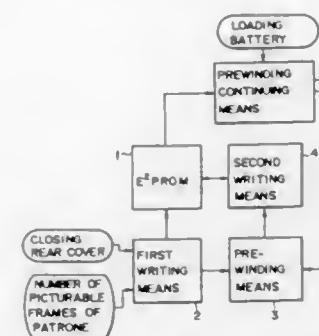
transparent support which has passed through said optically responsive film and originated from said light projector.

**5,414,482**  
**PREWINDING CONTROL DEVICE OF CAMERA**  
Fumio Iwai, Katsuji Ozawa, and Michihiro Shiina, all of Omiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Saltama, Japan

Filed Feb. 3, 1993, Ser. No. 12,732  
Claims priority, application Japan, Feb. 5, 1992, 4-054200  
Int. Cl.<sup>6</sup> G03B 1/18

U.S. Cl. 354—173.1

9 Claims



1. A pre-winding control device of a camera comprising:  
an electrically rewritable non-volatile memory E<sup>2</sup>PROM;  
reading means for reading a picturable total number of frames of a film from a patrone loaded in the camera;  
first writing means, responsive to a closing of a rear cover of the camera, for inputting the picturable total number of frames of the patrone from said reading means and for writing the picturable total number of frames of the patrone to said E<sup>2</sup>PROM;

pre-winding means, responsive to an end of writing of said first writing means, for starting a pre-winding for winding the film of the patrone to a spool, said pre-winding means counting a picturable number of frames of the film which are wound to the spool, and said pre-winding means finishing the pre-winding by winding the film of the a patrone to the spool completely;

decrement means, responsive to the counting of the picturable number of frames by said pre-winding means, for decreasing the picturable total number of frames of the patrone by 1 each time said pre-winding means counts the picturable number of frames of the film wound to the spool, and for providing a decreased picturable number of frames by subtracting the picturable number of frames wound to the spool from the picturable total number of frames of the patrone;

second writing means, responsive to said decrement means, for writing the decreased picturable number of frames to said E<sup>2</sup>PROM instead of the picturable total number of frames of the patrone, the decreased picturable number of frames in said E<sup>2</sup>PROM equalling "0" if the pre-winding is finished, and the decreased picturable number of frames in said E<sup>2</sup>PROM not equalling "0" if the pre-winding is interrupted;

recognizing means, responsive to a loading of a battery in the camera, for judging whether the decreased picturable number of frames in said E<sup>2</sup>PROM is "0", for recognizing that the pre-winding has finished when the decreased picturable number of frames in said E<sup>2</sup>PROM is "0" and recognizing that the pre-winding has been interrupted when the decreased picturable number of frames in said E<sup>2</sup>PROM is not "0"; and

pre-winding continuing means, responsive to said recognizing means, for driving said pre-winding means based on the decreased picturable number of frames in said E<sup>2</sup>

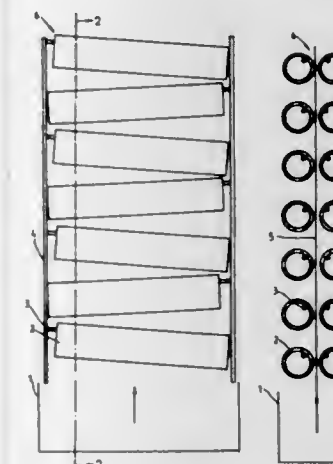
PROM and continuing the pre-winding when the decreased picturable number of frames in said E<sup>2</sup>PROM is not "0".

**5,414,483**  
**LIQUID WIPER FOR PHOTOGRAPHIC MATERIAL**  
Güter Rölke, Gummersbach; Ubbo Wernicke, Roesrath-Kleinchen, and Egon Bachem, Burscheid, all of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 6, 1992, Ser. No. 847,189  
Claims priority, application Germany, Mar. 23, 1991, 41 09 670.3; May 1, 1991, 41 14 228.4

Int. Cl.<sup>6</sup> G03D 3/08  
U.S. Cl. 354—320

1 Claim



1. A device for processing photographic materials comprising at least one tank filled with liquid and a means for substantially removing the liquid from the photographic material leaving the tank, wherein

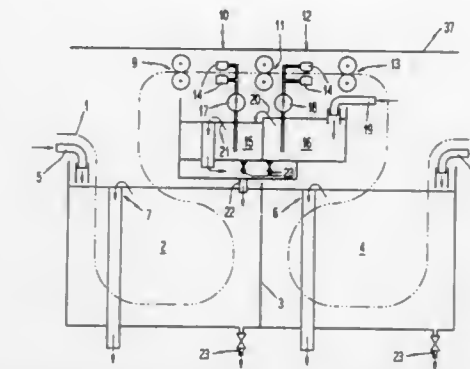
- a number of superposed and successive pairs of rollers are disposed above the level of liquid in the tank,
- the rollers in each pair are disposed parallel to one another in a plane,
- all the pairs of rollers are arranged along and in a vertical plane above said tank, and the axes of each pair of rollers are at an angle of 0° to 40° to the horizontal, and in the case of angles deviating from 0° the axes are disposed so that the lowermost point of one pair of rollers is underneath the uppermost point of the next higher pair and underneath the lowermost point of the next but one higher pair and correspondingly the uppermost point of a pair of rollers is underneath the lowermost point of the next higher pair and underneath the uppermost point of the next pair but one higher
- alternate pairs of rollers are disposed parallel to one another,
- the rollers in each pair are disposed relative to one another so that they always exert approximately the same pressure on the photographic material, irrespective of the thickness thereof and
- a supply of liquid is provided at the highest place on the highest pair of rollers, whereby water may run down the material and rollers to drip into the tank.

**5,414,484**  
**CASCADE ASSEMBLY FOR USE WITH APPARATUS FOR DEVELOPING A PHOTOGRAPHIC EMULSION CARRIER**

Walter Hofmuth; Alfons Kastl; Helmut Schausberger, and Anton Wimmer, all of München, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany  
Filed Jan. 6, 1994, Ser. No. 178,190  
Claims priority, application Germany, Feb. 18, 1993, 43 04 907.9

Int. Cl.<sup>6</sup> G03D 3/02, 3/08  
U.S. Cl. 354—321

9 Claims



1. A cascade assembly for use with apparatus for developing a photographic emulsion carrier, said apparatus comprising at least one inlet for photographic processing fluid; a plurality of tanks for photographic processing fluid and means for forwarding the carrier through said processing fluid in said tanks, in succession; said cascade assembly comprising, in combination:

- at least one cascade forming stage for bringing said carrier in contact with said processing fluid and means for conveying said processing fluid from said cascade stage into a processing fluid tank of said developing apparatus;
- means for conveying said carrier through the cascade assembly; and
- means, coupled to said at least one cascade stage and adapted to be connected to said fluid inlet, for supplying processing fluid to said at least one cascade stage; wherein said cascade assembly is adapted to be placed, as a cover, over said tanks, and wherein said carrier conveying means is adapted to be coupled mechanically to said carrier forwarding means while the cascade assembly is resting on said tanks.

**5,414,485**  
**OSCILLATING DRUM FOR AN APPARATUS FOR PROCESSING PHOTOGRAPHIC MATERIALS**  
John R. Fyson, London, United Kingdom, assignor to Eastman Kodak Company, Rochester, N.Y.  
PCT No. PCT/EP92/02709, § 371 Date May 27, 1994, § 102(e) Date May 27, 1994, PCT Pub. No. WO93/11461, PCT Pub. Date Jun. 10, 1993

PCT Filed Nov. 25, 1992, Ser. No. 244,339  
Claims priority, application United Kingdom, Nov. 28, 1991, 9125298

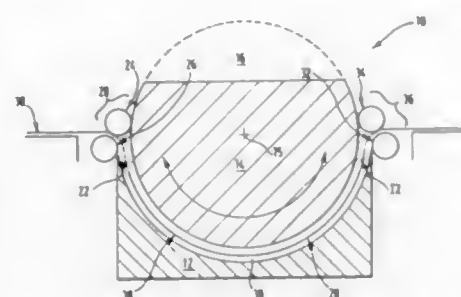
Int. Cl.<sup>6</sup> G03D 3/04  
U.S. Cl. 354—328

6 Claims

1. Photographic processing apparatus for processing photographic material, the apparatus comprising:  
a vessel;  
a drum mounted within the vessel and defining a processing tank therebetween; and



drive means for driving the material being processed through the processing tank relative to the vessel;



characterized in that the drum is oscillated about an axis between a first and a second position to provide the desired agitation of the processing solution.

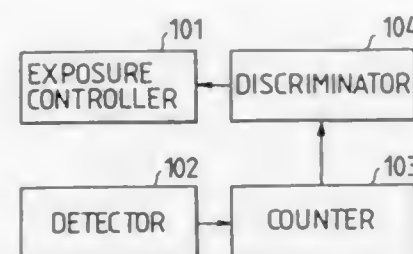
5,414,486

### CAMERA SHAKING PREVENTION DEVICE AND CAMERA SHAKING WARNING DEVICE

Tetsuro Goto, Funabashi; Kazuyuki Kazami, Tokyo; Koichi Daitoku, Sagami; Tsutomu Wakabayashi, Tokyo; Akira Ezawa, Tokyo, and Naoki Tomino, Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan  
Continuation of Ser. No. 15,301, Feb. 9, 1993, abandoned, which is a continuation of Ser. No. 774,174, Oct. 15, 1991, abandoned, which is a continuation of Ser. No. 593,984, Oct. 9, 1990, abandoned. This application Sep. 28, 1993, Ser. No. 128,252  
Claims priority, application Japan, Oct. 17, 1989, 1-269564  
Int. Cl.<sup>6</sup> G03B 7/08

U.S. Cl. 354—430

13 Claims

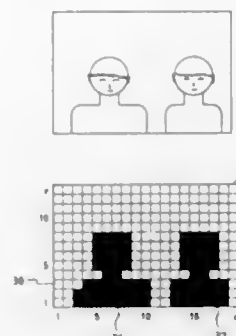


1. A camera shaking preventive device, comprising:  
light metering means for receiving light from an object and releasing a luminance signal corresponding to the luminance of the object;  
detection means for detecting camera shaking at a phototaking operation;  
counter means for counting a number of phototaking operations identified as involving camera shaking and a number of phototaking operations identified as not involving camera shaking, based on the result of detection by said detection means;  
discrimination means for comparing the results of said counting and identifying a relation thereof; and  
exposure control means for varying a shutter time, calculated from said luminance signal, to a shorter time if the number of phototaking operations identified as involving camera shaking is larger than the number of phototaking operations identified as not involving camera shaking, based on the result of discrimination by said discrimination means.

5,414,487  
LIGHT METERING CALCULATION APPARATUS  
Hiroyuki Iwasaki, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan  
Continuation of Ser. No. 831,201, Jan. 31, 1992, abandoned. This application Sep. 22, 1994, Ser. No. 309,469  
Claims priority, application Japan, Feb. 13, 1991, 3-040474; Apr. 9, 1991, 3-103833  
Int. Cl.<sup>6</sup> G03B 7/08

U.S. Cl. 354—432

52 Claims



1. A light metering calculating apparatus, comprising: light metering means for dividing an objective field into a plurality of light metering regions to perform a light metering operation, and outputting light metering signals corresponding to the respective light metering regions; and  
grouping means for comparing light of adjacent light metering regions based on the corresponding light metering signals from said light metering means, and grouping the plurality light metering regions into one or more groups of light metering regions such that each group is of a non-predetermined shape dependent upon the comparison results and is constituted of adjacent light metering regions having similar light.

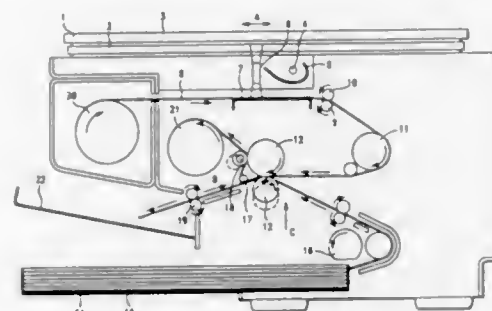
5,414,488

### IMAGE FORMING APPARATUS HAVING TEMPERATURE CONTROL FOR PHOTSENSITIVE MEMBER

Toru Fujita; Kiyoharu Mimose, and Takashi Suzuki, all of Suwa, Japan, assignors to Seiko Epson Corporation and Seiko Instruments Co., Ltd., both of Tokyo, Japan  
PCT No. PCT/JP92/00797, § 371 Date Apr. 16, 1993, § 102(e) Date Apr. 16, 1993, PCT Pub. No. WO93/00613, PCT Pub. Date Jan. 7, 1993  
PCT Filed Jun. 22, 1992, Ser. No. 980,804  
Claims priority, application Japan, Jun. 27, 1991, 3-156425; Dec. 12, 1991, 3-102547 U; Dec. 12, 1991, 3-328895  
Int. Cl.<sup>6</sup> G03B 27/32

U.S. Cl. 355—30

5 Claims



1. An image formation apparatus in which a photosensitive member is pressed together with a transfer member by a pressure transfer device after the photosensitive member, on which

an image was exposed, is heat developed by a heat developing device, the image formation apparatus comprising:  
means for changing at least one of a temperature and a heating time of said heat developing device; and  
detecting means for detecting at least one of a temperature and a humidity between said heat developing device and said pressure transfer device, and  
wherein at least one of the temperature and the heating time of said heat developing device is controlled by data generated from said detecting means.

5,414,489

### LIGHT PIPE SPECTRAL FILTER

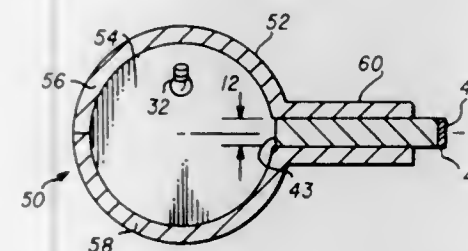
Martin C. Kaplan, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 22, 1994, Ser. No. 263,639

Int. Cl.<sup>6</sup> G01J 1/00

U.S. Cl. 355—67

21 Claims



1. A linear light source of the type employed in a document scanner for forming a line of uniform intensity, diffuse illumination at a document scanning plane comprising:  
an elongated light source having a longitudinally extending aperture therein for generating light at said aperture;  
a generally planar, light conducting pipe having a light entrance end face, a predetermined thickness, width and length and a light exiting end face for conducting light entering said light entrance end face through its length and emitting the light from said light exiting end face;  
spectral filter means associated with said light conducting pipe for spectrally filtering light emitted from said light exiting end face; and  
means for orienting said light conducting pipe with said light entrance end face positioned to receive light generated at said aperture and with said light exiting end face in proximity to a document scanning plane for conducting light exiting through said aperture along its length and for emitting the conducted light from said light exiting end face as a line of spectrally filtered diffuse illumination on a document in said document scanning plane.

5,414,490

### PHOTSENSITIVE MATERIAL EXPOSURE APPARATUS

Toshio Kurokawa, Kanagawa; Mitsuru Sawano, Shizuoka; Yukio Osawa, Kanagawa; Kenichi Nakagawa, and Mitsuyoshi Ichihashi, both of Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 23, 1993, Ser. No. 172,179

Claims priority, application Japan, Dec. 25, 1992, 4-357804

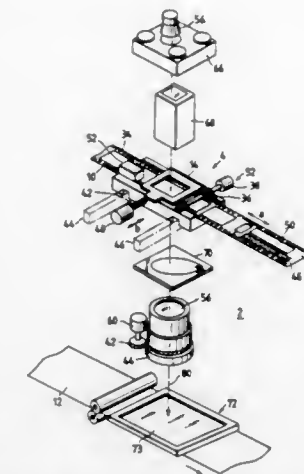
Int. Cl.<sup>6</sup> G03B 27/72

U.S. Cl. 355—71

20 Claims

1. A photosensitive material exposure apparatus, characterized in that a liquid crystal light regulation member capable of reversibly holding light transmission and scattering functions on the basis of current conduction control is disposed between a light source for illuminating an original image and a photosensitive material support so that the relation of haze H (%)

with the ratio B/A of the distance B between the liquid crystal light regulation member and a photosensitive material to the



distance A between the original image and the photosensitive material is represented by  $B/A < 0.3-0.0025 H$ .

5,414,491

### VACUUM HOLDER FOR SHEET MATERIALS

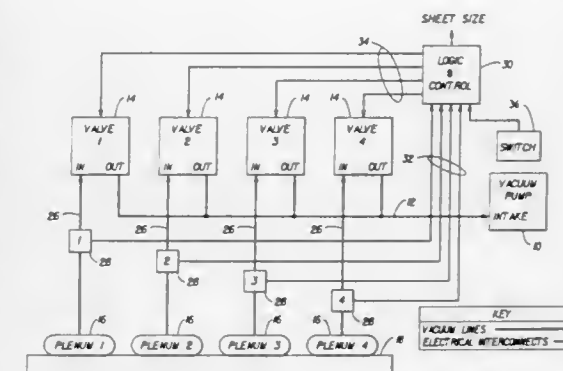
Robert C. Bryant, Honeoye Falls, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 14, 1994, Ser. No. 195,408

Int. Cl.<sup>6</sup> G03B 27/60, 27/62, 27/64, 27/20

U.S. Cl. 355—73

3 Claims



1. A sheet material holder, comprising:  
a. a vacuum platen defining a plurality of arrays of vacuum channels corresponding in number and size to a plurality of sheet material sizes on one surface thereof and including a corresponding plurality of distinct vacuum plenums communicating with said arrays of vacuum channels;  
b. a vacuum pump;  
c. a corresponding plurality of remotely actuatable valves connected between the vacuum plenums and the vacuum pump;  
d. a corresponding plurality of flow sensors for sensing the flow of air between the plenums and the vacuum pump; and  
e. logic and control means connected to the flow sensors and the valves for sensing air flow between a plenum and the vacuum pump and actuating the corresponding valve.

5,414,492

**IMAGE FORMING APPARATUS WITH CIRCUIT BOARD COVER GUIDING RECORDING MEDIUM**

Takeshi Kubota, Tama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

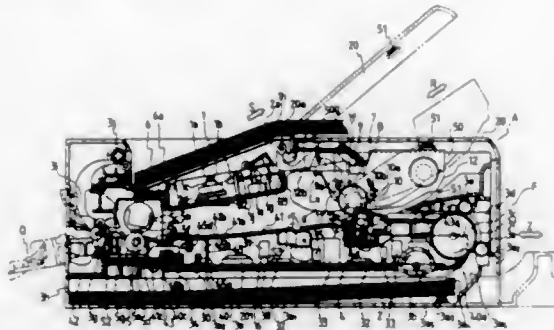
Continuation of Ser. No. 988,914, filed as PCT/JP93/00053, Jan. 18, 1993, abandoned.

This application Jul. 18, 1994, Ser. No. 276,501

Int. Cl.<sup>6</sup> G03G 15/00

U.S. Cl. 355—200

68 Claims



30. An image forming apparatus for forming an image on a recording medium, comprising:  
 an electrophotographic photosensitive member;  
 process means for acting on said photosensitive member;  
 an electric circuit board having an electric source for supplying power to said process means and a control portion for controlling the power supply to said process means;  
 a conductive cover for covering said electric circuit board and guiding the recording medium in a convey direction;  
 an insulative member disposed between said electric circuit board and said conductive cover; and  
 grounding means for grounding said conductive cover.

5,414,493

**IMAGE FORMING APPARATUS**

Haruo Fujii, Yokohama; Tatsuya Kobayashi, Tokyo; Nobuhiro Imai, Kawasaki; Hisayoshi Kojima, Yokohama; Masao Umezawa, Yokohama; Hideki Tada, Yokohama; Akira Ito, Tokyo; Kaoru Seto, Chigasaki; Motol Katob, and Daisuke Murata, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

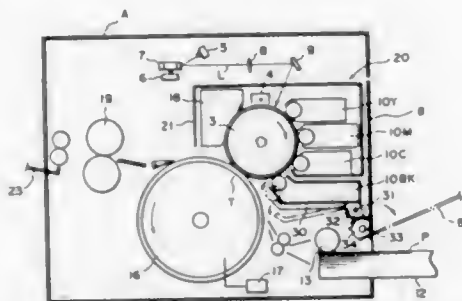
Continuation of Ser. No. 219,232, Mar. 28, 1994, abandoned, which is a continuation of Ser. No. 946,161, Sep. 17, 1992, abandoned, which is a continuation of Ser. No. 642,895, Jan. 18, 1991, abandoned. This application Aug. 25, 1994, Ser. No. 295,490

Claims priority, application Japan, Jan. 19, 1990, 2-8470; Jan. 19, 1990, 2-8471; Apr. 6, 1990, 2-90395

Int. Cl.<sup>6</sup> G03G 15/00

U.S. Cl. 355—200

13 Claims



1. An image forming apparatus having a main assembly, said image forming apparatus comprising:  
 a process cartridge detachably mountable relative to said main assembly of said image forming apparatus, said pro-

cess cartridge comprising an image bearing member and at least one developing means;  
 a developing unit, which is separable from said process cartridge, for supplying a developer to said image bearing member;  
 said developing unit comprising a developing roller for bearing a developer, wherein when said apparatus is in operation, said developing roller is positioned in an operative position close to or in contact with said image bearing member;  
 mounting means for detachably mounting said process cartridge to said main assembly; and  
 a cover openable relative to said main assembly having said mounting means, said cover being disposed to provide direct access to said process cartridge and to permit mounting and demounting of said process cartridge relative to said main assembly, wherein when said cover is opened, said developing roller moves away from the operative position.

5,414,494

**AUTOMATIC CALL TO SELECTED REMOTE OPERATORS IN RESPONSE TO PREDETERMINED MACHINE CONDITIONS**

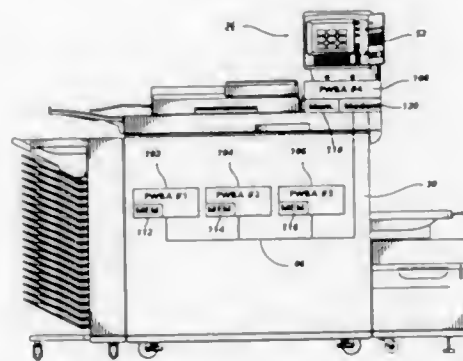
Andrew J. Aikens, Webster; Fritz F. Ebner, Rochester, and Ronald F. Chapuran, Pittsford, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 6, 1993, Ser. No. 161,612

Int. Cl.<sup>6</sup> G03G 21/00

U.S. Cl. 355—202

23 Claims





5,414,498

## LIQUID/DRY TONER IMAGING SYSTEM

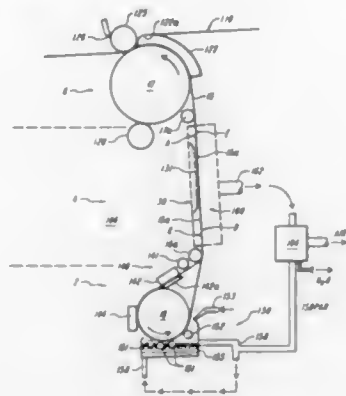
William R. Buchan, Pocasset; Robert A. Moore, Waquoit, both of Mass.; Sotos M. Theodoulou, Bramalea, Canada, and Jeffrey J. Carrish, Milford, Mass., assignors to Delphax Systems, Canton, Mass.

Filed Sep. 14, 1993, Ser. No. 121,078

Int. Cl.<sup>6</sup> G03G 15/10, 15/01

U.S. Cl. 355—256

18 Claims



1. A system for printing on a substrate, such system comprising an endless belt cyclically travelling around a roller mechanism that defines spatially separated successive first, second and third sections of said system a liquid toning unit in said first section for applying to the belt a liquid toner comprised of a liquid carrier and toner particles suspended in the carrier, for developing a latent charge image into liquid toned visible image at said first section means at said second section for driving off substantially all of said carrier from the visible image to leave a powder toner image resisting on the belt, and means for transfusing the powder toned image onto the substrate at said third section, the roller mechanism cyclically returning the belt from said third section to said first section for receiving a further liquid toned image.

5,414,499

## DEVELOPING DEVICE FOR IMAGE FORMING APPARATUS HAVING IMPROVED AIR/TONER FILTERING

Masasumi Yahata, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 22, 1993, Ser. No. 171,635

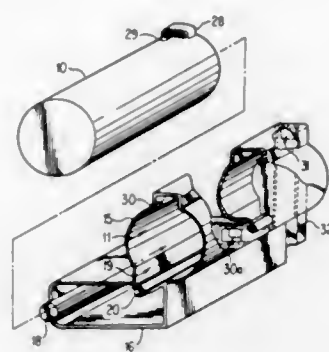
Claims priority, application Japan, Dec. 26, 1992, 4-359262 Int. Cl.<sup>6</sup> G03G 15/06

U.S. Cl. 355—260

12 Claims

1. A developing device for an image forming apparatus, comprising: a developer supply section formed with an opening in an upper portion thereof for receiving a developer from a cartridge containing said developer, said cartridge being capable of being mounted on said developer supply section in such a manner as to close said opening; a developing chamber accommodating a developer carrier for carrying the developer thereon, and formed with an opening through a part of a wall thereof for preventing

pressure inside said developing chamber from rising excessively; and



a filter provided on said cartridge in a longitudinally extending recess formed in said cartridge for closing said opening of said developing chamber.

5,414,500

## IMAGE RECORDING APPARATUS

Satoshi Furukawa, Suzuka, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

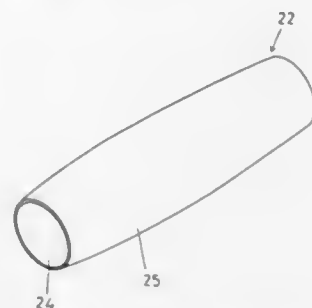
Filed Apr. 22, 1994, Ser. No. 231,055

Claims priority, application Japan, May 20, 1993, 5-118708

Int. Cl.<sup>6</sup> G03G 15/06

U.S. Cl. 355—261

19 Claims



1. An image forming apparatus, comprising: a housing; toner flow control means for modulating a flow of toner; toner supply means having at least a toner supply member for supplying charged toner to said toner flow control means, wherein said toner supply member is disposed in contact with said toner flow control means, said toner supply means comprising a roller which is designed to be thicker at a middle portion than at both ends; and a counter electrode disposed at an opposite side to said toner supply means with respect to said toner flow control means.

5,414,501

## IMAGE FORMING APPARATUS FOR FORMING IMAGES ON BOTH SURFACES OF RECORDING MATERIAL

Yasushi Miura, Kawasaki, and Nobuhiko Takekoshi, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 112,987, Aug. 30, 1993, abandoned.

This application Jun. 28, 1994, Ser. No. 266,450

Claims priority, application Japan, Aug. 28, 1992, 4-254077

Int. Cl.<sup>6</sup> G03G 15/16, 15/01

U.S. Cl. 355—271

29 Claims

16. An image forming apparatus comprising: an image bearing member for bearing a toner image;

5,414,503

## PREDICTIVE DECURLER APPARATUS AND METHOD

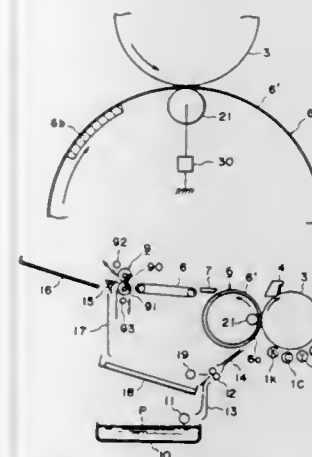
Robert P. Siegel; Youti Kuo, both of Penfield, and Edward C. Hanzlik, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 13, 1993, Ser. No. 166,371

Int. Cl.<sup>6</sup> G03G 21/00

U.S. Cl. 355—309

9 Claims



a transfer material carrying member for carrying and conveying a transfer material to a transferring station at which the toner image is transferred from said image bearing member onto the transfer material carried on said transfer material carrying member; wherein after the toner image is transferred onto a first surface of the transfer material, a toner image can be

transferred onto the second surface, of the transfer material, and said transfer material carrying member can carry a first transfer material, on the second surface of which the toner image is to be transferred, and a second transfer material, on the first surface of which the toner image is to be transferred, at the same time, at different locations on its carrying surface.

5,414,502

## ELECTROGRAPHIC IMAGING ELEMENT

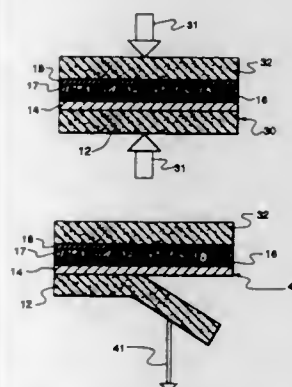
Douglas A. Cahill, Belchertown; Donald A. Brault, Granby, and Richard S. Himmelwright, Wilbraham, all of Mass., assignors to Rexham Graphics Inc., South Hadley, Mass.

Continuation of Ser. No. 115,563, Sep. 3, 1993, Pat. No. 5,363,179, which is a continuation-in-part of Ser. No. 42,278, Apr. 2, 1993, abandoned. This application Feb. 18, 1994, Ser. No. 198,599

Int. Cl.<sup>6</sup> G03G 15/20

U.S. Cl. 355—278

23 Claims



1. An electrographic element comprising, in the order given: a) a carrier layer, b) a conductive layer, c) a protective layer, d) a dielectric layer, and e) a substantially tack-free, adhesive layer which is activated at a pressure and a temperature which is above ambient pressure and temperature of the electrographic element.

5,414,504

## INTERFERENCE REMOVAL

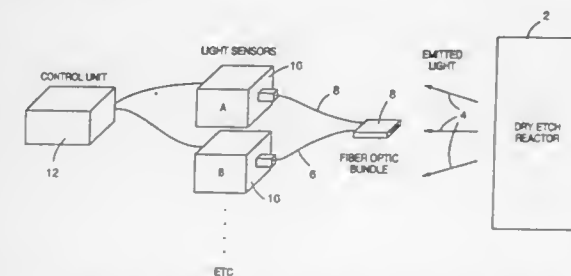
Herbert E. Litvak, Palo Alto; Steven C. Leach, Santa Clara, and Edward G. Rodgers, Mountain View, all of Calif., assignors to Xerox, Inc., Santa Clara, Calif.

Continuation of Ser. No. 526,558, May 18, 1990, Pat. No. 5,208,644. This application Feb. 19, 1993, Ser. No. 19,748 The portion of the term of this patent subsequent to May 4, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> G01N 23/22

U.S. Cl. 356—72

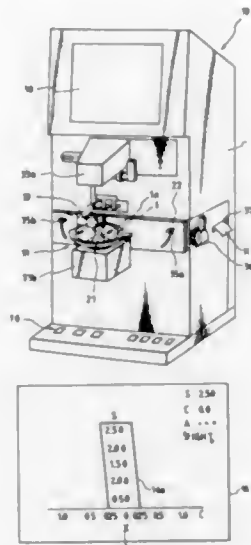
28 Claims



1. In an optical emission detection method which converts a light emission intensity to a measurable electrical signal for monitoring a dry etch process for microfabrication, an improved method for minimizing interferences comprising the steps of: (a) measuring said electrical signal in separate channels at two or more wavelengths, thereby generating a plurality of separate electrical signals; (b) normalizing the separate electrical signals from said separate channels; (c) analyzing said separate electrical signals for random

- noise, correlated fluctuations, and a dry process monitoring signal;
- (d) maximizing the signal to random noise ratio of the dry process monitoring signal;
- (e) minimizing the obscuring effects of correlated fluctuations from the separate channels by algorithms; thereby providing a resultant signal which is no longer obscured by random noise or correlated fluctuations.

**5,414,505**  
**LENS METER FOR TESTING PROGRESSIVE LENS**  
 Yukio Ikezawa, and Shinichi Kobayashi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Topcon, Tokyo, Japan  
 Filed Feb. 3, 1993, Ser. No. 12,599  
 Claims priority, application Japan, Feb. 3, 1992, 4-017641  
 Int. Cl.<sup>6</sup> G01B 9/00  
 U.S. Cl. 356—127 10 Claims



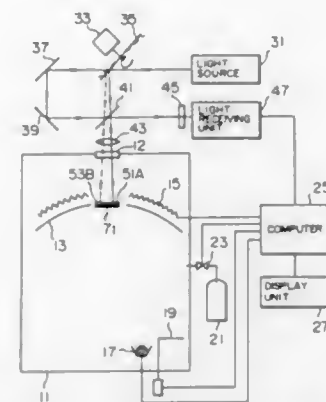
1. A lens meter having an optical measuring system enabling to measure optical characteristics of a progressive lens having a far vision region and a near vision region in a progressive band, comprises:

- a memory for storing optical characteristics of measuring points ranging from said far vision region to said near vision region measured by said optical measuring system;
- a distinguishing part for comparing said optical characteristics of each measuring point stored in said memory and distinguishing whether said measured points belong to a right or left side of said progressive band;
- a display for graphically displaying a result provided from said distinguishing part such that said progressive band is graphically illustrated to be distinguishable from said measuring points in said right side and said left side of said progressive band.

said display shows a combination of add power of said progressive lens and at least one of parameters selected from prismatic power, distance from said progressive band, and cylindrical power of said progressive lens, said add power and said selected parameters are displayed with respect to the position of said measuring points in said progressive lens, wherein said add power designates a relative value of refracting power of a spherical lens with respect to that of far vision region in the progressive lens, and cylindrical power designates refracting power of a cylindrical lens, and said prismatic power designates refracting power of a prism; and

said display alters said add power which is graphically displayed and a display width in a horizontal axis depending on a determined value of said add power of said progressive lens.

**5,414,506**  
**METHOD OF MEASURING REFRACTIVE INDEX OF THIN FILM AND REFRACTIVE INDEX MEASURING APPARATUS THEREFOR**  
 Shinichiro Saisho; Toshinobu Ikeda, and Akira Odagiri, all of Tokyo, Japan, assignors to Shincron Co., Ltd., Tokyo, Japan  
 Filed Aug. 31, 1993, Ser. No. 113,910  
 Claims priority, application Japan, Aug. 31, 1992, 4-257463  
 Int. Cl.<sup>6</sup> G01N 21/41  
 U.S. Cl. 356—128 12 Claims



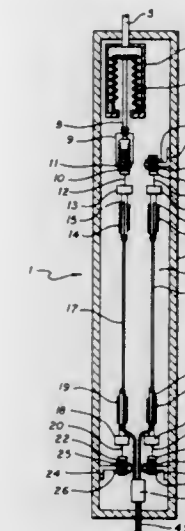
1. A method of measuring the refractive index of a dielectric thin film, comprising the steps of:

- (a) forming a dielectric thin film which is transparent, uniform, and geometrically and optically identical, on each of a first substrate and a second substrate, with refractive indexes of said first substrate and said second substrate being different from one another; and
- (b) measuring the reflectivities of said first and second substrates, each bearing said dielectric thin film thereon, with the application of a light with an identical wavelength to said two substrates; and
- (c) calculating the refractive index of the dielectric thin film using the measured reflectivities of said first and second substrates.

**5,414,507**  
**FIBER OPTICS PRESSURE SENSOR TRANSDUCER HAVING A TEMPERATURE COMPENSATOR**  
 Elvio E. Herman, Pacific Palisades, Calif.; Bart E. Likes, Issaquah, Wash.; Douglas A. Norton, Alliance, Ohio, and J. Douglas Smith, Houston, Tex., assignors to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Apr. 1, 1993, Ser. No. 45,338  
 Int. Cl.<sup>6</sup> G01B 9/02  
 U.S. Cl. 356—345 23 Claims

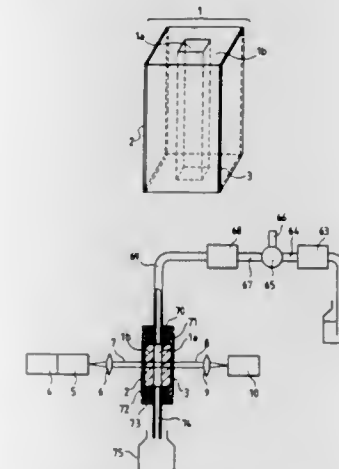
1. A fiber optic pressure sensor transducer, comprising:
- a converter for converting changes in pressure into movement;
  - a sensor optical fiber of a fiber optics interferometer operatively connected to said converter so as to have an optical path length which changes as a function of the pressure changing induced movement of said converter;
  - a reference optical fiber of a fiber optics interferometer which has an optical path length which is independent of the movement of said converter; and

temperature compensating means, positioned at least substantially between adjacent ends of said sensing optical



fiber and said converter, for causing a change in the length of said sensor optical fiber as a function of temperature.

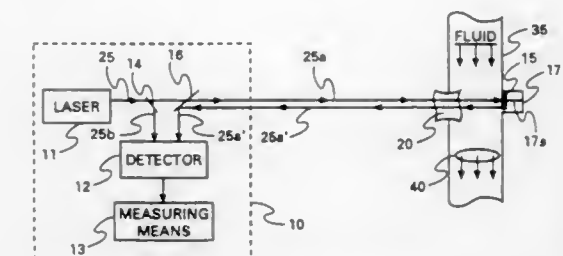
**5,414,508**  
**OPTICAL CELL AND OPTICAL DETECTION SYSTEMS LIGHT ABSORPTION**  
 Satoshi Takahashi, Kokubunji, and Hideki Kambara, Hachioji, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Mar. 2, 1993, Ser. No. 25,232  
 Claims priority, application Japan, Mar. 2, 1992, 4-044394  
 Int. Cl.<sup>6</sup> G01N 21/05, 15/02  
 U.S. Cl. 356—246 16 Claims



1. An optical cell for measuring light absorption by a sample solution in the cell comprising:

- a flow path having openings at first and second ends of the cell;
- a first half transmitting mirror being formed on an entire outside surface of a light incident side of the cell;
- a second half transmitting mirror being formed on an entire outside surface of a light output side of the cell;
- the first and second half transmitting mirrors being disposed so as to face each other; and
- an optical axis of an incident light to the cell and an optical axis of the output light from the cell being disposed on substantially a same axis.

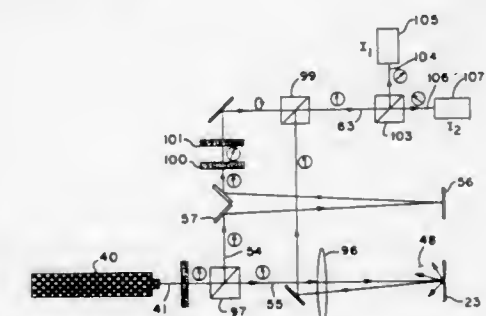
**5,414,509**  
**OPTICAL PRESSURE/DENSITY MEASURING MEANS**  
 James T. Veligdan, Manorville, N.Y., assignor to Associated Universities, Inc., Washington, D.C.  
 Filed Mar. 8, 1993, Ser. No. 27,878  
 Int. Cl.<sup>6</sup> G01P 3/36; G01B 9/02  
 U.S. Cl. 356—349 9 Claims



1. An apparatus for measuring the pressure of a translucent fluid medium comprising:

- a light producing means that is operable to emit a dual frequency light beam, said two frequencies being separated by a predetermined quantity;
- a beam splitter for separating said light beam into two beams each of which, respectively, have a different one of said dual frequencies;
- detecting means arranged in operable relation with said light producing means for determining difference in frequency between the two light beams and to produce a signal corresponding to that difference or beat frequency, said beam splitter being operable to direct one of said beams to the detecting means;
- reflective means for directing the other of said light beams along a pathway through said medium and to said detecting means; and
- measuring means for converting the beat frequency signal produced by said detecting means to an output corresponding to the integrated pressure of the fluid medium along the path traversed by said other light beam there-through.

**5,414,510**  
**METHOD AND APPARATUS FOR MEASURING SURFACE MOVEMENT OF AN OBJECT USING A POLARIZING INTERFEROMETER**  
 Thomas J. Schultz, Maumee, Ohio; Petros A. Kotidis, Waban, Mass.; Jaime A. Woodroffe, North Reading, Mass., and Peter S. Rostler, Newton, Mass., assignors to Textron Defense Systems, Division of Avco Corporation, Wilmington, Mass.  
 Division of Ser. No. 785,787, Oct. 31, 1991, Pat. No. 5,286,313.  
 This application Feb. 9, 1994, Ser. No. 194,032  
 Int. Cl.<sup>6</sup> G01B 9/02  
 U.S. Cl. 356—349 18 Claims



1. A method for gathering information about an object, said method comprising the steps of:

- a) generating a sound wave in said object;





sixth sinusoidal signals, correcting the ratio of said seventh sinusoidal signal to said eighth sinusoidal signal based on the ratio between amplitudes of said respective seventh and eighth sinusoidal signals obtained by the use of said maximum and minimum values of said third and fourth sinusoidal signals measured by said maximum and minimum measuring means, and obtaining said position information from said corrected value.

5,414,517

# METHOD AND APPARATUS FOR MEASURING THE SHAPE OF GLOSSY OBJECTS

Nakatomo Furuhashi, Tsukuba, Japan, assignor to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

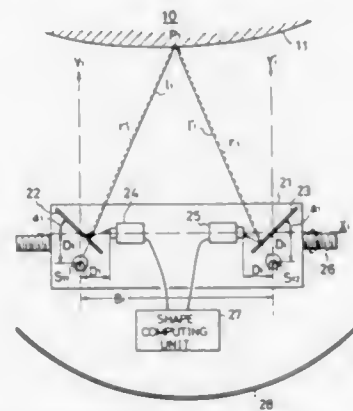
Filed Mar. 24, 1993, Ser. No. 36,251

Claims priority, application Japan, May 1, 1992, 4-139704

Int. Cl.<sup>6</sup> G01B 11/24

U.S. Cl. 356—376

2 Claims



2. A shape measurement apparatus for measuring shapes of glossy objects, comprising:

- a frame;
- first and second diffused spot light sources arranged a fixed distance apart from one another on said frame along a first axis;
- first imaging means for imaging light projected from said second light source and reflected from a measurement object;
- second imaging means for imaging light projected from said first light source and reflected from said measurement object;
- frame moving means for moving said frame while maintaining positional relationships of said first and second light sources and said first and second imaging means;
- means for utilizing video signals of said first and second imaging means to detect an angle of incidence of said light reflected onto said first and second imaging means each time said frame is moved by said frame moving means;
- shape calculating means which utilizes each angle of incidence thereby detected to calculate positions of light reflection points on said measurement object, and which utilizes said positions of said light reflection points to calculate a three-dimensional shape of said measurement object; and
- first and second semi-reflecting mirrors positioned at angles of 45° with respect to said first axis, wherein said first and second imaging means are arranged along a second axis which is parallel to said first axis and are each separated from respective first and second semi-reflecting mirrors by a distance that is equal to a distance from each of said first and second semi-reflecting mirrors to respective first and second light sources.

5,414,518

# METHOD AND APPARATUS FOR THE EVALUATION OF REFLECTIVE SURFACES

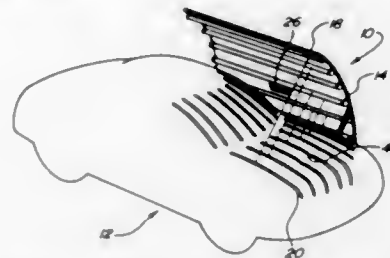
Diran Yazejian, Bloomfield Hills, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Continuation-in-part of Ser. No. 926,450, Aug. 10, 1992, abandoned. This application Apr. 18, 1994, Ser. No. 228,813

Int. Cl.<sup>6</sup> G01B 11/24

U.S. Cl. 356—376

15 Claims



1. An apparatus for visually evaluating a plurality of surfaces of a three dimensional vehicle-like object having a reflective exterior, said apparatus comprising:

- a main body portion including an upper portion and a lower portion, said upper portion including a concavely curved inner surface; and
  - a plurality of horizontally disposed light emitting members attached to said main body portion along both said upper and lower portions for producing multiple elongated images on said three dimensional vehicle-like object, said multiple elongated images including at least one elongated image in a portion of a first surface of said three dimensional vehicle-like object and at least one elongated image in a portion of a second surface of said three dimensional vehicle-like object;
- said apparatus is movable and positionable about said three dimensional vehicle-like object.

5,414,519

# METHOD FOR ALIGNING A SEMICONDUCTOR CHIP TO BE REPAIRED WITH A REPAIR SYSTEM AND A LASER REPAIR TARGET USED THEREFOR

Byoung Y. Han, Seoul, Rep. of Korea, assignor to Goldstar Electron Co., Ltd., Choongchungbook, Rep. of Korea

Filed Mar. 27, 1992, Ser. No. 858,723

Claims priority, application Rep. of Korea, Apr. 12, 1991, 5891/1991

Int. Cl.<sup>6</sup> C01B 11/00

U.S. Cl. 356—401

7 Claims



1. A method for aligning a semiconductor chip to be repaired with a repair system comprising the steps of: scanning a basic target on said semiconductor chip with a laser in either an X-direction or a Y-direction to calculate offsets in both X-direction and Y-direction; and determining an X-coordinate and Y-coordinate simultaneously from the scan of said basic target, wherein offsets in X-direction and Y-direction are calculated on the basis of respective differences in X-coordinate and Y-coordinate between center X- and Y-coordinates and X- and Y-coordinates in actual scanning.

5,414,520

# PROCESS AND DEVICE FOR DETECTING IMPURITIES IN A TEXTILE TEST MATERIAL

Rolf Joss, Dällikon, and Hans Wampfler, Zürich, both of Switzerland, assignors to Zellweger Uster AG, Uster, Switzerland

PCT No. PCT/CH93/00071, § 371 Date Nov. 15, 1993, § 102(e) Date Nov. 15, 1993, PCT Pub. No. WO93/19359, PCT Pub. Date Sep. 30, 1993

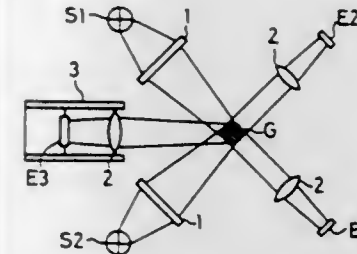
PCT Filed Mar. 15, 1993, Ser. No. 146,162

Claims priority, application Switzerland, Mar. 17, 1992, 855/92

Int. Cl.<sup>6</sup> G01N 21/89, 33/36

U.S. Cl. 356—430

22 Claims



1. A process for detecting impurities in a textile test material, comprising the steps of: illuminating the test material with light; measuring light reflected by the test material to produce a reflection signal; producing a diameter signal indicative of changes in the diameter of the test material; combining the reflection signal and the diameter signal to produce a measurement value; and detecting changes in the measurement value to indicate the presence of an impurity in the test material.

5,414,521

# DYNAMIC DISTORTION CORRECTION APPARATUS AND METHOD

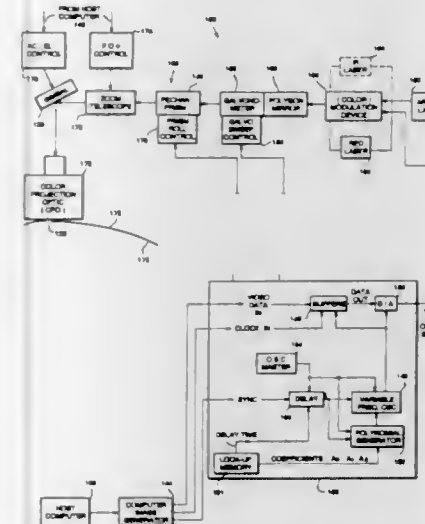
David A. Ansley, 1100 Newport Ave. #405, Long Beach, Calif. 90804-4066

Filed Sep. 12, 1991, Ser. No. 759,015

Int. Cl.<sup>6</sup> H04N 5/74

U.S. Cl. 348—123

3 Claims



1. A dynamic distortion correction apparatus for use in an image projector comprising: first means for generating an image comprising a plurality of raster lines;

second means for rotating said image so that said raster lines extend radially from a projection axis thereof; third means for causing each of said plurality of raster lines to be parallel to every other raster line to compensate for distortion in said image at any viewing angle; fourth means for linearly spacing said plurality of raster lines to compensate for distortion in said image at any viewing angle; and fifth means for linearly spacing a plurality of pixels along each of said raster lines to compensate for distortion in said image at any viewing angle.

5,414,522

# IMAGE READING APPARATUS WHICH DETECTS DOCUMENT SIZE

Shigeru Moriya, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

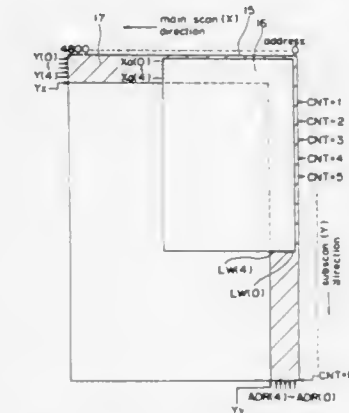
Filed Aug. 19, 1992, Ser. No. 932,248

Claims priority, application Japan, Aug. 20, 1991, 3-208087; Aug. 20, 1991, 3-208092

Int. Cl.<sup>6</sup> H04N 1/21

U.S. Cl. 358—296

20 Claims



1. An image reading apparatus comprising: an image reading means for reading image data of a plurality of lines in a document in at least one of a main scan direction and a subscan direction; and decision means for determining document edges for each of the plurality of lines determined from the image data read by said image reading means and for deciding a document size based on the document edges of the plurality of lines.

5,414,523

# AUDIO SIGNAL RECORDING/REPRODUCING APPARATUS FOR RECORDING AND REPRODUCING HIGH-DEFINITION TELEVISION SYSTEM AUDIO SIGNAL OF A PLURALITY OF CHANNELS

Nobuo Azuma, Yokohama; Takashi Furuhashi, Kamakura, and Hiroaki Takahashi, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 19, 1992, Ser. No. 901,134

Claims priority, application Japan, Jun. 21, 1991, 3-150093

Int. Cl.<sup>6</sup> H04N 5/76

U.S. Cl. 358—341

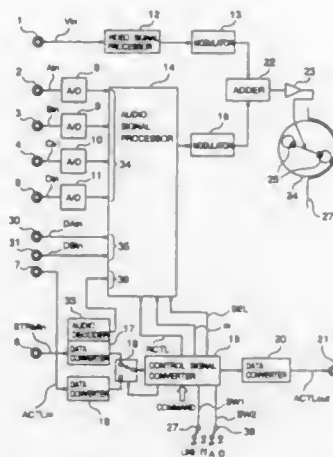
19 Claims

1. An audio signal recording apparatus for a magnetic recording/reproducing apparatus, the magnetic recording/reproducing apparatus being capable of recording and reproducing a video signal and audio signals and producing a command indicative of a desired recording audio signal mode, the audio signal recording apparatus comprising:

- input audio signal terminal means for receiving input audio signals of a plurality of channels of an input audio signal mode;
- input audio control signal terminal means for receiving an



input audio control signal corresponding to the input audio signal mode;  
 audio control signal converting means, responsive to the command indicative of the desired recording audio signal mode, for converting the input audio control signal into a recording audio control signal indicative of the desired recording audio signal mode;  
 audio signal processing means, responsive to the recording audio control signal, for converting the input audio signals into recording audio signals of the desired recording audio



signal mode indicated by the recording audio control signal;  
 identification signal generating means for generating an identification signal for use in reproducing the recording audio signals from a magnetic tape after the recording audio signals have been recorded on the magnetic tape, the identification signal including information from the recording audio control signal; and  
 recording means for recording the recording audio signals and the identification signal on the magnetic tape.

5,414,524

## IMAGE RENDERING CLIP REGISTERS

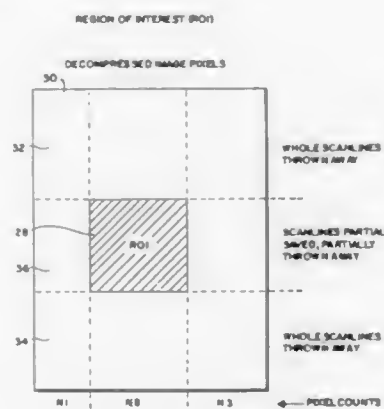
Christopher J. Payson, Nashua, N.H., and Timothy M. Hellman, Watertown, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jan. 14, 1992, Ser. No. 820,533

Int. Cl.<sup>6</sup> H04N 1/41

U.S. Cl. 358—426

22 Claims



1. A clipping circuit in an image processing system for selecting data from the representation of an image comprised of scan lines of pixels, said clipping circuit comprising:

a control circuit for passing pixel data values within a region

of interest in a first pass state and blocking the pixel data values outside the region of interest in a second pass state; length registers for storing lengths of portions of scan lines within and outside of the region of interest; and  
 a counter circuit coupled to receive lengths from the registers and to count pixel data values applied to the control circuit UP to one of the lengths from the registers, the counter circuit changing the control circuit pass state and resetting the counter circuit to count pixel data values applied to the control circuit up to another of the lengths from the registers on completion of the counting of the first length of pixel data values.

5,414,525

## IMAGE COMMUNICATING APPARATUS

Hiroyasu Ito, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

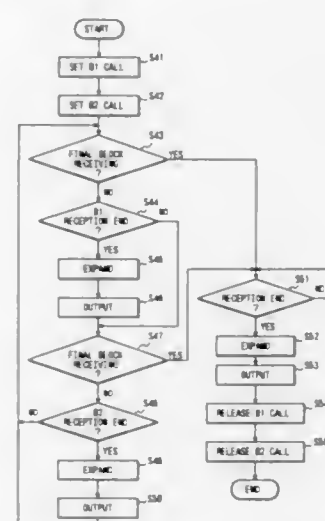
Filed Oct. 25, 1993, Ser. No. 139,758

Claims priority, application Japan, Oct. 26, 1992, 4-311002

Int. Cl.<sup>6</sup> H04N 1/41, 1/415

U.S. Cl. 358—426

11 Claims



1. An image communicating apparatus comprising:

input means for inputting image data;  
 dividing means for dividing said input image data into a plurality of blocks each of which is constructed by a predetermined number of pixels;  
 encoding means for encoding the image data on a unit basis of said blocks divided by said dividing means; and  
 transmitting means for allocating the data which was divided and encoded by said dividing means and said encoding means to arbitrary channels among a plurality of information channels on a block unit basis and for transmitting, wherein said transmitting means uses at least two information channels, first and second information channels, for transmitting encoded block data, and  
 wherein said transmitting means transmits encoded second block data by using the second information channel, while transmitting encoded first block data by using the first information channel.

5,414,526

## SYSTEM AND METHOD FOR ENCODING FACSIMILE DATA

Steven J. Friedman, Bellevue, Wash., assignor to Microsoft Corp., Redmond, Wash.

Filed Oct. 21, 1993, Ser. No. 140,761

Int. Cl.<sup>6</sup> H04N 1/415

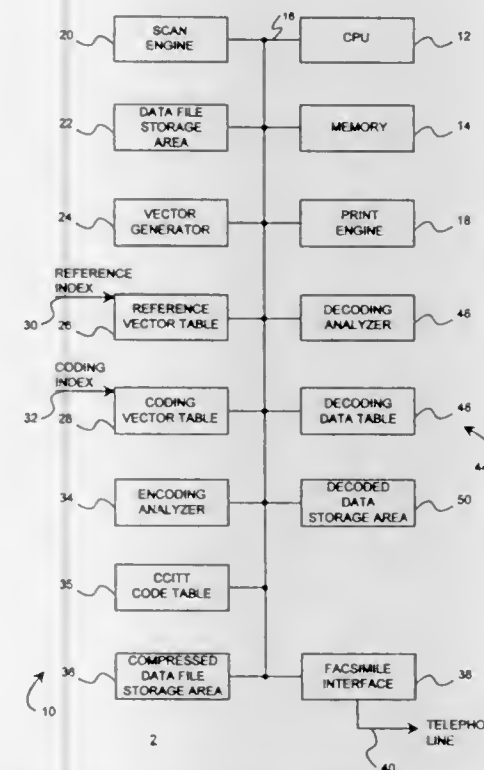
U.S. Cl. 358—426

42 Claims

1. A system for encoding facsimile data in a first facsimile

machine for transmission from the first facsimile machine to a second facsimile machine, comprising:

- a data file storage area containing a raw data file to be encoded according to a predetermined standard encoding format, said raw data file comprising a series of horizontal scan lines each having first and second ends, each of said horizontal scan lines comprising a plurality of pixels having first and second logic states;
- a generator analyzing said horizontal scan lines and generating position data indicative of positions on said horizontal scan lines relative to said first end where said pixels change from said first logic state to said second logic state and from said second logic state to said first logic state;
- a reference storage table coupled to said generator and receiving said position data for a single one of said horizontal scan lines designated as a reference scan line;
- a reference index pointing to a location within said reference table;



- a coding storage table coupled to said generator and receiving said position data for a single one of said horizontal scan lines adjacent to said reference line and designated as a coding scan line;
- a coding index pointing to a location within said coding table;
- an analyzer analyzing said reference scan line and said coding scan line by analyzing said position data in said reference table and said coding table, said analyzer generating compressed data for said coding scan line using a plurality of standard predetermined codes to encode said coding scan line according to said predetermined standard encoding format;
- a compressed data file storage area receiving said compressed data and temporarily storing said compressed data; and
- a facsimile interface sequentially receiving said stored compressed data from said compressed data file storage area and generating standard predetermined electrical signals representative of said compressed data.

5,414,527

## IMAGE ENCODING APPARATUS SENSITIVE TO TONE VARIATIONS

Yutaka Koshi, Koh Kamizawa, Setsu Kunitake, and Kazuhiro Suzuki, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 748,502, Aug. 22, 1991,

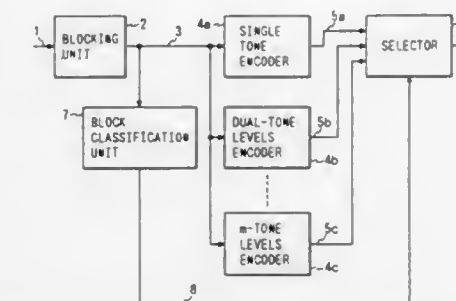
abandoned. This application Aug. 13, 1992, Ser. No. 928,718

Claims priority, application Japan, Aug. 14, 1991, 3-204436

Int. Cl.<sup>6</sup> H04N 1/415

U.S. Cl. 358—433

13 Claims



1. An image encoding device comprising:

- blocking means for sampling images and dividing each of said images into input blocks each including  $m \times n$  picture elements where  $m$  and  $n$  are positive integers, respectively;
  - block classifying means for classifying based on a number of tone levels and resolutions within said input blocks; and
  - a plurality of block truncation encoding means allocated such that the amount of codes of the tone levels and resolutions within said input blocks provides a given amount of codes in each of said input blocks, wherein said plurality of block truncation encoding means are switched in accordance with the results of said block classifying means to thereby execute their block truncation encoding operations,
- wherein said block classifying means comprises:
- locally decoding means for decoding two or more pieces of encoded information obtained by encoding said input blocks simultaneously or sequentially by said plurality of block truncation encoding means and
  - distortion computing means for obtaining an amount of truncation between said input blocks and a plurality of locally decoded blocks obtained by said locally decoding means, and
  - wherein the classified results of said input blocks are obtained from one of said plurality of locally decoded blocks which has the minimum distortion.

5,414,528

## FACSIMILE MACHINE EQUIPPED WITH APPENDANT INFORMATION ADDING UNIT

Junji Hatamura, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 939,428, Sep. 4, 1992, abandoned,

which is a continuation of Ser. No. 559,061, Jul. 30, 1990,

abandoned. This application Jan. 18, 1994, Ser. No. 184,760

Claims priority, application Japan, Jul. 28, 1989, 1-193873;

Jul. 28, 1989, 1-193874

Int. Cl.<sup>6</sup> H04N 1/00

U.S. Cl. 358—440

4 Claims

1. A facsimile machine for transmitting and receiving original images on original sheets between transmitting and reception sides, each original sheet bearing an original image, including:

- an image reading means for reading the original images;
- a sheet-presence detecting unit for detecting a presence of unread original sheets to be transmitted;
- an appendant information adding unit for automatically





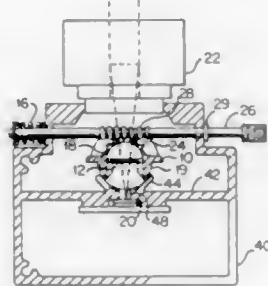
modulating means for modulating the processed image signal into a transmitting signal to be sent out to a telephone line.

5,414,534

**APPARATUS FOR MECHANICALLY ADJUSTING THE IMAGE ON CCD ARRAYS IN A SCANNING APPARATUS**  
Edward W. Bindon, Fairfax, Va., assignor to Vidar Systems Corporation, Herndon, Va.  
Continuation of Ser. No. 984,489, Dec. 2, 1992, abandoned. This application Aug. 4, 1994, Ser. No. 285,442  
Int. Cl.<sup>6</sup> H04N 1/04

U.S. Cl. 358—483

8 Claims



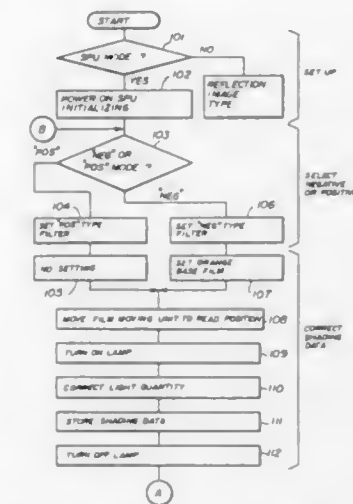
1. An apparatus for scanning an image line by line to produce data representative of the image comprising:
  - a plurality of linear arrays, each of the arrays having a plurality of photosensitive pixel elements arranged in succession along a linear axis of each array;
  - a steering device corresponding to each of the plurality of linear arrays, said steering device for fixedly positioning the image in the Y-direction relative to the corresponding array in order to align the images on each of the plurality of arrays in the Y-direction, said steering device remaining fixed during scanning operation and comprising: a rotatable carrier, an optically transparent plate having parallel surfaces, said plate being mounted in said carrier with said surfaces parallel to the linear axis of said corresponding array, a mechanism engaging a portion of said carrier to rotate said carrier and said plate about an axis parallel to said linear axis of said corresponding array for fixedly positioning the image in the Y-direction relative to the corresponding array;
  - an array support for supporting the arrays in position to scan the image, the linear axis of the arrays extending substantially perpendicular to the direction of movement of the image relative to the arrays;
  - a system for determining a starting pixel element for each array;
  - an image reader for reading video image data from each of the arrays beginning at the starting pixel element for each array and ending a predetermined number of pixel elements after the starting pixel element; and
  - a converter for forming a composite scan line of data representative of a single line of the image from the video image data read from each of the arrays.

**5,414,535**  
**APPARATUS FOR READING IMAGE FROM ORIGINAL IMAGE ON TRANSLUCENT FILM WITH AUTOMATIC ADJUSTMENT OF THE QUANTITY OF LIGHT FROM A LIGHT SOURCE**

Yoshiaki Kanmoto, Machida; Haruhiko Fukuda, Kawasaki; Kohtaroh Yonenaga, Yokohama, and Hiroyasu Shijo, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 21, 1992, Ser. No. 886,168  
Int. Cl.<sup>6</sup> H04N 1/04, 1/46, 1/40, 1/38  
U.S. Cl. 358—487

6 Claims



1. An apparatus for reading an image from an original image on a translucent film, said apparatus comprising:
  - a projector for projecting light through the translucent film so as to produce a projected image from the original image;
  - correction means for adjusting a quantity of the light projected by said projector;
  - an image sensor for reading out an image from the projected image produced by said projector and outputting an analog signal indicating the read-out image;
  - signal conversion means for converting the analog signal output by said image sensor into a digital signal indicating the read-out image; and
  - control means for detecting a peak value of digital signals supplied by said signal conversion means with respect to an effective range of the original image;
  - peak value holding means for comparing the peak value detected by said control means with a previously stored peak value and for selecting the greater peak value;
  - shading correction means for storing shading data which is indicated by a standard image signal output by said signal conversion means from a standard image read out from a standard original image, and for adjusting the digital signal output by said conversion means from the image read out from the original image, in accordance with shading data stored in said shading correction means;
  - said correction means including a light quantity correction filter having a plurality of transmission factors such that the quantity of the projected light is adjusted by selecting one of said plurality of transmission factors, with the selected one of said plurality of transmission factors determined in response to the selected peak value of the digital signals, and wherein said standard image signal output by said signal conversion means from the standard original image is supplied to said peak value holding means such that said correction means adjusts the quantity of the projected light using a first transmission factor of said light quantity correction filter, with the first transmission factor selected based upon the selected peak value output by said peak value holding means from the standard origi-

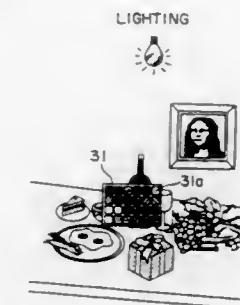
nal image, and further wherein the digital signal output by said signal conversion means from the original image is supplied to said shading correction means after the quantity of light is adjusted based on the standard image signal, and the digital signal adjusted by said shading correction means is supplied to said peak value holding means such that said correction means adjusts the quantity of the projected light by using a second transmission factor of said light quantity correction filter, with the second transmission factor selected based on the selected peak value output by said peak value holding means from the original image.

**5,414,537**  
**COLOR IMAGE PROCESSING METHOD AND APPARATUS**

Hideaki Omuro, Tokyo; Kohei Sakura, Kanagawa; Hidehiko Okada, Kanagawa; Tadashi Tokuyama, Kanagawa, and Akira Oryo, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 14, 1993, Ser. No. 90,927  
Claims priority, application Japan, Jul. 21, 1992, 4-215480  
Int. Cl.<sup>6</sup> H04N 3/08, 5/225  
U.S. Cl. 358—518

12 Claims

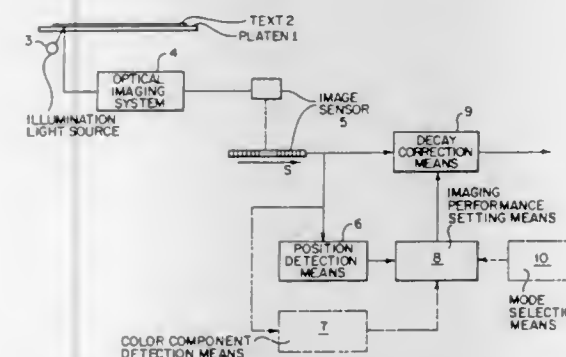


**5,414,536**  
**IMAGE READER HAVING THE ABILITY TO CORRECT IMAGING PERFORMANCE TO DUE FIELD ANGLE FOCUS VARIATIONS**

Yuji Kobayashi, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1993, Ser. No. 95,248  
Claims priority, application Japan, Jul. 23, 1992, 4-218367  
Int. Cl.<sup>6</sup> H04N 1/028, 1/04  
U.S. Cl. 358—504

6 Claims



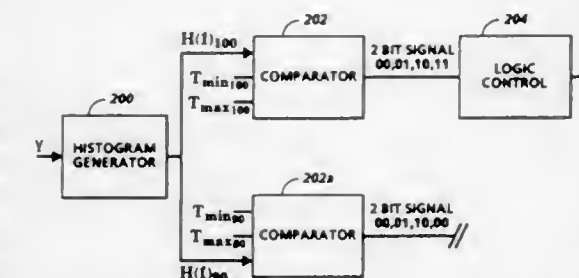
1. An image reader for reading the image of an original text placed on a platen by illuminating the text surface continuously with a slit-shaped light beam produced by an illumination light source, and focusing the slit-shaped reflected light beam from the text surface on a linear image sensor by means of an optical imaging system,
  - wherein said image reader further includes position detection means for detecting the position of image signals produced by said image sensor from the focused reflected light beams on said image sensor along a scanning direction(s) thereof;
  - imaging performance setting means for setting imaging performance information of said optical imaging system for the position of image signals detected by said position detection means; and
  - decay correction means for correcting the decay of the image signal in accordance with the imaging performance information set by said imaging performance setting means.

1. A color image processing method for processing a color image of an object, comprising the steps of:
  - imaging a color chart comprised of a plurality of color chips having respective known colorimetric parameters under predetermined exposure conditions;
  - imaging an object under exposure conditions equal to said predetermined exposure conditions so as to obtain a color image of the object;
  - determining colorimetric parameters of each of the imaged color chips of the imaged color chart;
  - computing a correlation between said known colorimetric parameters of each of said color chips of said color chart and the determined colorimetric parameters of each of the imaged color chips of said imaged color chart; and
  - correcting said color image of the object in accordance with the computed correlation.

**5,414,538**  
**IMAGE-DEPENDENT EXPOSURE ENHANCEMENT**  
Reiner Eschbach, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 7, 1993, Ser. No. 132,973  
Int. Cl.<sup>6</sup> H04N 1/46  
U.S. Cl. 358—522

27 Claims



1. A method for reproducing a natural scene image from electronically-encoded signals, while altering the exposure therein, comprising the steps of:
  - a) receiving an original electronically encoded natural scene image, where the encoding is in terms of color density signals;
  - b) converting the color density signals to a format wherein at least one signal represents image intensity and is defined for L levels of intensity;
  - c) comparing the intensity signal to a pair of preset threshold

- signals  $T_{light}$ ,  $T_{dark}$ , respectively indicating satisfactory lightness and darkness of the image and generating a multi state signal responsive to the comparison;
- d) storing the color density signals to an output buffer if the signal state indicates that the intensity signal has light or dark values exceeding both threshold signals or neither threshold signals  $T_{light}$ ,  $T_{dark}$ , thereby directing the electronically encoded image to a destination reproduction device without exposure alteration;
- e) responsive to a signal state indicating that the intensity signal has dark or light values exceeding one of threshold signals  $T_{light}$ ,  $T_{dark}$ , evaluating the function:

$$\text{Output} I = \text{Input} I^\gamma$$

where  $I$  is image intensity at a given discrete area of the image and  $\gamma$  is given as

$$\frac{\ln[(T_{light}, T_{dark})/L]}{\ln[(T_{light}, T_{dark})/L]}$$

- f) adjusting the tone reproduction characteristics of the destination reproduction device by the exponential function  $\gamma$  for printing portions of the received electronically encoded signals in which the intensity signal has dark or light values exceeding one of threshold signals  $T_{light}$ ,  $T_{dark}$ .

5,414,539

# COLOR IMAGE FORMING APPARATUS CAPABLE OF REPRODUCING A BLACK COLOR

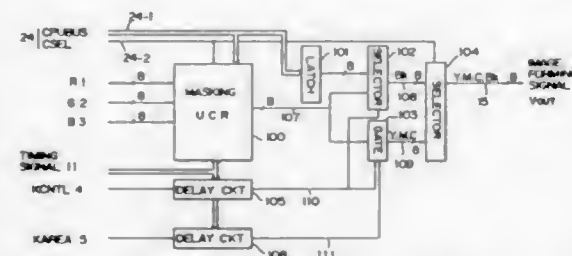
Toshihiro Kadowaki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 22,439, Feb. 16, 1993, abandoned, which is a continuation of Ser. No. 546,844, Jul. 2, 1990, abandoned, which is a continuation of Ser. No. 298,352, Jan. 18, 1989, Pat. No. 4,958,219. This application Oct. 22, 1993, Ser. No. 139,880

Claims priority, application Japan, Jan. 19, 1988, 63-010137 Int. Cl.<sup>6</sup> H04N 1/54

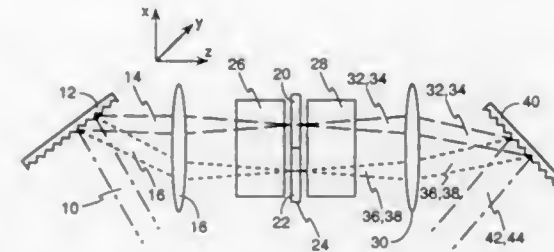
U.S. Cl. 358—529

48 Claims



1. A color image processing apparatus comprising: first input means for inputting a plurality of color component signals;
- second input means for inputting a bit image signal together with the color component signals; and
- means for color masking the plurality of color component signals, wherein said first and second input means input, via a communication channel, the color component signals and the bit image signal.

5,414,540  
FREQUENCY-SELECTIVE OPTICAL SWITCH  
EMPLOYING A FREQUENCY DISPERSIVE ELEMENT,  
POLARIZATION DISPERSIVE ELEMENT AND  
POLARIZATION MODULATING ELEMENTS  
Jayantilal S. Patel, Red Bank, and Yaron Silberberg, West Windsor Township, Mercer County, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.  
Continuation-in-part of Ser. No. 70,591, Jun. 1, 1993. This application Sep. 22, 1993, Ser. No. 125,607  
Int. Cl.<sup>6</sup> G02F 1/137, 1/13; H04J 14/06, 14/02  
U.S. Cl. 359—39 16 Claims



2. An optical switch comprising
- an entrance frequency dispersive element for receiving first and second input optical signals and dispersing them into dispersed beams according to the frequencies thereof;
- a focusing lens receiving said dispersed optical beams;
- a segmented polarization modulator having multiple individually controlled segments and positioned essentially at the focal length of said focusing lens for selectively controlling polarization characteristics of individual elements of said dispersed optical beams;
- a first polarization-dispersive element positioned between said focusing lens and said segmented polarization modulator;
- a second polarization-dispersive element positioned to the other side of said segmented polarization modulator for receiving the dispersed outputs of said segmented polarization modulator and for spatially displacing individual elements of said dispersed outputs dependent on the polarization thereof;
- an exit lens for receiving the outputs of said second polarization-dispersive element, said exit lens being essentially its focal distance away from said segmented polarization modulator; and
- an exit frequency dispersive element receiving the dispersed outputs from the second focusing lens and combining frequency components thereof into separate output optical signals.

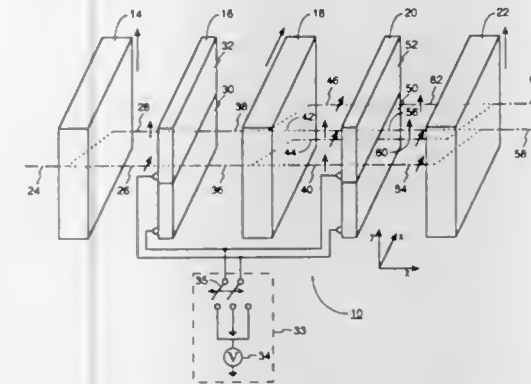
5,414,541

# OPTICAL SWITCH EMPLOYING FIRST AND SECOND FERROELECTRIC CELLS WITH ALIGNMENT LAYERS HAVING ALIGNMENT DIRECTIONS OFFSET BY 45°

Jayantilal S. Patel, Red Bank, and Yaron Silberberg, West Windsor Township, Mercer County, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.  
Filed Jun. 1, 1993, Ser. No. 70,591  
Int. Cl.<sup>6</sup> G02F 1/13, 1/137, 1/137, 1/03  
U.S. Cl. 359—39 4 Claims

1. A ferroelectric liquid-crystal optical switch comprising in succession in the direction of an input optical beam
- a first crystalline birefringent polarization light separator separating light according to its polarization along a first axis offset from the propagation direction of the input optical beam;
- a first polarization light modulator comprising a ferroelectric liquid-crystal and having an alignment layer comprising two alignment portions having alignment directions offset by 45° with respect to each other, said alignment

- portions defining two segments displaced along said first axis to rotate one of the polarization rotations of the beams passing therethrough dependent on the states of the first ferroelectric liquid crystal segments to cause both beams to have the same polarization state;
- a second crystalline birefringent polarization light separator separating light according to its polarization along a second axis offset from said first axis and said propagation direction;
- a second polarization light modulator comprising a second ferroelectric liquid-crystal and having an alignment layer comprising two alignment portions having alignment



- directions offset by 45° with respect to each other, said alignment portions defining two segments displaced along said first axis to rotate one of the polarization rotations of the beams passing therethrough dependent on the state of the second ferroelectric liquid crystal segments to cause the two beams to have orthogonal polarization states, and an exit crystalline birefringent layer having an optical axis parallel with said first direction for recombining the separated light, and further comprising
- biasing means applied to said alignment portions of said first and second liquid-crystal light modulators for selectively setting the states of said first and second ferroelectric liquid crystals.

5,414,542

# LIQUID CRYSTAL APPARATUS

Hideyuki Kawagishi, Fujisawa; Takashi Enomoto, Zama, and Hirofumi Iwamoto, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

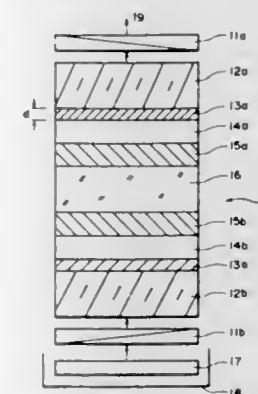
Continuation of Ser. No. 374,659, Jun. 30, 1989, abandoned.

This application Dec. 2, 1992, Ser. No. 985,232

Claims priority, application Japan, Jul. 1, 1988, 63-165660 Int. Cl.<sup>6</sup> G02F 1/13

U.S. Cl. 359—48

12 Claims



1. A liquid crystal apparatus, comprising:
- a liquid crystal cell comprising a pair of substrates each having thereon a transparent electrode with a thickness of

840 Å or less, 1320 to 1680 Å, 1960 to 2470 Å or 3180 to 3850 Å, and a layer of liquid crystal material having a thickness of 5 μm or less disposed between said pair of substrates;

wherein said liquid crystal layer has a maximum thickness  $D_{max}$  and a minimum thickness  $D_{min}$ , and said liquid crystal cell in combination with a light source provides an angle  $|\Delta\theta_{uv}|$  of 9 degrees or less formed between a line connecting a coordinate original and a chromaticity point defined by coordinates  $u^*$  and  $v^*$  at  $D_{max}$  and a line connecting said coordinate original and a chromaticity point defined by coordinates  $u^*$  and  $v^*$  at  $D_{min}$  on a  $u^*-v^*$  coordinate system according to a  $(L^*u^*v^*)$  space of CIE 1976;

said light being a fluorescent light source located behind said liquid crystal cell from a viewing direction thereof that illuminates said liquid crystal cell, with light having at least three peaks of emission energy;

said pair of substrates each having thereon a dielectric film having a larger refractive index than that of said transparent electrode.

5,414,543

# METHOD FOR MANUFACTURING A MULTIPLE LEVEL LIQUID CRYSTAL DISPLAY USING ALTERNATING METAL AND METAL OXIDE LAYERS

In-sik Jang, and Nobuyuki Yamamura, both of Suwon, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

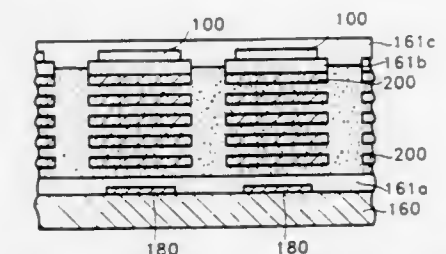
Continuation-in-part of Ser. No. 58,712, May 10, 1993. This application Aug. 24, 1993, Ser. No. 111,064

Claims priority, application Rep. of Korea, Aug. 24, 1992, 15192/92

Int. Cl.<sup>6</sup> G02F 1/133, 1/1333

U.S. Cl. 359—53

13 Claims



1. A method of manufacturing a multi-layer portion of a liquid crystal display device into which liquid crystal is deposited, said multi-layered portion formed over a substrate containing an electrode over which is disposed a protective layer, comprising the steps of:

depositing a metal layer;

oxidizing a portion of said metal layer to obtain an oxidized insulation layer disposed over a non-oxidized layer;

repeating said depositing and oxidizing steps a predetermined number of times to obtain a layered structure containing a plurality of said oxidized insulation layers and said non-oxidized layers;

forming a support structure for said oxidized layers; and

removing said non-oxidized layers to form empty spaces between said insulation layers into which said liquid crystal can be deposited.

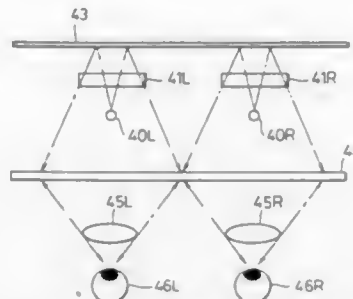


5,414,544

## DISPLAY APPARATUS

Koji Aoyagi, Kanagawa, and Toshio Kimura, Saitama, both of Japan, assignors to Sony Corporation, Japan  
 Filed Dec. 20, 1993, Ser. No. 169,362  
 Claims priority, application Japan, Dec. 25, 1992, 4-347011  
 Int. Cl.<sup>6</sup> G02F 1/133; G02B 27/14  
 U.S. Cl. 359—53

6 Claims



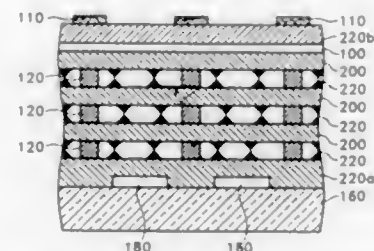
1. A head mounted display apparatus for displaying a video image comprising:
  - a display member including:
    - light source means for emitting light;
    - a pair of liquid crystal displays, each receiving light from said light source means and passing therethrough a part of the received light on the basis of the desired video image thereby projecting a corresponding pair of light images which correspond to said video image;
    - reflecting means for receiving the pair of light images projected from the pair of said liquid crystal displays and reflecting the same;
    - a single screen having first and second sides, said first side receiving the pair of light images reflected by said reflecting means and said second side projecting said pair of light images; and
    - means for focusing the pair of light images projected from said single screen onto the eyes of a user; and
    - holding means for securing said display member to the head of the user.

5,414,545

## MULTILAYERED LIQUID CRYSTAL DISPLAY WITH MULTIPLE BLACK UNIT COLUMNS

Hyung-seok Lee, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyungki, Rep. of Korea  
 Filed Dec. 22, 1993, Ser. No. 170,940  
 Claims priority, application Rep. of Korea, Dec. 26, 1992, 92-25628  
 Int. Cl.<sup>6</sup> G02F 1/133, 1/133.3, 1/133.9  
 U.S. Cl. 359—53

19 Claims



1. A liquid crystal display device comprising:
  - at least one substrate;
  - a plurality of first electrodes disposed in a predetermined pattern on said substrate and defining multiple pixel areas;
  - a protective layer overlaying said plurality of first electrodes;
  - a plurality of second electrodes disposed in a predetermined pattern opposite said plurality of first electrodes;

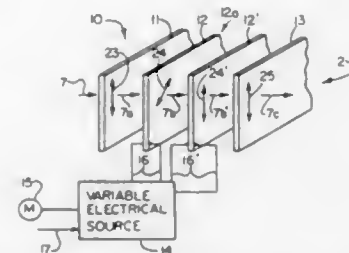
a liquid crystal layer disposed between said said plurality of second electrodes and said protective layer;  
 one or more insulation layers provided in said liquid crystal layer, and partitioning said liquid crystal layer into multiple liquid crystal layers, each respective liquid crystal layer similarly transmitting light in response to an electrical field; and,  
 columns placed in areas other than said defined pixel areas, and fixing the location of said one or more insulation layers in said liquid crystal layer;  
 wherein said columns are made of a black-colored material which absorbs external light, and wherein said columns are composed of multiple unit columns sequentially placed in upper and lower portions between adjacent insulation layers with said insulation layers inserted therebetween.

5,414,546

## DYNAMIC OPTICAL NOTCH FILTER

James L. Ferguson, 92 Adam Way, Atherton, Calif. 94025  
 Continuation of Ser. No. 72,348, Jun. 3, 1993, abandoned, which is a continuation of Ser. No. 869,048, Apr. 14, 1992, abandoned, which is a continuation of Ser. No. 713,542, Jun. 7, 1991, abandoned, which is a continuation of Ser. No. 561,804, Aug. 2, 1990, abandoned, which is a continuation of Ser. No. 230,790, Aug. 10, 1988, abandoned. This application Nov. 24, 1993, Ser. No. 158,711  
 Int. Cl.<sup>6</sup> G02F 1/1335, 1/1347, 1/23  
 U.S. Cl. 359—73

8 Claims



4. Apparatus for selectively filtering a wavelength of light from multiwavelength incident light, comprising:
  - a variable retarder to convert incident plane polarized light to elliptically polarized light,
  - a birefringent means for converting elliptically polarized light to plane polarized light having a direction of plane of polarization that is a function of the ellipticity of the light incident thereon,
  - color dispersion means for rotating the plane of polarization of the wavelength of light intended to be filtered a prescribed amount, and
  - analyzer means for blocking light such wavelength of light intended to be filtered while being able to transmit other wavelength of light.

5,414,547

## LIQUID CRYSTAL DISPLAY DEVICE AND MANUFACTURING METHOD THEREFOR

Mutsumi Matsuo; Ichio Yudasaka; Kiyohiko Kanai; Katsumi Nagase, and Takashi Inoue, all of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan  
 PCT No. PCT/JP92/01562, § 371 Date Jul. 16, 1993, § 102(e) Date Jul. 16, 1993, PCT Pub. No. WO93/11455, PCT Pub. Date Jun. 10, 1993

PCT Filed Nov. 27, 1992, Ser. No. 87,734  
 Claims priority, application Japan, Nov. 29, 1991, 3-316916; Aug. 18, 1992, 4-219428

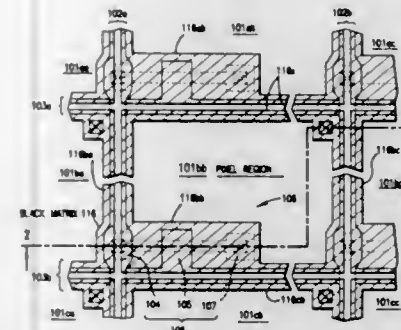
Int. Cl.<sup>6</sup> G02F 1/1343, 1/1335

U.S. Cl. 359—67

34 Claims

1. A liquid crystal display device comprising a transparent substrate, plural data lines and plural gate lines that section a surface of said transparent substrate into plural pixel regions,

wherein a first of said plural pixel regions includes: a thin film transistor having a source electrode electrically connected to one of said data lines, a gate electrode electrically connected to one of said gate lines, a pixel electrode electrically coupled to a drain of said thin film transistor, and wherein at least one



boundary between said first pixel region and adjacent second pixel regions includes an electrically conductive and light shielding layer extending along at least about  $\frac{1}{2}$  of one side of the first pixel region and insulated and separated from said data lines and said gate lines, and electrically connected to said pixel electrode of said first pixel region.

5,414,548

## ARRAYED-WAVE GUIDE GRATING MULTI/DEMUTIPLEXER WITH LOOP-BACK OPTICAL PATHS

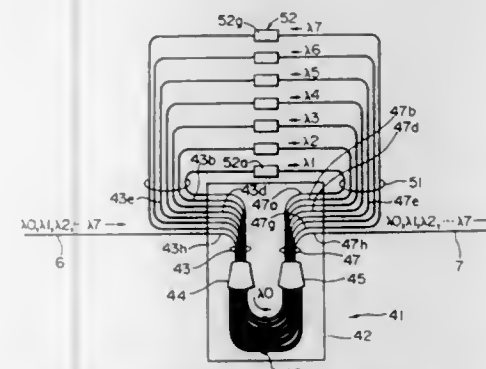
Yoshiaki Tachikawa; Masao Kawachi, both of Mito; Hiroshi Takahashi, Yokosuka, and Kyo Inoue, Yokohama, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan  
 Filed Sep. 28, 1993, Ser. No. 127,879

Claims priority, application Japan, Sep. 29, 1992, 4-260222; May 26, 1993, 5-124488

Int. Cl.<sup>6</sup> G02B 6/26; H04J 14/00

U.S. Cl. 359—130

33 Claims



1. An optical multiplexing/demultiplexing device, having loop-back paths constituted by a plurality of optical path means, for performing wavelength multiplexing and demultiplexing of an optical signal consisting of a plurality of wavelengths by separating said optical signal into individual wavelengths and propagating each wavelength separately in each of said optical path means, said device comprising:
  - a. an arrayed waveguide grating multi/demultiplexer device, comprising an arrayed waveguide grating; a plurality of input sections for receiving said optical signals; a plurality of output sections for outputting optical signals; a slab waveguide for distributing or coupling wavelength signals optically disposed between said plurality of input sections and said waveguide grating, and another slab waveguide for distributing or coupling wavelength signal

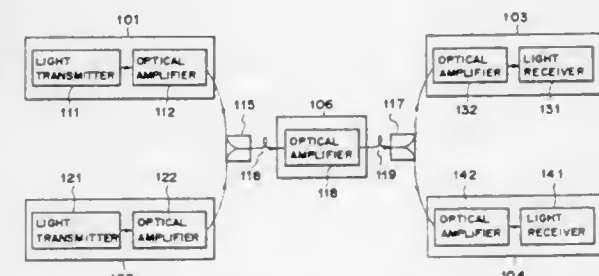
optically disposed between said plurality of output sections and said arrayed waveguide grating; and  
 b. a plurality of loop-back optical path means for propagating and looping optical signals comprising said plurality of optical path means and having signal processing means disposed on selected ones of the optical path means;  
 wherein said arrayed waveguide grating, a plurality of input sections, a plurality of output sections, and said slab waveguides are integrally fabricated on a common substrate base functioning as the arrayed waveguide grating multi/demultiplexer device, and said loop-back optical path means are optically connected with said plurality of input sections and with said plurality of output sections to propagate a wavelength signal from said plurality of output sections into at least one input section of said plurality of corresponding input sections to loop said wavelength signal at least once in one optical path means of said loop-back paths, thereby performing multiplexing and demultiplexing and signal time delay operations using said array waveguide grating multiplexer-demultiplexer device having loop-back paths.

5,414,549

## SEMICONDUCTOR OPTICAL AMPLIFYING APPARATUS

Michio Nishimura, Fujisawa; Jun Nitta, Sagami; Kenji Nakamura, Hadano; Masao Majima, Atsugi, and Toru Nakata, Ebina, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Division of Ser. No. 716,944, Jun. 18, 1991, Pat. No. 5,309,275.  
 This application Feb. 3, 1994, Ser. No. 191,180  
 Claims priority, application Japan, Jun. 21, 1990, 2-163665; May 27, 1991, 3-151023  
 Int. Cl.<sup>6</sup> H01S 3/19; G02B 6/12; H01L 33/00  
 U.S. Cl. 359—160

45 Claims



1. An optical communication system comprising a transmitter, a receiver, a transmission line for connecting said transmitter and receiver, and an optical amplifying apparatus which is disposed in at least one location of said transmitter and receiver,

wherein said optical amplifying apparatus comprises:

- a substrate;
- an active layer having a quantum well structure formed on said substrate, said active layer guiding first guided mode light and second guided mode light having a polarization direction perpendicular to that of the first guided mode light and amplifying the guided lights, said active layer having a wave-shape the height of which is less than respective extents of electric field distributions of the guided lights and which includes a plurality of inclined surfaces, a projected quantization axis obtained by projecting the quantization axis of the quantum well of said active layer in each inclined surface onto a plane perpendicular to a direction to which the guided lights are guided, forming an angle of  $45^\circ$  with respect to each vibration direction of electric field vectors of said first and second guided mode lights; and
- an electrode for supplying a current to said active layer.

5,414,550

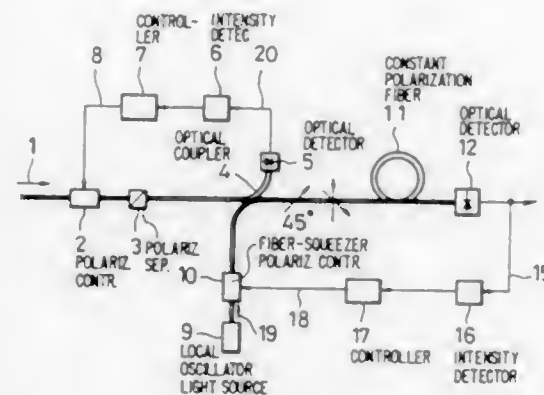
**OPTICAL HETERODYNE DETECTOR AND RECEIVER**  
Takashi Ono, Tokyo, Japan, assignor to NEC Corporation,  
Tokyo, Japan

Filed Apr. 27, 1993, Ser. No. 52,902

Claims priority, application Japan, Apr. 27, 1992, 4-108072  
Int. Cl.<sup>6</sup> H04B 10/06

U.S. Cl. 359—191

3 Claims



1. An optical heterodyne detector and receiver for rejecting an image signal, comprising:

- a first polarization controller for varying a polarization state of received signal light;
- a polarization separator for receiving signal light outputted from said first polarization controller and bringing the polarization of said signal light and the polarization of noise light into conformity with linear polarization;
- a local oscillator light source for oscillating in a single mode;
- a second polarization controller for varying a polarization state of locally oscillated light outputted from said local oscillator light source;
- an optical coupler for coupling the signal light outputted from said polarization separator and the locally oscillated light outputted from said second polarization controller;
- a first optical detector for receiving output light outputted from a first output port of said optical coupler and detecting a first beat signal therefrom;
- a first intensity detector for receiving said first beat signal from said first optical detector, and for detecting a first intensity signal of said first beat signal;
- a first controller for receiving said first intensity signal of said first beat signal, and for controlling said first polarization controller to maximize said first intensity signal of said first beat signal at all times;
- a polarization maintaining fiber having its own axis inclined 45° with respect to a main axis of the polarization state of the signal light outputted from a second output port of said optical coupler;
- a second optical detector for receiving output light from said polarization maintaining fiber and detecting a second beat signal therefrom;
- a second intensity detector for receiving said second beat signal from said second optical detector, and for detecting a second intensity signal of said second beat signal; and
- a second controller for receiving said second intensity signal of said second beat signal, and for controlling said second polarization controller to maximize said second intensity signal of said second beat signal at all times with a different control speed compared with a control speed of said first controller.

5,414,551

**AFOCAL OPTICAL SYSTEM AND MULTIBEAM RECORDING APPARATUS COMPRISING THE SAME**  
Masahide Okazaki, Kenji Ueyama, and Takahisa Hayashi, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Kyoto, Japan

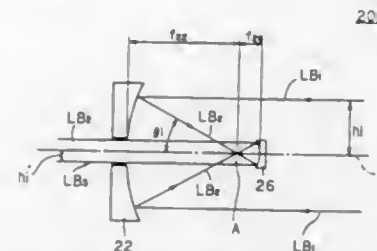
Division of Ser. No. 65,866, May 21, 1993, This application Aug. 16, 1994, Ser. No. 291,393

Claims priority, application Japan, May 27, 1992, 4-162202; May 27, 1992, 4-162209

Int. Cl.<sup>6</sup> G11B 7/095; G02B 17/08

U.S. Cl. 359—205

3 Claims



1. An afocal optical system having an optical axis, comprising:

- a spherical mirror, disposed on the optical axis, having a finite focal length; and
- an equisolidangle projection lens, disposed on the optical axis, having an optical characteristics defined by the following equation:

$$h' = 2f \sin(\theta/2)$$

where  $h'$  is a height of a light beam, leaving said equisolidangle projection lens, taken from the optical axis or a height of an image taken from the optical axis,  $f$  is a focal length of said equisolidangle projection lens and  $\theta$  is an angle of incidence with respect to said equisolidangle projection lens, the focal point of said equisolidangle projection lens substantially coinciding with that of said spherical mirror.

5,414,552

**PARTIALLY LOADED MICROWAVE WAVEGUIDE RESONANT STANDING WAVE ELECTRO-OPTIC MODULATOR**

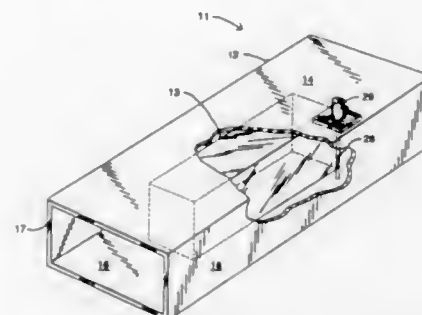
Asif A. Godil, Palo Alto, Calif., assignor to The Board of Trustees of the Leland Stanford, Jr. University, Stanford, Calif.  
Continuation of Ser. No. 932,880, Aug. 19, 1992, abandoned.

This application Dec. 27, 1993, Ser. No. 177,631

Int. Cl.<sup>6</sup> G02F 1/035; H01S 3/115

U.S. Cl. 359—247

3 Claims



1. A resonant standing wave electro-optic modulator for a beam of optical radiation, comprising:

- a) a block of a monocrystalline electro-optic solid state material which is transparent to said optical radiation and positioned to receive said beam therewithin, which block

is shaped to have a minimum of said material beyond a transverse sectional area of said beam;

- b) a guide for modulating microwave energy surrounding said block with the direction along which the electrical component of modulating microwave energy is supported generally coincident with the direction of the major crystalline axis of said block, which guide includes both side walls spaced from said block and microwave cutoff end sections which extend longitudinally beyond said block a distance selected to support with the remainder of said guide, a resonant standing wave of a predetermined microwave frequency having a phase velocity within said block which generally is matched with the phase velocity of said beam of optical radiation when said radiation also is within said block; and
- c) a microwave input coupler extending into said guide for inputting modulating microwave energy thereinto, said coupler comprising a rod which extends into said cavity at a location outside said end sections but spaced from said crystal and selected for said rod to act with the guide structure including one of said side walls as a loop coupler; and
- d) a quality factor,  $Q$ , being defined in terms of phase modulation and the dimensions of the electro-optic crystal by the equation:

$$A = \frac{\pi n_o^3 r_{33}}{\lambda_o} \sqrt{\frac{\alpha P Q_o}{\omega \epsilon_2 \epsilon_o b d [L + \sin(2\phi)/K_2]}} L \frac{\sin u - u}{u^2}$$

where:

$n_o$ =index of refraction of the crystal;  
 $r_{33}$ =electro-optic coefficient of the crystal;  
 $\lambda_o$ =wavelength of light in free space;  
 $\alpha$ =fraction of electrical energy in crystal  $\approx 0.97$ ;  
 $P$ =input microwave power;  
 $L$ =length of crystalline block;  
 $d$ =width of crystalline block;  
 $b$ =height of crystalline block;  
 $\omega$ =frequency of modulation;  
 $K_2$ =propagation constant of the waveguide  $= \sqrt{\omega^2 \mu_o \epsilon_o - K_x^2}$ ;  
 $C_o$ =speed of light in vacuum;

$$u = \frac{\omega L n_o}{2 C_o} - \frac{k_z L}{2};$$

$u=0$  (if perfect phase matching is achieved);  
 $\epsilon_o$ =permittivity of free space;  
 $\epsilon_2$ =dielectric constant of electro-optic crystal;  
 $Q_o$ =quality factor (unloaded);  
 $\phi = \tan^{-1}(Y/K_2)$ ;

$$\gamma = \frac{\pi}{a} \sqrt{1 - \frac{\omega a}{C_o \pi}}$$

$A$ =phase modulation in radians.

5,414,553

**ELECTROABSORPTIVE ASYMMETRICAL FABRY-PEROT MODULATOR ARRAY FOR LINE PRINTERS**

Rogelio F. Nochebuena, Pasadena, and Thomas L. Paoli, Los Altos, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 29, 1993, Ser. No. 158,559

Int. Cl.<sup>6</sup> G01D 15/14

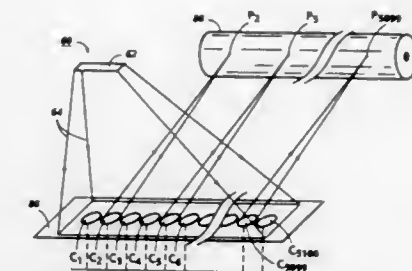
U.S. Cl. 359—259

20 Claims

- 1. An optical system, comprising:
- a light source for emitting a light beam;

a medium;

a modulator located in the path of the light beam from said light source;  
said modulator having a plurality of elements each of which either absorbs the light beam or reflects the light beam;  
said elements of said modulator being so constructed and arranged to reflect the light beam onto said medium;  
means for exposing all of said elements to the light beam;



means for supplying a plurality of pixel information; each of said elements being operably connected to said supplying means to receive one of said plurality of pixel information from said supplying means; and each of said plurality of elements of said modulator being responsive to said received pixel information for either absorbing or reflecting the light beam.

5,414,554

**OPTICAL SEMICONDUCTOR AMPLIFIER**  
Tsumoto Aoyama, Tokyo, Japan, assignor to NEC Corporation,  
Tokyo, Japan

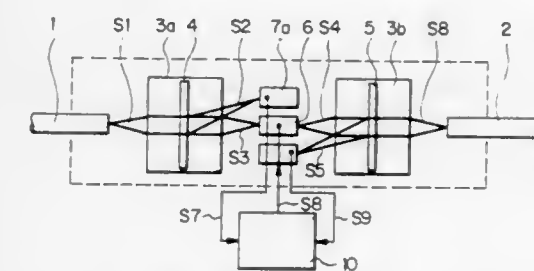
Filed Oct. 13, 1993, Ser. No. 135,447

Claims priority, application Japan, Oct. 13, 1992, 4-273951

Int. Cl.<sup>6</sup> H01L 31/00

U.S. Cl. 359—344

18 Claims



- 1. An optical semiconductor amplifier comprising:
- an input optical waveguide medium for feeding input light;
- first optical coupling means including first optical branching means for splitting said input light into a first beam and a second beam;
- optical semiconductor amplifier means for amplifying said first beam;
- first photodetector means for receiving said second beam and generating a corresponding first electric signal;
- second optical coupling means including second optical branching means for splitting a third beam of light into a fourth beam and a fifth beam, wherein said third beam is an amplification of said first beam by said optical semiconductor amplifier element;
- second photodetector means for receiving said fifth beam and generating a corresponding second electric signal;
- an output waveguide medium for receiving said fourth beam; and
- feedback control circuit means for controlling an injection current to said optical semiconductor amplifier means in



response to said first electric signal and said second electric signal.

5,414,555

# METHOD FOR THE MANUFACTURE OF A THREE-MIRROR OPTICAL SYSTEM AND THE OPTICAL SYSTEM RESULTING THEREFROM

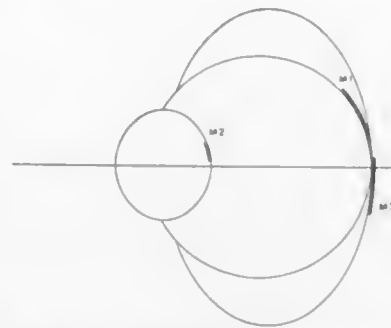
Gilbert Y. Chan, Diamond Bar, Calif., and Kenneth G. Preston, Foxboro, Mass., assignors to Aerojet-General Corporation, Rancho Cordova, Calif.

Continuation of Ser. No. 820,010, Jan. 13, 1992, abandoned. This application Apr. 15, 1993, Ser. No. 48,575

Int. Cl.<sup>6</sup> G02B 17/06

U.S. Cl. 359—366

6 Claims



1. An optical system, comprising:
  - a plurality of mirrors, each of said plurality of mirrors having a predetermined arcuate surface contour, each surface contour being distinct each from the other, an extension of said arcuate surface contour defining a respective closed envelope for each of said distinctly surfaced contoured plurality of mirrors, said closed envelope for each of said mirror contours being bisected by a common axis;
  - two of said plurality of mirrors being integrally formed on a common substrate, each of said two mirrors being defined by a different surface contour equation whose respective closed envelopes intersect said common axis at a common point.

5,414,556

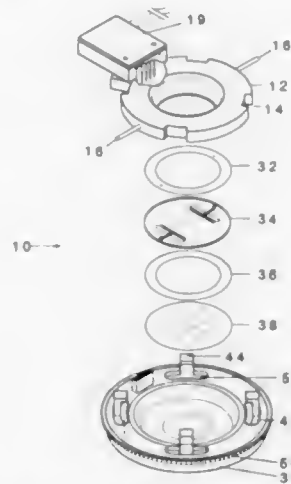
# SECURING AND LOCKING ASSEMBLY FOR LIVE CELL CHAMBERS

Daniel C. Focht, 334 Heist Rd., Butler, Pa. 16001  
Filed Mar. 29, 1993, Ser. No. 38,241

Int. Cl.<sup>6</sup> G02B 21/34

U.S. Cl. 359—398

5 Claims



1. In a live cell chamber apparatus for studying live cells in

culture medium with a microscope including a chamber frame unit, a chamber base unit, first and second coverslip windows and sealing units operatively associated with said coverslip windows forming a chamber thereof, the improvement therewith of a securing and locking assembly comprising:

mating means for coupling said chamber frame unit and said chamber base unit together, thereby forming an enclosure, and

securing means for uniformly securing and locking said enclosure upon rotation thereof through a pre determined arcuate distance, and for unlocking said enclosure upon reverse rotation the same arcuate distance.

5,414,557

# RETICLE APPARATUS FOR NIGHT VISION DEVICES

Earle N. Phillips, Roanoke, Va., assignor to ITT Corporation, New York, N.Y.

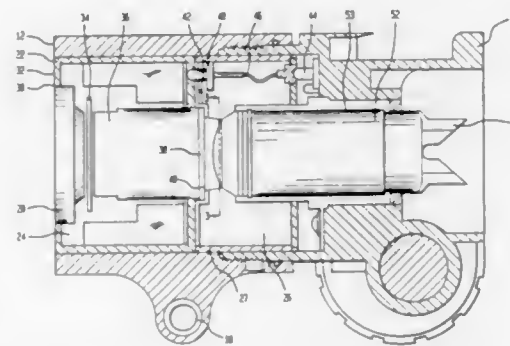
Continuation of Ser. No. 982,882, Nov. 30, 1992, abandoned.

This application Mar. 30, 1994, Ser. No. 220,392

Int. Cl.<sup>6</sup> G02B 23/00; H01J 31/50

U.S. Cl. 359—428

20 Claims



1. An illuminated reticle apparatus for a night vision goggle system, said night vision goggle system including an image intensifier tube and a fiber optic element aligned with said tube having an output surface upon which a monochromatic output image is displayed, comprising:

a substantially transparent substrate having an outer peripheral edge for receiving light and having a surface affixed to said output surface;

a light source disposed proximate said outer peripheral edge for selectively directing light through said outer peripheral edge into said substrate, said light being of a color that optically contrasts said monochromatic output image; and

opaque material disposed on said substrate in the form of a predetermined reticle pattern, wherein said opaque material reflects the light produced by said light source, thereby illuminating said reticle pattern in light that optically contrasts the monochromatic output image.

5,414,558

# SCREEN FOR A PROJECTOR

Shy-Loong You, No. 356, Hsin-Hsing Rd., Yen-Tien Tsun, Yung-An Hsiang, Kaohsiung Hsien, Taiwan, Prov. of China

Filed Feb. 14, 1994, Ser. No. 195,641

Int. Cl.<sup>6</sup> G03B 21/56

U.S. Cl. 359—451

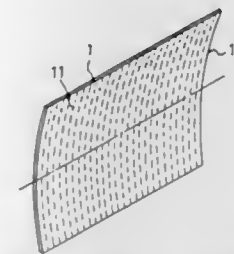
3 Claims

1. A screen for a projector, said screen being used for reflecting light emitted from said projector and comprising:

a metal plate body having a concave reflection surface which is horizontally straight and vertically curved and which has a predetermined radius of curvature; and

a plurality of elongated parallel streaks protruding uniformly from said reflection surface and extending from a top end of said reflection surface to a bottom end of said reflection surface in a generally vertical direction, any adjacent pair

of said streaks being arranged and spaced apart from each other at a distance so that said streaks function as a concave grating, said concave reflection surface being coated with a transparent film by immersing said metal plate body



in a caustic solution so as to decrease interference from light sources other than said projector; whereby, when said screen is in use, said light emitted from said projector can form high contrast images on said concave reflection surface.

5,414,559

# DEVICE FOR HOMOGENIZING A LIGHT BEAM

Berthold Burghardt, Waake; Hans-Jürgen Kahlert, Göttingen, and Uwe Sarbach, Jena, all of Germany, assignors to Microlas Lasersystem GmbH, Göttingen, Germany

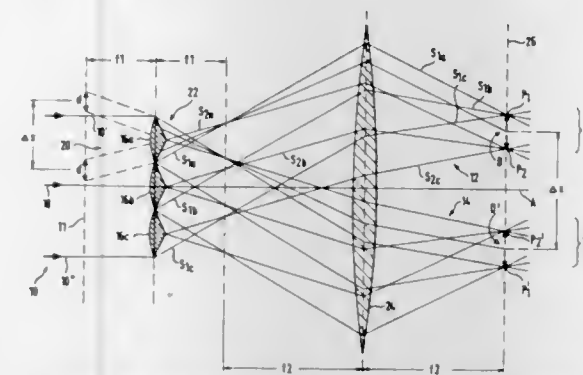
Filed Jun. 22, 1993, Ser. No. 81,018

Claims priority, application Germany, Jun. 24, 1992, 42 20 705.3

Int. Cl.<sup>6</sup> G02B 27/12

U.S. Cl. 359—623

3 Claims



1. A device for homogenizing a light beam (10), comprising an array of first lenses (16a, 16b, 16c) impinged upon by a light beam (10) from one side (20) wherein the light beam propagates from a source in a direction (18) parallel to the optical axis (A) of the device, each of the first lenses being convexly shaped on the side upon which the light beam impinges and being prismatically shaped on the side (22) from which the light beam emerges, the prismatic shape being such that a first part of the light beam impinging on each of said first lenses is deflected to one side of the optical axis (A) and a second part of the light beam impinging on each of said first lenses is deflected to another side of the optical axis (A), and at least one second lens (24) disposed downstream, with respect to the path of the light beam from the source, from the array of first lenses (16a, 16b, 16c), said at least one second lens being a convergent lens.

5,414,560

# SINGLE LENS

Toshihiko Kiriki, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

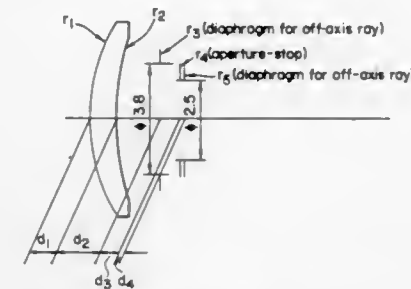
Filed Dec. 2, 1993, Ser. No. 161,152

Claims priority, application Japan, Dec. 7, 1992, 4-351158

Int. Cl.<sup>6</sup> G02B 3/02

U.S. Cl. 359—654

9 Claims



1. An optical device, comprising
  - a single lens of a meniscus-type lens whose index of refraction is distributed in a radial direction perpendicular to the optical axis thereof; and
  - a diaphragm having an aperture and provided at the concave side of the meniscus-type lens;
 wherein the optical device satisfies the following formulas,

$$7 \leq F \leq 16$$

$$20^\circ \leq 2\omega \leq 90^\circ$$

where, an F number of the optical system is defined as F, and an angle of view of the lens is defined as  $2\omega$ , and wherein, when the refractive index distribution in the radial direction perpendicular to the axis is defined by the following formula:

$$n_i = n_0 + n_1 i^2 + n_2 i^4 + n_3 i^6$$

$$i: "i" \text{ shows } d, F, \text{ or } C \text{ line}$$

$$h: \text{height from the axis}$$

the optical device satisfies the following formulas:

$$n_1 c - n_1 d < 0$$

$$n_1 F - n_1 d < 0.$$

5,414,561

# TELECENTRIC IMAGING OPTICAL SYSTEM

Kenji Wakimoto, and Takahisa Hayashi, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

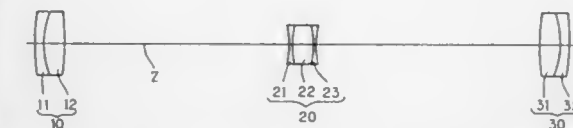
Filed Jan. 21, 1993, Ser. No. 7,329

Claims priority, application Japan, Jan. 23, 1992, 4-034280

Int. Cl.<sup>6</sup> G02B 15/14

U.S. Cl. 359—663

15 Claims



1. A telecentric imaging optical system for forming an image of an object, said optical system comprising:
  - a first lens system having a positive focal length  $f_1$ , a second lens system having a negative focal length  $f_2$ , and a third lens system having a positive focal length  $f_3$ , said lens systems being disposed in order along an optical axis of said optical system, said second lens system being located between said first lens system and said third lens system;

wherein said third lens system is disposed so that the front focal point thereof substantially coincides with the rear focal point of the composite lens system consisting of said first lens system and said second lens system; wherein said focal lengths satisfy the conditions:

$$f/2.5 < -f/2 < 2 \times f/1$$

$$f/2.5 < -f/2 < 2 \times f/3$$

so as to provide said optical system with an increased variable power ratio, and wherein at least one of said lens systems is movable along said optical axis so as to change a first distance between said first lens system and said second lens system and a second distance between said second lens system and said third lens system, to thereby vary the magnification of said optical system, while maintaining telecentricity.

#### 5,414,562 ZOOM LENS

Klichirou Ueda, Ashiya, Japan, assignor to Konica Corporation, Tokyo, Japan

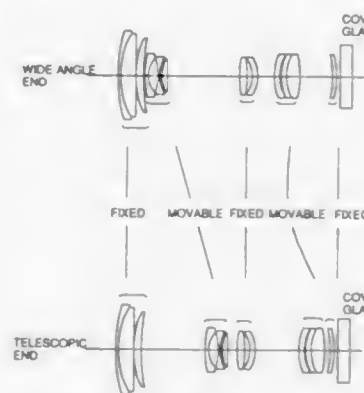
Filed Mar. 8, 1993, Ser. No. 27,814

Claims priority, application Japan, Mar. 19, 1992, 4-092294

Int. Cl.<sup>6</sup> G02B 15/14

U.S. Cl. 359—683

8 Claims



1. A zoom lens comprising:

- a first lens group having a positive refractive power provided at a fixed position nearest to an object to be photographed;
- a second lens group having a negative refractive power provided next to said first lens group, comprising from the object side, a negative meniscus single lens, a convex surface of which faces the object side, a biconcave single lens and a positive single lens in that order, said second lens group being movable along the optical axis in accordance with a change of magnification;
- a third lens group having a positive refractive power provided at a fixed position next to said second lens group, comprising of a lens having a weak refractive power including at least one aspherical surface, and a lens having a positive refractive power;
- a fourth lens group having a positive refractive power provided next to said third lens group, being movable along the optical axis in accordance with a change of magnification; and
- a fifth lens group having a weak refractive power provided at a fixed position furthest from an object to be photographed.

#### 5,414,563 ELECTROMAGNETIC OBJECTIVE LENS DRIVING APPARATUS OF OPTICAL DATA RECORDING AND REPRODUCING APPARATUS

Akihiro Tanaka, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

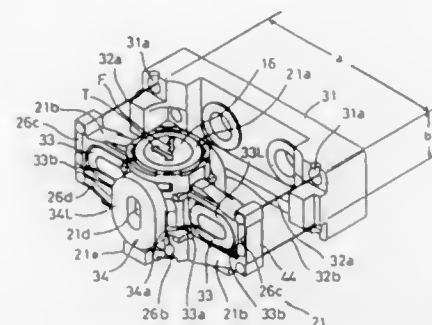
Filed Jul. 28, 1993, Ser. No. 98,070

Claims priority, application Japan, Jul. 28, 1992, 4-201044; Jul. 28, 1992, 4-201046

Int. Cl.<sup>6</sup> G02B 7/02

U.S. Cl. 359—814

21 Claims



18. An electromagnetic objective lens driving apparatus of an optical disc data recording and reproducing apparatus, comprising:

- a carriage which is moveable in a radial direction of the optical disc;
- and objective lens holder which supports an objective lens in a manner such that laser beams are converged onto the optical disc;
- a yoke member provided on the carriage and provided with permanent magnets which constitute electromagnetic driving circuits for moving the objective lens holder in the tracking and focusing directions;
- a supporting block secured to the objective lens holder;
- an elastic support which connects the objective lens holder and the supporting block, and which supports the objective lens holder so as to move for movement in the focusing and tracking directions of the optical disc by a force of the elastic support; and
- said objective lens holder provided with a cylindrical holder portion that holds the objective lens and a pair of symmetrical wings having holes therein, said wings project radially from the cylindrical holder portion in the tracking direction and have a predetermined thickness, focusing coils secured to the respective wings, an outer surface of said focusing coils contacting an inner surface of said holes, a thickness of said focusing coils corresponding to said predetermined thickness of said wings, whereby said focusing coils are substantially contained within said holes, and tracking coils secured to diametrically opposed outer surface portions of the cylindrical holder portion perpendicular to the tracking direction.

#### 5,414,564

##### DEFORMABLE TELESCOPE MIRROR

Konrad Pausch, Essen-Bredeney, and Karl-Heinz Stenvers, Issum, both of Germany, assignors to Krupp Industrietechnik Gesellschaft mit beschränkter Haftung, Duisburg, Germany

Filed Mar. 12, 1993, Ser. No. 31,133

Claims priority, application Germany, Mar. 14, 1992, 42 08 229.3

Int. Cl.<sup>6</sup> G02B 5/08, 7/18

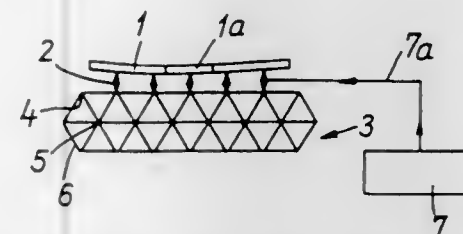
U.S. Cl. 359—846

11 Claims

1. A telescope mirror assembly comprising

- a space frame;
- a deformable mirror body;
- a plurality of spaced supporting elements bonded to the mirror body by an adhesive;

- fastening means for releasably securing each said supporting element to said space frame for combining said mirror body and said space frame into a self-supporting construction;
- piezoelements interposed between each said supporting element and said space frame for selectively imparting by the piezoelements a pressing or pulling force to a portion of said mirror body for moving said portion toward or away from said space frame; and



- an intermediate member disposed between each supporting element and a respective said piezoelement; each said intermediate member having opposite first and second ends; said first end engaging an end of a respective said supporting element and said second end engaging an end of said respective piezoelement; said first end being bonded by an adhesive to said end of said respective supporting element.

#### 5,414,565

##### TILTING KINEMATIC MOUNT

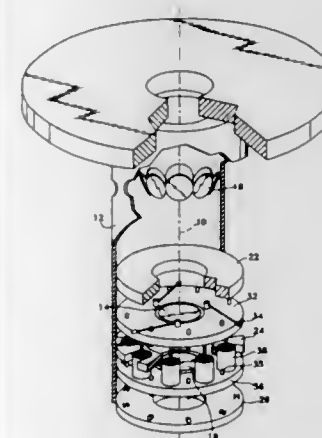
Mark T. Sullivan, 1661 18th Ave., San Francisco, Calif. 94122, and Joseph A. Mansfield, 531 NW Canyon Dr., Redmond, Oreg. 97756

Filed Nov. 27, 1991, Ser. No. 800,580

Int. Cl.<sup>6</sup> G02B 7/18

U.S. Cl. 359—872

9 Claims



1. A multi-positional optic mount, comprising:

- a tilt plate, said tilt plate carrying an optical element;
- means for movably suspending said tilt plate within a housing such that said tilt plate has six degrees of freedom;
- a plurality of baseplates rigidly attached to the interior of said housing;
- means for tilting said tilt plate;
- means for providing contact between said tilt plate and at least two of said baseplates, said means for providing contact being configured to provide six and only six points of contact between said tilt plate and at least two of said baseplates, said six points of contact constraining said tilt plate at a precise, reproducible position relative to said housing.

#### 5,414,566

##### APPARATUS AND METHOD FOR GENERATING HIGH SPEED DUBBING SIGNAL

Yoshinobu Oba; Hideo Oshima, and Toshihiro Uehara, all of Tokyo, Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Continuation of Ser. No. 936,264, Aug. 27, 1992, abandoned.

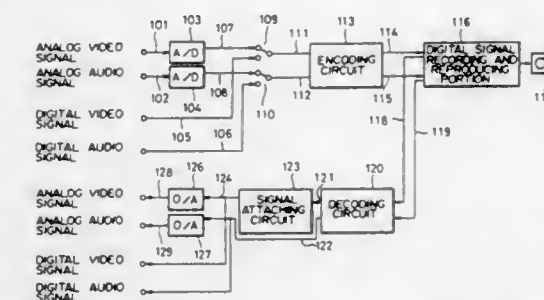
This application Jan. 26, 1994, Ser. No. 186,888

Claims priority, application Japan, Aug. 28, 1991, 3-217238

Int. Cl.<sup>6</sup> G11B 27/02, 5/00, 5/09; H04N 5/86

U.S. Cl. 360—13

18 Claims



1. An apparatus for generating and recording a high speed dubbing signal which generates the high speed dubbing signal from a first digital signal consisting of frame signals, and which records the high speed dubbing signal on a tape, each of the frame signals consisting of N data segments, where N is an integer greater than one, said apparatus comprising:

- data compressing means for reducing the amount of information in the first digital signal by a factor of N by compressing the N data segments within one frame interval so that one frame signal is compressed into one data segment interval, and by arranging the compressed data into one data segment to form a second digital signal; and
- recording means including a head drum that rotates heads for performing helical recording of the second digital signal on said tape at a normal tape speed and at a normal drum rotational frequency in such a manner that the second digital signal associated with one data segment is recorded on M/N tracks on a predetermined length of tape during one frame interval, where M is the number of tracks that would be needed to record the first digital signal on the predetermined length of tape during one frame interval at the normal tape speed and drum rotational frequency.

#### 5,414,567

MAGNETIC RECORDING AND REPRODUCING DEVICE  
Nobutaka Amada; Toshifumi Takeuchi; Akira Abeta; Takao Arai, all of Yokohama, and Kouei Usuda, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 11, 1990, Ser. No. 625,822

Claims priority, application Japan, Dec. 13, 1989, 1-321426

Int. Cl.<sup>6</sup> H04N 5/78

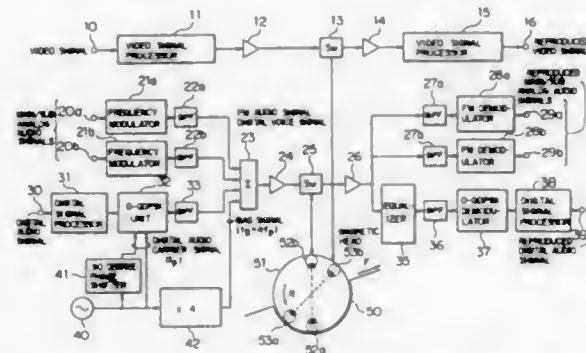
U.S. Cl. 360—19.1

37 Claims

- A magnetic recording method comprising the steps of: performing a quadrature phase shift keying operation on a digital information signal, superimposing a high frequency bias signal on the quadrature phase shift keyed digital information signal, recording a signal resulting from the superimposing step in a deep portion of a magnetic layer of a magnetic tape with a first rotary head, and recording a video signal in a surface portion of the magnetic layer above a track formed by recording the signal resulting from the superimposing step with a second rotary head which is different in azimuth angle from the first rotary head,



wherein a frequency of the high frequency bias signal is set to a value which is four times as high as a carrier frequency of the quadrature phase shift keyed digital information signal.

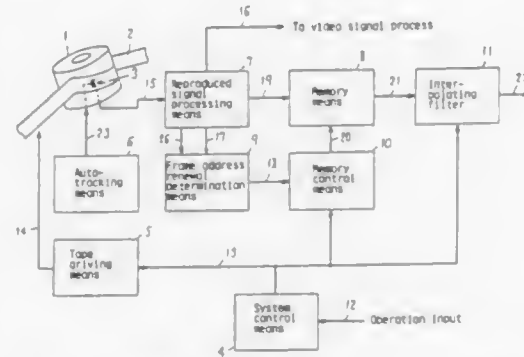


frequency of the quadrature phase shift keyed digital information signal.

# 5,414,568 VARIABLE SPEED DIGITAL SIGNAL REPRODUCING APPARATUS

Hideshi Taki, Hirakata; Takafumi Ueno, Nara; Shiro Tsuji, Mino; Masataka Nikaide, Hirakata, and Nobuyoshi Kihara, Amagasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan  
Continuation of Ser. No. 720,507, Jul. 26, 1991, abandoned. This application Nov. 24, 1993, Ser. No. 156,941  
Claims priority, application Japan, Oct. 23, 1989, 1-275291; Oct. 26, 1989, 1-280501

Int. Cl.<sup>6</sup> H04N 5/783  
U.S. Cl. 360—19.1 4 Claims



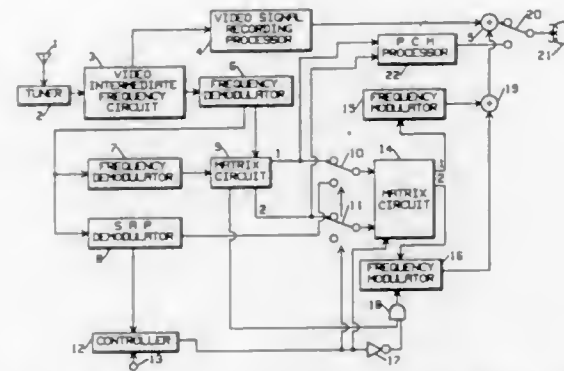
1. A variable speed digital signal reproducing apparatus for reproducing a PCM audio signal recorded at an original sampling frequency, said PCM audio signal being recorded in oblique tracks formed on a tape with a rotary head, a predetermined number of said oblique tracks representing one frame of a video signal, said apparatus comprising:  
system control means for outputting tape running speed information in accordance with an operation mode,  
tape driving means for driving a tape in compliance with said tape running speed information,  
reproduction signal processing means for demodulating a reproduction signal from said rotary head, said reproduction signal being representative of said PCM audio signal recorded on said tape,  
memory means for storing said demodulated reproduction signal,  
reproduction signal renewal detection means for determining whether said demodulated reproduction signal is the same as the previous demodulated reproduction signal by comparing said demodulated reproduction signal with said previous demodulated reproduction signal when variable speed reproduction of said PCM audio signal

recorded on said tape is performed based on said tape running speed information,  
memory control means for controlling write in of said demodulated reproduction signal to said memory means in compliance with a determination result output from said reproduction signal renewal detection means, and for controlling readout of said demodulated reproduction signal from said memory means at a sampling frequency in compliance with said tape running speed information, and interpolating filter means for interpolating said demodulated reproduction signal read from said memory means in accordance with said tape running speed information so that a frequency of said demodulated reproduction signal readout from said memory means equals said original sampling frequency.

# 5,414,569 MAGNETIC RECORDING APPARATUS WITH SELECTIVE RECORDING OF AUXILIARY AUDIO SIGNAL

Masami Sekiguchi, and Toru Yamamoto, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan  
Continuation of Ser. No. 955,525, Oct. 1, 1992, abandoned. This application Aug. 3, 1994, Ser. No. 298,536  
Claims priority, application Japan, Oct. 4, 1991, 3-257925  
Int. Cl.<sup>6</sup> G11B 5/02

U.S. Cl. 360—19.1 6 Claims



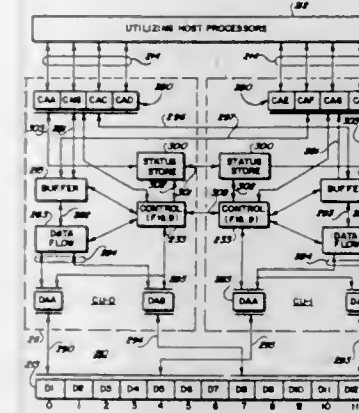
1. An apparatus for recording a television signal which includes a video signal, a main audio program and may include a Second Audio Program (SAP), comprising:  
means for receiving said television signal and generating a processed video signal therefrom;  
a first demodulator for producing a sum audio signal including a sum of left and right stereo channels;  
a second demodulator, receiving said sum audio signal, for producing a difference audio signal including a difference of left and right stereo channels;  
matrix means for producing a matrix signal indicative of the presence of said difference audio signal;  
an SAP demodulator, also receiving said sum audio signal, for demodulating an SAP audio signal, and for determining if said television signal includes an SAP audio signal, said SAP demodulator producing a signal indicative of the presence of said SAP signal;  
control means responsive to said signal indicative of the presence of said SAP audio signal and responsive to an input signal indicating whether said SAP audio signal is to be recorded, for producing a control signal;  
a first frequency modulator for selectively modulating either said SAP audio signal or said sum audio signal to produce a first modulated audio output signal;  
a second frequency modulator for modulating said difference audio signal to produce a second modulated audio output signal;  
gating means, responsive to said control signal and said

matrix signal for enabling operation of said second frequency modulator only when said difference audio signal is present;  
switching means, responsive to said control signal, for selectively switching either said SAP audio signal or said sum audio signal to said first modulator, and said difference audio signal to said second frequency modulator;  
combining means for combining said processed video signal with said first and second modulated audio output signals to produce a combined signal; and  
recording means for recording said combined signal on a recording medium.

# 5,414,570 TAPE MARKS RECORDED IN USER DATA BLOCKS HAVING IDENTIFICATIONS OF THE RECORDED TAPE MARKS

Scott M. Fry, Tucson, Ariz.; Scott A. Jackson, Snohomish, Wash., and Richard A. Ripberger, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y. Division of Ser. No. 978,859, Nov. 19, 1992, Pat. No. 5,274,772, which is a division of Ser. No. 372,744, Jun. 28, 1989, Pat. No. 5,200,864. This application Jul. 28, 1993, Ser. No. 98,149  
Int. Cl.<sup>6</sup> G11B 5/09

U.S. Cl. 360—48 10 Claims



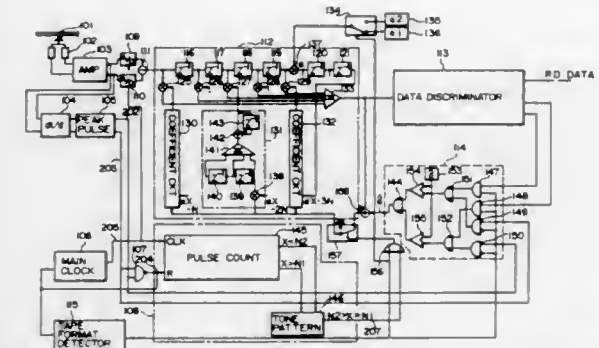
1. Data storage apparatus having data means for recording and reading data signals to and from, respectively, a record medium having a plurality of elongated tracks, said recorded data signals being arranged in addressable data blocks recorded in said elongated tracks;  
format means connected to the data means for generating a block format for each said data block including a clock synchronization portion, a data storage portion, a data-indicating control portion and an error redundancy portion and controlling the data means to format any data to be recorded into said block format for recording in said elongated tracks as data-containing data blocks;  
said data means having read means for reading said data blocks from the record medium recorded in said block format for separating said data-indicating control portion and data storage portion to remove data recorded in the data storage portion from the read data block and to sense and respond to the signals in said synchronization portion, said data-indicating control portion and said error redundancy portion for processing the data contained in the data storage portion;  
the improvement including, in combination:  
control mark means in the format means for generating a control-mark-indicating data portion and a control-mark-indicating control portion for generating a record medium control mark indication to be recorded in said block format;  
said control mark means being connected to the data means for supplying said control-mark-indicating data portion and control-mark-indicating control portion to the data

means for generating a control-mark containing data block for recording on said record medium between predetermined ones of said data-containing or control-mark containing data blocks; and  
said read means having control mark detecting means for examining said control portion of each data block read from the record medium for detecting if the control portion of said read data block is a control-mark-indicating control portion for sending both the read data and control portions to the format means as an indication of a detected record medium control mark and for detecting if the control portion of said read data block is a data-indicating control portion for sending both the read data and control portions to said data means as a read data-containing data block.

# 5,414,571 ADAPTIVE EQUALIZATION CIRCUIT FOR MAGNETIC RECORDING APPARATUS HAVING HIGH ERROR IMMUNITY

Hiromi Matsushige; Minoru Kosuge, both of Odawara; Yasuhiro Shimura, Hiratsuka; Hideo Miyasaka, Odawara; Satoshi Minoshima, Fujisawa; Tsuguji Tachiuchi, Odawara; Kazunori Iwabuchi, Yokohama; Terumi Takashi, Ebina, and Naoto Matsunami, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 16, 1992, Ser. No. 961,623  
Int. Cl.<sup>6</sup> G11B 5/35; H03H 7/30, 7/40; H03K 5/159  
U.S. Cl. 360—65 8 Claims



1. An adaptive equalizing data reproducing circuit comprising:  
a data reading means for reading data from a recording medium;  
an adaptive equalizing means for optimizing a waveform of a read signal from said data reading means;  
a first expected value generating means for discriminating an output signal from said adaptive equalizing means to generate a first expected value for a waveform of a discriminated signal;  
a format detecting means for detecting a specified pattern of a signal written on said recording medium from said read signal;  
a monitor means for monitoring whether a waveform of said read signal is periodical or not based on an output of said format detecting means;  
a second expected value generating means for generating a second expected value from said waveform of said read signal monitored by said monitor means;  
an error detecting means for generating an error signal representing a difference between an output of said adaptive equalizing means and said first expected value of said first expected value generating means, for adaptive equalize and generating an error signal representing a difference between said output of said adaptive equalizing means and said second expected value of said second expected value generating means, for adaptive learning

and feeding said error signal back to said adaptive equalizing means; and  
 a select means for selecting said error signal for adaptive equalizing or said error signal for adaptive learning as a feedback output applied to said adaptive equalizing means in accordance with said output of said format detecting means,  
 wherein multiplication factors of said multipliers of said adaptive equalizing means are changed in accordance with said error signal applied thereto.

5,414,572

# HAVING HEAD SHIFT CONTROL MEANS WITH SELECTABLE HEAD SHIFT RATES AND HEAD CONTROL POSSIBILITIES

Shigeo Yamagata, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

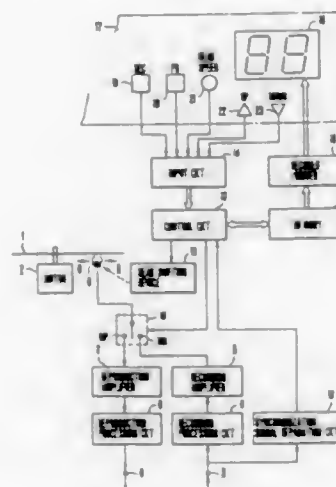
Division of Ser. No. 912,012, Jul. 10, 1992, Pat. No. 5,267,102, which is a continuation of Ser. No. 449,508, Dec. 4, 1989, abandoned, which is a continuation of Ser. No. 313,351, Feb. 21, 1989, abandoned, which is a continuation of Ser. No. 81,596, Aug. 3, 1987, abandoned, which is a continuation of Ser. No. 849,342, Apr. 7, 1986, abandoned, which is a continuation of Ser. No. 698,624, Feb. 6, 1985, abandoned. This application Aug. 4, 1993, Ser. No. 101,649

Claims priority, application Japan, Feb. 6, 1984, 59-18411; Jul. 24, 1984, 59-154695

Int. Cl. G11B 5/55

U.S. Cl. 360-75

26 Claims



1. An apparatus for recording signals on and/or reproducing recorded signals from a record bearing medium, comprising:  
 (a) a recording and/or reproducing head;  
 (b) shifting means for shifting said head relative to the record bearing medium to change the recording or reproducing position of the head on the medium;  
 (c) shift control means for controlling said shifting means, said shift control means having a plurality of different control possibilities and controlling the shifting means according to selected one of said possibilities;  
 (d) selection means for selecting one of said control possibilities of said shift control means;  
 (e) display means for displaying an information; and  
 (f) display control means responsive to said selection means for causing said display means to display an information on the selected control possibility of said shift control means at the time of the selection of the possibility by the selection means and causing the display means to display another information in the case other than the selection of said control possibility of the shift control means,  
 wherein said another information includes an information on the position of said head on the record bearing medium,

wherein said shift control means includes manually operable means for causing said shift means to shift said head, and said control possibilities include a first possibility for causing said shift means to shift said head by a predetermined amount in response to each operation of said operable means and a second possibility for causing the shift means to successively shift the head with said predetermined amount as long as the operable means is in the operated condition,  
 wherein said second possibility includes a plurality of sub-possibilities different from each other in the head shift rates;  
 said selection means being arranged to select one of said sub-possibilities of said second possibility.

5,414,573

# CASSETTE ACCOMMODATING TYPE ELECTRONIC DEVICE HAVING A PLURALITY OF WINDOWS FOR IDENTIFYING THE AMOUNT OF REMAINING TAPE AND THE SIDE LABEL OF THE CASSETTE ACCOMMODATED IN THE DEVICE

Noriyuki Koga, Chiba, and Hisashi Hanzawa, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

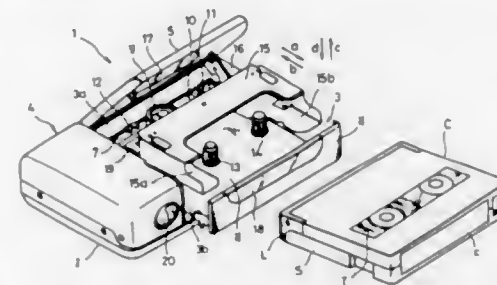
Filed Nov. 18, 1993, Ser. No. 154,622

Claims priority, application Japan, Nov. 30, 1992, 4-343383

Int. Cl. G11B 5/008

U.S. Cl. 360-93

8 Claims



1. A cassette accommodating type electronic device having an electronic equipment housing which comprises:  
 a cassette accommodating portion for accommodating therein a tape cassette in which a recording medium is accommodated;  
 said housing having formed therein an opening portion through which said tape cassette is inserted into said cassette accommodating portion;  
 driving means for driving said recording medium of said cassette accommodated in said cassette accommodating portion;  
 a lid for opening and closing said opening portion;  
 a front panel cooperating with the lid for opening and closing the opening portion, said front panel being adjacent to a side of said tape cassette opposite to a second side of said tape cassette having an opening providing access to said recording medium when said tape cassette is resting in said cassette accommodating portion and said lid is in a closed position; and  
 a first transparent window formed through a surface of said lid and a second transparent window formed through a surface of said front panel so that two different cassette surfaces of said tape cassette accommodated in said cassette accommodating portion can be visually identified.

5,414,574

# HYBRID BASE FOR ULTRATHIN DISK DRIVES

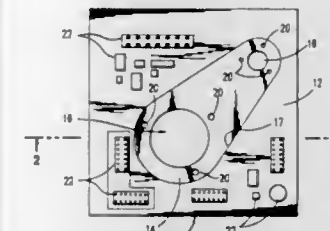
Zine E. Boutaghou; Sattar S. Malek, both of Rochester, and Dean A. Richards, St. Charles, all of Minn., assignors to International Business Machines, Corp., Armonk, N.Y.

Filed Jul. 29, 1993, Ser. No. 99,306

Int. Cl. G11B 5/012, 17/02

U.S. Cl. 360-97.01

16 Claims



1. A magnetic disk drive apparatus comprising:  
 a drive motor;  
 a magnetic disk for recording and storing data;  
 a head actuator mechanism for accessing a plurality of recording tracks on said disk; and  
 a hybrid base plate/circuit board supporting said drive motor, magnetic disk and head actuator mechanism, said base plate/circuit board includes:  
 a metal base plate having means for supporting said drive motor and said head actuator mechanism;  
 a printed circuit board having an aperture corresponding to the perimeter of said base plate;  
 said metal base plate disposed within said circuit board aperture so that the base plate perimeter abuts against sides of the aperture, said base plate and said circuit board joined together to form a single hybrid structure.

5,414,575

# MAGNETIC DISC DRIVE DEVICE WITH HUB AND CLAMPER ASSEMBLY FOR REDUCING POST-ASSEMBLY MACHINING

Koichi Katakura, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seisakusho, Nagano, Japan

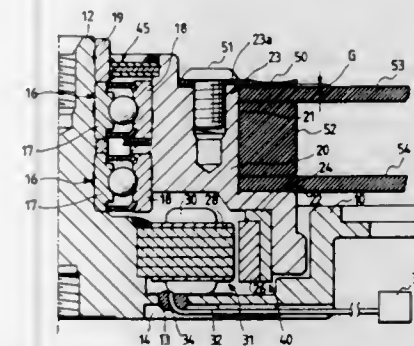
Filed Oct. 7, 1993, Ser. No. 132,681

Claims priority, application Japan, Oct. 8, 1992, 4-76919 U

Int. Cl. G11B 17/02

U.S. Cl. 360-98.08

4 Claims



1. A magnetic disc drive device comprising:  
 a cylindrical hub which rotates with a plurality of magnetic discs, the cylindrical hub having disc clamp holes defined

in an end surface thereof and a flange on which said magnetic discs are positioned;  
 a motor for rotating said cylindrical hub;  
 at least one spacer, disposed between said magnetic discs, for separating said magnetic discs from each other;  
 a projecting member, formed between the disc clamp holes and the magnetic discs to be clamped, extending in the axial direction of the hub on an outer edge of said end surface of the hub, an upper surface of said projecting member being the only portion of the end surface of the hub that is machined during post-assembly machining; and  
 a clasper clamped on said upper surface of said projecting member, said clasper exerting clamping force on said plurality of magnetic discs  
 wherein the projecting member has a mounting reference surface for said clasper clamping the magnetic discs, said clasper contacting said mounting reference surface when said plurality of magnetic discs are clamped.

5,414,576

# SPACE SAVING CONFIGURATION OF A PRINTED CIRCUIT BOARD FOR A MAGNETIC HEAD ON A FLEXURE SEAT FOR THE HEAD

Jiro Ueki, Fuchu, and Fumio Nagase, Tama, both of Japan, assignors to TEAC Corporation, Tokyo, Japan

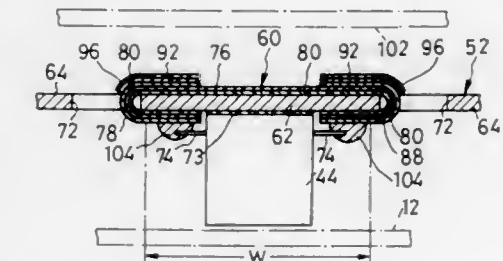
Filed Jun. 9, 1993, Ser. No. 74,224

Claims priority, application Japan, Jun. 12, 1992, 4-047118 U

Int. Cl. G11B 21/04, 21/16

U.S. Cl. 360-104

8 Claims



1. In an apparatus for data transfer with a rotating data storage disk, in combination:  
 (a) carriage means movable, substantially radially of the disk;  
 (b) a substantially planar flexure seat mounted to the carriage means, the flexure seat having a first side directed toward the disk and a second side directed away therefrom;  
 (c) a flexible printed circuit board having a conductive pattern formed thereon, the circuit board comprising:  
 (i) a major portion disposed on the second side of the flexure seat;  
 (ii) a first pair of flaps extending in opposite directions from opposite ends of the major portion and folded onto the first side of the flexure seat; and  
 (iii) a second pair of flaps extending from the first pair of flaps, respectively, and folded, after having been folded together with the first pair of flaps onto the first side of the flexure seat, back onto the second side of the flexure seat into overlying relationship with at least part of the conductive pattern on the major portion; and  
 (d) a transducer mounted on the first side of the flexure seat for writing and/or reading data on the disk, the transducer having leads electrically connected to the conductive pattern on the first pair of flaps of the flexible printed circuit board.



5,414,577

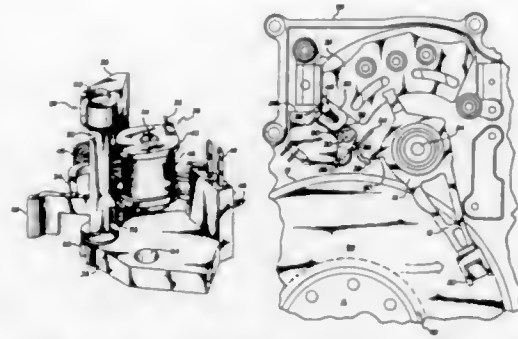
**MAGNETICALLY COUPLED HARD DISK DRIVE HEAD POSITIONER LATCH**

Haldun Arin, Moorpark, and Kenneth Murray, Granada Hills, both of Calif., assignors to Micropolis Corporation, Chatsworth, Calif.

Filed Apr. 23, 1993, Ser. No. 52,373  
Int. Cl.<sup>6</sup> G11B 5/54, 5/55

U.S. Cl. 360—105

16 Claims



1. A hard disk drive storage system including a plurality of magnetic storage disks coaxially mounted on a spindle having a motor, a permanent magnet structure defining a gap in said magnet structure and generating a magnetic field, a rotatable head positioner, including a plurality of magnetic heads, for shifting the position of said heads across said magnetic disks, and a fail-safe magnetically coupled head positioner latch assembly, said positioner latch assembly comprising:

- a rotatably mounted latch support;
  - a latch arm extending outwardly from said latch support and being moveable between a parked position and a non-interactive position;
  - said latch arm adapted for engaging said head positioner to hold said head positioner in the parked position, and said latch arm being non-interactive with said head positioner when said latch arm is in the non-interactive position;
  - means for maintaining said latch arm in the non-interactive position during disk drive storage system activity;
  - a solenoid assembly included on said latch support for moving said latch arm into the parked position when said solenoid assembly generates a magnetic field opposite to said permanent magnet structure magnetic field in response to an electrical current applied to said solenoid assembly, said electrical current being generated by said spindle motor during hard disk storage system power shut-down; and
  - a tang extending outwardly from said latch support and being adapted to penetrate said permanent magnet structure gap;
- wherein said head positioner is restrained by said latch arm in the parked position by a magnetic coupling force between said tang and said permanent magnet structure, and said latch arm is moved out of the parked position by actuation of said head positioner upon initiating hard disk drive system activity.

5,414,578

**VOICE COIL SERVO MOTOR FOR ADJUSTING MAGNETIC HEAD**Ragnar Liaa, Vettre, and Lars Simonsen, Osteras, both of Norway, assignors to Tandberg Data Storage A/S, Oslo, Norway  
Filed Sep. 15, 1993, Ser. No. 122,366Int. Cl.<sup>6</sup> G11B 5/55, 21/08

U.S. Cl. 360—106

15 Claims

1. An apparatus for positioning of a magnetic head with respect to a magnetic tape applied thereto, comprising:

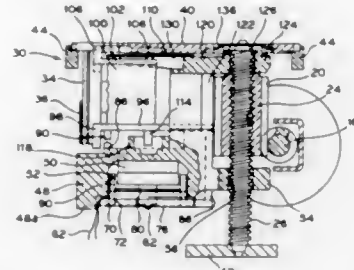
- a magnetic head;
- a magnetic head support structure mounted to said magnetic head;

a magnet;

a magnet housing surrounding said magnet, said magnet mounted within said magnet housing, and selectively fixed in position;

a movable coil surrounding said magnet within said magnet housing, said coil connected to said head support structure, movement of said coil positioning said magnetic head with respect to said magnet housing;

wherein said magnet housing comprises a closed first end and an open second end, and said closed first end is arranged between said magnet and said magnetic head;



current leads electrically connected to said coil for inducing a select current through said coil;

wherein said first closed end and said second open end comprise a closed top and an open bottom respectively, and said magnetic head is arranged elevated from said closed top; and

said magnetic head support structure extending from said magnetic head below said magnet housing, said coil connected to said magnetic head support structure through said open bottom of said magnet housing.

5,414,579

**HEAD CYLINDER FOR A RECORDER**

Dietmar Uhde, Königfeld; Rüdiger Lehmann, St. Georgen; Günter Gleim, Villingen-Schwenningen; Peter Hoch, Triberg, all of Germany, and Hartmut Schandl, Vienna, Austria, assignors to Deutsche Thomson-Brandt GmbH, Germany

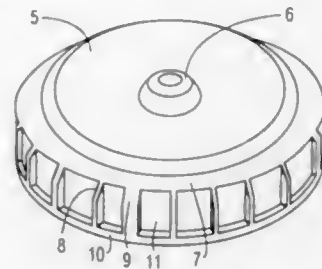
Filed Nov. 26, 1993, Ser. No. 159,700

Claims priority, application Germany, Jun. 6, 1991, 41 18 535.8; WIPO, May 29, 1992, PCT/EP92/01192

Int. Cl.<sup>6</sup> G11B 15/46

U.S. Cl. 360—107

3 Claims



1. A drum for a rotatable cylinder head comprising:

- an opaque disc-shaped member;
- a plurality of opaque fins affixed to said disc-shaped member and substantially normal to said disc-shaped member, a first plurality of said fins having a first width and a second plurality of said fins having a second width broader than said first width, each of said fins having a distal end remote from said disc-shaped member; and
- an opaque circumferential ring affixed to said distal ends of each of said fins, said opaque disc-shaped member, said fins and said circumferential ring forming a plurality of apertures about said drum.

5,414,580

**MAGNETIC STORAGE SYSTEM USING THIN FILM MAGNETIC RECORDING HEADS USING PHASE-SHIFTING MASK**

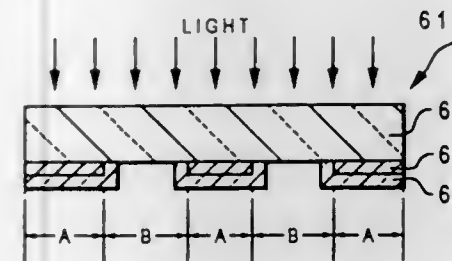
Marc D. Levenson, Saratoga, and Hugo A. E. Santini, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 13, 1994, Ser. No. 242,810

Int. Cl.<sup>6</sup> G11B 5/17

U.S. Cl. 360—123

1 Claim



1. A magnetic storage system comprising:

- a magnetic storage medium having a plurality of tracks for recording of data; and
- a magnetic read/write head maintained in a closely spaced position relative to the magnetic storage medium during relative movement between the magnetic read/write head and the magnetic storage medium; and
- actuator means coupled to the magnetic read/write head for moving the magnetic read/write head to selected tracks on the magnetic storage medium;

wherein the magnetic read/write head comprises:

- a first permalloy yoke on a substrate, wherein the edges of the first yoke create steps from the top of the first yoke down to the substrate;
- a first partial conformal layer of an electric insulation material over the first permalloy yoke and the substrate;
- a copper coil on the electric insulation layer, wherein the copper coil is fabricated using a lithography process including placing a phase-shifting mask layer, formed in the image of the copper coil and containing non-printable openings covered by transparent material of a thickness that creates a 180° phase-shift in illumination, over a photoresist layer, the phase-shifting mask layer creating illumination destructive interference in regions of the photoresist layer that are covered by the phase-shifting mask layer and immediately adjacent to regions of the photoresist layer not covered by said mask layer;
- a second electric insulation layer over the copper coil, wherein the second electric insulation layer planarizes the coil topography; and
- a second permalloy yoke over the second electric insulation layer, wherein said second yoke is joined to said first yoke at a back gap but separated from said first yoke by a thin insulating layer at a recording gap.

5,414,581

**TAPE CASSETTE WITH V-SHAPED TAPE BUILD-UP AREA FOR CONTROLLING MISFEED TAPE**

Richard F. Rich, Warren, Pa., assignor to Loran Cassette &amp; Audio Products, Warren, Pa.

Filed Nov. 19, 1993, Ser. No. 154,528

Int. Cl.<sup>6</sup> G11B 23/087, 15/32

U.S. Cl. 360—132

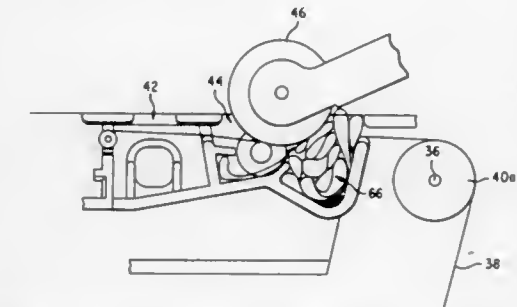
12 Claims

1. A tape cassette for insertion into a tape deck having a nip formed between a capstan and a pinch roller pivotally biased toward the capstan, to drive tape within the tape cassette past a head of the tape deck, the tape cassette comprising:

- a housing having top and bottom walls and a peripheral wall therebetween, the peripheral wall having a first opening for receiving the pinch roller and a second opening for receiving the head, at least one of the top and bottom

walls having an aperture for receiving the capstan in a position opposite the first opening to locate the tape in the nip between the capstan and pinch roller;

- a pair of hubs rotatable within the housing for feeding and taking-up the tape with ends of the tape being attached to the hubs such that the tape travels between the hubs and in a tape feed direction through the nip;
- a guide bracket mounted within the housing for guiding the tape on opposite sides of the nip in the tape feed direction, the guide bracket including a first extension supporting a first tape guide on a first side of the nip between the capstan and the second opening and a second extension supporting a second tape guide on a second side of the nip opposite from the first side;



the second extension including a first arm extending away from the tape at an angle to the tape feed direction and a second arm extending toward the tape to position the second tape guide against the tape, the first and second arms defining a V-shaped misfeed tape build-up area for storing misfeed tape within the housing; and

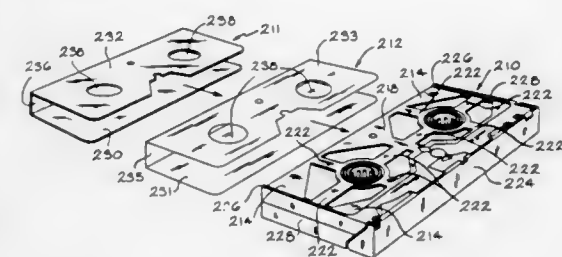
the first arm including a curved rib projecting from the first arm and toward the second tape guide and having a curved surface partially circumferentially spaced from the capstan on the second side of the capstan for deflecting the misfeed tape toward the V-shaped misfeed tape storage area and inhibiting misfeed tape from wrapping around the capstan.

5,414,582

**COMPOSITE TAPE CASSETTE**Edwin C. McLaren, 9868 Ford Rd., Perrysburg, Ohio 43551  
Continuation-in-part of Ser. No. 897,233, Jun. 11, 1992, Pat. No. 5,311,388. This application Jan. 27, 1994, Ser. No. 188,209  
Int. Cl.<sup>6</sup> G11B 23/02

U.S. Cl. 360—132

15 Claims



1. A composite tape cassette for use with a tape playback and record device comprising, in combination:

- a rigid frame member defining the shape of such tape cassette for supporting the reels and tape, such tape and reels being retained between a pair of opposed support members, such support members being engaged together to define opposed side panels and a back panel, and a tape gate in opposition to said back panel and extending between said two side panels, wherein said support members and back panel define a first thickness of rigid material and

said side panels and tape gate define a second thickness of rigid material, said second thickness being greater than said first thickness and said second thickness provides the desired rigidity and durability for such cassette;

a clear plastic sheath member bonded to said frame member to encompass said support members and back panel and abut said side panels and tape gate; and

a paperboard label member having preapplied graphics enclosed between said thin clear plastic sheath and said frame member.

5,414,583

# CURRENT SOURCE BUS TERMINATOR WITH VOLTAGE CLAMPING AND STEADY STATE POWER REDUCTION

Mark Jordan, Manchester, N.H., assignor to Unitrode Corporation, Billerica, Mass.

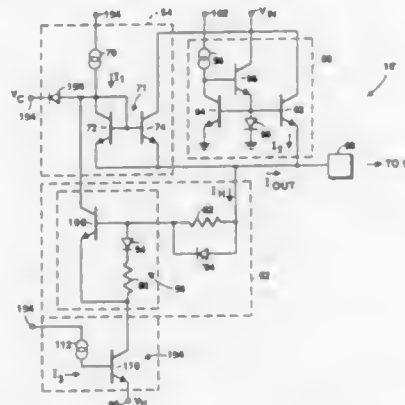
Continuation of Ser. No. 810,396, Dec. 19, 1991, abandoned.

This application Feb. 14, 1994, Ser. No. 195,488

Int. Cl.<sup>6</sup> H03K 5/00

U.S. Cl. 361-91

30 Claims



1. A constant current bus terminator comprising: an output terminal capable of being in communication with a bus of a type having a bus voltage that is pulled to a low voltage level when a driver asserts a signal thereon, said bus voltage being permitted to rise when said driver releases said bus; and
- a current source in communication with said output terminal, said current source supplying a substantially constant current flowing from said current source into said output terminal when said bus is asserted by said driver in order to pull up the bus voltage when said driver releases said bus.

5,414,584

# CIRCUIT BREAKER ENCLOSURE GAS VENTING SYSTEM

Michael S. Young, Cincinnati, Ohio, assignor to Square D Company, Palatine, Ill.

Filed Jun. 9, 1993, Ser. No. 74,252

Int. Cl.<sup>6</sup> H01H 9/00

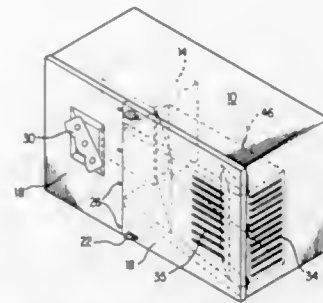
U.S. Cl. 361-115

10 Claims

1. A gas venting system for a metallic enclosure housing an electrical circuit breaker of the type having gas vents in the circuit breaker case for expelling gases produced when the circuit breaker interrupts a fault current, and wherein the enclosure includes one or more covers providing access to the interior of the enclosure and vents through which the circuit breaker gases can exit the enclosure, said gas venting system comprising:

- a substantially hollow gas chute defining an interior volume and having a breaker end aperture and at least one vent end aperture, said breaker end aperture and said vent end aperture communicating with one another through

said interior volume, said gas chute being attached to an inside surface of the breaker enclosure cover such that when the enclosure cover is closed said breaker end aperture is in a juxtaposed relationship with and encloses the circuit breaker gas vents and said vent end aperture is in a juxtaposed relationship with and encloses the enclosure



- vents such that any gas produced by the circuit breaker and expelled through the breaker gas vents must enter said gas chute through said breaker end aperture and thereby be directed to said vent end aperture where the gas exits the enclosure through the enclosure vents; and
- (b) means for attaching said gas chute to the inside surface of the circuit breaker enclosure cover.

5,414,585

# ROTATING TAPE EDGE GUIDE

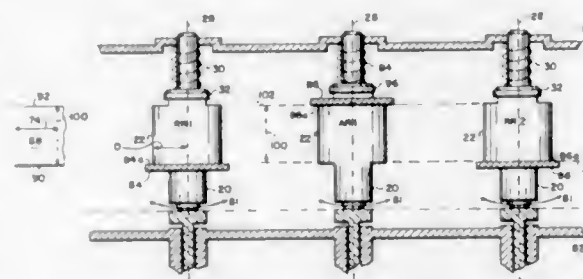
George Saliba, Northboro, Mass., assignor to Quantum Corp., Milpitas, Calif.

Filed Jul. 19, 1993, Ser. No. 94,272

Int. Cl.<sup>6</sup> G11B 15/60

U.S. Cl. 360-130.21

19 Claims



1. A tape guide assembly, comprising: two spaced apart reference mechanisms, each of the reference mechanisms having a reference surface for engagement with a first longitudinal tape edge, the reference surfaces being planarly aligned with a predetermined tape travel path and mounted for movement with the first tape edge to guide the first tape edge along the tape travel path; and an adjustment mechanism located in between the two reference mechanisms, the adjustment mechanism having an adjustment surface for engagement with the second longitudinal tape edge, the adjustment surface being parallel to the reference surfaces, being mounted for movement with the second tape edge to guide the second tape edge along the tape travel path, and being flexibly mounted for movement with the second tape edge in a direction perpendicular to the plane of the reference surfaces to urge the first tape edge into contact with the reference surfaces to minimize movement of the tape in a direction perpendicular to the reference surfaces and the adjustment surface during the tape movement.

5,414,586

# SUPERCONDUCTING CURRENT LIMITING DEVICE

Tsukushi Hara, Saitama; Takeshi Ohkuma, Tokyo; Kazuyuki Tsurunaga, Tokyo; Daisuke Ito, Tokyo, and Takamitsu Tada, Chiba, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

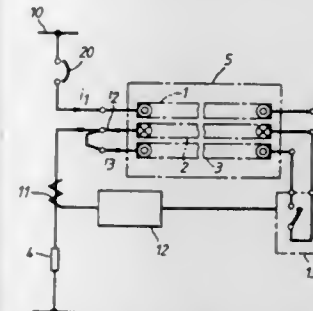
Filed Apr. 20, 1993, Ser. No. 49,446

Claims priority, application Japan, Apr. 20, 1992, 4-099438

Int. Cl.<sup>6</sup> H02H 3/08

U.S. Cl. 361-19

6 Claims



1. A superconducting current limiting device for limiting overcurrent flowing in a load, said device comprising: a current limiter including a first superconducting coil, a second superconducting coil arranged coaxially with said first superconducting coil so as to have a negative magnetic coupling condition, and a third superconducting coil arranged coaxially with said first and second superconducting coils so as to have a negative magnetic coupling condition with said second superconducting coil and so as to have a positive magnetic coupling condition with said first superconducting coil; said first and second superconducting coils being electrically connected in series; high speed switch means connected electrically in series with said third superconducting coil to form a series circuit; said series circuit being electrically connected in parallel with said second superconducting coil; and current monitoring means for monitoring current flowing in said load and for generating a signal so as to close said high speed switch means when said current flowing in said load exceeds a prescribed value, wherein said first, second and third superconducting coils having a critical current value larger than said prescribed value.

5,414,587

# SURGE SUPPRESSION DEVICE

Willie C. Kiser, Rio Rancho; Kevin G. Foreman, Sandia Park, and Paul J. Miller, Albuquerque, all of N. Mex., assignors to TRW Inc., Redondo Beach, Calif.

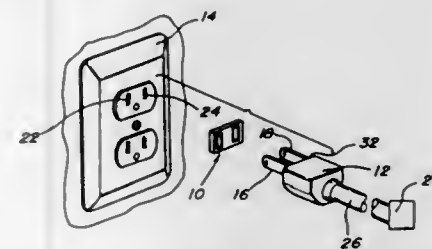
Continuation-in-part of Ser. No. 938,111, Aug. 31, 1992, Pat. No. 5,290,191, which is a continuation-in-part of Ser. No. 895,148, Jun. 5, 1992, Pat. No. 5,181,859, which is a

continuation of Ser. No. 694,262, Apr. 29, 1991, abandoned. This application Dec. 30, 1992, Ser. No. 998,333

Int. Cl.<sup>6</sup> H01R 13/02

U.S. Cl. 361-118

28 Claims



1. A surge suppression device for protecting electrical equip-

ment from damage, the electrical equipment being supplied with power from a plug having a plurality of male pins which mate with sockets in a female electrical receptacle, said device comprising:

- a structure sufficiently thin so as to fit between adjacent faces of the plug and female receptacle while permitting the pins to mate with the sockets;
- said structure having holes therein aligned with the pins in the plug, the structure being insertable over the pins so that the pins extend through the holes;
- first contact means for making electrical contact with one of the pins as it extends through a hole in the structure;
- second contact means for making electrical contact with a second pin as it extends through a second hole in the structure;
- said structure including a body made of voltage transient limiting material having opposing first and second faces;
- said first contact means being electrically connected to the first face;
- said second contact means being electrically connected to the second face; and
- whereby the device is insertable over the pins of the male plug and the body provides surge suppression protection for the electrical equipment when the plug is mated with the female receptacle.

5,414,588

# HIGH PERFORMANCE CAPACITORS USING NANO-STRUCTURE MULTILAYER MATERIALS FABRICATION

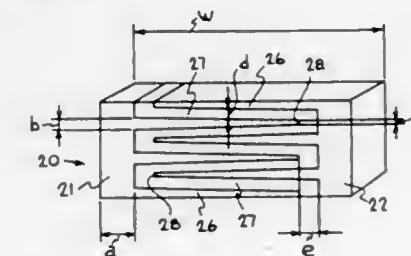
Troy W. Barbee, Jr., Palo Alto; Gary W. Johnson, and Dennis W. O'Brien, both of Livermore, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Sep. 20, 1993, Ser. No. 122,940

Int. Cl.<sup>6</sup> H01G 4/012

U.S. Cl. 361-304

20 Claims



1. A capacitor comprising: a plurality of submicron thick layers of a conductive material; said layers of conductive material being continuously tapered in cross-section along a length thereof; a plurality of layers of a dielectric material; one of said layers of dielectric material being intermediate adjacent layers of said conductive material; said layers of dielectric material being interconnected; and conductive terminals operatively connected to said layers of conductive material.

5,414,589

# CAPACITOR HAVING A CHANGEABLE DIELECTRIC CAPACITY AND MANUFACTURING METHOD THEREOF

Koshi Amano, and Satoru Yatake, both of Kyoto, Japan, assignors to Rohm Co., Ltd., Kyoto, Japan

Filed Jun. 7, 1993, Ser. No. 72,457

Int. Cl.<sup>6</sup> H01G 1/14

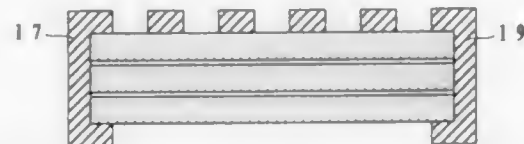
U.S. Cl. 361-306.3

13 Claims

1. A capacitor having a changeable dielectric capacity comprising:



- a) a main body part of dielectric ceramic,  
b) a first internal electrode formed in the main body part,  
c) a first plurality of terminal electrodes formed on a face of the main body part so that at least one of the first terminal electrodes faces the first internal electrode,



- d) a first common terminal electrode formed on a face of the main body part so that the common terminal electrode connects with the internal electrode, and  
e) a second common terminal electrode formed on a face opposite to the face on which the first common terminal electrode is formed.

5,414,590

## METER SOCKET ASSEMBLY AND DISTRIBUTION BOARD

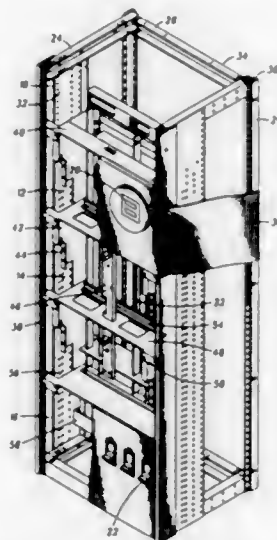
Gholam R. Tajali, Nashville, Tenn., assignor to Square D Company, Palatine, Ill.

Filed Oct. 22, 1993, Ser. No. 142,255

Int. Cl.<sup>6</sup> H02B 9/00

U.S. Cl. 361-669

16 Claims



1. An electrical distribution board comprising:  
a framework defining a rectangular shape having a front, rear and side faces, the framework having vertical structural components;  
a meter compartment within the framework being defined by the front face of the framework, by a pair of side panels connecting to the vertical structural components and being disposed in a parallel relation to each other and to the side faces of the framework and perpendicular to the front face of the framework, by a bottom electrically insulating barrier connecting to a cross-member extending horizontally between the vertical structural components and by a bus partially defining the rear face of the meter compartment opposite the front face of the framework, the bus being electrically insulated from the framework and having one side facing the meter compartment adapted for electrical connection;  
an opening through each side panel and between each side face of the framework and the bottom barrier, the opening

being of sufficient size to allow electrical connections therethrough;  
an L-shaped insulating barrier connecting to the bottom barrier and being disposed in front of the bus;  
whereby, the meter compartment is adapted to mount therein a meter socket assembly and to electrically connect line terminals extending from the rear face of the meter socket assembly to the bus and to electrically connect load terminals from the bottom edge of the meter socket assembly through the opening to other compartments.

5,414,591

## MAGNETIC DISK STORAGE SYSTEM

Hidayuki Kimura, Tsuchiura; Tsuyoshi Takahashi, Odawara; Tomio Suzuki, Hiratsuka; Toshio Ohdaira, Odawara; Kouki Uefune, Minamishigara, and Yuji Nishimura, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

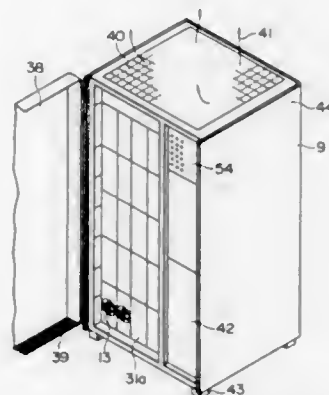
Filed Apr. 15, 1992, Ser. No. 868,421

Claims priority, application Japan, Apr. 15, 1991, 3-082209

Int. Cl.<sup>6</sup> H05T 7/20

U.S. Cl. 361-695

16 Claims



1. A magnetic disk storage system comprising a plurality of magnetic disk drives provided in a system casing, each of the magnetic disk drives including magnetic disks for storing information, magnetic heads for reading and writing information between said magnetic disks, a carriage mechanism for positioning said magnetic heads, and a housing for hermetically sealing them,

said magnetic disk storage system further comprising partitions for separating and arranging said magnetic disk drives for which partitions are provided between said disk drives so as to form container chambers of the disk drives, and blast means for cooling said magnetic disk drives which blast means are provided in said container chambers, said partitions being formed with openings through which cooling air is passed between adjacent two of said container chambers, each of said openings being positioned in said partitions so that one of said disk drives is cooled by the cooling air which is passed through said openings in one of said partitions from said blast means for an adjacent container chamber to said one of said disk drives when the blast means for said one of said disk drives cannot supply cooling air to said one of said disk drives.

5,414,592

## HEAT TRANSFORMING ARRANGEMENT FOR PRINTED WIRING BOARDS

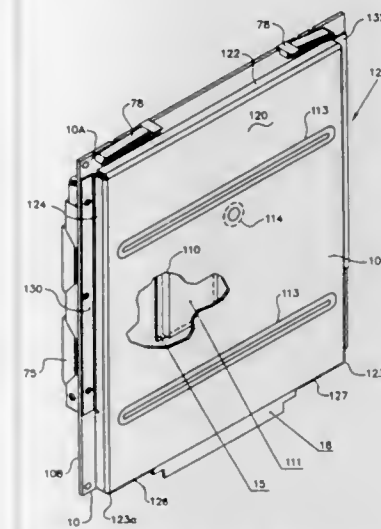
Mark E. Stout, Plymouth, and Clinton S. Vilks, Brooklyn Park, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 38,595, Mar. 26, 1993, abandoned. This application Aug. 17, 1994, Ser. No. 291,784

Int. Cl.<sup>6</sup> H05K 7/20

U.S. Cl. 361-704

4 Claims



1. Apparatus for conducting heat away from a component mounted on a printed circuit board to a chassis, said printed circuit board having first and second edge portions:  
first and second channels formed in said chassis  
a thermally conductive cover member having a first surface extending generally over the printed circuit board and in close proximity to the component, said cover having first and second walls extending downwardly toward the printed circuit board with each wall including a flange extending outwardly from the walls and in contact with the first and second edge portions of said printed circuit board; and  
wedging means for wedging the first and second edge portions and the first and second flanges together into the first and second channels respectively so that the printed circuit board with the cover is fixedly mounted to the chassis and a thermal path from the component through the cover and the walls and flanges to the chassis is provided.

5,414,593

## ELECTRONIC UNIT FORMED BY TWO BOARDS JOINED BY ASSEMBLING MEANS

Eddy Furlan, Rungis, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 22, 1993, Ser. No. 171,152

Claims priority, application France, Dec. 24, 1992, 92 15710

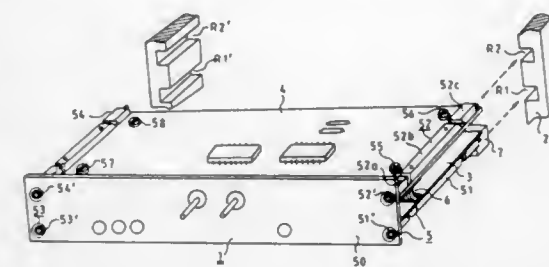
Int. Cl.<sup>6</sup> H05K 1/11

U.S. Cl. 361-784

4 Claims

1. An electronic unit, comprising: a first board and a second board, said first board and said second board each having a front edge, a rear edge and two side edges; at least one flexible conductor to connect said first board and said second board; a plug fixedly joined to the rear edge of said first board; and assembling means comprising a plate to assemble said first board and said second board in parallel to each other and perpendicularly to said plate, and said assembling means further comprising adjusting elements to adjust a distance between said first board and said second board to at least two distinct values, which is one value of said at least two values when said first board and said second board are respectively inserted into a first pair and a second pair of parallel grooves so

as to position each side edge of said two side edges within a respective one of said parallel grooves, and which is another



value of said at least two values when said first board and said second board are respectively locked within said first pair and said second pair of parallel grooves.

5,414,594

## SELF-ADJUSTING INSERTION/EXTRACTION APPARATUS FOR PRINTED CIRCUIT BOARDS

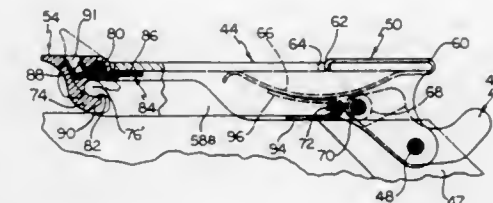
Val Hristake, Maplewood, N.J., assignor to VSI Corporation, Torrance, Calif.

Filed Dec. 14, 1993, Ser. No. 166,686

Int. Cl.<sup>6</sup> H05K 5/00, 7/12; H01R 13/629, 13/635

U.S. Cl. 361-755

22 Claims



1. An insertion/extraction apparatus for a printed circuit board configured to make electrical connections with a connector mounted at the base of a printed circuit board rack, comprising:  
a pawl pivotally secured to the printed circuit board;  
a lever pivotally secured to the printed circuit board and movable between a raised position and a lowered position; and  
a spring for resiliently coupling the lever to the pawl such that pivoting the lever in a first direction, from the raised position to the lowered position, yieldably biases the pawl into engagement with the printed circuit board rack, to insert the printed circuit board into the connector, and such that pivoting the lever in a second direction, from the lowered position to the raised position, moves the lever into engagement with the printed circuit board rack, to extract the printed circuit board from the connector.

5,414,595

## DISPLAY APPARATUS FOR VEHICLE

Toshio Oike, and Hiroyuki Yokota, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Nov. 10, 1993, Ser. No. 149,914

Claims priority, application Japan, Nov. 19, 1992, 4-080027

U; Nov. 19, 1992, 4-080028 U; Aug. 2, 1993, 5-042329 U

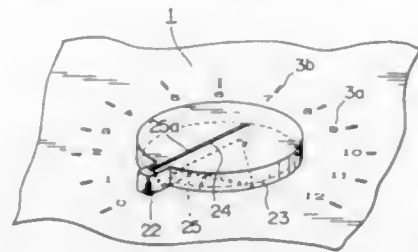
Int. Cl.<sup>6</sup> G01D 13/28

U.S. Cl. 362-26

7 Claims

1. A display apparatus for a vehicle comprising:  
a dial with a substantially round light-transmissible portion;  
a pointer plate situated on a front side of the dial and driven to rotate according to a measured value;  
a light-transmissible slit formed on the pointer plate;  
a light source situated on a rear side of the dial; and

a light introducing member for gathering light from said light source to introduce said light into said slit;



wherein an outwardly extending projection is formed on an outer periphery of said pointer and said slit of the pointer plate is prolonged up to said projection.

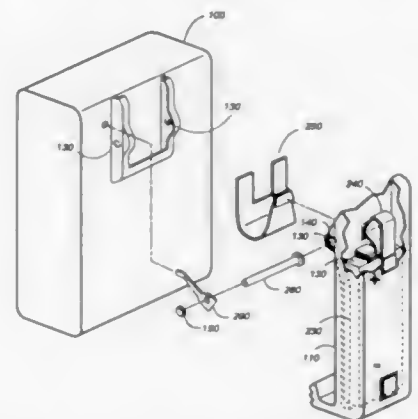
5,414,596

# PORTABLE ELECTRONIC DEVICE ATTACHMENT CLIP HOUSING A BATTERY

Eric T. Eaton, and Charles W. Mooney, both of Lake Worth, Fla., assignors to Motorola Inc., Schaumburg, Ill.

Filed Oct. 4, 1993, Ser. No. 131,352

Int. Cl.<sup>6</sup> H04B 1/08; H01R 39/00; H01M 2/10; H05K 5/02  
U.S. Cl. 361—814 11 Claims



1. A portable electronic device comprising:  
a housing including an attachment clip;  
electronic circuitry enclosed within the housing; and,  
an energy storage device housed within the attachment clip.

5,414,597

# SHIELDED CIRCUIT MODULE

Gael D. Lindland, South Lyon, and Sylvester P. Porambo, Canton, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 4, 1994, Ser. No. 237,810

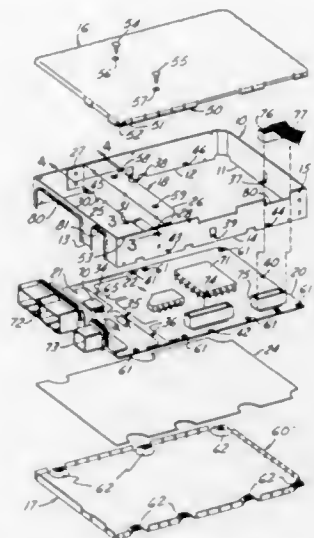
Int. Cl.<sup>6</sup> H05K 9/00

U.S. Cl. 361—816

9 Claims

1. An RF shielded electronic module comprising:  
a stamped sheet metal wrap providing first, second, third, and fourth side walls, said stamped sheet metal wrap being substantially rectangular with said first and third side walls being substantially opposed and said second and fourth side walls being substantially opposed, said stamped sheet metal wrap including an overlap for securing said walls proximate one of the four corners of the rectangle formed by said walls, said stamped sheet metal wrap including hook tabs formed by portions of said walls;  
a stamped sheet metal cross member extending between said second and fourth side walls, said stamped sheet metal

cross member comprising a fifth wall having a plurality of projection tabs extending therefrom;  
a circuit board received within said first, second, third, and fourth side walls, said circuit board having a first plurality of holes each receiving a respective projection tab and having first and second areas, said first area having at least a first component thereon and said second area having at least a second component thereon to be shielded from said first component, said fifth wall and said first plurality of holes being positioned intermediate said first and second areas, said circuit board including a second plurality of holes each receiving a respective hook tab; and



a pair of stamped sheet metal covers joined to said stamped sheet metal wrap substantially enclosing said fifth wall and said circuit board;  
said stamped sheet metal wrap including fold tabs formed by portions of said walls, said fold tabs being folded over said circuit board after insertion of said projection tabs and said hook tabs into said first plurality of holes and said second plurality of holes, respectively;  
whereby said stamped sheet metal wrap and said stamped sheet metal covers provide an externally shielded enclosure and, together with said fifth wall, provide internal shielded compartments.

5,414,598

# LIGHT WEDGE FOR DISTRIBUTING LIGHT ACROSS A DISPLAY DEVICE

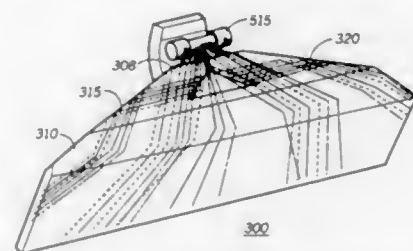
Clifford L. H. Anderson, Lake Worth, Fla., assignor to Motorola Inc., Schaumburg, Ill.

Continuation of Ser. No. 939,768, Sep. 2, 1992, abandoned. This application Jun. 13, 1994, Ser. No. 259,112

Int. Cl.<sup>6</sup> G01D 11/28

U.S. Cl. 362—26

23 Claims



1. A light wedge formed from light conducting material, comprising:  
a first surface for receiving light rays from a light emitting source, the first surface having a first axial length;

a second surface substantially opposite the first surface and having a second axial length;  
two side surfaces further bounding the light conducting material between the first surface and the second surface; and  
a plurality of sidewalls positioned about an axis substantially parallel to a line of symmetry between the two side surfaces, the plurality of sidewalls forming a cavity within the light conducting material, wherein the plurality of sidewalls receives first and second portions of the light rays emanating through a central region of the light conducting material and distributes the first portion of the light rays away from the central region to outer regions of the light conducting material on either side of the cavity, and wherein the plurality of sidewalls directs the second portion of the light rays through the cavity and through the central region of the light conducting material.

5,414,599

# SURFACE LIGHT SOURCE DEVICE

Isamu Kaneko; Hideaki Katoh; Kazuaki Yokoyama, all of Saitama, and Tsuyoshi Ishikawa, Tokyo, all of Japan, assignors to Enplas Corporation, Kawaguchi, Japan

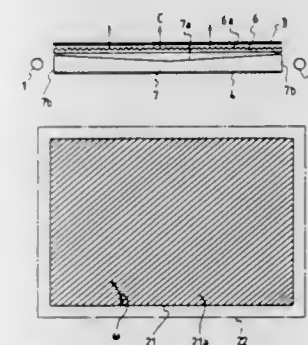
Filed Jul. 8, 1992, Ser. No. 910,746

Claims priority, application Japan, Sep. 9, 1991, 3-080357 U; Nov. 28, 1991, 3-105342 U

Int. Cl.<sup>6</sup> F21V 8/00

U.S. Cl. 362—31

20 Claims



1. A surface light source device comprising:  
a transparent panel made of a transparent material and having a rectangular plate-like shape;  
at least one linear light source disposed in a vicinity of at least one edge surface of said transparent panel;  
a diffusion panel;  
a transparent sheet having saw-tooth-like sectional shape protrusions formed in a plurality of substantially parallel rows on a surface of said transparent sheet, said diffusion panel and said transparent sheet being disposed on a front surface of said transparent panel with a space reserved between said diffusion panel and said transparent sheet, and said surface of said transparent sheet facing said diffusion panel; and  
a reflecting surface disposed on a rear surface of said transparent panel;  
wherein said plurality of substantially parallel rows of protrusions having said saw-tooth-like sectional shape are disposed at an angle greater than 0° but less than 90° with respect to said at least one edge surface of said transparent panel.

5,414,600

# CONDENSING AND COLLECTING OPTICAL SYSTEM USING AN ELLIPSOIDAL REFLECTOR

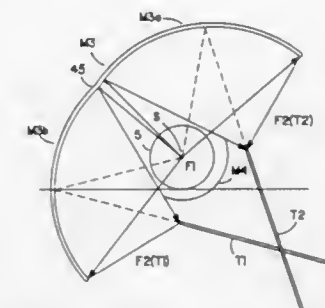
Karlheinz Strobl; Glenn S. Baker; Douglas M. Brenner, all of Los Angeles, and Robert L. Piccioni, Thousand Oaks, all of Calif., assignors to Cogent Light Technologies, Inc., Santa Clarita, Calif.

Filed Jul. 30, 1993, Ser. No. 99,953

Int. Cl.<sup>6</sup> F21V 7/09

U.S. Cl. 362—32

33 Claims



1. A system for condensing and collecting electromagnetic radiation, the system comprising a source, a reflector and a target, wherein:

the reflector has an ellipsoidal surface portion having a curvature concave relative to both the target and the source of radiation and an effective ellipsoidal reflecting portion defined by a portion of the ellipsoidal surface portion radiated by the source and subtended by an acceptance cone of the target, the effective ellipsoidal reflecting portion having a major axis with first and second focal points defined by the elliptical curvature of the ellipsoidal surface portion;  
the source of radiation radiates into substantially all directions and is disposed proximate to the first focal point of the effective ellipsoidal reflecting portion so as to produce a substantially focused image of the source at the second focal point of the effective ellipsoidal reflecting portion;  
the target is an optical fiber disposed proximate to the second focal point for receiving the radiation collected and subsequently redirected by the effective ellipsoidal reflecting portion, the target having an optical axis offset from the major axis of the effective ellipsoidal reflecting portion; and  
the configuration of the reflector and the orientation of the optical fiber are selected to provide approximately no magnification of the source and to provide substantially maximum flux density at an entrance aperture of the optical fiber.

5,414,601

# PROJECTION HEADLAMP LIGHTING SYSTEM FOR PROJECTING A WIDE SPREAD CONTROLLED PATTERN OF LIGHT

John M. Davenport, Lyndhurst; Richard L. Hansler, Pepper Pike, both of Ohio, and John L. Henkes, Latham, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 16, 1992, Ser. No. 991,599

Int. Cl.<sup>6</sup> B60Q 1/04

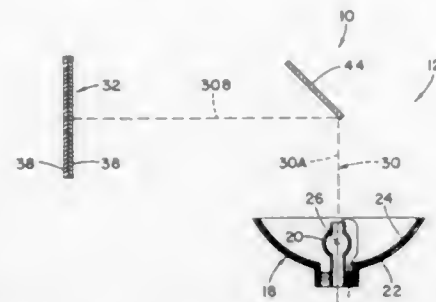
U.S. Cl. 362—61

5 Claims

1. A projection headlamp system, comprising:  
(a) a curved reflector having first and second optical focal points associated therewith positioned along an optical axis, said first focal point being within and closer to said reflector than said second focal point which is spaced from said reflector;  
(b) a gas discharge lamp disposed within said curved reflector substantially at said first focal point thereof and along said optical axis, said lamp being operable for generating light, said reflector being operable for receiving a substan-



- tial portion of said light generated by said lamp and directing said light along said optical axis;
- (c) a cold mirror positioned on said optical axis for receiving light from said reflector along a first leg of said optical axis and reflecting said light toward said second focal point along a second leg of said optical axis displaced substantially ninety degrees from said first leg of said optical axis;
- (d) first means positioned adjacent said optical axis for creating an image of a well-defined sharp cut-off of light;
- (e) second means having a known focal length and being positioned along said optical axis spaced from said first



means at a distance approximately equal to said known focal length for receiving said light from said second focal point and projecting said light as a wide spread controlled pattern containing said image of said well-defined sharp cutoff to thereby provide a low beam illumination for a vehicle and;

- (f) wherein said first means is a contoured edge formed on said cold mirror and effective such that light directed along said optical axis is only reflected on to said second means with such light strikes said cold mirror above said contoured edge.

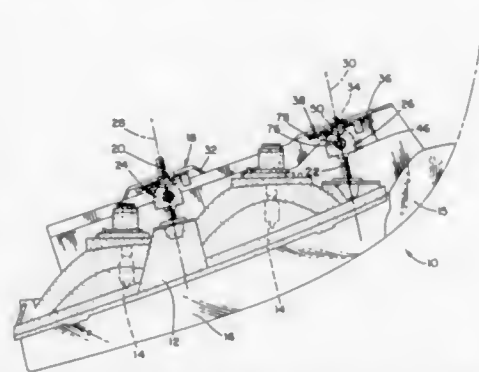
5,414,602

## VEHICLE HEADLAMP ADJUSTER WITH PIVOTING HOUSING

Paul E. Young, Muncie; Rex E. Clendenen, Jr., Anderson; Juan Delbosque, Lapel; Roy Smith, Indianapolis; Gary L. Miller, Lapel, and Brian S. Lewis, Middletown, all of Ind., assignors to General Motors Corporation, Detroit, Mich.  
Filed Aug. 22, 1994, Ser. No. 293,620  
Int. Cl.<sup>6</sup> F21M 3/20

U.S. Cl. 362—66

7 Claims



1. A headlamp assembly having a lamp unit mounted on a panel of a vehicle, a first adjustment device and a second adjustment device located between the support panel and the lamp unit for adjusting the lamp unit in a vertical plane and in a horizontal plane, respectively, for aiming a light beam emitted by a light source, at least one adjustment device comprising:

a mounting panel connected to the vehicle panel, the mounting panel having an aperture, and upper and lower ends of

- the mounting panel providing linearly aligned cylindrical surfaces facing the vehicle panel;
- a housing fixably connected with projecting upper and lower rods for pivotal entrapment in the cylindrical surfaces of the mounting panel, allowing pivotal movement of the housing with respect to the vehicle panel;
- a drive screw mounted by the housing and projecting therefrom having an end pivotally connected to the lamp unit; and
- a first gear mounted within the housing, the first gear threadably encircling the drive screw, rotation of the first gear causing translational movement of the drive screw.

5,414,603

## AIRPORT LIGHTING UNIT

David H. Conway, 12 Chanctonbury Way, Crowley, West Sussex, England RH11 8TE

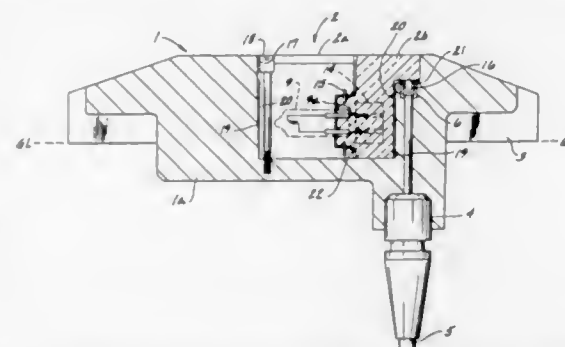
Filed Jun. 14, 1993, Ser. No. 50,384

Claims priority, application United Kingdom, Nov. 6, 1990, 9024083; Aug. 20, 1991, 9117953

Int. Cl.<sup>6</sup> F21S 1/02

U.S. Cl. 362—153.1

5 Claims



1. A lighting unit for airports comprising a base unit adapted to be secured at ground level and a demountable module releasably connected to the base unit, the base unit including first electrical contact members and the demountable module including a lamp communicating with two oppositely disposed and upwardly inclined cavities each defining a light emitting path and second electrical contact members for mating with said first electrical contact members when the module is located in position in the base unit, each cavity including a bi-convex lens and a prism lens, and a lamp holder for supporting the lamp, the lamp holder being translucent so that a small amount of light or a glow is visible from the top of the unit to indicate to an observer at a remote point when it is alight.

5,414,604

## LIGHT REFLECTOR WITH EDGE ILLUMINATION

Roger M. Anderson, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 9, 1993, Ser. No. 149,295

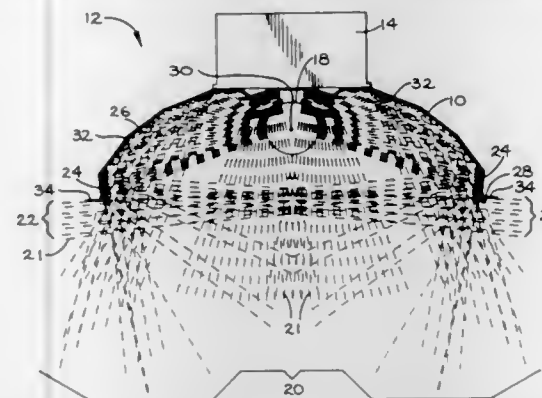
Int. Cl.<sup>6</sup> F21S 3/00

U.S. Cl. 362—217

16 Claims

1. A reflector having an elongate concave inner surface defining a cavity, said inner surface having spaced parallel opposite edges defining an open outlet side for said cavity and having a longitudinal reflectivity axis midway between and parallel to said opposite edges and spaced into said cavity from an imaginary plane across the open side of the cavity including the edges so that all portions of a fluorescent lamp coaxially positioned along said reflectivity axis are within the cavity, said inner surface being symmetrical about a central plane extending through said reflective axis and including a major specularly reflective central portion between said edges adapted to reflect a major portion of the light emitted from a fluorescent lamp coaxially positioned along said reflectivity axis in first directions generally normal to said reflectivity axis

and generally normal to said imaginary plane, and opposite reflective signal portions adjacent said edges each angles inwardly toward said central plane and oriented to direct a minor portion of the light emitted by a fluorescent lamp coaxially positioned along said reflectivity axis across the open side of the cavity and past the opposite edge of the inner surface at acute exit angles generally in the range of 2 to 20 degrees with



respect to said imaginary plane so that when the reflector is positioned to direct light from a fluorescent lamp coaxially positioned along said reflectivity axis downwardly toward an area to be illuminated, light reflected from the signal portions will indicate to persons spaced from the illuminated area in a direction generally normal to said edges of the inner surface that the fluorescent lamp is emitting light.

5,414,605

## LAMP ASSEMBLY

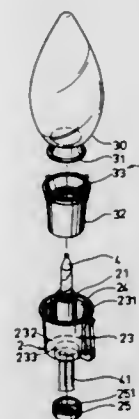
Cheng-Yuan Lin, No. 39, Sec. 3, Chung-Hua Rd., Hsinchu City, Taiwan, Prov. of China

Filed Jul. 27, 1993, Ser. No. 97,041

Int. Cl.<sup>6</sup> F21V 31/00

U.S. Cl. 362—267

2 Claims



1. A lamp assembly comprising:
- a lamp holder including a vertical cylindrical housing which is made of an insulating material and which has an open top, an inner side wall and a bottom wall, and a lamp seat that is mounted securely in said housing so as to define an annular groove between said lamp seat and said housing, said housing having a bottom hole formed in said bottom wall thereof;
- a lamp being connected securely to an upper end portion of said lamp seat and having an electrical conduit extending through said lamp seat and said bottom hole of said housing;
- a lampshade unit including a generally cylindrical rubber seal retained within said annular groove of said housing, and a transparent lampshade which covers said lamp and

which has an annular bottom end portion that is sleeved on said lamp seat and that is retained within said rubber seal; and

said lamp holder having several elongated axial ribs projecting inwardly from the inner side wall of said housing to press said rubber seal against said annular bottom end portion of said transparent lampshade; whereby, a tight connection is provided between said lampshade unit and said lamp holder.

5,414,606

## LIGHTING FIXTURE

Harald Weingartner, Telfs, Austria, assignor to D. Swarovski & Co., Austria

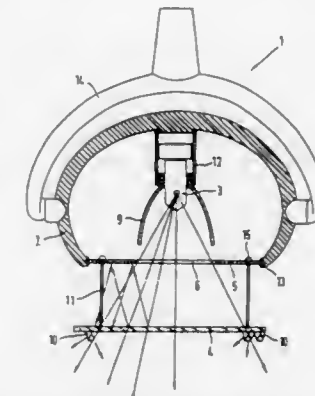
Filed Mar. 12, 1993, Ser. No. 30,584

Claims priority, application Germany, Mar. 16, 1992, 42 08 410.5

Int. Cl.<sup>6</sup> F21V 3/00, 7/02; F21P 1/02

U.S. Cl. 362—307

17 Claims



1. A lighting fixture (1) comprising a lamp housing (2) and an illuminant (3) disposed therein, wherein below the illuminant (3) in a direction of light radiation and a distance from the lamp housing (2) a light-dispersive decorative body (4) is provided, and a plate (5) with a central bore (6) is arranged between the illuminant (3) and the decorative body (4),

characterized in that the decorative body (4) is in a form of one of a cut plate and a plate covered with cut glass elements (10) and that the plate (5) with the central bore (6) is reflective on the side facing away from the illuminant.

5,414,607

## OUTDOOR LANDSCAPE LIGHTING FIXTURE

William F. Harris, and Michael R. Helms, both of Charlotte, N.C., assignors to W.F. Harris Lighting, Inc., Monroe, N.C.

Continuation-in-part of Ser. No. 951,140, Sep. 25, 1992, abandoned. This application Jul. 19, 1993, Ser. No. 93,457

Int. Cl.<sup>6</sup> F21V 21/00, 23/00

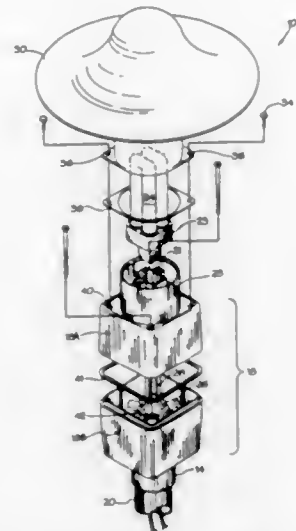
U.S. Cl. 362—362

4 Claims

1. An outdoor ground-supported light fixture of the type adapted to operate on a 120 volt electrical power supply, the fixture being characterized by integral means for containing an electrical connection between respective electrical conductor wires from a source of 120 volt electrical power and a lamp without the need for a separate junction box, comprising:

- (a) a nonconductive hollow staff having a lower end for disposition in the ground and an upper end for disposition above ground level;
- (b) first electrical conductor wires from a 120 volt power source extending through said lower end into said staff and exiting from said upper end of said staff;
- (c) an integral illumination unit having a wiring compartment formed unitarily with a lamp enclosure, said wiring compartment having a mating base and a cap cooperatively assembled with one another to define therebetween an interior make-up wiring enclosure, the base being

mounted to said upper end of said staff with an aperture in said base receiving said first electrical conductor wires from said upper end of said staff through said aperture and the gap comprising a lamp receiving means supporting a lamp, said lamp receiving means having second electrical conductor wires extending therefrom into said make-up



wiring enclosure, said lamp enclosure being integrally affixed directly to said cap about said lamp; and (d) respective ends of said first electrical conductor wires and said second electrical conductor wires being electrically joined with one another within said make-up wiring enclosure of said wiring compartment for connecting said lamp to said power source.

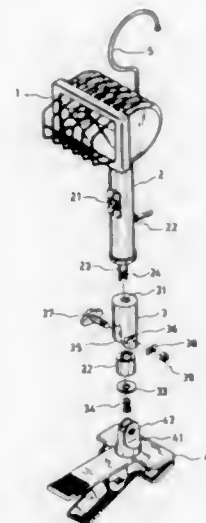
5,414,608

# REPLACEABLE STEM STRUCTURE FOR LAMP HOLDER

Albert Stekelenburg, Taipei, Taiwan, Prov. of China, assignor to All Line Inc., Taipei, Taiwan, Prov. of China  
Filed Nov. 30, 1993, Ser. No. 160,080  
Int. Cl.<sup>6</sup> F21V 21/08

U.S. Cl. 362—396

2 Claims



1. A lamp structure with a replaceable mounting base comprising:
  - (a) a lamp head;
  - (b) a lamp stem having first and second lamp stem ends, wherein said lamp stem being connected to said lamp head

- at said first lamp stem end, and said lamp stem having an internally threaded post at said second lamp stem end;
- (c) a replaceable mounting base having first and second mounting base ends, wherein said first mounting base end containing a hollow cylindrical hole for receiving said internally threaded post of said lamp stem so as to support said lamp stem while allowing said lamp head to do 360° rotation;
- (d) a connecting body containing said first and second mounting base ends and said hollow cylindrical hole for receiving said internally threaded post;
- (e) a clamp holder having a projecting body, said projecting body containing a projecting hole therethrough;
- (f) a lamp stem screw to be threadably received by said internally threaded cylindrical post so as to fixedly but rotatably affix said lamp stem to said connecting body;
- (g) said connecting body further containing an axially extending hollow portion and a radially extending hand screw hole in said second mounting base end, said axially extending hollow portion being so dimensioned for completely receiving said lamp stem screw; and
- (h) a hand screw means to be inserted through said projecting hole of said projecting body and said hand screw hole of said connecting body for affixing said connecting body to said clamp holder.

5,414,609

# DC TO DC/DC TO AC POWER CONVERSION SYSTEM

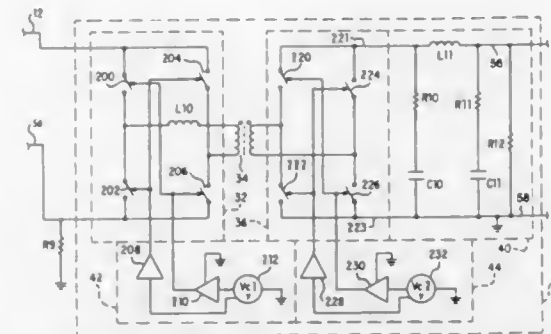
Alexander Levrin, Los Angeles; Joseph M. Nowosielski, Laguna Hills; Gao M. Too-That, Mission Viejo, and Ramamoorthy Rajagopalan, Irvine, all of Calif., assignors to Square D Company, Palatine, Ill.

Filed Aug. 25, 1992, Ser. No. 935,041

Int. Cl.<sup>6</sup> H02M 3/335

U.S. Cl. 363—17

22 Claims



1. A high efficiency power conversion system comprising:
  - a. first and second input terminals serving as a supply side of said power conversion system;
  - b. a transformer having a primary winding and at least one secondary winding, said primary winding having at least a first and second input line, the at least one secondary winding having at least a first and second output line;
  - c. a first switching matrix having at least two switching elements, each input terminal connected to at least one switching element and at least one energy storage element located in parallel with each of said switching elements, said first switching matrix connected to said first and second lines of said primary and wherein the switching matrix applies an alternating signal to the primary winding of the transformer;
  - d. at least one set of output lines having a first output line and a second output line serving as a load side of said power conversion system;
  - e. a second switching matrix connected to said first and second leads of said secondary winding of said transformer for providing an output waveform from the secondary winding of the transformer;

- f. a first control circuit for controlling said first switching matrix to apply an alternating signal to the transformer;
- g. a second control circuit for controlling said second switching matrix to convert said alternating signal to a power output signal to said output lines;
- h. wherein said power conversion system is selectively functional as a DC to DC converter and as a DC to AC converter; and
- i. wherein said power conversion system is bidirectional, allowing power to be converted from the supply side to the load side and from the load side to the supply side.

5,414,610

# UNIVERSAL POWER CONVERTER WITH SINGLE, SHARED POWER TRANSFORMATION CIRCUIT

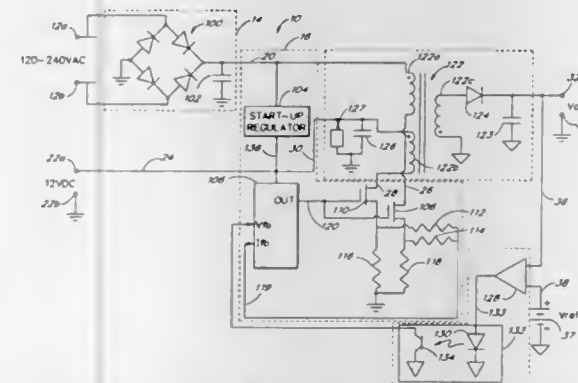
Gerald L. Brainard, San Jose, Calif., assignor to AST Research, Inc., Irvine, Calif.

Filed Jan. 21, 1993, Ser. No. 80,384

Int. Cl.<sup>6</sup> H02M 3/335

U.S. Cl. 363—21

30 Claims



1. A power converter for converting an input voltage signal to a DC output voltage signal for driving a DC load, said power converter comprising:
  - a first set of input terminals for receiving an AC input voltage signal;
  - a second set of input terminals for receiving a DC input voltage signal;
  - a single, shared power transformation circuit directly connected to said first set and said second set of input terminals, said power transformation circuit comprising:
    - a first voltage stage coupled to said first set of input terminals;
    - a second voltage stage coupled to said second set of input terminals; and
    - a third voltage stage coupled to said first and second voltage stages for converting said input voltage signal to said DC output voltage signal, said third voltage stage further including a set of output terminals connected to said DC load; and
  - a controller driver connected between said first and second set so input terminals and said first and second voltage stages for during a selected one of said first and second voltage stages.

5,414,611

# SINGLE TRANSFORMER SWITCHING REGULATOR

Takanori Muto, and Teruhisa Sudou, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Oct. 8, 1993, Ser. No. 134,270

Claims priority, application Japan, Oct. 12, 1992, 4-272167; Aug. 18, 1993, 5-203792

Int. Cl.<sup>6</sup> H02M 3/335

U.S. Cl. 363—21

14 Claims

1. A switching regulator having an input circuit for receiving direct-current energy and an output circuit, comprising:
  - a single transformer having a primary winding connected in

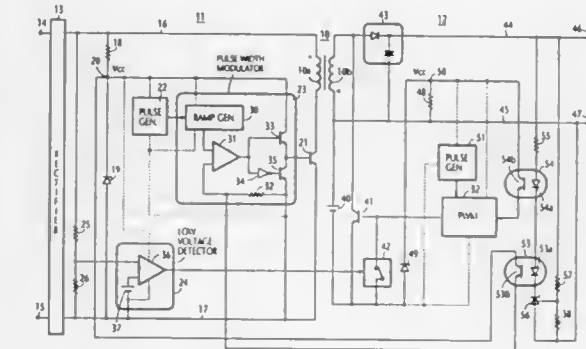
said input circuit for receiving direct-current energy and a secondary winding connected in said output circuit; monitor means for monitoring direct-current energy in said output circuit;

a first switching element connected in said input circuit in series with said primary winding;

first high frequency pulse generator means energized by the direct-current energy of said input circuit for producing first high frequency pulse and causing said first switching element to interrupt said direct-current energy of said input circuit in response to the first high frequency pulse, said first high frequency pulse having a duty ratio inversely variable as a function of the direct-current energy monitored by said monitor means;

rectifier means connected in said output circuit for converting high frequency energy developed in said secondary winding into said direct-current energy of said output circuit;

low voltage detector means for producing a low voltage



indication signal when said direct-current energy of said input circuit falls below a specified value;

a battery connected to the secondary winding of said transformer; and

means connected to said battery for deriving constant direct-current energy from said battery and coupling the constant direct-current energy to said output circuit in response to said low voltage indication signal, said means for deriving comprising:

a second switching element connected in series with said battery across said secondary winding; and

second high frequency pulse generator means energized by the direct-current energy of said output circuit for generating a second high frequency pulse with a variable duty ratio and causing said second switching element to interrupt a current supplied from said battery in response to the second high frequency pulse in the presence of said low voltage indication signal, the duty ratio of the second high frequency pulse being inversely proportional to the direct-current energy monitored by said monitor means.

5,414,612

# HVDC TRANSMISSION WITH A CONVERTER CONNECTED BETWEEN AN AC VOLTAGE AND A DC LINK COMMON TO THE CONVERTERS

Per-Erik Björklund, Falun; Bernt Bergdahl, Ludvika; Urban Åström, Saxdalen, all of Sweden, and John J. Vithayathil, Portland, Oreg., assignors to Asea Brown Boveri AB, Västerås, Sweden

Filed Aug. 3, 1993, Ser. No. 101,072

Int. Cl.<sup>6</sup> H02J 3/36

U.S. Cl. 363—35

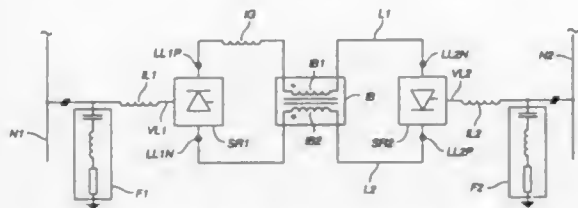
22 Claims

1. An HVDC transmission system with at least two converters, each converter having a.c. and d.c. supply lines, wherein each converter is connected between an alternating-voltage network and a dc link common to the converters, and wherein



one of said at least a first converter is connected to a respective alternating-voltage network thereof without the use of any separate winding transformer, comprising:

- at least one mutual inductor arranged on the dc side of said first converter, said mutual inductor having two windings



each connected to a respective one of said dc supply lines of the converter and magnetically coupled to each other, the at least one mutual inductor being designed and connected to exhibit a high impedance to ground mode currents.

5,414,613

### SOFT SWITCHING ACTIVE SNUBBER FOR SEMICONDUCTOR CIRCUIT OPERATED IN DISCONTINUOUS CONDUCTION MODE

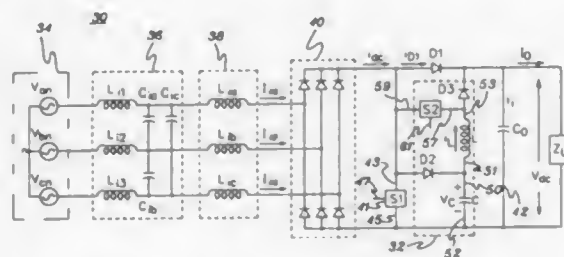
Keming Chen, Schenectady, N.Y., assignor to REM Technologies, Incorporated, Schenectady, N.Y.

Filed Aug. 20, 1993, Ser. No. 110,100

Int. Cl.<sup>6</sup> H02H 7/125

U.S. Cl. 363-52

15 Claims



1. A snubber network for a power conversion circuit operated in discontinuous conduction mode, the power conversion circuit having an input for coupling to a source of power and an output for coupling to a load to which converted power is to be delivered, the power conversion circuit further including a semiconductor element (S1) having two main current path electrodes and a control electrode for alternate turn-on and turn-off operation thereof in response to a given gating signal at the control electrode for selective conduction of current through the power conversion circuit, said snubber network comprising:

- a snubber capacitor (C) having a first terminal and a second terminal;
- an isolation diode (D2) having an input and an output, said input of said isolation diode (D2) being connected to a first one of the two main current path electrodes of the semiconductor element (S1) and said output of said isolation diode (D2) being connected to said first terminal of said snubber capacitor (C); said second terminal of said snubber capacitor (C) being connected to a second one of the two main current path electrodes of the semiconductor element (S1) such that upon turn-off of the semiconductor element (S1) said snubber capacitor (C) provides a soft-switching characteristic to the semiconductor element (S1) by absorbing energy; and
- an active reset circuit (S2, L, D3) responsive to a given reset signal for resetting of said snubber capacitor (C), said active reset circuit being connected to a first junction defined as said input of said isolation diode (D2) connected to the first one of the two main current path electrodes of the semiconductor element (S1) and to a second

junction defined as said output of said isolation diode (D2) connected to said first terminal of said snubber capacitor (C) such that upon receipt of said reset signal energy held by said snubber capacitor (C) is fully recovered by said active reset circuit, without potential for damage to the semiconductor element (S1), for subsequent transfer to the output of the power conversion circuit with turn-off of the semiconductor element (S1) commensurate with the power conversion circuit's delivery of converted power to its output.

5,414,614

### DYNAMICALLY CONFIGURABLE SWITCHED CAPACITOR POWER SUPPLY AND METHOD

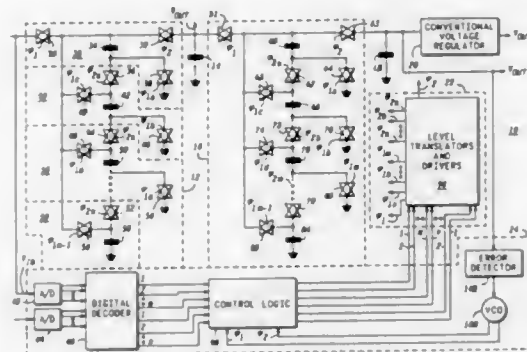
Bruce A. Fette, Mesa, and Steve D. DaBell, Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 6, 1994, Ser. No. 254,794

Int. Cl.<sup>6</sup> H02M 3/18

U.S. Cl. 363-59

19 Claims



1. A dynamically configurable switched capacitor power supply comprising:

- a first dynamically adjustable switched capacitor network having a first input, a first output and including a first plurality of n many switched capacitors, said first input adapted to be coupled to a power source, said first dynamically adjustable switched capacitor network for providing a step-up or step-down power supply regulation function in response to first control signals; and
- a control network comprising:
  - an error detector coupled to said first output;
  - an oscillator for providing a clocking signal;
  - an analog to digital conversion circuit for providing a digital representation of a voltage of said power source; and
  - control logic for providing said first control signals in response to said clocking signal and in response to signals from said error detector.

5,414,615

### PATTERN GENERATION CONTROL FOR INVERTER DRIVES

Ajith K. Kumar, and Thomas D. Stitt, both of Erie, Pa., assignors to General Electric Company, Erie, Pa.

Continuation of Ser. No. 85,463, Jun. 30, 1993, abandoned,

which is a continuation of Ser. No. 781,514, Oct. 22, 1991, abandoned, which is a continuation-in-part of Ser. No. 618,787, Nov. 27, 1990, Pat. No. 5,168,439. This application Jun. 17,

1994, Ser. No. 261,656

Int. Cl.<sup>6</sup> H02M 7/44

U.S. Cl. 363-95

14 Claims

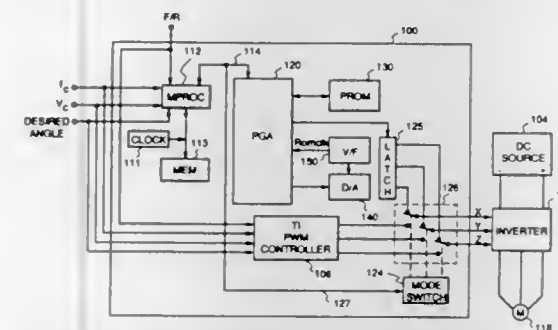
1. A control circuit, initialized and adjusted by a processor means, for generating firing signals for an inverter for converting dc voltage to three phase variable amplitude and frequency ac voltage, comprising:

- memory means for storing firing pattern signals defining

on/off status of switching devices making up the inverter circuit, the memory means storing firing pattern signals only for a predetermined range of degree values that is smaller than a range of 0° through 360°;

clock means for generating a variable frequency clock signal in accordance with a received variable signal value;

writable counter means coupled for receiving the variable



frequency clock signal and for outputting successive addresses to the memory means to cause the memory means to output successive ones of the firing pattern signals; and firing pattern generating means, connected to the memory means, for inputting the firing pattern signals output by the memory means and for generating firing signals for a range of values larger than the range stored in the memory means.

5,414,616

### INVERTER WITH REDUCED WIRING INDUCTANCE AND INCREASED CURRENT BALANCE BETWEEN SEMICONDUCTOR SWITCHING ELEMENTS

Yoshihisa Hatozaki, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

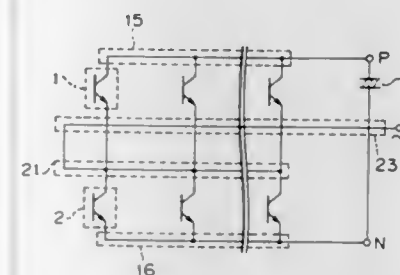
Filed Jan. 26, 1994, Ser. No. 187,019

Claims priority, application Japan, Jan. 28, 1993, 5-032819

Int. Cl.<sup>6</sup> H02M 7/5387

U.S. Cl. 363-132

4 Claims



1. An inverter device comprising:

- an arrangement of a plurality of semiconductor switching elements connected in parallel in each phase to constitute an upper arm and a lower arm of a bridge circuit, said arrangement having a longitudinal extension,
- a smoothing capacitor disposed laterally in proximity to the longitudinal extension of the parallel-connected semiconductor switching elements,
- a direct current circuit portion comprising two short-circuiting bars connecting both ends of the smoothing capacitor to the input ends of the respective semiconductor switching elements, and
- an output circuit portion comprising a short-circuiting bar connecting the output ends of the semiconductor switching elements to an output terminal; wherein the two short-circuiting bars of the direct current circuit portion are each formed of a conducting plate bent so as to have a crank-shaped cross section having outside flat surfaces,

one of the outside flat surfaces of each of the two conducting

plates is connected to the input end of each semiconductor switching element, and the other outside flat surfaces of the respective conducting plates are superimposed on each other, in close proximity, via an insulator.

5,414,617

### CONTROLLED ZONE VACUUM SYSTEM

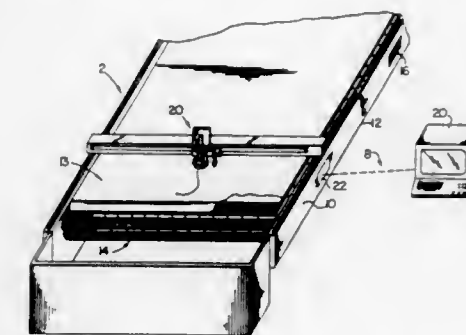
Robert Pomerleau, Springfield, Mass., and Joseph R. Vlvirito, South Windsor, Conn., assignors to Gerber Garment Technology, Inc., Tolland, Conn.

Filed Sep. 21, 1993, Ser. No. 125,112

Int. Cl.<sup>6</sup> G05B 11/01; B26D 7/04

U.S. Cl. 364-140

14 Claims



14. A method of controlling vacuum to specific areas of a cutter bed of the type having a permeable support surface comprised of bristle bed, said method comprising the steps of: providing a permeable support surface having a given area as defined by a length and a width dimension; dividing the given area into zones having a first dimension extending parallel to the width dimension and a second dimension extending parallel to the length dimension of the bed; providing a vacuum source and controllably connecting the vacuum source to each of said zones through separate conduit means; providing valve means associated with each of said conduit means for controlling the passage of vacuum between said vacuum source to each of the plurality of zones respectively; providing in a controller data corresponding to motion controls of a cutter head having a cutter over the cutting surface and using said data to drive opening and closing of respective ones of said valves by providing a look ahead feature as part of the controller which determines for said motion control data prior to the arrival of a cutter tool which of said respective ones of said valves is to be opened and closed such that energized zones occur as a result of either the cutter being directly over the involved zone or cutter head approach to an adjacent zone which is disposed immediately adjacent the zone presently occupied by the cutter; and the step of using said motion control data to determine the beginning and the end point of segments of an involved contour and then determining whether the location of the beginning end point relative to the zone in which it exists is the same or different zone from the zone in which the end point is located in.

5,414,618

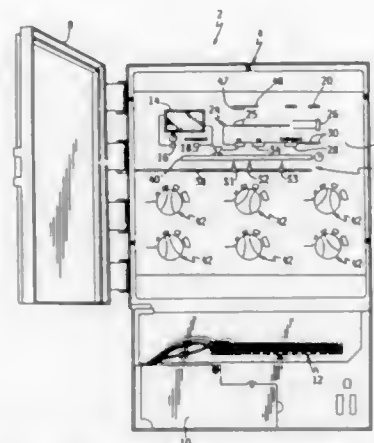
## IRRIGATION CONTROLLER WITH ANALOG DATA INPUT DEVICES

Gerald L. Mock, Corona; Alberto D. Benmergul, Alto Loma, and Uzair Siddiqui, Riverside, all of Calif., assignors to The Toro Company, Minneapolis, Minn.

Division of Ser. No. 37,495, Mar. 24, 1993, Pat. No. 5,272,620, which is a continuation of Ser. No. 554,685, Jul. 18, 1990, abandoned. This application Dec. 21, 1993, Ser. No. 172,518 Int. Cl.<sup>6</sup> G06F 15/46

U.S. Cl. 364-140

10 Claims



1. An improved irrigation controller for individually and automatically controlling water flow to a plurality of individual watering stations in accordance with a programmed watering schedule over a period of days, the controller comprising:

a variable analog data input device for inputting into the schedule at least one selectively changeable value of at least one parameter of the schedule as a function of the position of the analog data input device relative to a housing of the controller, and wherein the analog data input device is accessible to a user for manual manipulation on the housing of the controller and is set by a user by moving the data input device on the controller housing between physically different positions relative to the controller housing with each different position of the data input device relative to the controller housing representing a different value for the parameter, wherein the analog data input device is connected between high and low reference voltages and has an output at which an output voltage may be read with the output voltage lying between the high and low reference voltages and with the output voltage varying as the analog data input device is moved between its different positions on the controller housing; and

means connected to the output of the analog data input device for reading the position of the analog data input device to derive the value of the parameter which has been set by the position of the analog data input device by reading the output voltage appearing at the output of the analog data input device, which comprises:

(a) capacitor means connected to a current source for charging the capacitor means;

(b) logic and control means operatively connected to the capacitor means and to the analog data input device, the logic and control means having means for reading instantaneous values of the high and low reference voltages when reading the output voltage of the analog data input device by charging the capacitor means to the high and low reference voltages and to the output voltage of the analog data input device and by timing the amount of time it takes the capacitor means to charge to the high and low reference voltages and the output voltage of the analog data input device to derive instan-

taneous maximum, minimum and actual conversion times respectively; and wherein the

(c) logic and control means further includes means for performing the following functions for deriving a setting for the analog data input device:

- for subtracting the maximum from the minimum conversion times to provide a range;
- for dividing the range by a predetermined number of steps to provide a step size; and
- for subtracting the minimum conversion time from the actual conversion time for the analog data input device and dividing the result by the step size to arrive at a setting expressed as a number of steps in the range.

5,414,619

## METHOD AND DEVICE FOR CONTROLLING OBJECT TO BE CONTROLLED USING LEARNING FUNCTION

Yasunori Katayama, Mito; Yasuo Morooka, Hitachi; Takashi Okada, Hitachi; Masaaki Nakajima, Hitachi; Satoshi Hattori, Iwaki, and Masakane Shigyo, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

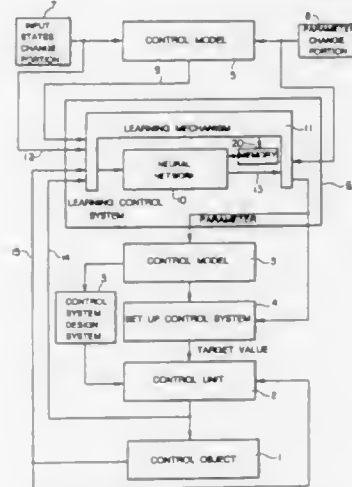
Filed Jan. 15, 1993, Ser. No. 5,400

Claims priority, application Japan, Jan. 20, 1992, 4-007630

Int. Cl.<sup>6</sup> G06F 15/46, 15/18; G05B 13/04

U.S. Cl. 364-151

20 Claims



1. A method for controlling an object by giving commands to actuators to control said object to perform desired operations, said method comprising the steps of:

obtaining, by learning, relationships between respective values of parameters of a model for said controlled object and input/output state values of said model, and storing the obtained relationships in memory means as results of the learning;

deciding parameter values of said model by referring to the obtained relationships resulting from the learning stored in said memory means based on input/output measured values of said controlled object; and

obtaining commands based on said decided parameter values and giving said obtained commands to said actuators.

5,414,620

## SYNTHETIC FRICTION ALGORITHM FOR A HAND CONTROL ELEMENT

James W. Kauffman, Palm Harbor, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 9, 1993, Ser. No. 103,899

Int. Cl.<sup>6</sup> G05B 19/18

U.S. Cl. 364-167.01

3 Claims

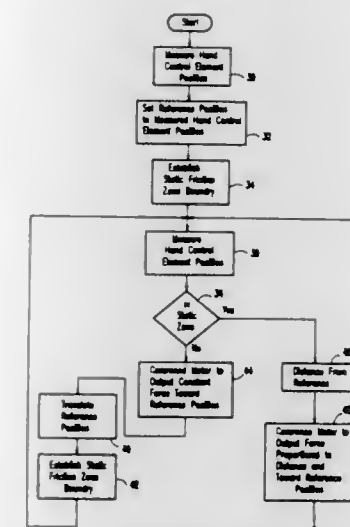
1. A method for simulating friction forces in an active, posi-

tion mode hand controller that includes a hand-control element and a motor coupled to said hand-control element, said method comprising the steps of:

establishing a reference position;

establishing a static friction zone having a static zone boundary that extends a short distance on either side of said reference position;

linearly increasing a force toward said reference position applied by said motor to said control element as said hand-control element moves from said reference position within said static friction zone;



maintaining a constant force toward said reference position applied by said motor to said control element as said hand-control element moves from said reference position outside said static friction zone; and redefining said reference position when a position of said hand-control element crosses said static zone boundary of said static friction zone, by translating said static zone boundary closest to said position of said hand-control element, to said position of said hand-control element.

5,414,621

## SYSTEM AND METHOD FOR COMPUTING A COMPARATIVE VALUE OF REAL ESTATE

John R. Hough, 19014 Capehart Dr., Gaithersburg, Md. 20879

Filed Mar. 6, 1992, Ser. No. 846,932

Int. Cl.<sup>6</sup> G06G 7/52; G06F 15/30

U.S. Cl. 364-401

5 Claims

1. A network for serving multiple user stations and providing data related to the value of a property upon a request being entered at a user station, the network comprising: a central unit for determining the value of a subject property comprising:

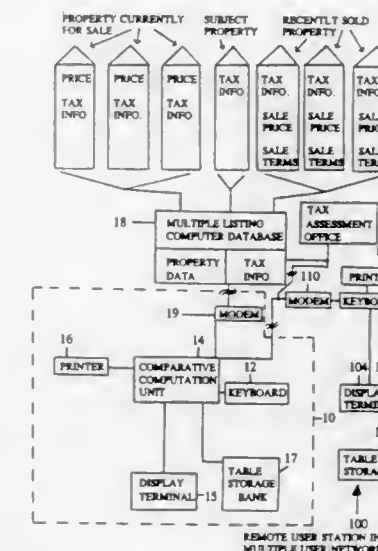
means for receiving via telephone lines requests from a plurality of user stations, said requests including a user specified subject property and comparable properties for which comparative value information is sought;

means for remotely accessing via telephone lines assessment data, sales data and property data of a plurality of properties, including subject property and comparable properties;

storage means for storing the property data and assessment data for the subject property and comparable property and sales data of the comparable properties, whereby property data and assessment percentage data for a particular property may be retrieved from said storage means by selecting an address or tax identification number of said particular property;

computer means connected to the storage means, means for receiving and means for remotely accessing, said computer control means, responsive to a request received by said means for receiving, for retrieving from said storage

means an assessment percentage and property data if available for said subject property, selecting comparable properties, and determining a price/assessment percentage factor for each comparable property by dividing the selling price of each comparable property by the assessment percentage for the corresponding comparable property, and determining a net comparative value for each comparable property by multiplying the assessment percentage of the subject property by the corresponding



price/assessment percentage factor for each comparable property; and

a plurality of remote computer-controlled user stations and means at each remote user station for communicating with said central unit and exchanging data therebetween, each of said remote user stations comprising input means for specifying as a request to be transmitted at least a subject property for which comparative values are to be determined.

5,414,622

## METHOD AND APPARATUS FOR BACK PROJECTING IMAGE DATA INTO AN IMAGE MATRIX LOCATION

Ronald G. Walters, 10229 Clipper Cove, Aurora, Ohio 44202

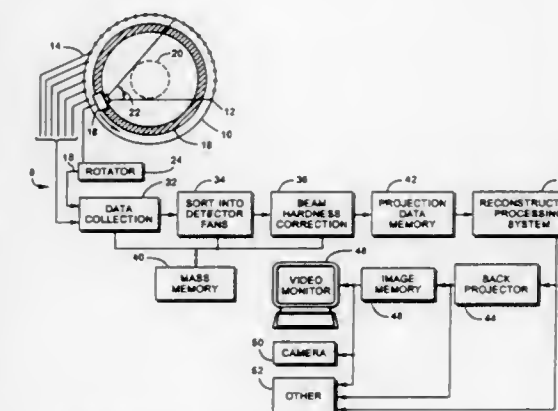
Continuation of Ser. No. 798,734, Nov. 15, 1985. This

application Feb. 1, 1988, Ser. No. 150,899

Int. Cl.<sup>6</sup> G06F 15/48

U.S. Cl. 364-413.19

21 Claims



1. An apparatus for back projecting data provided by a CT scanner or other object image scanner into an image matrix



location, wherein the data are associated with a particular view of a test subject, comprising:

- a projection data memory means for storing projection data;
- a linearization pointer memory means for storing a set of projection data memory pointers;
- scaling means operatively connected to the linearization pointer memory means for selecting a member of the set of projection data memory pointers;
- means operatively connected to the scaling means and the projection data memory means for determining, based on the selected projection data memory pointer, the projection data associated with the image matrix location; and
- means operatively connected to the determining means for accumulating the projection data associated with the image matrix location.

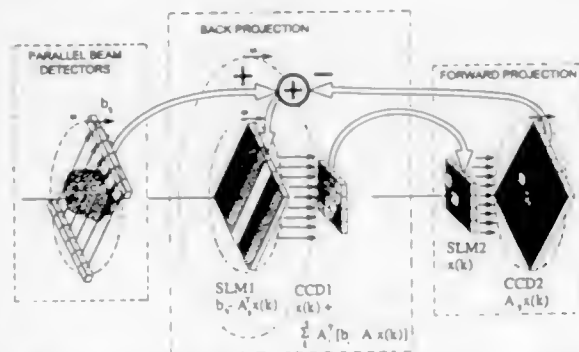
5,414,623

### OPTOELECTRONIC SYSTEM FOR IMPLEMENTATION OF ITERATIVE COMPUTER TOMOGRAPHY ALGORITHMS

Tongxin Lu, and Satish S. Udpa, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Ames, Iowa  
Filed May 8, 1992, Ser. No. 880,716  
Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 364—413.21

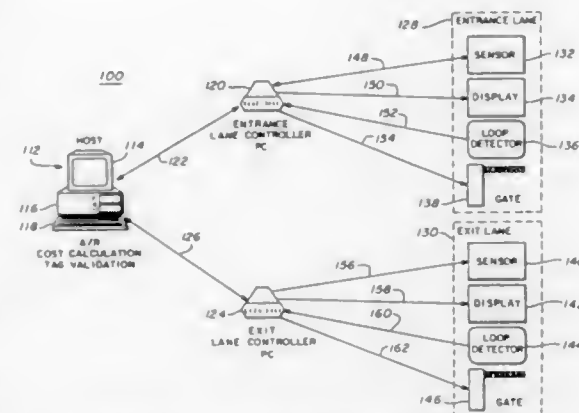
27 Claims



18. A projection iterative reconstruction method for iterative reconstruction of a two-dimensional (2-D) image of an object based on a plurality of one-dimensional (1-D) image projection signals obtained from an imaging device, the projections taken at different projection angles, the image signals providing corresponding image data, said method comprising the steps of:

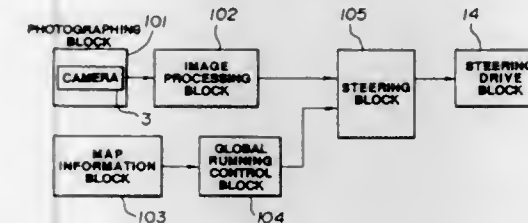
- providing a plurality of state vectors representing the image projection signals at all angles of projection;
- calculating a reconstructed image vector from the plurality of state vectors;
- forward projecting the reconstructed image vector to obtain a forward projected vector corresponding to each state vector;
- updating each state vector for each angle of projection based on the corresponding state vector and the corresponding forward projected vector;
- back projecting the updated state vectors at all angles of projection to generate back projections and summing the back projections to generate an updated reconstructed image vector;
- iterating steps (c), (d), and (e) until the updated state vectors converge with the corresponding forward projected vectors to a desired extent; and
- displaying a representation of the object based on the updated reconstructed image vector.

5,414,624  
AUTOMATED VEHICLE PARKING SYSTEM  
Robert B. Anthonyson, Sunapee, N.H., assignor to Avid Systems Corporation, Chicago, Ill.  
Filed Nov. 8, 1993, Ser. No. 148,983  
Int. Cl.<sup>6</sup> G06F 15/21; G07B 15/02  
U.S. Cl. 364—424.01 3 Claims



- An automated vehicle parking system for access and revenue control of a parking facility having controlled entrance lanes and controlled exit lanes, the system comprising:
  - a device for detecting a vehicle as the vehicle approaches the facility entrance lane;
  - a sensor for transmitting an interrogation signal to the approaching vehicle;
  - an electronic tag associated with the vehicle for receiving a transmitted signal and returning a vehicle tag identification signal to the sensor;
  - a lane controller processor coupled to the sensor and the vehicle detection device for storing data representing the time of day, said lane controller processor activating the sensor upon receipt of a signal representing a detected vehicle, receiving the vehicle tag identification signal from the sensor, and determining if the received vehicle identification signal is valid;
  - a computer database including data representing current status of each vehicle tag identification, the parking rate schedule for each vehicle tag identification, vehicle entrance time and date, vehicle exit time and date, vehicle parking duration interval including but not limited to 24 hours, 4-24 hours, and 0-4 hours, maximum and minimum vehicle parking duration intervals, parking facility identification, and home parking facility identification;
  - a computer coupled to the lane controller and the computer database for receiving a valid vehicle tag identification signal, the lane number, and the time of day of entrance of the vehicle to the facility for revenue control purposes and for the generating of a signal to the lane controller system to open or close the lanes; and
  - an accounting module coupled to the computer and including:
    - an accounts receivable submodule for each of the vehicle identification tags for storing costs and generating periodic billing statements for parking of each identified vehicle;
    - a rates definition table submodule for defining parameters for a rate calculation algorithm including parking rates for each identified vehicle; and
    - a rate calculation submodule identifying rate schedules for each vehicle account and calculating costs with the rate calculation algorithm based upon appropriate rates and parking times.

5,414,625  
SYSTEM AND METHOD FOR PROVIDING STEERING CONTROL FOR AUTONOMOUS VEHICLE  
Akira Hattori, Kanagawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Apr. 1, 1992, Ser. No. 862,610  
Claims priority, application Japan, Apr. 1, 1991, 3-068571; Jun. 21, 1991, 3-177468  
Int. Cl.<sup>6</sup> G06F 15/50  
U.S. Cl. 364—424.02 29 Claims



21. A system for providing a steering control for an autonomous vehicle so as to run the vehicle in parallel to a road contour index, comprising:

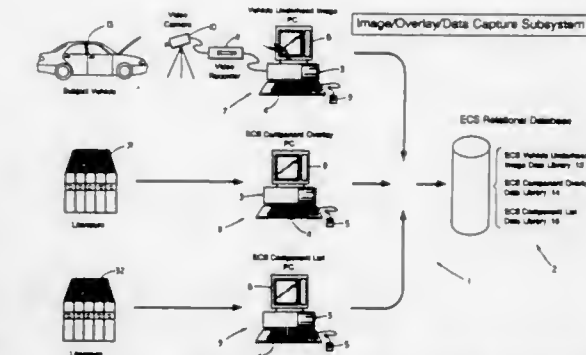
- first means having a video camera, the video camera being disposed on the vehicle so as to face toward a vehicle forward direction, for photographing a white line serving as the road contour index extending along a side edge of a running road and outputting an image signal indicating a presence of the white line;
- second means, including an image processing block, for setting a plurality of measuring points for a plurality of predetermined distances set toward the vehicular forward direction ahead of a vehicular center on a vehicular coordinate system and for defining positions of the white line with respect to the respective measuring points and outputting the position data of the white line at the respective measuring points and outputting the defined position data;
- third means for setting a running reference line on which the vehicle is to run autonomously;
- fourth means for setting a membership function for each measuring point which at least gives predetermined reliabilities to input values of the position data for the measuring points mutually adjacent to the corresponding one of the measuring points to which the membership function is set; and
- fifth means for calculating a steering angle through which a steering mechanism of the vehicle is steered for each measuring point with the position data for the respective measuring points and output from the third means as input steering values, said fifth means calculating the steering angle for each measuring point on a basis of a weight mean method in which reliabilities are multiplied by the position data for the respective measuring points and outputting a final steering angle which is calculated using a gross mean of the calculated steering angle and said system providing the steering control through the steering mechanism of the vehicle on the basis of the calculated final output steering angle of the fifth means so as to run the vehicle in parallel to the road contour index.

5,414,626  
APPARATUS AND METHOD FOR CAPTURING, STORING, RETRIEVING, AND DISPLAYING THE IDENTIFICATION AND LOCATION OF MOTOR VEHICLE EMISSION CONTROL SYSTEMS  
Rodney T. Boorse; Bruce R. Kohn, and Kerri R. Shotwell, all of Tucson, Ariz., assignors to Envirotech Systems Corp., Tucson, Ariz.  
Filed May 19, 1993, Ser. No. 63,600  
Int. Cl.<sup>6</sup> G06F 17/30  
U.S. Cl. 364—424.03 18 Claims

- An apparatus for capturing and storing visual images and information pertaining to the identity and the location of motor

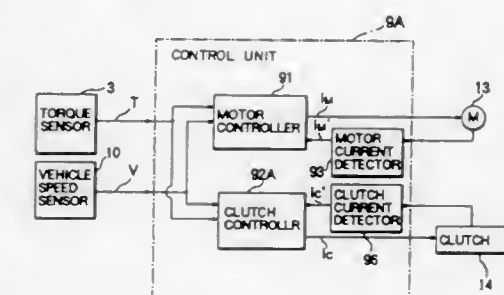
vehicle emission control systems within the underhood engine compartment of a subject motor vehicle, comprising:

- a computer system;
- means for creating a first computer database, including data corresponding to the visual image of the engine compartment of the subject vehicle;
- means for creating a second computer database, including data corresponding to a visual overlay for said visual image of the engine compartment, said visual overlay having the identity and the location of at least one emission control system for the subject vehicle;



- means for creating a third computer database, including vehicle identification data and the identity of said emission control system pertaining to the subject vehicle;
- means for relationally storing said first, second, and third databases in said computer system, so that by entering the vehicle identification data into an input of said computer system, said computer system will retrieve and output a composite visual image of said visual image of the engine compartment and said visual overlay.

5,414,627  
ELECTRIC POWER STEERING CONTROL DEVICE FOR AUTOMOTIVE VEHICLE  
Shunichi Wada; Kazuhisa Nisino, both of Himeji, and Yasushi Sasaki, Hamamatsu, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo and Suzuki Motor Corporation, Hamamatsu, both of Japan  
Filed Aug. 10, 1993, Ser. No. 103,914  
Claims priority, application Japan, Aug. 17, 1992, 4-217674  
Int. Cl.<sup>6</sup> B62D 5/04  
U.S. Cl. 364—424.05 5 Claims



- An electric power steering device for an automotive vehicle comprising:
  - a steering system including a steering wheel;
  - electric motor means for providing an assisting steering torque to said steering system;
  - electromagnetic clutch means for selectively transmitting said assisting steering torque generated by said electric motor to said steering system;
  - steering torque sensor means for detecting a steering torque applied upon said steering system;

vehicle speed sensor means for detecting a speed of said vehicle;

motor controller means, coupled to said steering torque sensor means and said vehicle speed sensor means, for generating a motor drive command level in accordance with said steering torque detected by said steering torque sensor means and said vehicle speed detected by said vehicle speed sensor means, said motor drive command level corresponding to a command level of said assisting steering torque generated by said electric motor means, wherein said motor controller means reduces said motor drive command level to zero when said vehicle speed is above a predetermined vehicle speed;

clutch controller means, coupled to said steering torque sensor means and said vehicle speed sensor means, for generating a clutch drive command level in accordance with said steering torque detected by said steering torque sensor means and said vehicle speed detected by said vehicle speed sensor means, said clutch drive command level corresponding to a degree of engagement of said electromagnetic clutch means by which said assisting steering torque of said electric motor means is transmitted to said steering system, wherein said clutch controller means includes: (a) means for setting a first predetermined torque level for determining an occurrence of an abnormal level of said steering torque, and a second predetermined torque level smaller than said first predetermined torque level; (b) means for setting said clutch drive command level to a level corresponding to said vehicle speed detected by said vehicle speed sensor means when said vehicle speed detected by said vehicle speed sensor means is below a predetermined vehicle speed; (c) means for setting said clutch drive command level to a predetermined level when said vehicle speed detected by said vehicle speed sensor means is above said predetermined vehicle speed and said steering torque detected by said steering torque sensor means is below said first predetermined torque level; (d) means for setting said clutch drive command level to a predetermined level smaller than said predetermined level set by said means (c), when said vehicle speed detected by said vehicle speed sensor means is above said predetermined vehicle speed and said steering torque detected by said steering torque sensor means rises above said first predetermined torque level; and (e) means for returning said clutch drive command level to said predetermined level set by said means (c), when said steering torque detected by said steering torque sensor means falls below said second predetermined torque level.

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#### ESTIMATED VEHICLE SPEED CALCULATION APPARATUS

Masato Yoshino, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 7, 1992, Ser. No. 909,653

Claims priority, application Japan, Jul. 11, 1991, 3-171059  
Int. Cl.<sup>6</sup> B60T 8/60

U.S. Cl. 364—426.02

19 Claims

1. An estimated vehicle speed calculating apparatus for calculating an estimated vehicle speed based upon a wheel speed of a driven wheel and a non-driven wheel of a vehicle equipped with an antilock brake control for each wheel, comprising:

- a sensing device that detects said wheel speed of said driven wheel and said non-driven wheel of said vehicle;
- a calculating device that calculates an estimated vehicle speed based on an input data;
- a storage device that stores said estimated vehicle speed calculated by said calculating device at a time when said antilock brake control is applied with respect to at least one of said driven wheel and said non-driven wheel or a brake operation begins;

a detecting device that detects a period when said antilock brake control is applied;

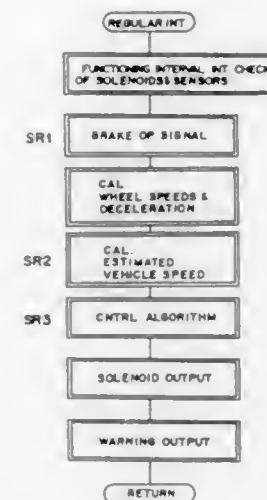
a second detecting device that detects a period when the brakes of said vehicle are applied;

first means for comparing a highest non-driven wheel speed with a highest driven wheel speed;

second means for comparing said highest driven wheel speed with said stored estimated vehicle speed;

third means for comparing said stored estimated vehicle speed with a sum of a newly obtained estimated vehicle speed plus a first predetermined value, said first predetermined value being within a range of ten to twenty kilometers per hour;

means for renewing said stored estimated vehicle speed to



equal a sum of said newly obtained estimated vehicle speed plus said first predetermined value when said stored estimated vehicle speed becomes greater than said sum of said newly obtained estimated vehicle speed plus said first predetermined value;

first means for selecting, as said input data, said highest non-driven wheel speed when said highest non-driven wheel speed is greater than said highest driven wheel speed, or when said highest driven wheel speed is greater than said stored estimated vehicle speed; and

second means for selecting, as said input data, said highest driven wheel speed when said highest non-driven wheel speed is not greater than said highest driven wheel speed and said highest driven wheel speed is not greater than said stored estimated vehicle speed.

5,414,629

#### NAVIGATION SYSTEM WITH ROUTE DETERMINATION PROCESS CAPABLE OF DETERMINING A DESIRED ROUTE READILY AND CORRECTLY

Nobutaka Inoue, Aichi, Japan, assignor to Masprodenkō Kabushikikaisha, Japan

Filed Nov. 19, 1993, Ser. No. 154,816

Claims priority, application Japan, Mar. 31, 1993, 5-073853  
Int. Cl.<sup>6</sup> G06F 15/50

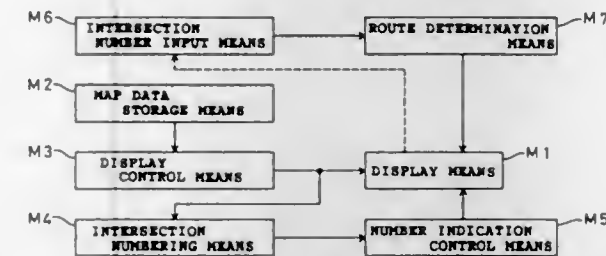
U.S. Cl. 364—444

13 Claims

1. A navigation system for a vehicle comprising: display means for displaying a road map thereon; map data storage means for storing map data therein and for supplying a road map to be displayed by said display means; display control means for controlling said display means to display a desired road map from the map data stored in said map data storage means with intersections on the displayed road map being displayed without an intersection number;

intersection numbering means for assigning, during operation of said navigation system, an intersection number to each intersection of the road map currently displayed by said display means;

number indication control means for controlling said display means to indicate the assigned intersection number adjacent each respective intersection of the road map currently displayed by said display means;



intersection number input means for inputting a desired intersection number from the intersection numbers displayed by said display means; and

route determination means for storing each road located between the assigned intersection number of a currently inputted intersection and the assigned intersection number of a previously inputted intersection as a route to be taken and for indicating each such road as the determined route on the road map displayed by said display means.

5,414,630

#### VEHICLE-MOUNTED NAVIGATION SYSTEM

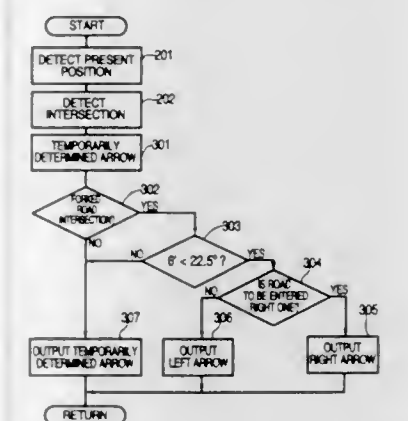
Hidekazu Oshizawa, Cupertino, Calif., and Tatsuhiko Abe, Rochester, N.Y., assignors to Zexel Corporation, Tokyo, Japan

Filed Sep. 29, 1993, Ser. No. 128,836

Int. Cl.<sup>6</sup> G06F 15/50

U.S. Cl. 364—449

5 Claims



1. A navigation system, comprising: means for computing an optimal route from a starting point to a destination from map information stored in a map information storage medium, said optimal route including intersections; means for detecting a present position of a vehicle; means for detecting, from present position information obtained by said means for detecting, a next intersection said vehicle will encounter on said optimal route; a plurality of direction indication images indicating a plurality of particular directions spaced a predetermined angle apart, an integer multiple of said predetermined angle being 360°; memory means for storing said plurality of direction indication images;

means for deciding whether said next intersection is a special intersection wherein a plurality of roads meet; said special intersection having a first road and a second road connected thereto, said first and said second roads being arranged in a left and right relation to one another when viewed at said special intersection, the directions of said first and said second roads being substantially indistinguishable from a common particular direction among said plurality of particular directions;

first means for selecting, when a result from said means for deciding indicates no said special intersection, one of said plurality of direction indication images stored in said memory means indicating one of said plurality of particular directions that is closest to the direction in which said vehicle should advance at said next intersection;

second means for selecting, when said means for deciding indicates said special intersection when said first road is to be taken, one of said plurality of direction indication images indicating one of said particular directions displaced clockwise by said predetermined angle from said common particular direction;

third means for selecting, when said means for deciding indicates said special intersection when said second road is to be taken, one of said plurality of direction indication images indicating one of said particular directions displaced counterclockwise by said predetermined angle from said common particular direction; and

means for displaying said selected one of said plurality of direction indication images.

5,414,631

#### COLLISION-AVOIDANCE DEVICE FOR AIRCRAFT, NOTABLY FOR AVOIDING COLLISIONS WITH THE GROUND

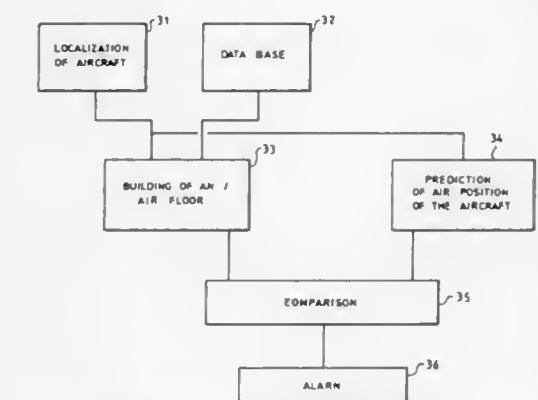
Xavier Denoize, and François Faivre, both of St. Medard, France, assignors to Sextant Avionique, Meduon la Foret, France

Filed Nov. 8, 1993, Ser. No. 149,185

Claims priority, application France, Nov. 10, 1992, 92 13529  
Int. Cl.<sup>6</sup> G08G 5/04

U.S. Cl. 364—461

20 Claims



1. A collision-preventing device for an aircraft, said device comprising: means for locating a geographical location of said aircraft; a data base containing a description of safety altitudes as a function of at least geographical locations, wherein said description of safety altitudes is at least a function of elevation points of an area on a surface of the earth in a vicinity of said aircraft so that a single safety altitude encompasses a region in said area having a plurality of elevation points, said single safety altitude being greater than a maximum elevation

means for computing an air floor between said aircraft and said region, said computing means being connected to said locating means and to said data base, wherein said air floor



is a function of the geographical location of said aircraft and said description of safety altitudes, wherein an overall altitude of said floor is greater than or equal to said safety altitudes between said aircraft and said surface of the earth, said floor being computed throughout a flight of said aircraft and encompassing a plurality of said safety altitudes within said region;

means for predicting an air position of said aircraft between a first given instant and a second given instant, said predicting means being connected to said locating means, wherein an altitude of said aircraft is known at said first given instant;

means for comparing said predicted air position of said aircraft with said floor, said comparing means being connected to said prediction means and to said computing means; and

an alarm connected to said comparing means, said alarm being triggered when a result of said comparing means indicates that said predicted air position of said aircraft is beneath said floor.

5,414,632

# SYSTEM AND METHOD FOR PREDICTING FAILURE IN MACHINE TOOL

Yasumasa Mochizuki; Tomoaki Yoshino; Shinichi Hasegawa, and Masakazu Sano, all of Shizuoka, Japan, assignors to Jatco Corporation, Fuji, Japan

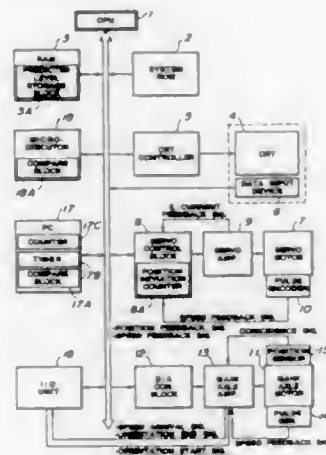
Filed Mar. 5, 1992, Ser. No. 846,666

Claims priority, application Japan, Mar. 6, 1991, 3-040296

Int. Cl.<sup>6</sup> G06F 15/46; G05B 13/02

U.S. Cl. 364-474.16

22 Claims



1. A system for predicting an occurrence of failure in a machine tool, comprising:

- first means for detecting a monitor data which is changed according to an operating situation in a series of working processes of the machine tool within an operating cycle, said first means including fifth means for detecting a position deviation variable of a tool as a result of rotation of a servomotor installed in the machine tool as the monitor data, the position deviation variable being defined as a deviation in position of the tool between contents of a movement instruction for the tool derived from a CPU to the servomotor and contents of an output pulse signal of a pulse encoder indicating an actual movement distance of the tool;
- second means for variably setting a prediction level of failure against the monitor data, the prediction level being varied according to different types of operating situations in the machine tool within the operating cycle;
- third means for comparing the monitor data detected by the first means with the prediction level set by the second means during a predetermined one of the series of working processes of the machine tool, said predetermined one

of the series of working processes including the servomotor rotation, and outputting a failure prediction signal when the value of the monitor data exceeds the prediction level; and

- fourth means for informing the prediction of the occurrence of failure on the basis of the received failure prediction signal.

5,414,633

# PATH CONTROL METHOD OF TOOL WITHDRAWAL AND RESUMPTION IN CNC

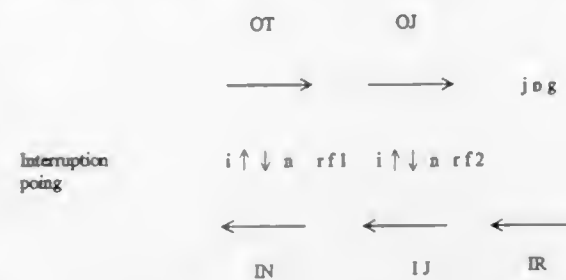
Yih F. Chang, Hsinchu, Taiwan, Prov. of China, assignor to Industrial Technology Research Institute, Hsinchu, Taiwan, Prov. of China

Filed Dec. 21, 1992, Ser. No. 993,695

Int. Cl.<sup>6</sup> G06F 15/46; G05B 19/18

U.S. Cl. 364-474.32

2 Claims



1. In a CNC operation, a path control method for tool withdrawal and resumption characterized in that said path control method comprising the steps of:

- defining first and second turning points between an interruption point and a destination point;
- defining first and second withdrawal statuses, which will be on when said tool is moving from said interruption point to said first turning point, and from said first turning point to said second turning point, respectively, each of said withdrawal statuses corresponding to a set of predetermined withdrawal path control parameters;
- defining first, second and third resumption statuses, which will be on said tool is moving from said destination point to said second turning point, from said second turning point to said first turning point, and from said first turning point to said interruption point, respectively, each of said resumption statuses corresponding to a set of predetermined resumption path control parameters;
- moving said tool in accordance with an interpolation scheme, said interpolation scheme comprising the following steps:
  - deciding whether an interruption signal has been detected, if yes, then deciding if said first withdrawal status is on; if said first withdrawal status is on and said interruption signal continues, then continuing said movement of said tool according to said interpolation scheme toward a destination point, if said interruption signal stops then turning on said third resumption status and returning said tool to said interruption point;
  - if said first withdrawal status is off and said second withdrawal status is on, determining if said interruption signal continues, if yes, then continuing said movement of said tool toward said destination point, if said interruption signal stops, then turning said second resumption status on and returning said tool to said first turning point;
  - if said first withdrawal status is off and said second withdrawal status is also off, then determining if said second resumption status is on, if yes, then turning on said second withdrawal status and moving said tool to said second turning point if said interruption signal

continues, otherwise returning said tool to said interruption point;

- if said first withdrawal status is off and said second withdrawal status is also off, then if said second resumption status is off, then checking whether said third resumption status is on, if said first resumption status is on then turning on said first withdrawal status and moving said tool to said first turning point if said interruption signal continues, otherwise returning said tool to said interruption point; if said first resumption status is off, then returning said tool to said interruption point;
- after moving said tool to said first turning point, checking if said first resumption status is on, if yes then returning said tool to said interruption point, if no then performing the following steps:
  - checking if first withdrawal status is on, if yes and said interruption signal continues, then turning said turning said second withdrawal status on and moving said tool to said second turning point, if said interruption signal stops then turning said third resumption status on and returning said tool to said interruption point;
  - if said first withdrawal status is off then checking if said second resumption status is on, if no, then moving said tool to a destination where said tool will be repaired, if yes, then checking if said interruption signal continues, if said interruption continues, then turning said second withdrawal status on and moving said tool to said second turning point, if said interruption signal stops then turning said first resumption status on and returning said tool to said interruption point; and
  - said path control method further comprising the step of using a detector attached to a CNC machine to facilitate a correction of factors that may be responsible for causing an interruption of said CNC operation.

5,414,634

# SYSTEM AND METHOD FOR CONTROLLING ITEM SELECTION, SEQUENCE AND COMPLETENESS

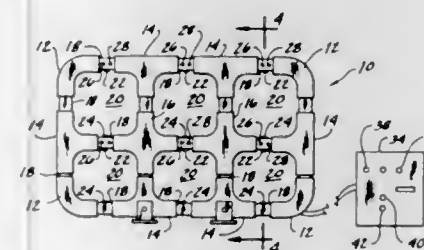
Bill W. Morgan, Dardanelle; James A. Whiteside, and Julian R. Hann, both of Russellville, Ark., assignors to Stark Manufacturing, Inc., Russellville, Ark.

Filed Apr. 19, 1993, Ser. No. 49,159

Int. Cl.<sup>6</sup> G06F 15/46

U.S. Cl. 364-478

4 Claims



1. Apparatus for controlling manual item selection order and completeness by a human operator, comprising:

- a frame structure forming a plurality of openings through which a hand can be inserted, each associated with a supply of an item;
- a plurality of lights supported by said frame structure adjacent respective openings where they are visible by the operator;
- a plurality of sensors supported by said frame for sensing access by the hand of the operator to each item, each sensor being disposed adjacent an item to be selected;
- programmable logic controller (PLC) means connected to each sensor for receiving and storing signals therefrom each time an item associated with the respective sensor is accessed by the hand of the operator and for recording an initial sequence in which the signals are received, said means thereafter activating said lights serially one at a time in the stored sequence so as to guide the operator in

the selection sequence, said means further comparing subsequent signals from the sensors as the operator inserts his hand to the recorded sequence of initial signals and deactivating said lights in the sequence as an item is accessed by the operator, and providing a warning signal to the operator if the sequence is different; and

switch means movable between a learning position permitting the PLC means to receive and store the signals each time an item is accessed, and a running position for permitting the PLC means to compare subsequent signals from the sensors to the recorded sequence.

5,414,635

# OSCILLOSCOPE WITH DYNAMIC TRIGGERING DETERMINATION

Genichiro Ohta, Ebina, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

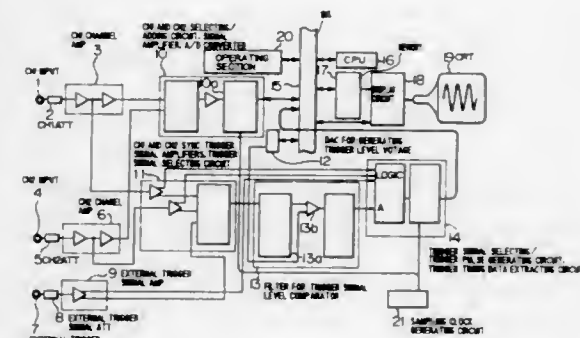
Filed Nov. 2, 1992, Ser. No. 970,400

Claims priority, application Japan, Nov. 8, 1991, 3-293484; Nov. 8, 1991, 3-293485; Nov. 8, 1991, 3-293486; Nov. 8, 1991, 3-293487; Nov. 8, 1991, 3-293489

Int. Cl.<sup>6</sup> G01R 13/28

U.S. Cl. 364-481

12 Claims



1. An oscilloscope comprising:
  - means for extracting main period components included in a signal to be observed;
  - means for displaying waveforms regarding the extracted period components and information indicating with which period components the waveforms are triggered on a screen; and
  - means for triggering with other period components selected from said extracted main period components by an input from an operating section.

5,414,636

# SEMICONDUCTOR MEMORY DEVICE HAVING A MEMORY CELL CAPACITOR AND A FABRICATION PROCESS THEREOF

Taiji Ema, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 894,605, Jun. 5, 1992, abandoned. This application Aug. 29, 1994, Ser. No. 296,594

Claims priority, application Japan, Jun. 7, 1991, 3-136544; Oct. 30, 1991, 3-285088

Int. Cl.<sup>6</sup> H01L 27/108

U.S. Cl. 364-488

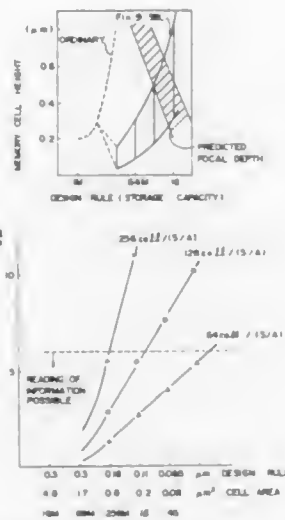
9 Claims

1. A method for fabricating a dynamic random access memory, said dynamic random access memory including a memory cell array region that includes therein a plurality of memory cells, each of said memory cells including a stacked type memory cell capacitor, said memory cell array region having a first surface level, and said dynamic random access memory including a peripheral region that has a second surface level lower than said first surface level, said memory cell array region and

said peripheral region being bounded from each other by a stepped boundary, said method comprising the steps of:

- determining design rules that specify a smallest pattern width that is used in the dynamic random access memory, with respect to word lines and bit lines forming the dynamic random access memory and further with respect to a pattern that extends from said memory cell array region to said peripheral region across said stepped boundary;
- determining a step height of said stepped boundary based upon said design rules determined in said step (a) by determining a focal depth of an optical exposure system that is used for exposing a device pattern of the dynamic random access memory, in correspondence to the word lines and the bit lines, and obtaining a height H according to a relationship

$$H = DOF \times ((DRULE_1 / DRULE_2)^2 - 1)$$



where DOF designates the focal depth for the word lines and bit lines, DRULE<sub>1</sub> designates the design rule for the pattern that extends across said stepped boundary, and DRULE<sub>2</sub> designates the design rule for the word lines and the bit lines;

- determining a capacitance of the memory cell capacitor based upon said step height of said stepped boundary that is determined in said step (b);
- determining a parasitic capacitance of said bit line such that a ratio of said parasitic capacitance to said capacitance of the memory cell is smaller than a predetermined factor;
- determining the number of the memory cells that are connected to one bit line based upon said parasitic capacitance of the bit line determined in said step (d); and
- fabricating said dynamic random access memory in accordance with said determining in steps (a)-(c).

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#### INTRA-MODULE SPARE ROUTING FOR HIGH DENSITY ELECTRONIC PACKAGES

Claude L. Bertin, Burlington; Christopher P. Miller, Underhill, both of Vt., and David J. Perlman, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

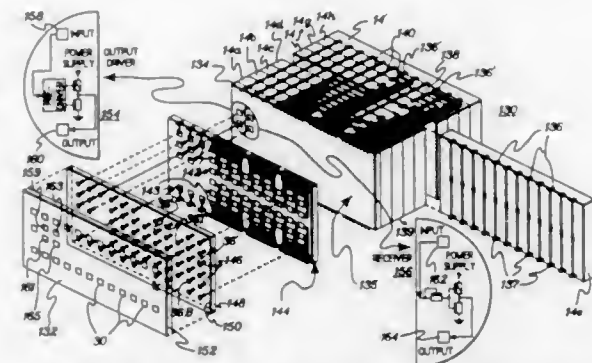
Filed Jun. 24, 1992, Ser. No. 903,681  
Int. Cl.<sup>6</sup> H05K 7/00

U.S. Cl. 364-489

55 Claims

1. A method of fabricating a multichip module for a high density electronic package such that the module maintains a predetermined pattern of interconnect landings on an access surface thereof while accommodating the possible presence of a defective chip in the module, comprising the steps of:

laminating together multiple chips, including a spare chip, to form a module;  
providing a set of chip circuitry connecting pads for each chip of the module at a first pad level of the module;  
testing the module to identify a defective chip in the module;  
providing a predetermined pattern of interconnect landings on an access surface of the module, each landing of said pattern being normally associated with a respective pad of



a non-spare chip, and conductively connecting each landing to the respective pad normally associated therewith if said testing identifies no defective chip in the module; and if said testing identifies a defective chip in the module, forming a spare routing pattern on the module itself which electrically isolates a pad of the defective chip from the predetermined pattern of landings and electrically connects a corresponding pad of the spare chip to the predetermined pattern of landings.

5,414,638

#### PROGRAMMABLE INTERCONNECT ARCHITECTURE

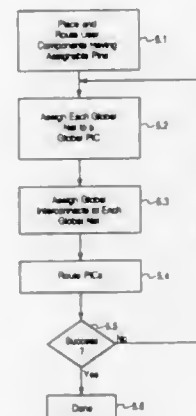
Henry T. Verheyen, San Jose; Charles J. Kring, Jr., Sunnyvale, and Robert Osann, Jr., San Jose, all of Calif., assignors to Aptix Corporation, San Jose, Calif.

Filed Dec. 18, 1992, Ser. No. 993,331

Int. Cl.<sup>6</sup> H03K 17/693

U.S. Cl. 364-489

33 Claims



32. A structure comprising:

- a plurality of user components;
- a first plurality of programmable interconnect circuits (PIs) each of which comprises a plurality of programmable leads such that each PI can programmably connect any one of its programmable leads to another one of its programmable leads, each PI being connected to a user component;
- a second plurality of PIs each of which has a plurality of programmable leads such that each PI of the second plurality can programmably connect any one of its programmable leads to another one of its programmable leads;

a plurality of conductive interconnects each of which connects a unique programmable lead of a PI of the first plurality to a unique programmable lead of a PI of the second plurality so that each programmable lead of each PI of the first plurality is connected by an interconnect to at most one of the programmable leads of the PIs of the second plurality and each programmable lead of each PI of the second plurality is connected by an interconnect to one and only one of the programmable leads of the PIs of the first plurality, wherein the interconnects connect each PI of the first plurality to each PI of the second plurality.

5,414,639

#### AUTOMATIC TESTING METHOD AND TESTING APPARATUS FOR DEVICES

Takatoshi Sugimoto; Hideaki Yoshimura, and Masayuki Suzuki, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

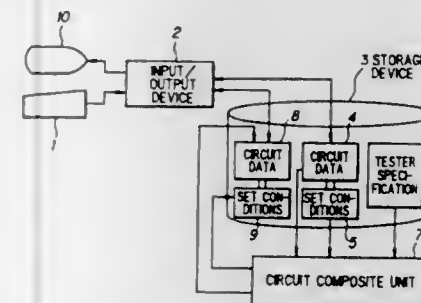
Filed Jan. 19, 1994, Ser. No. 183,358

Claims priority, application Japan, Jan. 19, 1993, 5-023806; Jan. 19, 1993, 5-023808

Int. Cl.<sup>6</sup> G01D 21/00; G01R 31/00; G06F 11/00

U.S. Cl. 364-489

7 Claims



7. A connection method for connecting a tester for measuring characteristics of a multi-terminal device, and wherein a device board is disposed between the multi-terminal device and the tester, comprising the steps of:

- determining a number n of points under test of the device board and a number M of resources of the tester;
- comparing the number n of the points under test and the number M of the resources of the tester, and connecting the tester and the device board in accordance with a result of the comparison;
- when n is < M, directly connecting the resources of the tester to the points under test in a one-to-one correspondence and directly setting a set value of each point under test for each testing item as a set value for each resource; and
- when n is > M, a set condition of each testing item for each point under test between the device board and the tester resource is determined, and if a plurality of different points under test have the same set condition over all the testing items, these points under test are grouped as one point under test for connection to one of the resources.

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#### METHOD AND APPARATUS FOR ADAPTIVE DEMAND LIMITING ELECTRIC CONSUMPTION THROUGH LOAD SHEDDING

John E. Seem, Menomonee Falls, Wis., assignor to Johnson Service Company, Milwaukee, Wis.

Continuation of Ser. No. 725,314, Jul. 5, 1991, abandoned. This application Feb. 23, 1994, Ser. No. 216,601

Int. Cl.<sup>6</sup> H02J 3/14

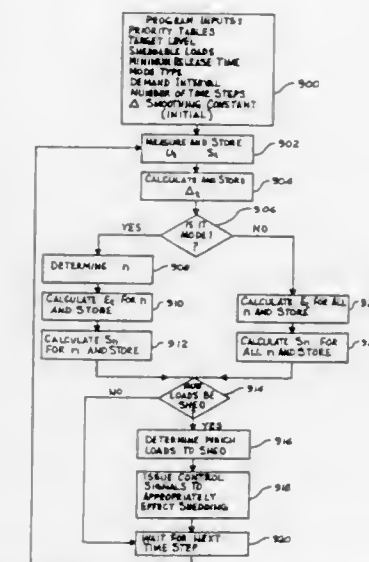
U.S. Cl. 364-493

14 Claims

1. An apparatus for controlling aggregate electrical load of

an electrical system to a load level below a predetermined target level, the apparatus comprising:

- a sensor means for sensing said aggregate electrical load and generating load information representative of said aggregate electrical load;
- a memory means for storing information; and
- a processor means for executing a predetermined program; said processor means, said memory means, and said sensor means being operatively interconnected;
- said processor means effecting storage of said load information in said memory means;
- said processor means including a predictor means for forecasting a predicted load to be shed for a predetermined future period to keep said load level below said target level, said processor means issuing shed control signals to selected devices within said electrical system to shed appropriate devices of said selected devices in accordance



with said predicted load to be shed, said processor means effecting storage of shed information indicative of the amount of electrical load being shed, said predictor means providing a forecast of energy requirements for said predetermined future period in accordance with said load information and said shed information, said predictor means further providing a maximum forecast of energy requirements for said predetermined future time period in accordance with an error factor and said forecast of energy requirements, said processor means calculating said predicted load to be shed in accordance with said maximum forecast of energy requirements, wherein said error factor is calculated from differences between said forecast of energy requirements for said predetermined future time period made during a previous time period and a sum of said load information and said shed information during said previous time period.

5,414,641

#### METHOD AND APPARATUS FOR DETERMINING ELEMENTARY CIRCUITS AND INITIAL VALUES OF FLOWS IN A PIPE NETWORK

Sakura Shinoaki, Fujisawa, and Junichi Enomoto, Funabashi, both of Japan, assignors to Tokyo Gas Co., Ltd, Tokyo, Japan

Filed May 11, 1993, Ser. No. 59,291

Int. Cl.<sup>6</sup> G06F 15/36

U.S. Cl. 364-510

15 Claims

1. A method for automatically determining elementary circuits and initial values of flows in a pipe network including one or more source nodes and a plurality of demanding nodes, said one or more source nodes and the plurality of demanding nodes being interconnected with pipes, and each of the pipes





- a) an axis inclination sensing means to determine the position of an optical flat;
- b) a circuit means being connected to said axis inclination sensing means and operative to provide an electrical signal having a signal property which varies in proportion to an inclination of said optical flat about a respective mechanical axis;
- c) an analog-to-digital (A/D) converter means operatively connected to said circuit means and converting each signal to a digital word having a binary value representative of a displaced line of sight passing through said optical flat from a reference value thereof;
- d) a computer means operatively connected to said A/D converter means and operative to convert each digital word to a displacement reading associated therewith;
- e) a display means connected to said computer means and operative to display a displacement reading equivalent respectively to said inclination of said optical flat about said mechanical axis; and
- f) said computer means having means for calibration of said optical micrometer, said optical micrometer operative to eliminate a requirement for a backlash test for said calibration, said calibration means including a zero centering test to establish zero centering and a range accuracy test to establish range accuracy and having means for adjusting said zero centering and said range accuracy of said optical micrometer.

5,414,647

# NON-CONTACT METHOD AND SYSTEM FOR BUILDING CAD MODELS BY INTEGRATING HIGH DENSITY DATA SCANS

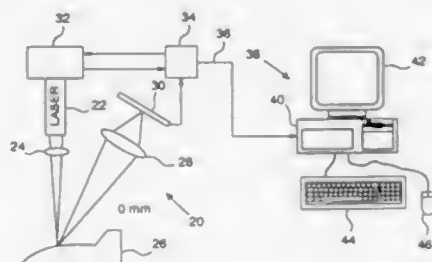
Samuel E. Ebenstein, Southfield; Gregory H. Smith, and Paul J. Stewart, both of Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 980,419, Nov. 23, 1992, Pat. No. 5,384,717, and a continuation-in-part of Ser. No. 161,025, Dec. 3, 1993, Pat. No. 5,319,567. This application May 26, 1994, Ser. No. 249,789

Int. Cl.<sup>6</sup> G01C 25/00

U.S. Cl. 364-560

17 Claims



1. A method of building a CAD model which represents an object positioned at a scanning station, the method comprising the steps of:

- generating reference data relating to a surface of the object to be scanned, the surface including at least one reference feature of the object, the at least one reference feature having a boundary;
- scanning the surface of the object at the scanning station based on the reference data to generate reflected signals;
- converting the reflected signals to corresponding electrical signals;
- computing scan data based on the electrical signals;
- determining at least a portion of the boundary of the at least one reference feature based on the scan data to obtain boundary data;
- determining the location of at least one reference feature of the object in a local coordinate system based on the boundary data;
- repeating steps a)-f) for another surface of the object to obtain the location of the at least one reference feature in

- a second local coordinate system different from the first local coordinate system;
- comparing the locations of the at least one reference feature in the coordinate systems to obtain a transform;
- mapping the scan data into a global coordinate system based on the transform; and
- integrating the scan data in the global coordinate system to obtain a CAD model of the object.

5,414,648

# NONDESTRUCTIVELY DETERMINING THE DIMENSIONAL CHANGES OF AN OBJECT AS A FUNCTION OF TEMPERATURE

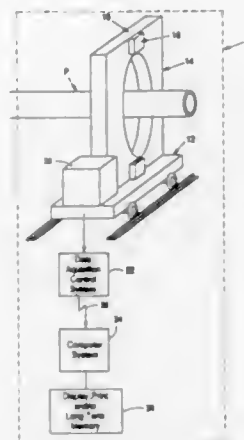
Ira L. Morgan; Robert H. Rice; Joseph E. Bolger, all of Austin, Tex., and Donald G. Schindler, Pittsburgh, Pa., assignors to Integrated Diagnostic Measurement Corporation, Austin, Tex.

Filed May 31, 1990, Ser. No. 531,322

Int. Cl.<sup>6</sup> G01B 15/02

U.S. Cl. 364-563

17 Claims



1. A method for nondestructively determining the dimensional changes in an object as a function of temperature over a desired temperature range, comprising:

- scanning a single cross-section of said object with penetrating radiation along a plurality of paths;
- sensing the temperature of the object as the object is being scanned and generating temperature signals representative of the temperature of the cross-section of the object;
- generating electrical signals representative of the radiation attenuation along each of the plurality of paths through the cross-section of the object;
- converting the electrical signals representative of the attenuated penetrating radiation signals into signals representative of the density-length of the object along each of the plurality of paths;
- processing the density-length signals to determine, by use of a computer model of the object to be examined, dimensional measurements of a cross-section of the object;
- processing the temperature signals to generate a temperature which corresponds with each determined dimensional measurement;
- allowing the object to increase and/or decrease in temperature; and
- periodically repeating steps a) through g) at different temperatures whereby a series of correlated dimensional and temperature measurements are taken of the same cross-section over the desired temperature range.

5,414,649

# GENERATION AND SIMULATION OF KNOWLEDGE BASES WITH MARKING OF NODE BEING SIMULATED

Edison Tse, and Min Zhu, both of Los Altos, Calif., assignors to Expert Edge Corp., Palo Alto, Calif.

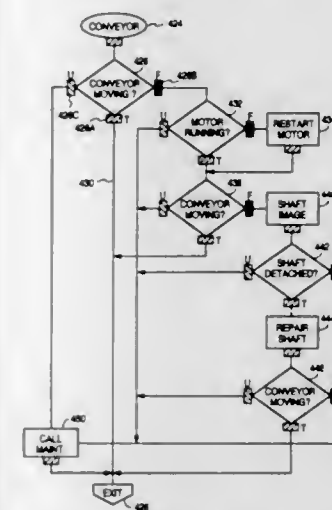
Division of Ser. No. 715,753, Jun. 14, 1991, Pat. No. 5,261,037.

This application Jun. 30, 1993, Ser. No. 85,863

Int. Cl.<sup>6</sup> G06F 15/60, 15/20

U.S. Cl. 364-578

22 Claims

MICROFICHE APPENDIX INCLUDED  
(32 Microfiche, 3089 Pages)

1. A method of simulating an execution of a knowledge base and displaying the simulation of said knowledge base on a display of a computer, said method comprising the steps of: selecting a set of one or more statements of said knowledge base; representing, by said computer, each statement from said set by a node on said display; simulating an execution of said knowledge base; and when, during said simulating step, an evaluation of any one of said statements of said set is being simulated, marking the respective node on said display by said computer as the node representing the statement whose evaluation is being simulated.

5,414,650

# PARSING INFORMATION ONTO PACKETS USING CONTEXT-INSENSITIVE PARSING RULES BASED ON PACKET CHARACTERISTICS

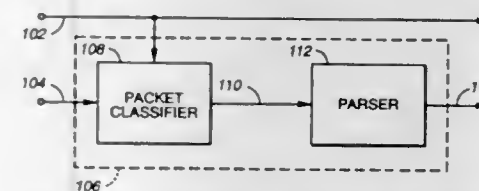
Peter J. Hekhuis, Ashland, Oreg., assignor to Compression Research Group, Inc., Ashland, Oreg.

Filed Mar. 24, 1993, Ser. No. 35,438

Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 364-715.02

20 Claims



1. An information processor for processing an information stream comprising input packets, said information processor comprising

input means for receiving said information stream and for receiving an indication of the boundaries in said information stream for each of said input packets,

classification means for classifying said input packets according to intrinsic characteristics of said input packets, parsing means responsive to said classification means for parsing said input packets into output packets and for generating an indication of the boundaries of said output packets, wherein each of said output packets comprises or represents one or more of said input packets, and means for reiteratively classifying and parsing packets previously classified and parsed to generate further output packets comprising or representing one or more of said packets previously classified and parsed.

5,414,651

# ARITHMETIC UNIT FOR MULTIPLYING LONG INTEGERS MODULO M AND R.S.A. CONVERTER PROVIDED WITH SUCH MULTIPLICATION DEVICE

Jozef L. W. Kessels, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 854,178, Mar. 20, 1992, abandoned.

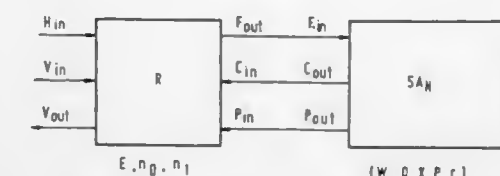
This application Oct. 21, 1993, Ser. No. 140,817

Claims priority, application European Pat. Off., Mar. 22, 1991, 91200639

Int. Cl.<sup>6</sup> G06F 7/38

U.S. Cl. 364-746

5 Claims



1. A systolized and modular arithmetic device for multiplying a first multibit integer Q and a second multibit integer P modulo a third multibit integer M, said integers are input to said device during a first cycle and processed during a second cycle, comprising:

- a control module;
- a first processing module coupled to said control module;
- a second processing module coupled to said first processing module;
- a tail module coupled to said second processing module;
- said first and second processing modules having modular storage means for storing mutually exclusive first bit parts of said first integer Q and mutually exclusive second bit parts indicating said third integer M in monotonously decreasing significance away from said control module;
- said control module having output means for outputting a control signal to said first processing module and input means for receiving a carry signal from said first processing module;
- said first processing module having means for receiving said control signal from said control module and for receiving a carry signal from said second module, output means for outputting said carry signal to said control module and outputting said control signal to said second processing module and multiplying means for multiplying a portion of said first multibit integer Q and a portion of said second multibit integer P modulo M;
- said second processing module having means for receiving said control signal from said first processing module and for receiving a carry signal from said tail module, output means for outputting said carry signal to said first processing module and outputting said control signal to said tail module and multiplying means for multiplying a further portion of said first multibit integer Q and a further portion of said second multibit integer P modulo M;
- said means for receiving and output means of said second processing module operating one half cycle later than said means for receiving and output means of first processing module; and



said tail module including emulating means for emulating a dummy signal of said first integer Q and said third integer M with respect to a low significant end and outputting said dummy signal to said second processing module.

5,414,652

## MAGNETO-OPTICAL MEMORY ELEMENT

Michinobu Mieda, Shiki; Hiroyuki Katayama; Akira Takahashi, both of Nara, and Kenji Ohta, Kitakatsuragi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

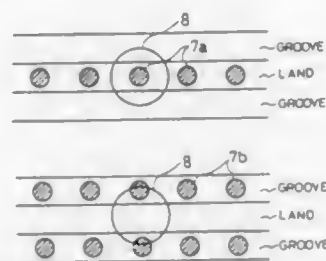
Filed Aug. 22, 1994, Ser. No. 293,720

Claims priority, application Japan, Aug. 27, 1993, 5-212953; Aug. 12, 1994, 6-190573

Int. Cl.<sup>6</sup> G11C 13/06

U.S. Cl. 365—122

4 Claims



1. A magneto-optical memory element comprising:  
a transparent substrate;  
grooves, formed on at least one surface of said transparent substrate, for guiding a light beam;  
lands, each land being formed between said grooves;  
a magneto-optical recording layer formed on a surface of said transparent substrate on which said grooves are formed; and  
tracks formed on said grooves and lands, for recording and reproducing information,  
wherein a width of each groove and a width of each land are substantially equal,  
information is recorded on and reproduced from said tracks on said grooves and said lands, and  
a groove depth d is arranged such that

$$0.13 \times \lambda / n \leq d \leq 0.18 \times \lambda / n$$

where  $\lambda$  is a wavelength of the light beam and n is a refraction index of said transparent substrate.

5,414,653

## NON-VOLATILE RANDOM ACCESS MEMORY HAVING A HIGH LOAD DEVICE

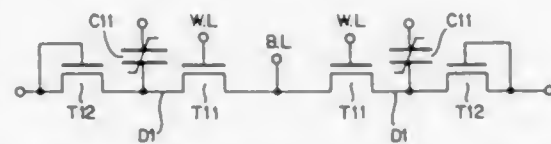
Shigeo Onishi, Nara; Kazuya Ishihara, Tenri; Kenichi Tanaka, Fukuyama, and Keizo Sakiyama, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 6, 1993, Ser. No. 132,292

Int. Cl.<sup>6</sup> G11C 11/22

U.S. Cl. 365—145

4 Claims



1. A non-volatile random access memory including a plurality of unit cells, each cell comprising:  
a transistor composed of source and drain regions and a gate electrode,  
a ferroelectric capacitor having an accumulating electrode, a ferroelectric film and a cell plate wherein the accumul-

ing electrode is connected to either of the source and drain regions, and

- a high load device connected to both of the accumulating electrode of the ferroelectric capacitor and the source or drain region connected to the ferroelectric capacitor, wherein the high load device provided in the cell is used with an adjacent cell in common.

5,414,654

## DRIVING CIRCUIT OF A FERROELECTRIC MEMORY DEVICE AND A METHOD FOR DRIVING THE SAME

Yasushi Kubota, Sakurai, and Shigeo Onishi, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

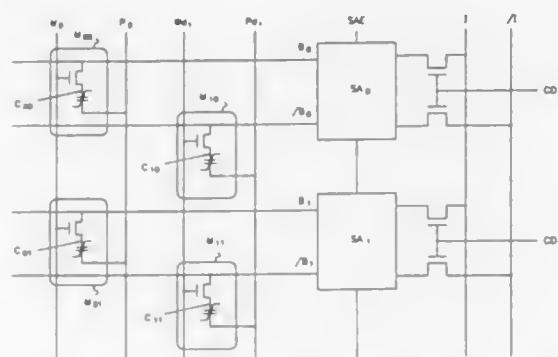
Filed Oct. 8, 1993, Ser. No. 133,253

Claims priority, application Japan, Oct. 9, 1992, 4-271619

Int. Cl.<sup>6</sup> G11C 11/22

U.S. Cl. 365—145

12 Claims



1. A ferroelectric memory device, comprising:  
a plurality of bit lines carrying data signals and voltage signals, every adjacent two of the bit lines being paired to form a plurality of bit line pairs;  
sense amplifiers connected to each of the bit line pairs;  
a plurality of memory cells for storing data, each memory cell having a first capacitor and a first switching element, the first capacitor being connected to one of the bit lines via the first switching element, wherein the first capacitor includes a capacitor insulating film, at least one portion of the capacitor insulating film being formed of a ferroelectric material;  
a plurality of dummy cells for storing a reference voltage, each dummy cell having a second capacitor and a second switching element, the second capacitor being connected to one of the bit lines via the second switching element, wherein the second capacitor includes the capacitor insulating film at least one portion of the capacitor insulating film being formed of a ferroelectric material;  
a first common electrode line for controlling a voltage to be applied to the first capacitor;  
a second common electrode line for controlling a voltage to be applied to the second capacitor;  
a first word line for controlling the first switching element; and  
a second word line for controlling the second switching element,  
wherein a plurality of the memory cells and at least one of the dummy cells are connected to each bit line, and wherein each of the memory cells and each of the dummy cells have substantially the same structure and the same capacitance.

5,414,655

## SEMICONDUCTOR MEMORY DEVICE HAVING A STACK-TYPE CAPACITOR

Tohru Ozaki, Tokyo, Japan; Hiroshi Takato, and Akihiko Nitayama, both of Wappingers Falls, N.Y., assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

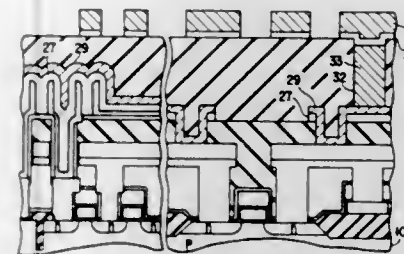
Filed Jul. 16, 1993, Ser. No. 94,421

Claims priority, application Japan, Jul. 17, 1992, 4-191120

Int. Cl.<sup>6</sup> G11C 11/24

U.S. Cl. 365—149

21 Claims



9. A semiconductor memory device comprising:

a semiconductor substrate;

at least one memory cell section including a plurality of memory cells each formed of a capacitor comprising an upper electrode, a lower electrode, and a capacitor insulation layer formed therebetween, and a MOS transistor formed on said semiconductor substrate;

a peripheral circuit section formed on said semiconductor substrate in an area other than an area in which said memory cell section is formed; and

a wiring layer serving as said upper electrode of said capacitor and serving as a wire of said peripheral circuit section which wire is electrically separated from said upper electrode, wherein

said wiring layer includes a first wiring layer and a second wiring layer,

said first wiring layer is formed on an insulating layer covering said memory cell section and said peripheral circuit section,

said peripheral circuit section has contact holes formed therein passing through a part of said first wiring layer and said insulating layer, and

said second wiring layer is formed on said first wiring layer and within said contact holes so as to electrically contact at least one of a lower-layer wire of said peripheral circuit section and said semiconductor substrate.

5,414,656

## LOW CHARGE CONSUMPTION MEMORY

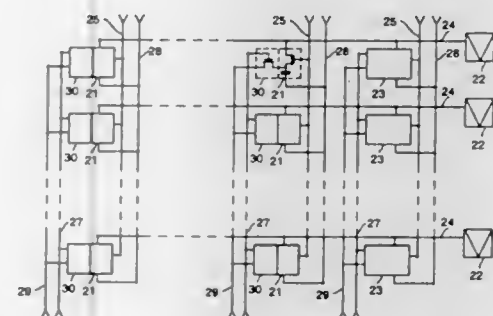
Donald M. Kenney, 18 Birch Rd., Shelburne, Vt. 05482

Filed Mar. 23, 1994, Ser. No. 216,611

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—149

9 Claims



1. In a memory device of the FET dynamic random access type including a matrix of memory cells arranged in rows and columns, each said cell comprising at least an access transistor

and a memory capacitor having a storage node plate and a reference plate, a plurality of access word lines arranged in a column direction of said matrix, and a plurality of bit lines arranged in a row direction, the improvement comprising:

- (a) a storage node precharge circuit, said precharge circuit comprising at least one precharge transistor connected between said storage node plate and a precharge voltage source, each said precharge transistor having a gate connected to one of a plurality of precharge word lines arranged in said column direction of said matrix, and  
(b) control means for writing a voltage into an addressed column of said cells, including said precharge word line in said addressed column having a first voltage pulse sufficient to cause charging of storage node plates in the addressed column to a first binary data level via said precharge transistors, and selective means for subsequent discharge of cells in said addressed column, including said access wordline in said addressed column having a second voltage pulse sufficient to cause discharge of storage node plates to a second binary data level via said access transistors.

5,414,657

## ASYNCHRONOUS STATIC RANDOM ACCESS MEMORY DEVICE FOR PROPAGATING READ-OUT DATA BIT THROUGH SINGLE BIT LINE

Yasunori Okimura, Kanagawa, Japan, assignor to NEC Corporation, Tokyo, Japan

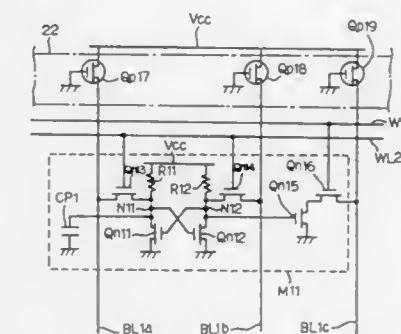
Filed Apr. 29, 1994, Ser. No. 235,698

Claims priority, application Japan, May 17, 1993, 5-113558

Int. Cl.<sup>6</sup> G11C 11/34

U.S. Cl. 365—154

2 Claims



1. An asynchronous static random access memory device fabricated on a semiconductor chip, comprising:

- a) a plurality of first word lines selectively energized in a read-out operation;  
b) a plurality of second word lines selectively energized in a write-in operation;  
c) a plurality of first bit lines;  
d) a plurality of second bit lines respectively paired with said plurality of first bit lines for forming a plurality of bit line pairs;  
e) a plurality of third bit lines respectively associated with said plurality of bit line pairs for forming a plurality of bit line sets;  
f) a charging circuit coupled between a first source of voltage level and said plurality of bit line sets for supplying current to said plurality of bit line sets; and  
g) a plurality of memory cells selectively associated with said plurality of first word lines, said plurality of second word lines and said plurality of bit line sets for said read-out operation and said write-in operation,  
each of said plurality of memory cells comprising:  
g-1) a memory circuit having a resistor, a first memory node and a first switching transistor coupled between a first power voltage line and a second power voltage line different in potential level and a series of a second resistor, a second memory node and a second switching

transistor coupled between said first power voltage line and said second power voltage line, said first memory node and said second memory node being respectively connected to a gate electrode of said second switching transistor and a gate electrode of said first switching transistor for storing a potential difference indicative of a data bit,

g-2) a pair of first switching transistors coupled between said first and second memory nodes and said bit line pair, and gated by one of said plurality of second word lines,

g-3) a converting circuit responsive to a voltage level at one of said first and second memory nodes for changing a voltage level on one of said plurality of third bit lines,

g-4) a second switching transistor coupled between said one of said plurality of third bit lines and said converting circuit, and gated by one of said plurality of first word lines for enabling said converting circuit to change said voltage level on said one of said plurality of third bit lines, and

g-5) a capacitive element coupled with the other of said first and second memory nodes for canceling a parasitic capacitance due to said converting circuit.

5,414,658

# **ELECTRICALLY ERASABLE PROGRAMMABLE READ-ONLY MEMORY ARRAY**

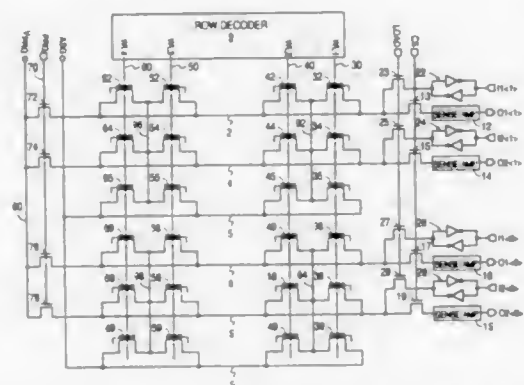
Nagesh Challa, Sunnyvale, Calif., assignor to Nexcom Technology, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 136,438, Oct. 13, 1993, which is a division of Ser. No. 896,772, Jun. 10, 1992, Pat. No. 5,297,081, which is a continuation-in-part of Ser. No. 625,807, Dec. 11, 1990, Pat. No. 5,222,040. This application May 17, 1994, Ser. No. 245,189

Int. Cl.<sup>6</sup> G11C 13/00

U.S. Cl. 365—185

32 Claims



1. A memory array operative at different times in an erase mode, a program mode, and a read mode, comprising:

a first settable threshold memory cell having a control terminal and first and second controlled terminals, wherein the threshold is set by application of a voltage across the control terminal and the first controlled terminal thereof;

a second settable threshold memory cell having a control terminal and first and second controlled terminals, wherein the threshold is set by application of a voltage across the control terminal and the first controlled terminal thereof;

a first switch having a control terminal and first and second controlled terminals;

a second switch having a control terminal and first and second controlled terminals;

an array reference line connected to the respective first controlled terminals of the first and second switches, the respective second controlled terminals of the first and

second switches being connected to one another by a common line;

a bit line connected to the respective first controlled terminals of the first and second memory cells, the respective second controlled terminals of the first and second switches being connected to the common line;

a first word line connected to the respective control terminals of the first memory cell and the first switch; and

a second word line connected to the respective control terminals of the second memory cell and the second switch.

5,414,659

# **SEMICONDUCTOR MEMORY DEVICE HAVING ADDRESS TRANSITION DETECTOR QUICKLY ENABLING REDUNDANCY DECODER**

Munehiro Ito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

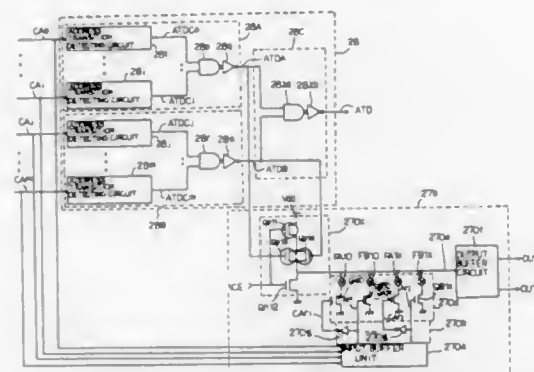
Filed Sep. 20, 1993, Ser. No. 123,258

Claims priority, application Japan, Sep. 24, 1992, 4-255058

Int. Cl.<sup>6</sup> G11C 29/00

U.S. Cl. 365—200

4 Claims



1. A semiconductor memory device comprising:

a) a plurality of regular memory cells arranged in a plurality of addressable regular memory cell groups;

b) at least one redundant memory cell group with which one of said plurality of addressable regular memory cell groups is replaced;

c) a regular addressing system associated with said plurality of addressable regular memory cell groups, and responsive to address signals indicative of an address assigned to one of said addressable regular memory cell groups for allowing an external device to access data information stored therein;

d) an address transition detecting unit having

d-1) a plurality of address transition detecting sub-units supplied with said address signals, and operative to check said address signals to see whether or not at least one address signal changes the logic level for producing respective output signals each indicative of a change of said at least one address bit or not, and

d-2) a logic unit having a plurality of input nodes respectively coupled with said plurality of address transition detecting sub-units, and producing an address transition signal from said output signals; and

e) a redundancy unit associated with said redundant memory cell group, and having

e-1) a decoding line,

e-2) a precharging circuit having a plurality of charging transistors coupled in parallel between a source of current and said decoding line, said plurality of charging transistors being gated by said output signals of said plurality of address transition detecting sub-units, respectively,

e-3) a memory and decoding circuit storing the address of one of said plurality of addressable regular memory cell groups replaced with said at least one redundant mem-

ory cell group, and comparing the address indicated by said address signals with said address stored therein to see whether or not said addresses are inconsistent with one another for determining to provide a current path between said decoding line and a constant voltage line or not, and

e-4) a means coupled with said decoding line, and allowing said at least one redundant memory cell group to be accessible instead of said one of said plurality of addressable regular memory cell groups when said decoding line is electrically isolated from said constant voltage line, said means being further operative to keep said at least one redundant memory cell group non-accessible when said decoding line is coupled through said current path with said constant voltage line.

5,414,661

# **SEMICONDUCTOR MEMORY DEVICE**

Makoto Ihara, Sakurai, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

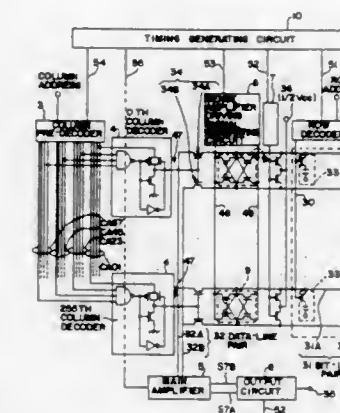
Filed Sep. 3, 1993, Ser. No. 117,252

Claims priority, application Japan, Sep. 8, 1992, 4-239814

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—203

6 Claims



5,414,660

# **DOUBLE WORD LINE TYPE DYNAMIC RAM HAVING REDUNDANT SUB-ARRAY OF CELLS**

Tadahiko Sugibayashi, Isao Naritake, and Tatsuya Matano, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

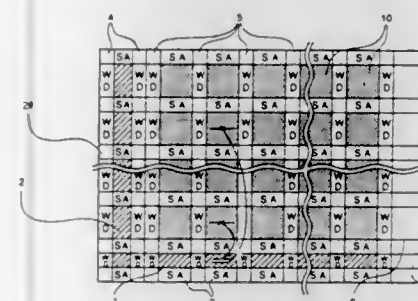
Filed Sep. 30, 1993, Ser. No. 129,854

Claims priority, application Japan, Oct. 1, 1992, 4-263348

Int. Cl.<sup>6</sup> G11C 29/00

U.S. Cl. 365—200

2 Claims



1. A double word line type dynamic RAM comprising:

a plurality of regular sub-arrays each including a number of regular memory cells, said regular sub-arrays being arranged in the form of a matrix in such a manner that, the regular sub-arrays and word driver arrays for the regular sub-arrays are alternately located in a row direction, and the regular sub-arrays and sense amplifier arrays for the regular sub-arrays are alternately located in a column direction;

a main word decoder located along a column direction at the outside of the word driver array located at one side end in the row direction of said word driver arrays; and

a row redundant sub-array positioned at the outside of the sense amplifier array located at one side end in the column direction of said sense amplifier arrays;

a redundant sense amplifier array located at the outside of said row redundant sub-array, and including a plurality of pairs of redundant complementary main word lines of the number remarkably smaller than the number of complementary main word lines contained in said regular sub-array, so that the size of said redundant sub-array is correspondingly remarkably smaller than the size of said regular sub-array.

5,414,662

# **DYNAMIC RANDOM ACCESS MEMORY USING IMPERFECT ISOLATING TRANSISTORS**

Richard C. Foss, Kirkcaldy Fife, Scotland; Peter B. Gillingham, Kanata; Robert Harland, Carp, both of Canada; Masami Mitsuhashi, Gunma, and Atsushi Wada, Aichi, both of Japan, assignors to Mosaid Technologies Incorporated, Kanata, Canada

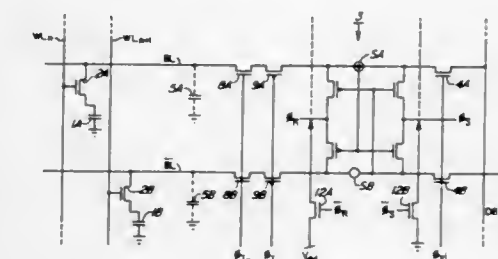
Continuation of Ser. No. 680,747, Apr. 5, 1991, abandoned. This application Nov. 4, 1993, Ser. No. 147,038

Claims priority, application United Kingdom, Apr. 6, 1990, 9007789; Apr. 5, 1991, 9107164

Int. Cl.<sup>6</sup> G11C 7/02

U.S. Cl. 365—203

17 Claims



1. A dynamic random access memory (DRAM) comprising:  
(a) a plurality of bit storage capacitors,



- (b) a folded bit line comprised of a complementary bit line pair for receiving charge stored on one of said capacitors, having bit line capacitance;
- (c) a sense amplifier having a pair of sense nodes for sensing a voltage differential across said sense nodes;
- (d) high resistance controllable current leakage imperfect isolating means connecting said bit line to said sense nodes for receiving an enabling voltage for causing current leakage therethrough between said sense nodes and the bit line while maintaining high resistance;
- (e) means for applying said enabling voltage for causing effective current to leak through the imperfect isolating means;
- (f) means for enabling said sense amplifier and establishing full predetermined logic levels across said sense nodes;
- (g) means for disabling said imperfect isolating means and thereby removing isolation between said sense nodes and the bit line;
- whereby current passing through the sense amplifier to said sense nodes is enabled to charge said bit line capacitance through said imperfect isolating means to a predetermined logic voltage level.

5,414,663

# VLSI MEMORY WITH AN IMPROVED SENSE AMPLIFIER WITH DUMMY BIT LINES FOR MODELING ADDRESSABLE BIT LINES

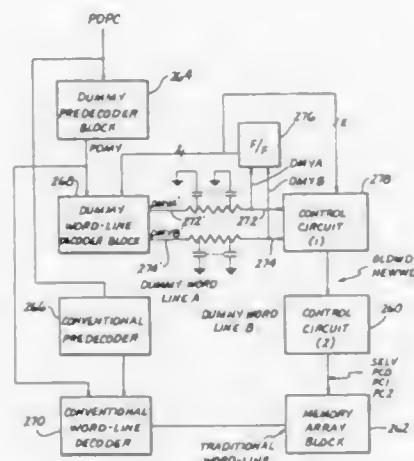
James A. Komarek, Balboa Beach; Scott B. Tanner, Irvine; Clarence W. Padgett, Westminster, and Jack L. Minney, Irvine, all of Calif., assignors to Creative Integrated Systems, Inc., Santa Ana, Calif.

Division of Ser. No. 912,112, Jul. 9, 1992, Pat. No. 5,241,497. This application Jun. 3, 1993, Ser. No. 71,892

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—210

23 Claims



3. A memory circuit comprising:

- a plurality of word lines;
- a memory block comprising a plurality of addressable memory cells coupled to said word lines;
- a control circuit coupled to said memory block for producing a plurality of precharge and control signals for reading said memory block;
- a word line decoder coupled to said memory block for providing address signals to said memory block;
- a dummy word line decoder for generating simulative address signals;
- a first and second dummy word line electrically simulative to word lines within said memory, block one of said dummy word lines modeling a previously selected word line within said memory block and the other one of said dummy word lines modeling a newly selected word line within said memory block;
- means for alternately designating to said dummy word line

decoder which of said first and second dummy word lines models a previously selected word line and a newly selected word line, said means being coupled to said first and second dummy word lines; and

transition control means coupled to said first and second dummy word lines for determining the transitional time when said dummy word lines have set up a complete and valid address, said transition control means being coupled to said control circuit to initiate operation of said control circuit allowing reading of said memory block by said word line decoder depending upon said transition completion as determined by said transition control means,

wherein precharge, timing and control signals generated by said control circuit are initiated by said control circuit in response to determinations made by said transition control means as individualized to said memory circuit according to actual observed transition points within said first and second dummy word lines.

5,414,664

# FLASH EPROM WITH BLOCK ERASE FLAGS FOR OVER-ERASE PROTECTION

Tien-Ler Lin, Cupertino; Ray L. Wan, Milpitas, both of Calif.; Ling-Wen Hsiao, Taipei, and Gilbert Sung, Ping-Chan City, both of Taiwan, Prov. of China, assignors to Macronix International Co., Ltd., Hsinchu, Taiwan, Prov. of China

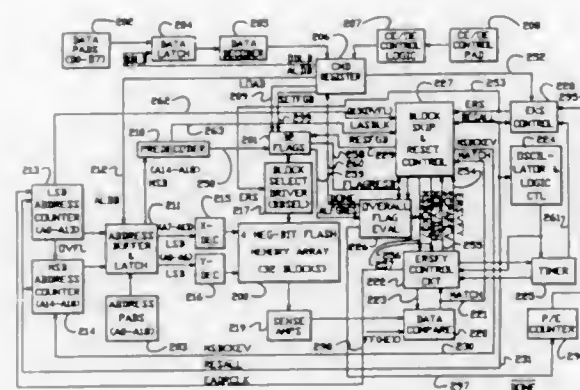
PCT No. PCT/US93/05146, § 371 Date Aug. 31, 1993, § 102(e) Date Aug. 31, 1993

PCT Filed May 28, 1993, Ser. No. 108,662

Int. Cl.<sup>6</sup> G11C 7/00, 16/00

U.S. Cl. 365—218

12 Claims



1. An apparatus for storing data, comprising: a memory array including a plurality of blocks of FLASH EPROM memory cells;
- energizing power supply circuits, coupled with the memory array, to apply energizing voltages to the plurality of blocks of memory cells to read and program addressed memory cells in the memory array and to erase at least a block of the memory array;
- erase verify logic, coupled with the memory array, to separately verify erasure of blocks in the plurality of blocks of memory cells; and
- control circuits, coupled to the energizing power supply circuits and the erase verify logic to control the energizing power supply circuits to re-erase blocks which fail erase verify and wherein: the control circuits further include a plurality of block erase flags corresponding to respective blocks in the plurality of blocks of memory cells; and the erase verify logic further includes logic to control the plurality of block erase flags to indicate blocks to be re-erased and a circuit responsive to the plurality of block erase flags to verify erasure of blocks indicated by the block erase flags.

# 5,414,665 METHOD OF ERASING DATA STORED IN ELECTRICALLY ERASABLE AND PROGRAMMABLE READ ONLY MEMORY DEVICE WITHOUT DETERIORATION OF CHARACTERISTICS

Noriaki Kodama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

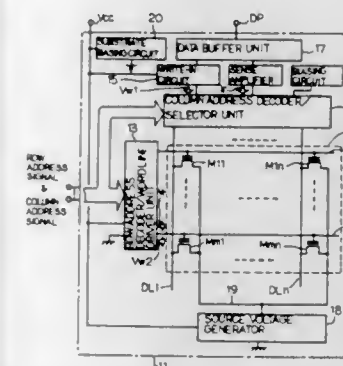
Filed Apr. 5, 1994, Ser. No. 222,917

Claims priority, application Japan, Apr. 5, 1993, 5-077303

Int. Cl.<sup>6</sup> G11C 11/40

U.S. Cl. 365—218

10 Claims



10. A method of erasing a data bit stored in a floating gate type field effect transistor having an n-type source region formed in a p-type semiconductor layer, an n-type drain region formed in said p-type semiconductor layer and spaced from said source region, a first gate insulating film covering a channel region between said n-type source region and said n-type drain region, a floating gate electrode on said first gate insulating film and a control gate electrode over said floating gate electrode and electrically isolated therefrom, comprising the steps of:

- a) biasing said n-type source region, said n-type drain region, said control gate electrode and said p-type semiconductor layer to a first positive voltage level, a ground voltage level, the ground voltage level and the ground voltage level, respectively, for evacuating electrons accumulated in said floating gate electrode as a Fowler-Nordheim tunneling current;
- b) biasing said p-type semiconductor layer, said control gate electrode, said n-type source region and said n-type drain region to a negative voltage level, a second positive voltage level, a third positive voltage level, and the ground voltage level, respectively for producing electron-hole pairs around the p-n junction between said n-type source region and said p-type semiconductor layer, electrons of said electron-hole pairs being accelerated for injecting into said floating gate electrode for calibrating a threshold of said floating gate type field effect transistor, holes of said electron-hole pairs flowing into said p-type semiconductor layer, the amount of electrons injected into said floating gate electrode being dependent on the amount of electrons left in said floating gate electrode in said step a).

5,414,666

# MEMORY CONTROL DEVICE

Ryohei Kumagai, and Weikang Yang, both of Tokyo, Japan, assignors to Ezel Inc., Tokyo, Japan

Filed Jul. 30, 1992, Ser. No. 921,110

Claims priority, application Japan, Jul. 31, 1991, 3-214805

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—222

22 Claims

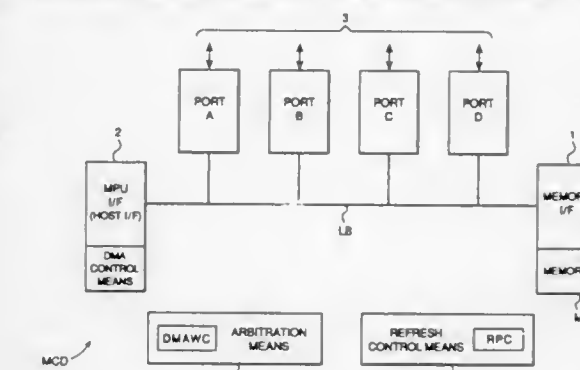
1. A memory control device for controlling a dynamic memory that has a local bus, comprising:

- a memory interface, connected to said memory and to at least one external device, for controlling access to said memory so that all communication with said memory is provided through said memory interface;

a plurality of input and output ports coupled to said memory through said memory interface and the local bus;

refresh control means coupled to said memory through said memory interface for refreshing said memory;

arbitration means, connected to said memory interface, said



input and output ports and said refresh control means, for arbitrating memory access requests from said refresh control means and said input and output ports on the basis of an access priority; and

means for adjusting the access priority of said refresh control means.

5,414,667

Patent Not Issued For This Number

5,414,668

# SEMICONDUCTOR MEMORY DEVICE

Katsuya Nakashima, and Hisanobu Tsukazaki, both of Nagasaki, Japan, assignors to Sony Corporation, Tokyo, Japan

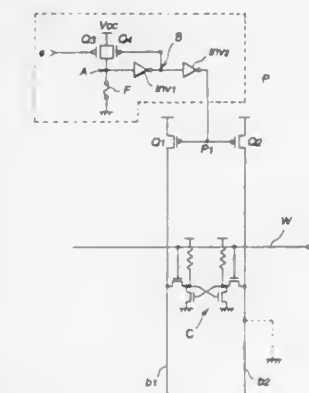
Filed Dec. 23, 1993, Ser. No. 172,400

Claims priority, application Japan, Dec. 25, 1992, 4-345779

Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—225.7

5 Claims



1. A memory device comprising:

- a memory cell for storing data;
- at least one bit line connected to said memory cell;
- switching means normally held in a first condition connecting said bit line to a voltage source, said switching means being in a second condition disconnecting said bit line from said voltage source in the presence of a control signal;
- program means for producing the control signal to change said switching means from the first condition to the second condition when said bit line has a leakage trouble, said program means incorporating a fuse connected between a fuse node and ground, and at least one inverter to produce said control signal and having all input connected to said fuse node.

5,414,669

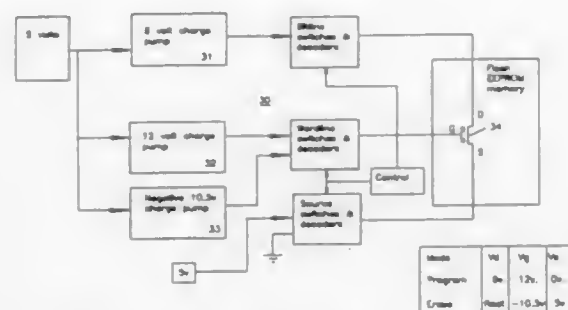
# METHOD AND APPARATUS FOR PROGRAMMING AND ERASING FLASH EEPROM MEMORY ARRAYS UTILIZING A CHARGE PUMP CIRCUIT

Kerry D. Tedrow, Orangevale; Robert E. Larsen, Shingle Springs; Chaitanya S. Rajguru, Folsom; Cesar Galindo, Stockton; Jahanshir J. Jayanifard, Sacramento, and Mase J. Taub, Elk Grove, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Sep. 10, 1993, Ser. No. 119,719  
Int. Cl.<sup>6</sup> G11C 13/00

U.S. Cl. 365—226

21 Claims



1. A computer system comprising:

a central processor;  
an output display;

a memory arrangement comprising

a flash EEPROM memory array including a plurality of floating gate field effect transistor devices,

a first charge pump for providing a first positive voltage to be applied to drain terminals of the floating gate field effect transistor devices during a programming operation,

a second charge pump for providing a second positive voltage to be applied to source terminals of the floating gate field effect transistor devices during an erasing operation,

and switching circuitry responsive to control signals indicating the existence of a program or an erase operation for connecting voltage from the first charge pump to the drain terminals, ground to the source terminals, and the voltage from the second charge pump to the gate terminals of the floating gate field effect transistor devices during a programming operation, and for disconnecting the voltage furnished by the first charge pump from the drain terminals, connecting ground to the gate terminals, and the voltage from the second charge pump to the source terminals of the floating gate field effect transistor devices during an erasing operation;

and

a system bus for transferring data and addresses between the central processor, the memory arrangement, and the output display.

5,414,670

# LOW POWER MEMORY ARRAY USING SELECTIVE DEVICE ACTIVATION

Scott Schaefer, 301 E. Fairbrook Way, Boise, Id. 83706  
Continuation of Ser. No. 608,125, Oct. 31, 1990, Pat. No. 5,257,233. This application Jan. 4, 1993, Ser. No. 66

Int. Cl.<sup>6</sup> G11C 8/00

U.S. Cl. 365—230.03

18 Claims

1. An array for storing bits of information, the array having a plurality of random access memory devices, and each memory device comprising:

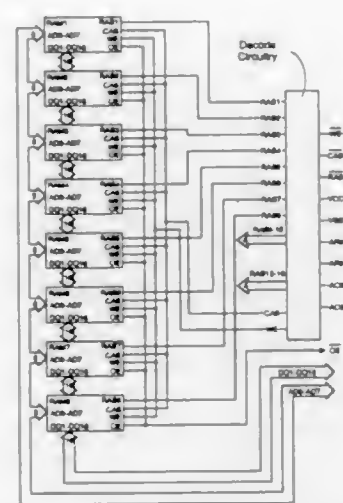
a) a plurality of subarrays, each subarray comprising a plurality of bits and one address for each of said bits such that

one address corresponds to one bit in each of said subarrays;

b) a plurality of data out lines, the number of said data out lines corresponding to the number of said subarrays within one of the memory devices;

c) a select line to select the memory device from the plurality of memory devices;

d) a power connection electrically coupled with the memory device; and



e) a ground connection electrically coupled with the memory device,

whereby each memory device can be independently accessed to read from and write to each of said subarrays in one of said memory devices wherein an access to one of said memory devices results in a significant increase in current used by said accessed memory device;

f) the array further comprising a memory device having one data out line for supplying a memory parity bit.

5,414,671

# SEMICONDUCTOR MEMORY DEVICE HAVING OPERATION CONTROL MEANS WITH DATA JUDGING FUNCTION

Katsumi Fukumoto, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

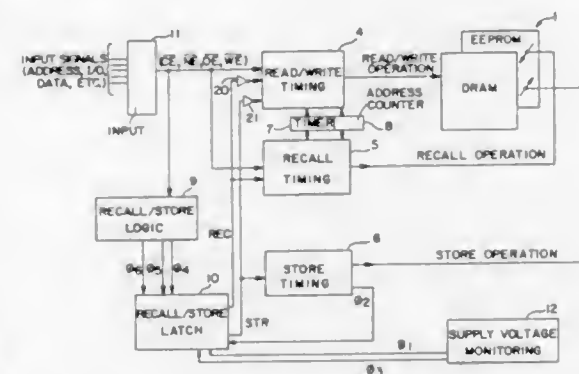
Filed Apr. 30, 1991, Ser. No. 694,289

Claims priority, application Japan, May 1, 1990, 2-116141; Jul. 30, 1990, 2-202958

Int. Cl.<sup>6</sup> G11C 17/00

U.S. Cl. 365—228

12 Claims



1. A semiconductor memory device comprising:

an array of memory cells, each of said memory cells comprising volatile memory means and nonvolatile memory means;

a port for receiving at least a chip enable signal, a nonvolatile enable signal, an output enable signal, and a write enable signal;

read/write means, operatively coupled to said memory cells and the port, for performing a read operation or a write operation on the volatile memory means;

recall means, operatively coupled to said memory cells and said port, for performing a recall operation on said memory cells;

store means, operatively coupled to said memory cells, for performing a store operation on said memory cells;

operation control means, operatively coupled to said port, said read/write means, said recall means and said store means, for generating first and second signals to said read/write, recall and store means on the basis of said chip enable signal, nonvolatile enable signal, output enable signal and write enable signal, said first signal, supplied to said recall means directly and supplied to said read/write means through inverting means for inverting the logic level of a signal, and being indicative of the disabling of said read/write means and said store means, the second signal, supplied to the store means directly and supplied to said read/write means through the inverting means, and being indicative of the disabling of said read/write means and said recall means;

said operation control means comprising logic means for judging a possibility that data stored in said volatile memory means is different from data stored in said nonvolatile memory means as a function of at least one of said chip enable signal, said non-volatile enable signal, said output enable signal and said write enable signal, and

wherein said operation control means supplies said second signal to said store means to initiate said store operation only after said logic means judges said possibility to exist.

5,414,672

# SEMICONDUCTOR MEMORY DEVICE INCLUDING ADDRESS TRANSITION DETECTOR

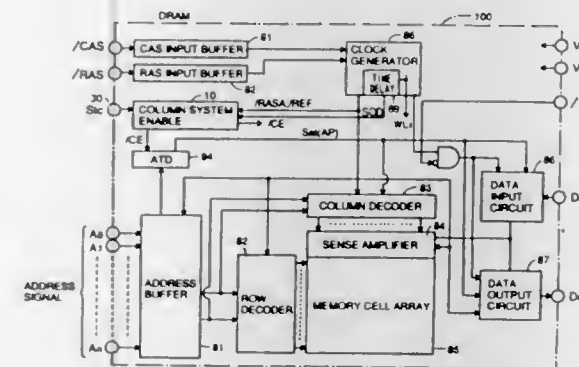
Yuko Ozeki, and Yoshio Fudeyasu, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 27, 1993, Ser. No. 126,763

Claims priority, application Japan, Oct. 7, 1992, 4-268745  
Int. Cl.<sup>6</sup> G11C 7/00

U.S. Cl. 365—233.5

8 Claims



1. A semiconductor memory device, comprising:

a memory cell array including a plurality of memory cells arranged in rows and columns;  
sense amplifier means for amplifying data signals stored in said memory cells;

means for generating a termination signal indicating a predetermined end of a sense operation by said sense amplifier means;

address transition detector means for detecting transition of an externally applied address signal;

activating means responsive to the termination signal for activating said address transition detector means; and  
timing control means responsive to an externally applied timing control signal for delaying an activation timing by said activating means of said address transition detector means later than a timing defined by said termination signal.

5,414,673

# SONIC MEASUREMENT WHILE DRILLING

Serge A. Scherbatskoy, 3921 Clayton Rd. E., Fort Worth, Tex. 76116

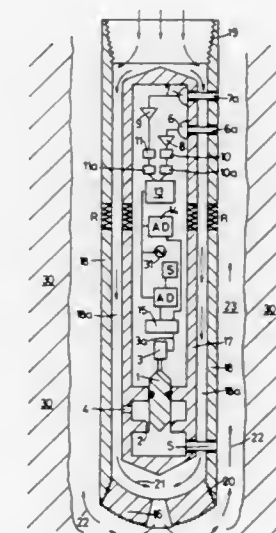
Filed Nov. 4, 1992, Ser. No. 971,312

Claims priority, application United Kingdom, Apr. 21, 1992, 9208524

Int. Cl.<sup>6</sup> G01V 1/40

U.S. Cl. 367—25

1 Claim



1. A system for measuring a characteristic of formations surrounding a drill hole during drilling operations using a fluid circulation system, said fluid circulation system comprising a drill string through which drilling fluid is forced to flow under pressure downwardly through said drill string from the earth's surface towards a downhole location near a lower end of said drill string, said circulation system also comprising an annulus surrounding said drill string from said downhole location to the earth's surface, said drilling fluid flowing upwardly through the annulus, said measuring system comprising:

a) a flow restriction at said downhole location and within said circulation system, said restriction establishing within said circulation system a fluid high pressure zone and a fluid low pressure zone; a channel for passing fluid between said zones;

b) downhole pressure pulse generator means comprising a valve in said channel and means for operating said valve and generating fluid pressure pulses within said circulation system, said generated fluid pressure pulses interacting with the formations adjacent said circulation system thereby producing formation pressure pulses within said formations;

c) downhole pressure pulse receiving means comprising two fluid pressure transducers in said annulus and spaced unequally from said downhole pressure pulse generator means, said fluid pressure transducers being responsive to said formation pressure pulses as they are returned from said formations to said drilling fluid;

d) said downhole pressure pulse receiving means also comprising means for combining the outputs of said two transducers and generating an output signal representative of



such combination, said output signal being representative of a characteristic of said formations; and  
 e) said output signal being provided to an input of said means for operating said valve, wherein said output signal is telemetered to the surface by way of said circulation system.

5,414,674

# RESONANT ENERGY ANALYSIS METHOD AND APPARATUS FOR SEISMIC DATA

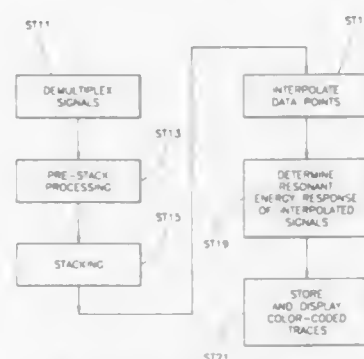
Eugene Lichman, Houston, Tex., assignor to Discovery Bay Company, Houston, Tex.

Filed Nov. 12, 1993, Ser. No. 150,480

Int. Cl.<sup>6</sup> G01V 1/30

U.S. Cl. 367-49

12 Claims



1. A method of locating high-density hydrocarbon deposits, comprising the steps of:

- obtaining analog signals representative of seismic information;
- converting said analog signals to digital signals;
- interpolating points along one of said digital signals within a predetermined time window;
- conducting a resonant energy analysis of the digital signal within said predetermined time window, said analysis comprising forming a plot of said digital signal in the quefrency domain, separating said plot into resonant and non-resonant portions, and determining a ratio of the area under the resonant portion to the area under the non-resonant portion;
- repeating steps c and d for each of said digital signals; and
- locating high-density hydrocarbon deposits by choosing areas having a high value of said ratio.

5,414,675

# SONAR SYSTEM FOR DETECTION OF NEAR BOTTOM TARGETS

Kenneth P. Geohagan, Jr., Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jul. 15, 1985, Ser. No. 755,117

Int. Cl.<sup>6</sup> G01S 9/66, 15/89

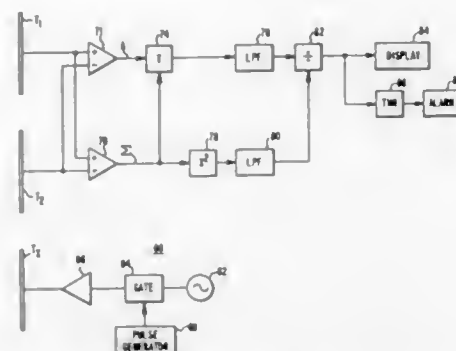
U.S. Cl. 367-88

6 Claims

1. Apparatus for detecting targets on or above the bed of a body of water, comprising:

- an acoustic transmitter means operable to periodically project a pulse of acoustic energy toward a target area of said bed;
- first and second receiver transducers positioned to receive acoustic energy reflected back from said target area, as a result of said projection, and operable in response thereto to provide corresponding respective first and second output signals;
- circuit means for deriving, from said first and second output signals, respective sum and difference signals;

D) means for phase detecting said sum and difference signals; and



E) means responsive to said phase detection for providing an output signal indicative of the presence of a possible target.

5,414,676

# SONAR ARRAY WITH REDUCED GRATING LOBES

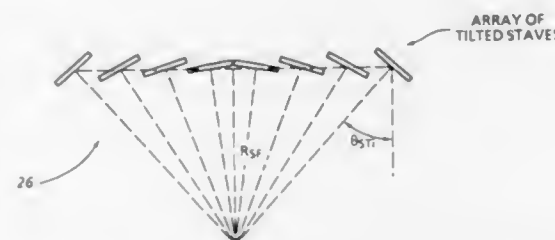
William J. Zehner, Lynnhaven, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 16, 1994, Ser. No. 213,962

Int. Cl.<sup>6</sup> G01S 15/08

U.S. Cl. 367-103

2 Claims



1. Apparatus for reducing the radiation level of grating lobes relative to the level of the main lobe in a multi-element antenna array used to transmit and receive radiation signals comprising an array of stave elements which are tilted at a predetermined angle with respect to the main response axis, each of the stave elements having a signal output, and means for electronically focussing the antenna array by providing a predetermined phase shift to each of the individual stave element signal outputs, wherein the predetermined phase shift is defined as follows:

$$\phi_i = 2\pi f_0 T_i$$

where

$f_0$  = sonar operating frequency, and

$$T_i = \frac{\delta_i}{c} \quad \text{where}$$

$c$  = sound velocity,

$$\delta_i = K - \sqrt{R_f^2 + \left[ i - \left( \frac{N-1}{2} \right) \right]^2 d^2}$$

$R_f$  = desired focal distance,  
 $i$  = stave number = 1, 2, 3, ..., N.

-continued

$$K = \sqrt{R_f^2 + \left( \frac{N-1}{2} \right)^2 d^2}$$

and  $d$  = spacing between stave elements.

5,414,677

# GROUND MOVEMENT SENSOR

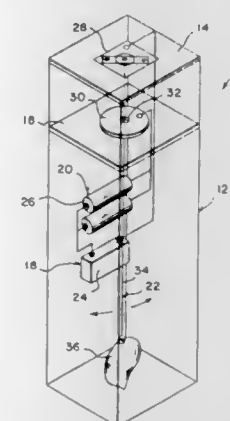
Lloyd C. Feagin, Jr., R.R. 2, Box 365, Salters, S.C. 29590, and George Spector, 233 Broadway Rm 702, New York, N.Y. 10279

Filed Feb. 9, 1994, Ser. No. 194,168

Int. Cl.<sup>6</sup> G01V 1/16

U.S. Cl. 367-179

3 Claims



1. An earth movement sensor which comprises:

- a housing having a top shelf and an intermediate shelf;
- an electrically energizing signalling alarm carried in said housing;
- an electrical power source carried in said housing for said alarm;
- a pendulum operated switch suspended from the top shelf in said housing and operatively connected between said power source and said alarm to energize said alarm from said power source when there is earth movement; wherein said alarm is a buzzer that serves to warn of danger by emitting a sound; wherein said power source is a battery pack, wherein said pendulum operated switch includes:
- a positive metal plate mounted to the top shelf of said housing, said metal plate electrically connected to said alarm;
- a negative contact washer having an orifice mounted on the intermediate shelf of said housing and electrically connected to said power source;
- a steel wire suspended from said metal plate and extending through the orifice of said contact washer and
- a weight affixed to a lower end of said steel wire, so that when said weight swings, said steel wire will engage with said contact washer to close a circuit to activate said alarm; further including means for raising and lowering the intermediate shelf of said housing, to adjust the sensitivity of the contact made between the movement of said steel wire within the orifice in said contact washer.

5,414,678

# MAGNETO-OPTIC RECORDING MEDIUM HAVING TWO RECORDING LAYERS, AND DRIVE FOR SAME

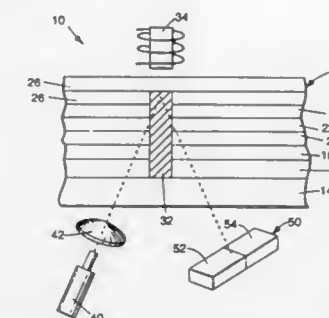
William A. Challener, IV, Grant Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 2, 1994, Ser. No. 300,311

Int. Cl.<sup>6</sup> G11B 13/04

U.S. Cl. 369-13

13 Claims



1. A magneto-optic recording medium, comprising, in order: a substrate;

- a first magneto-optic layer characterized by a first Curie temperature,  $T_{c1}$ ;
- a second magneto-optic layer characterized by a second Curie temperature,  $T_{c2}$ , wherein  $|T_{c2} - T_{c1}| > 30^\circ \text{C.}$ ; such that the magneto-optic layers exist in one of two magnetic states as follows:
  - a first magnetic state wherein the magneto-optic layers are magnetized in the same direction, the first state characterized by a first magneto-optic rotation,  $\theta_1$ , a first magneto-optic ellipticity,  $\epsilon_1$ , and a first phase shift,  $\phi_1$ , wherein  $\phi_1 = \tan^{-1}(\epsilon_1/\theta_1)$ ; and
  - a second magnetic state wherein the magneto-optic layers are magnetized in opposite directions, the second state characterized by a second magneto-optic rotation,  $\theta_2$ , a second magneto-optic ellipticity,  $\epsilon_2$ , and a second phase shift,  $\phi_2$ , wherein  $\phi_2 = \tan^{-1}(\epsilon_2/\theta_2)$  wherein  $85^\circ < |\phi_2 - \phi_1| < 95^\circ$ .

5,414,679

# DISC PLAYER HAVING A TRANSPORTING DEVICE FOR MOVING A DISC AND DISC HOLDER

Wilhelm Menke, Ingelheim, Germany, assignor to NSM Aktiengesellschaft, Bingen, Germany

PCT No. PCT/DE92/00027, § 371 Date Jul. 22, 1993, § 102(e) Date Jul. 22, 1993, PCT Pub. No. WO93/13343, PCT Pub. Date Aug. 6, 1992

PCT Filed Jan. 16, 1992, Ser. No. 94,014

Claims priority, application Germany, Jan. 22, 1991, 41 01 693.9

Int. Cl.<sup>6</sup> G11B 17/22, 17/08, 33/02

U.S. Cl. 369-36

16 Claims

15. A disc player, comprising:

- a playback unit including a turntable having a driveshaft;
- at least one disc storage magazine having a plurality of storage compartments arranged in a stack and a plurality of superposed disc holders stored therein, each disc holder accommodating one disc; and
- a transporting device movable in a direction of the stack for moving a desired disc and respective disc holder back and forth between said storage compartment and said playback unit, and including:
  - a horizontally displaceable extraction device for extracting the respective disc holders from said magazine, comprising:
    - a reciprocating carriage;
    - a retractable gripping arm mounted to said carriage and being extendable for engaging with a recess in the respective disc holder;

U.S. Cl. 369—47 6 Claims

1. A determination method for determining whether or not a disk, positioned for playback in a CD player, is a partially recorded CD in which recording or formatting have not been finalized, said method comprising the steps of:

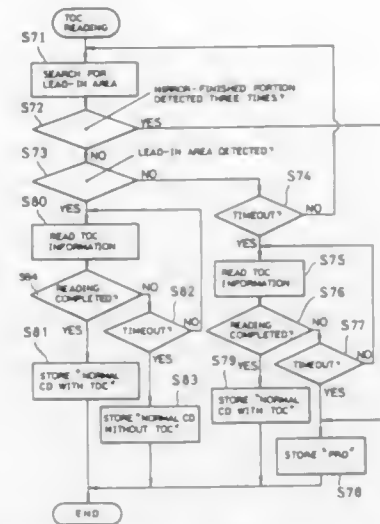
searching for a lead-in area of the disk using a pickup of the CD player to scan across a surface of the disk a predetermined number of times;

in response to said searching step, interpreting a predetermined number of runaways of a servo system of the CD

UMI



player as an affirmative detection of a mirror-finished portion of the disk; and

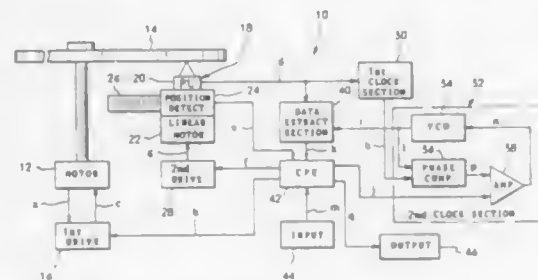


determining from the affirmative detection of the mirror-finished portion that the disk is a partially-recorded CD.

5,414,685  
DISK PLAYER WITH CONSTANT ANGULAR VELOCITY  
Hidetoshi Shimizu, Ueda, Japan, assignor to Shinano Kensi  
Kabushiki Kaisha, Nagano, Japan  
Filed Oct. 4, 1993, Ser. No. 130,790  
Claims priority, application Japan, Jul. 14, 1993, 5-174222  
Int. Cl.<sup>6</sup> G11B 7/00

U.S. Cl. 369—48

## 8 Claims



1. A disk player, comprising:

- a motor for rotating a disk;
- an optical pick-up for reading recorded data including synchronizing signals and output-data elements recorded on said disk, and outputting them as first signals, said optical pick-up being capable of moving in the radial direction of a disk driven by said motor;
- a first clock section for extracting the synchronizing signals from the first signals and generating first clock signals, whose frequency is equal to the frequency of the synchronizing signals;
- a second clock section for generating second clock signals and coinciding the frequency and the phase of the second clock signals with the frequency and the phase of the first clock signals;
- said second clock section being a phase lock circuit including a voltage controlled oscillator for outputting the second clock signals, a phase comparing section for comparing the phase of the second clock signals with the phase of the first clock signals, said phase comparing section outputting phase difference signals whose voltage level corresponds to the phase difference between the first clock signals and the second clock signals, and a control signal generating section for generating control voltage, which

is capable of making the phase difference zero, on the basis of voltage level of the phase difference signals and voltage level corresponding to predetermined initial frequency of said voltage controlled oscillator and inputting the control voltage to said voltage controlled oscillator;

a data extracting section for extracting the output-data elements in the first signals on the basis of the second clock signals and outputting them as second signals; and

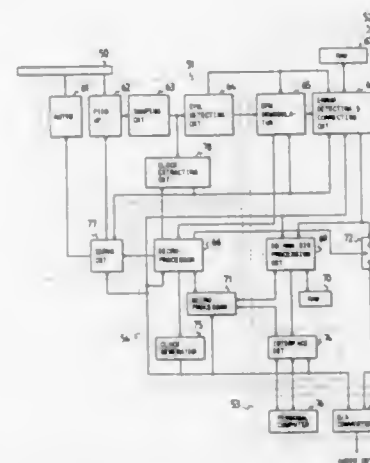
a processing section for rotating said motor at a fixed rotational speed.

5,414,686  
DATA PLAYBACK APPARATUS FOR REALIZING HIGH  
TRANSFER RATE  
Hiroyuki Iitsuka, Osaka, Japan, assignor to Matsushita Electric  
Industrial Co., Ltd., Osaka, Japan  
Division of Ser. No. 964,469, Oct. 21, 1992, Pat. No. 5,313,343,  
which is a continuation of Ser. No. 648,109, Jan. 31, 1991,  
abandoned. This application Jan. 25, 1994, Ser. No. 186,079  
Claims priority, application Japan, Feb. 1, 1990, 2-22432; Feb.  
1, 1990, 2-22433

U.S. Cl. 369—48

Int. Cl.<sup>6</sup> G11B 7/00

## 5 Claims

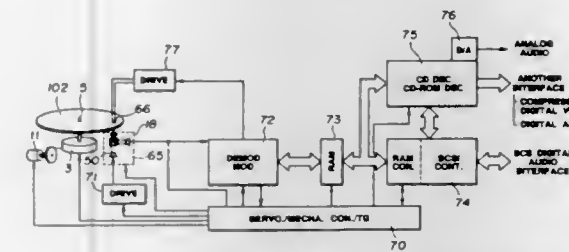


1. A data playback apparatus for reproduction of data information and control information recorded in a recording medium, said data information comprising real-time data which is dependent on time to be read out from said recording medium with a predetermined data rate and non-real-time data which is not dependent on time, and said control information being indicative of whether said data information is said real-time data or said non-real time data, said apparatus comprising:

- reproduction means for reproducing said data information and said control information from said recording medium so as to output a reproduction signal containing said data information and said control information;
- separation means coupled to said reproduction means so as to be responsive to said reproduction signal from said reproduction means to separately output said control information and said data information;
- processing and outputting means coupled to said separation means for processing and outputting said data information outputted from said separation means; and
- control means coupled to said reproduction means to control said reproduction means, said control means being coupled to said separation means to be responsive to said control information from said separation means so as to make a determination, on the basis of said control information, as to whether said data information to be reproduced from said recording medium is said real-time data or said non-real-time data, when said data information is said non-real-time data, said control means controlling said reproduction means so that said data information is repro-

duced at a higher speed as compared with when said data information is said real-time data.

5,414,687  
DISC RECORDING/REPRODUCING APPARATUS  
Kiyoshi Ohmori, Kanagawa; Tetsu Watanabe, Tokyo; Katsuhiko  
Seo, Tokyo, and Junichi Kudo, Tokyo, all of Japan, assignors  
to Sony Corporation, Tokyo, Japan  
Division of Ser. No. 889,494, May 27, 1992, abandoned. This  
application Nov. 10, 1993, Ser. No. 150,402  
Claims priority, application Japan, May 28, 1991, 3-152416  
Int. Cl.<sup>6</sup> G11B 7/00  
U.S. Cl. 369—50 1 Claim



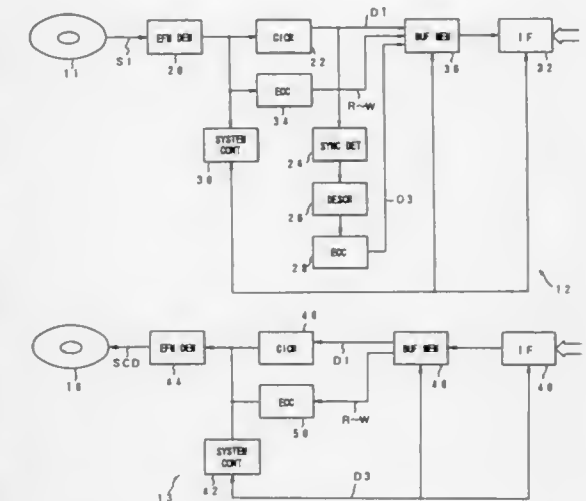
1. A magneto-optical disc recording and reproducing apparatus comprising:

- an outer casing including at least a lower chassis;
- rotational driving means within the outer casing for driving a magneto-optical disc at a substantially constant angular velocity, the disc being housed within a disc cartridge and having a substrate and a signal recording region formed on the substrate, the signal recording region containing a plurality of concentric signal recording zones located at increasing radial distances from the center of the disc, each signal recording zone having a substantially equal line recording density and containing servo clock signals encoded such that linear distances between the servo clock signals along circular tracks of the disc increase as the radial distance of each track from the center of the disc increases, whereby the servo clock signals recorded at different radial distances from the center of the disc are reproduced at a substantially constant frequency;
- optical means for radiating a light beam onto the disc and for receiving light returning from the disc;
- magnetic head means for applying a magnetic field onto the disc when recording information signals on the disc;
- magnetic head support means for supporting the magnetic head means, the magnetic head support means being attached to the optical means so that the magnetic head means move in unison with the optical means;
- loading means for loading the disc cartridge into the disc recording and reproducing apparatus, and for unloading the disc cartridge from the disc recording and reproducing apparatus; and
- controlling means for controlling the rotational driving means, the optical means, and the magnetic head means, the controlling means modifying the servo clock signals to form a plurality of channel clock signals for reproducing and recording signals in the signal recording zones, each signal recording zone having one corresponding channel clock signal such that the frequencies of the channel clock signals of the signal recording zones located at larger radial distances from the center of the disc are higher than the frequencies of the channel clock signals of signal recording zones located at smaller radial distances from the center of the disc.

5,414,688  
DISK REPLICATION APPARATUS  
Tatsuya Inokuchi, c/o Sony Corporation 7-35, Kitashinagawa  
6-chome, Shinagawa-ku, Tokyo, Japan  
Filed Sep. 29, 1993, Ser. No. 128,878  
Claims priority, application Japan, Sep. 30, 1992, 4-285462  
Int. Cl.<sup>6</sup> G11B 7/00  
U.S. Cl. 369—84  
5 Claims

U.S. Cl. 369—84

## 5 Claims



1. A disk replication apparatus, comprising:

- a reproduction unit for reproducing an original optical disk and sequentially outputting reproduced data, the original optical disc including a program region;
- a recording signal generation unit for sequentially converting said reproduced data into a recording signal;
- a control unit for controlling said reproduction unit and said reproducing signal generation unit;

the reproducing unit having an EFM demodulator for demodulating a reproduction signal obtained from the program region of the original optical disk and for producing a reproduction subcode and main data; and

- an error correction means for generating a reproduction data by correcting the error of the main data;
- said recording signal generation unit including a subcode generation means, a correction code generation means, and an EFM modulation means, the subcode generation means generating a subcode in accordance with subcode generation data input through a predetermined input means by using a timing of the reproduction subcode as a reference, the timing of the reproduction being generated by the recording signal generation unit, the correction code generation means generating an error correction code of the reproduction data, and the EFM modulation means synthesizing the reproduction data, the error correction code of the reproduction data and the subcode and EFM modulating the reproduction data, the error correction code of the reproduction data and the subcode to generate the recording signal.

5,414,689

# OPTICAL INFORMATION RECORDING/REPRODUCING APPARATUS USING PIT EDGE RECORDING SYSTEM

Takeshi Maeda, Kokubunji; Shinichi Arai, Odawara; Kazuo Isaka, Odawara; Atsushi Saito, Ichikawa; Takuya Mizokami, Odawara; Hisataka Sugiyama, Kodaira, and Satoshi Kawamura, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

PCT No. PCT/JP91/00697, § 371 Date Jan. 27, 1992, § 102(e) Date Jan. 27, 1992, PCT Pub. No. WO91/19290, PCT Pub. Date Dec. 12, 1991

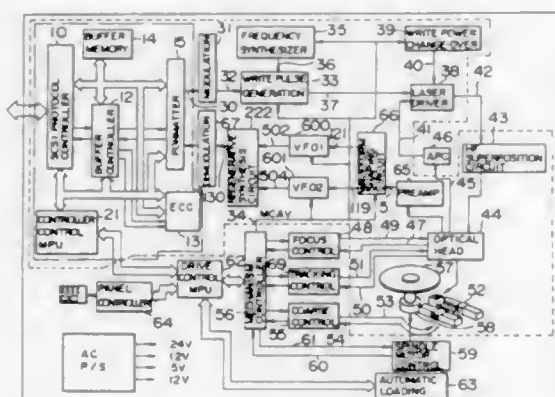
PCT Filed May 24, 1991, Ser. No. 820,593

Claims priority, application Japan, May 25, 1990, 2-133819; May 25, 1990, 2-133820; Aug. 31, 1990, 2-228128

Int. Cl. G11B 7/00

U.S. Cl. 369-116

81 Claims



1. An information recording and reproducing apparatus comprising:

- rotating means for rotating a recording medium at an approximately constant angular velocity, the recording medium being a disk and being divided into a plurality of zones each including a plurality of concentric tracks;
- selecting means for selecting one of the zones in which code information is to be recorded;
- modulating means for modulating the code information to form modulated code information, the modulated code information having a bit rate;
- bit rate changing means for changing the bit rate of the modulated code information in accordance with the selected zone;
- recording means for recording the modulated code information on the recording medium by forming localized recording regions in the recording medium having edges corresponding to the modulated code information, the localized recording regions having a physical property which is different from a physical property of unrecorded regions of the recording medium; and
- characteristic changing means for changing a recording characteristic of the apparatus and a reproducing characteristic of the apparatus in accordance with the selected zone;
- wherein the modulated code information includes pulses; and
- wherein the characteristic changing means includes means for changing pulse widths of the pulses such that the edges of the localized recording regions are formed at constant positions irrespective of the selected zone.

5,414,690

# MOVING APPARATUS, A MOVING METHOD AND AN INFORMATION DETECTION AND/OR INPUT APPARATUS USING THE SAME

Shun-Ichi Shido, Yokohama; Toshihiko Miyazaki, Hiratsuka; Kunihiko Sakai, Isehara, and Takahiro Oguchi, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

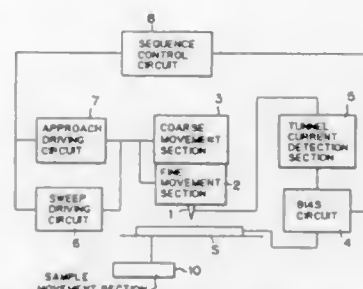
Continuation of Ser. No. 826,411, Jan. 27, 1992, abandoned. This application Oct. 24, 1994, Ser. No. 328,391

Claims priority, application Japan, Jan. 29, 1991, 3-029349; Jan. 29, 1991, 3-029350

Int. Cl. H01J 37/26

U.S. Cl. 369-126

13 Claims



1. An apparatus for moving a probe relative to a predetermined object to cause a physical phenomenon to occur between said probe and said object, and to cause said probe to approach said object, said apparatus comprising:

- a first actuator for coarsely moving at least one of said probe and said object relative to the other in a predetermined direction to bring said probe and said object close to each other;
- a second actuator for vibrating at least one of said probe and said object to displace one relative to the other in a direction parallel to a surface of said object;
- a detection section for detecting a physical phenomenon occurring between said probe and said object and for producing a detection output; and
- a control section for controlling said second actuator to vibrate at least one of said probe and said object relative to the other in the direction parallel to the surface of said object, and for controlling said first actuator to control the approach of said probe relative to said object on the basis of the detection output by said detection section during the vibrating by said second actuator.

5,414,691

# OPTICAL DISK, METHOD OF MANUFACTURING THE SAME AND METHOD OF RECORDING THE SAME

Kunihiko Shimada; Shuichi Yanagisawa, and Satoru Tanaka, all of Tsurugashima, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 14, 1993, Ser. No. 165,932

Claims priority, application Japan, Dec. 16, 1992, 4-336393

Int. Cl. G03C 1/00; G11B 7/24

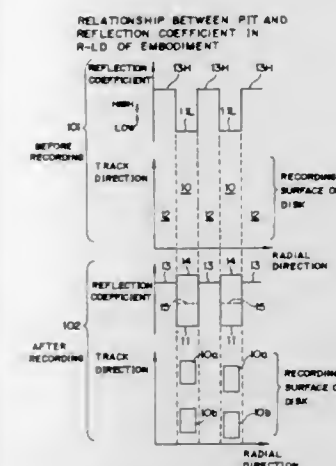
U.S. Cl. 369-275.2

5 Claims

1. A recordable optical disk, to which information can be recorded by irradiating a light beam by an optical disk player, comprising:

- a disk substrate having a recording surface;
- a track portion coaxially or spirally arranged on the recording surface, and made of material having a reflection coefficient that is increased by irradiating a light beam thereonto so that the information is recordable on the irradiated track portion by irradiating the light beam modulated in correspondence with the information; and
- an interval portion disposed on the recording surface be-

tween adjacent turns of the track portion on the recording surface, the interval portion having a reflection coefficient



higher than a reflection coefficient of the track portion in a condition before the information is recorded.

5,414,692

# OPTICAL INFORMATION RECORDING MEDIUM

Ikuo Aoki, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

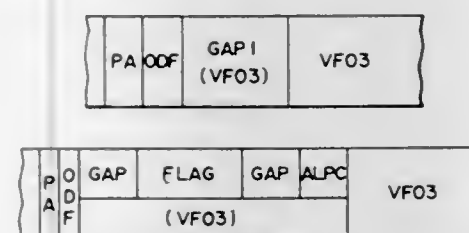
Filed May 3, 1993, Ser. No. 57,104

Claims priority, application Japan, May 8, 1992, 4-115963

Int. Cl. G11B 5/09

U.S. Cl. 369-275.3

4 Claims



1. An optical information recording medium in the form of a 130 mm ROM disk or a 130 mm magneto-optical recording disk including a partial ROM section, provided with a sector format which is preformatted in accordance with a mark edge recording method, wherein a specified data pattern is preformatted in part or all of areas GAP, FLAG, GAP, and ALPC.

5,414,693

# SELF-ALIGNED DUAL-BIT SPLIT GATE (DSG) FLASH EEPROM CELL

Yueh Y. Ma, Los Altos, and Kuo-Tung Chang, San Jose, both of Calif., assignors to Hyundai Electronics Industries Co., Ltd., Seoul, Rep. of Korea

Division of Ser. No. 134,779, Oct. 12, 1993, Pat. No. 5,364,806, which is a division of Ser. No. 751,499, Aug. 29, 1991, Pat. No. 5,278,439. This application Jul. 1, 1994, Ser. No. 269,972

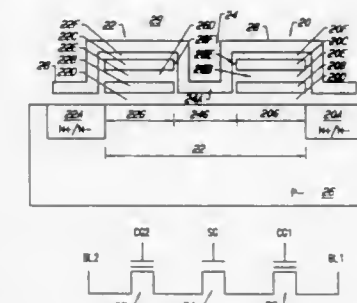
Int. Cl. E11C 11/40

U.S. Cl. 365-185

3 Claims

- 1. A flash EEPROM array comprising
- a plurality of dual-bit flash EEPROM cell structures arranged in rows and columns, each cell structure including first and second floating gate transistors separated by a select gate transistor,
- a plurality of bit lines interconnecting drains of floating gate transistors of cell structures aligned vertically,

a plurality of word lines interconnecting select gates of cell structures aligned horizontally, floating gates of said floating gate transistors being formed



from a first polysilicon layer, the control gates of all floating gate transistors being formed from a second polysilicon layer, and said word lines and said select gates being formed from a third polysilicon layer.

5,414,694

# ADDRESS TRACKING OVER REPEATER BASED NETWORKS

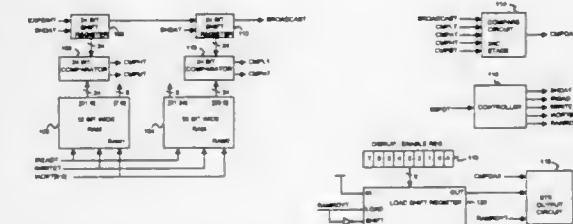
Ian S. Crayford, San Jose; William Lo, Santa Clara, and Nader Vije, Sunnyvale, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 19, 1993, Ser. No. 19,926

Int. Cl. H04B 3/36; H04L 25/20; H04J 3/14; G06F 11/00

U.S. Cl. 370-13.1

7 Claims



1. In a repeater, including a plurality of ports, that receives and transmits a plurality of packets of data, each one of the plurality of packets including a source address (SA) field and a destination address (DA) field, a system for tracking and validating SAs coupled to the plurality of ports, the system comprising:

- means for storing a value representation of an SA field, the storing means includes first and second random access memories (RAMs); each of the RAMs containing a portion of the value representation of the SA field;
- means for receiving a packet and for extracting a value representation of the SA field from the received packet;
- means coupled to the storing means and to the receiving means for comparing the extracted SA value representation to the stored SA value representation, wherein a signal is provided responsive to the comparison indicating a match or a mismatch, the comparing means further includes a comparator means, the comparator means comprises first and second comparators, the first comparator being coupled to the first RAM and the second comparator being coupled to the second RAM, each of the first and second comparators providing a partial compare of the extracted SA field representation to the value representation in the storing means; and
- means for disrupting the received packet responsive to the signal wherein the signal is responsive to the comparison indicating a mismatch.



5,414,695

# METHOD FOR MONITORING EXISTING TELEPHONE CONNECTIONS, PARTICULARLY PERMANENTLY SWITCHED TELEPHONE CONNECTIONS

Werner Nagler, Hohenschaeflarn, and Bernhard Gloess, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 3, 1993, Ser. No. 145,092

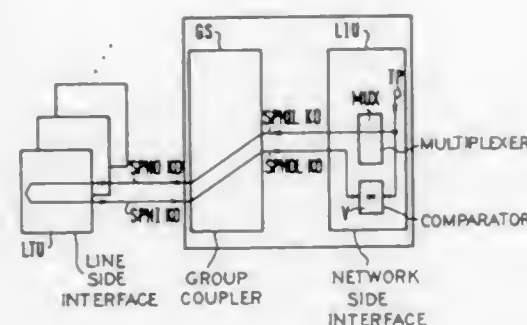
Claims priority, application European Pat. Off., Nov. 20, 1992, 92119844

Int. Cl.<sup>6</sup> H04L 12/26, 1/12, 1/24

U.S. Cl. 370—15

6 Claims U.S. Cl. 370—16

18 Claims



1. A method for monitoring existing telephone connections in a digital time-division multiplex telephone switching center having a redundant central switching network having first and second switching network halves, and the switching center having component parts of a peripheral line circuit area, comprising the steps of:

- comparing first information of a first time channel coming from said first switching network half to second information of a second time channel coming from said second switching network half, and continuing to step b) for a positive comparison of said first information and said second information;
- branching one information of said first and second information, that is coming from said first and second switching network halves, respectively, and that is intended for forwarding, in a line side interface of the peripheral area pertaining to a connected subscriber line or trunk line, mirroring said one information onto a separate time channel, transmitting said mirrored information back to a network side interface at the central switching network of the peripheral area and comparing in said network side interface said received mirrored information to said one information coming from the switching network;
- branching received information coming from the connected subscriber line or trunk line in the line side interface from an original time channel in which the received information appears, conducting said branched received information on a same connecting path as the original time channel in said separate time channel to said network side interface at the central switching network and comparing in said network side interface said branched received information to said received information of the original time channel; and
- supplying, before repeating steps a), b) and c) for a further time channel, a check word in the network side interface at the central switching network and transmitting said check word in said separate time channel to the appertaining line side interface, mirroring said check word in said line side interface, transmitting said mirrored check word back to said network side interface at the central switching network, and comparing in the network side interface a pattern of said mirrored check word to a pattern of the supplied check word.

5,414,696

# CELL EXCHANGING APPARATUS

Munenori Tsuzuki; Hideaki Yamanaka; Hirotaka Saito, and Kazuyoshi Oshima, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 12, 1992, Ser. No. 975,104

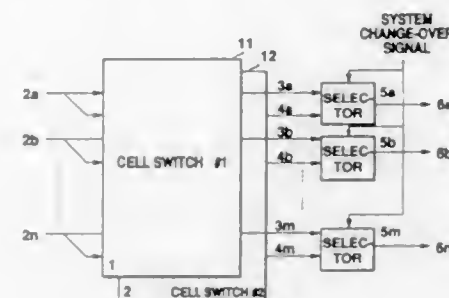
Claims priority, application Japan, Nov. 15, 1991, 3-300476; Feb. 24, 1992, 4-036189

The portion of the term of this patent subsequent to Mar. 14, 2012, has been disclaimed.

Int. Cl.<sup>6</sup> H04J 3/14

6 Claims U.S. Cl. 370—16

18 Claims



1. An asynchronous transfer mode (ATM) cell exchanging apparatus for distributing input cells to corresponding cell output lines, each input cell including a data portion and a header portion having address information, comprising:

- a first cell switch for distributing the input cells to a first set of switch output lines in accordance with the address information of the header portions of the input cells, said first cell switch outputting an idle cell when there are no input cells;
- a second redundant cell switch for distributing the input cells to a second set of switch output lines in accordance with the address information of the header portions of the input cells and independent of the first cell switch, said second redundant cell switch outputting an idle cell when there are no input cells; and
- a selection mechanism, connected to a corresponding one of the cell output lines and to a corresponding first switch output line of the first set of switch output lines and to a corresponding second switch output line of the second set of switch output lines, for selecting one of the first and second switch output lines as a currently selected switch output line that provides cells to the corresponding cell output line, and for selecting the other of the first and second switch output lines as a spare switch output line, wherein said selection mechanism is switchable between selecting the first switch output line and the second switch output line, said selection mechanism including:
  - a confirmation mechanism for confirming that idle cells are output on each of the currently selected switch output line and the spare switch output line before switching selection by the selection mechanism from the currently selected switch output line to the spare switch output line.

5,414,697

# DATA TRANSMISSION CONTROL SYSTEM

Yoshiro Osaki, Hachioji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 21, 1993, Ser. No. 94,224

Claims priority, application Japan, Jul. 22, 1992, 4-195560

Int. Cl.<sup>6</sup> H04J 3/14; H04L 12/56

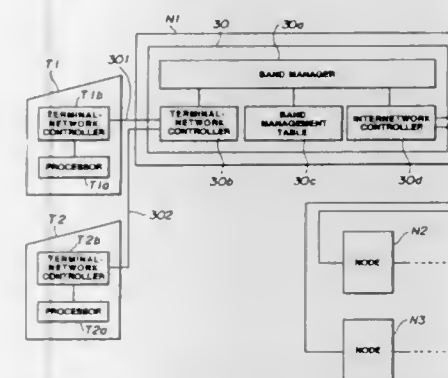
U.S. Cl. 370—17

11 Claims

1. A data transmission control system in a data transmission system having a plurality of terminals connected to a network having a plurality of nodes, wherein, when the plurality of terminals call the plurality of nodes connected to the plurality of terminals, call setting signals having data transmission format parameters including a priority of data to be transmitted

are transmitted and a data transmission state of the data transmission system is optimally controlled on the basis of the data transmission format parameters, each node of the plurality of nodes comprising:

storage means for storing therein the data transmission format parameters of calls being currently set in the node; processing means, after the data transmission format parameters of an inputted call setting signal are stored in the storage means, for monitoring a traffic state of the node on the basis of the data transmission format parameters stored in the storage means including the stored data transmission format parameters of the call setting signal for connecting the call designated by the call setting signal if the monitored traffic density does not exceed a range of a traffic density managed by the node when the call design-



nated by the call setting signal is accepted, and for changing the data transmission format parameters of a call with a low priority to an optimum value within the range of the traffic density managed by the node on the basis of priorities of the data transmission format parameters of the calls stored in the storage means if the monitored traffic density exceeds the range of the traffic density managed by the node when the call designated by the call setting signal is accepted and, in the latter case subsequent to the changing to the optimum value, for connecting the call designated by the call setting signal; and

transmission means for transmitting a first call control signal containing the data transmission format parameters to be changed to a terminal handling the call to be changed by the processing means.

5,414,698

# METHOD OF COMMUNICATION

John L. Adams, Suffolk, England, assignor to British Telecommunications public limited company, London, England

PCT No. PCT/GB92/01476, § 371 Date Nov. 24, 1993, § 102(e) Date Nov. 24, 1993, PCT Pub. No. WO93/03568, PCT Pub. Date Feb. 18, 1993

PCT Filed Aug. 7, 1992, Ser. No. 142,401

Claims priority, application United Kingdom, Aug. 8, 1991, 9117172

Int. Cl.<sup>6</sup> H04L 12/56

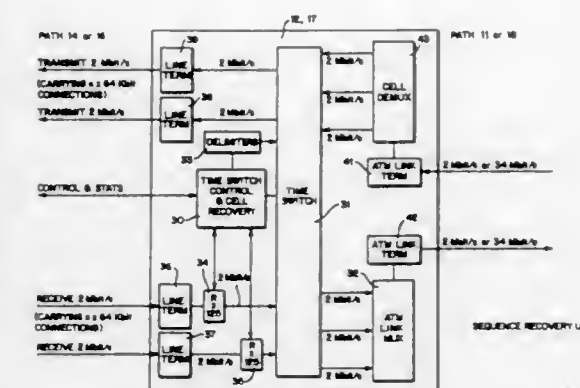
U.S. Cl. 370—17

8 Claims

1. A method of communicating a digital broadband signal—in the form of a series of cells, including a series of idle cells, each cell being formed by m portions—between a transmitter and a receiver via a plurality, n, of narrow band communications paths, each path having an arbitrary propagation time, in which successive portions of the cells are propagated along the paths in a fixed cyclic order with each successive portion being propagated along the next path in the cycle, wherein said method is characterised in that:

each idle cell includes a header having a first header portion which is the same in each idle cell and unique to the

header, and in that the receiver determines the cyclic order from the order of arrival at the receiver of the first



header portions of successive idle cells and the values of m and n.

5,414,699

# METHOD AND APPARATUS FOR RECEIVING AND DECODING COMMUNICATION SIGNALS IN A CDMA RECEIVER USING PARTIAL DE-CORRELATION

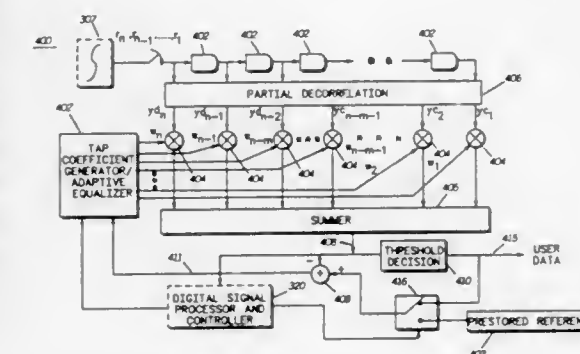
Edward K. B. Lee, Sunrise, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 27, 1993, Ser. No. 126,865

Int. Cl.<sup>6</sup> H04J 13/00

U.S. Cl. 370—18

18 Claims



1. In a Code Division Multiple Access (CDMA) receiver which utilizes adaptive equalization for minimizing errors between a Direct Sequence Spread Spectrum (DS-SS) signal and a reference signal; a method for optimizing convergence rate and minimizing errors in decoding a received signal comprising the steps of:

- receiving a DS-SS communication signal including at least one near signal, noise, and a desired DS-SS signal, wherein said desired DS-SS signal comprises binary bits coded with a spreading chip sequence;
- sampling during a bit interval said received DS-SS communication signal at a chip rate to produce received samples, said received samples being correlated with each other;
- partially de-correlating the received samples by employing a partial orthogonal transformation algorithm;
- providing a first subspace having a de-correlated segment associated with the desired DS-SS signal and the at least one near signal;
- providing a second subspace having a correlated segment associated with noise;
- adaptively and individually equalizing the first subspace to optimize convergence rate and minimize errors; and

g) adaptively and collectively equalizing the second sub-space.

5,414,700

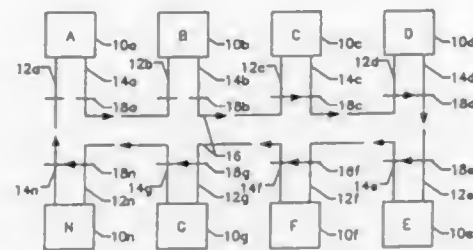
# NEGOTIATION PROTOCOL FOR ESTABLISHMENT OF FULL DUPLEX COMMUNICATION ON A TOKEN RING NETWORK

Henry S. Yang, Andover; Barry A. Spinney, Wayland; William R. Howe, Pepperell, and Luc A. Pariseau, Arlington, all of Mass., assignors to Digital Equipment Corp., Maynard, Mass. Continuation of Ser. No. 966,110, Oct. 23, 1992, abandoned, which is a continuation-in-part of Ser. No. 893,217, Jun. 2, 1992, abandoned, which is a division of Ser. No. 468,480, Jan. 22, 1990, Pat. No. 5,155,726. This application Apr. 12, 1994, Ser. No. 226,423

Int. Cl.<sup>6</sup> H04J 3/02; H04L 12/28

U.S. Cl. 370-24

20 Claims



1. A method for establishing full duplex operation between two stations in a token ring network, the method comprising the steps of:

- exchanging messages between the two stations to confirm that there are no other stations on the network and that the two stations agree to switch to full duplex mode;
- exchanging messages between the two stations to begin a transition to full duplex mode, including transmitting from at least one of the stations an agreed upon signal; and
- completing the transition to full duplex mode upon receipt and processing of the agreed upon signal in both stations, to complete the transition in both stations within a bounded time period, to minimize the possibility of return to token ring mode in either station.

5,414,701

# METHOD AND DATA STRUCTURE FOR PERFORMING ADDRESS COMPRESSION IN AN ASYNCHRONOUS TRANSFER MODE (ATM) SYSTEM

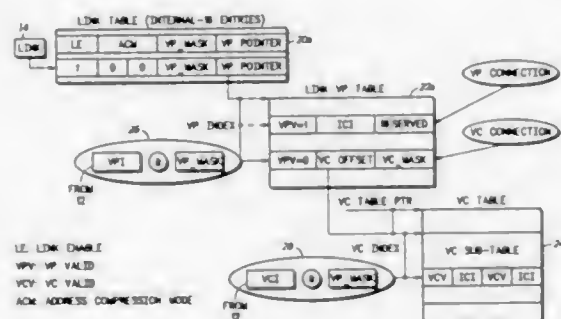
Ronen Shtayer, Tel Aviv; Roni Elyahu, Ramat-Gan, and Aviel Livay, Holon, all of Israel, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 22, 1994, Ser. No. 279,140

Int. Cl.<sup>6</sup> H04Q 11/04

U.S. Cl. 370-58.2

25 Claims



8. A method for address compression in an asynchronous transfer mode (ATM) system, the method comprising the steps of:

- providing a serial stream of ATM bytes to an ATM system; extracting a physical layer identifier from the serial stream of ATM bytes;
- extracting a virtual path identifier from the serial stream of ATM bytes;
- extracting a virtual channel identifier from the serial stream of ATM bytes;
- using the physical layer identifier as an index into a plurality of entries in a link table;
- using an entry in the link table to access a selected one virtual path table out of a plurality of virtual path tables stored in memory;
- using the virtual path identifier to index into the selected one virtual path table to identify a selected one entry in the selected one virtual path table;
- extracting a virtual channel offset from the selected one entry;
- using the virtual channel offset and the virtual channel identifier to access a selected one virtual channel table entry in a selected one virtual channel table out of a plurality of virtual channel tables; and
- extracting an ingress connection identifier from the selected one selected one virtual channel table entry.

5,414,702

# PACKET DISASSEMBLER FOR USE IN A CONTROL UNIT OF AN ASYNCHRONOUS SWITCHING SYSTEM

Norimasa Kudoh, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

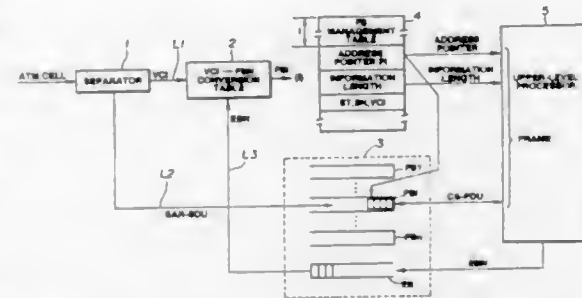
Filed Oct. 19, 1993, Ser. No. 137,927

Claims priority, application Japan, Oct. 20, 1992, 4-281849

Int. Cl.<sup>6</sup> H04J 3/74; H04L 12/56; H04Q 11/04

U.S. Cl. 370-60

10 Claims



9. A packet disassembler for disassembling a plurality of input packets each having an information part of a predetermined fixed information length and an identification part including an identifier indicative of a connection with other packets into a frame to be processed by an upper-level processor, comprising:

- separation means for separating each of said packets into the information part and the identification part;
- a plurality of fixed-length buffers each having an identical length and having a storage capacity equal to a multiple of said predetermined fixed information length;
- another buffer for storing a frame buffer number of said fixed-length buffer where the packets were disassembled as a frame buffer number of an empty fixed-length buffer when said disassembling is completed and a series of the information parts in the packets are transmitted to said upper-level processor; and
- management means for performing allocation control for allocating a newly input packet to one of said plurality of fixed-length buffers having an identifier identical to the identifier of the newly input packet when disassembling of previously input packets having an identifier identical to that of the newly input packet in the identification part separated by said separation means is not completed, and for performing allocation control for allocating the newly input packet with an empty one of said plurality of buffers

when the disassembling of the previously input packets having the identical identifier is completed or when no disassembling of packets having the identical identifier is carried out.

5,414,703

# ASYNCHRONOUS CELL SWITCH

Kenji Sakaue, Yokohama; Yasuro Shobatake, Kawasaki; Masahiko Motoyama, Yokohama, and Yoshinari Kumaki, Urayasu, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

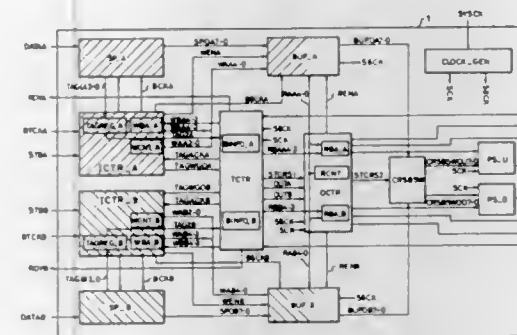
Continuation of Ser. No. 772,095, Oct. 7, 1991, abandoned. This application Dec. 20, 1993, Ser. No. 169,553

Claims priority, application Japan, Oct. 8, 1990, 2-268549

Int. Cl.<sup>6</sup> H04J 3/14

U.S. Cl. 370-60

8 Claims



1. An ATM communication switch for selectively transferring cells from a plurality of input communication routes to a plurality of output communication routes in accordance with destinations of the respective cells, said ATM communication switch comprising:

- a plurality of input buffers connected with said input communication routes;
- a plurality of output buffers connected with said output communication routes;
- a plurality of cell switches, each having a clock input port for receiving a clock signal and each capable of receiving cells from two input ports and selectively outputting cells from two output ports, the cell switches being combined in series and parallel with each other between said input and output communication routes via said input and output buffers in order to transfer a cell from any of said input communication routes to any of said output communication routes;

- at least one intermediate cell switch being connected between first and second preceding cell switches and first and second subsequent cell switches of said plurality of said cell switches and having a clock input port for receiving a clock signal;
- clock generating means for generating clock signals for each of the plurality of cell switches and said at least one intermediate cell switch;
- first cell input means, connected, via one of the input ports of the intermediate cell switch, with an output port of the first preceding cell switch, for receiving clock signals supplied to the first preceding cell switch and for receiving a cell from the first preceding cell switch in synchronism with the clock signals supplied to the first preceding cell switch;
- second cell input means, connected, via the other of said input ports corresponding to the intermediate cell switch, with an output port corresponding to the second preceding cell switch for receiving clock signals supplied to the second preceding cell switch and for receiving a cell from the second preceding cell switch in synchronism with the clock signals supplied to the second preceding cell switch;

first cell storing means connected with said first cell input means for storing a plurality of cells;

second cell storing means connected with said second cell input means for storing a plurality of cells;

cell transfer control means connected with said first and second cell input means and said first and second cell storing means for transferring cells from said first cell input means to said first cell storing means in synchronism with the clock signals supplied to the first preceding cell and from said second cell input means to said second cell storing means in synchronism with the clock signals supplied to the second preceding cell; and

cell output means connected with said first and second cell storing means for outputting cells stored in said first and second cell storing means to the first and second subsequent cell switches in accordance with the destinations of the respective cells in synchronism with the clock signals supplied to the intermediate cell switch.

5,414,704

# ADDRESS LOOKUP IN PACKET DATA COMMUNICATIONS LINK, USING HASHING AND CONTENT-ADDRESSABLE MEMORY

Barry A. Spinney, Wayland, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

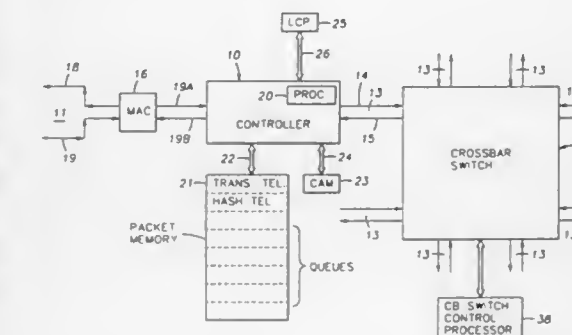
Continuation of Ser. No. 964,738, Oct. 22, 1992, abandoned.

This application Apr. 5, 1994, Ser. No. 223,379

Int. Cl.<sup>6</sup> H04J 3/26; H04L 12/46, 12/56

U.S. Cl. 370-60

22 Claims



1. A method of performing an address lookup for an N-bit input address in a data communication system, comprising the steps of

- hashing said N-bit input address by a known hash function to produce an N-bit input hashed address;
- indexing into a hash table to select a hash bucket using an index part of said hashed address, the hash bucket containing a pointer and a size value;
- indexing into a translation table to select a binary tree of records at a location identified by said pointer, the selected binary tree having a size specified by said size value; and
- searching said records of said selected binary tree to obtain a stored hashed address from each one of said records, including
- comparing said stored hashed address from each one of said records with a remainder part of said input hashed address, and when a one of said records with a matching remainder part is found, retrieving a stored address from said one of said records with a matching remainder part.



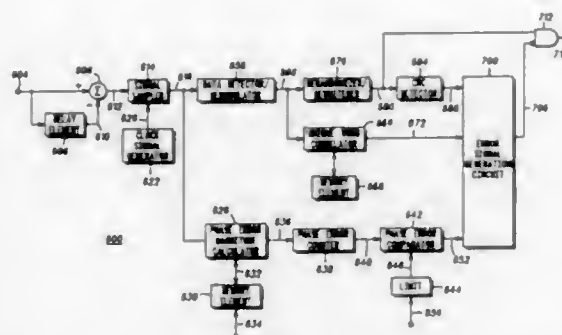


# 5,414,711 ERROR DETECTOR CIRCUIT AND METHOD THEREFOR

Tomoyuki Okada, Palatine; Dale F. Medendorp, Crystal Lake, and Terrie L. Frane, Bloomington, all of Ill., assignors to Motorola Inc., Schaumburg, Ill.  
Filed May 20, 1993, Ser. No. 64,266  
Int. Cl.<sup>6</sup> H04L 27/22

U.S. Cl. 371—5.1

23 Claims



1. An error detector circuit for a receiver operative to receive a discretely-encoded signal comprised of at least one sequence formed of a plurality of signal portions having phase values associated therewith, wherein the at least one sequence includes a first sequence portion and a second sequence portion, said error detector circuit operative to detect when a selected number of sequences of the at least one sequence comprising the discretely-encoded signal is comprised of excessive numbers of erroneous signal portions, said error detector circuit comprising:

- a first sequence portion comparator for determining when the first sequence portion of the at least one sequence comprising the discretely-encoded signal is received by the receiver with greater than a first threshold number of errors and for generating a first comparison signal of a first signal level responsive thereto;
- a second sequence portion comparator for determining when the second sequence portion of the at least one sequence comprising the discretely-encoded signal is received by the receiver with greater than a second threshold number of errors and for generating a second comparison signal of a first signal level responsive thereto;
- a phase error detector for determining when phase differences between adjacent signal portions of the discretely-encoded signal are beyond allowable levels greater than a third threshold number of times and for generating a phase error signal of a first signal level responsive thereto; and
- an error signal generator for generating an error signal when either the first sequence portion comparator generates the first comparison signal of the first signal level or in which both the phase error detector generates the phase error signal of the first signal level and the second sequence portion comparator generates the second comparison signal of the first signal level, collectively in excess of a fourth threshold number of times.

# 5,414,712 METHOD FOR TRANSMITTING DATA USING A COMMUNICATION INTERFACE BOX

Eric B. Kaplan, Wheaton, and Arthur G. Kuehn, Mount Prospect, both of Ill., assignors to Progressive Computing, Inc., Oak Brook, Ill.

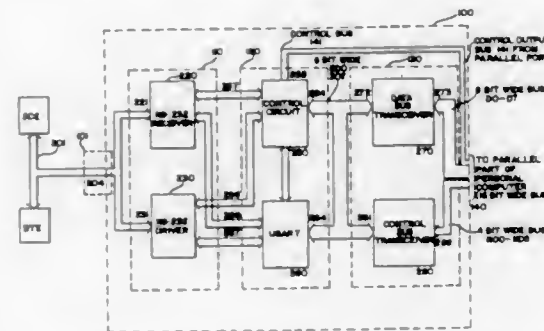
Filed Jul. 23, 1991, Ser. No. 734,584  
Int. Cl.<sup>6</sup> G06F 11/00

U.S. Cl. 371—15.1

3 Claims

1. A method of transmitting data between at least one external communication device and a serial data analyzer unit, the method comprising the steps of:

receiving data from one or more external communication devices;  
processing said data received from said external communication devices;  
converting said data from serial to parallel form;  
connecting a parallel port of a personal computer to the serial data analyzer unit;  
adapting data lines and control data lines from the parallel port of the personal computer to transmit and receive data;  
selecting a read or write transaction in the serial data analyzer unit;  
selectively transmitting said data between at least one external communication device and the parallel port of the personal computer for serial data analysis;  
configuring control data lines to a desired type of transaction;  
transmitting bits of information from data lines between a universal synchronous/asynchronous receiver/transmitter (USART), capable of converging serial data of up to 8 bits, and a control circuit;  
writing 8 bits of information to the data lines for the write sequence;  
writing the desired type of transaction to control output lines for the write sequence; and  
writing end of transaction to control output lines for the write sequence.



receiving data from one or more external communication devices;  
processing said data received from said external communication devices;  
converting said data from serial to parallel form;  
connecting a parallel port of a personal computer to the serial data analyzer unit;  
adapting data lines and control data lines from the parallel port of the personal computer to transmit and receive data;  
selecting a read or write transaction in the serial data analyzer unit;  
selectively transmitting said data between at least one external communication device and the parallel port of the personal computer for serial data analysis;  
configuring control data lines to a desired type of transaction;  
transmitting bits of information from data lines between a universal synchronous/asynchronous receiver/transmitter (USART), capable of converging serial data of up to 8 bits, and a control circuit;  
writing 8 bits of information to the data lines for the write sequence;  
writing the desired type of transaction to control output lines for the write sequence; and  
writing end of transaction to control output lines for the write sequence.

# 5,414,713 APPARATUS FOR TESTING DIGITAL ELECTRONIC CHANNELS

Thomas E. Waschura, Mountain View, and James R. Waschura, Palo Alto, both of Calif., assignors to Synthesis Research, Inc.  
Filed Feb. 5, 1990, Ser. No. 475,336  
Int. Cl.<sup>6</sup> H04L 12/26

U.S. Cl. 371—20.4

20 Claims

1. An apparatus for testing a digital electronic channel which communicates data in words, comprising:  
detector means for receiving a data stream from the electronic channel under test in words, the detector means including means for comparing the data stream from the channel under test to an expected result and identifying and locating errors by their address in the data stream and means for transmitting error address location information; and  
computer means for performing analysis on the error data detected by the detector means and the computer means including means for receiving the error location information

tion and a data bus for enabling communication and control between the computer means and the detector means,

first logic element is asserted during a first time period, and a second control signal provided to the second control input of the second logic element is negated during the first time period.

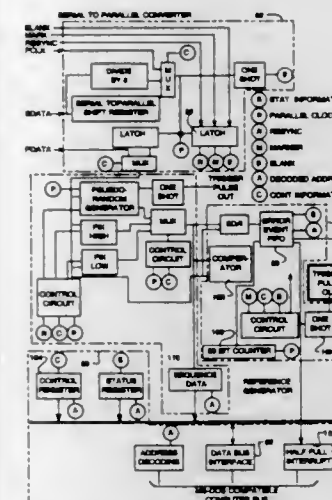
# 5,414,715 METHOD FOR AUTOMATIC OPEN-CIRCUIT DETECTION

Michael W. Hamblin, Stow, and Gordon D. Robinson, Acton, both of Mass., assignors to GenRad, Inc., Concord, Mass.

Filed Feb. 5, 1993, Ser. No. 14,154  
Int. Cl.<sup>6</sup> G06F 11/00

U.S. Cl. 371—23

9 Claims



whereby error location information can be recorded and addressed for analysis.

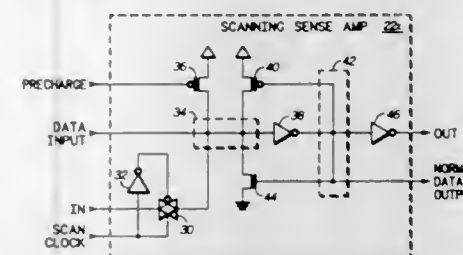
# 5,414,714 METHOD AND APPARATUS FOR SCAN TESTING AN ARRAY IN A DATA PROCESSING SYSTEM

Michael E. Gladden; Robert J. Skruhak; Oded Yishay, all of Austin, Tex., and Eytan Hartung, Ramat Gan, Israel, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 26, 1992, Ser. No. 857,878  
Int. Cl.<sup>6</sup> G01R 31/28; G06F 11/00

U.S. Cl. 371—22.3

20 Claims



1. A data processing system having a first logic element and having a second logic element, the first and second logic elements each comprising:

- a scan data input for receiving a scan data input signal;
- a non-scan data input;
- a first control input;
- a second control input;
- a scan data output;
- a first inverter having an input coupled to said non-scan data input, and having an output;
- a second inverter having an input connected to the output of said first inverter and having an output connected to the input of said first inverter;
- a transistor having a first current electrode connected to a power supply voltage terminal, having a gate electrode coupled to the first control input, and having a second current electrode coupled to the input of said first inverter; and
- coupling means for selectively coupling the scan data input to the input of said first inverter, said coupling means being coupled to said scan data input and the input of said first inverter; and

wherein the scan data output of the first logic element is coupled to the scan data input of the second logic element, and a first control signal provided to the second control input of the

1. For diagnosing improper connections between a board device of a given type, which board device includes device input and output pins, and a printed-circuit board, on which the board device is mounted, that includes board nodes associated with respective device input and output pins and further includes conductive paths intended to place each device input pin in electrical communication with each board node associated therewith, a method comprising the steps of:

- A) compiling for at least one, given device input pin of the given type of board device a unilaterally-disabling list of device input pins, at which an open circuit does not disable the given device input pin, that are disabled by an open circuit at the given device input pin;
- B) applying to a plurality of the board nodes associated with device input pins respective components, associated with those device input pins, of a test vector sequence of signal vectors;
- C) sensing at predetermined nodes a first response to the test vector sequence;
- D) applying to the plurality of the board nodes associated with device input pins respective components of a modified vector sequence that is the same as the test vector sequence except that the values of at least some of the modified vector sequence's components applied to the board node associated with the given device input pin differ from the corresponding components in the test vector sequence;
- E) sensing at the predetermined nodes a response to the modified vector sequence;
- F) compiling a possibly-open list of possibly open device input pins that includes the given device input pin if the response to the modified vector sequence does not differ from the response to the test vector sequence; and
- G) generating an opens-test report containing an undiagnosable list of every pin that is in any unilaterally-disabling list compiled for a pin in the possibly-open list.





5,414,721

## SERIAL DATA RECEIVING DEVICE

Yoshimitsu Fukui, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

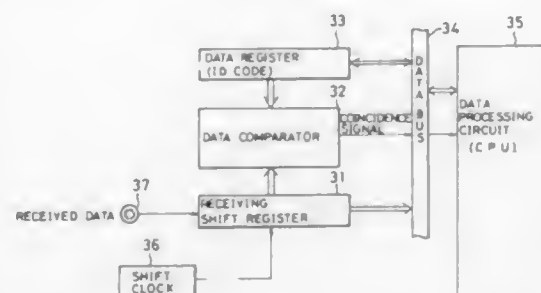
Filed Apr. 22, 1992, Ser. No. 872,001

Claims priority, application Japan, May 29, 1991, 3-126046; May 29, 1991, 3-126047

Int. Cl.<sup>6</sup> G06F 7/02

U.S. Cl. 371—67.1

17 Claims



1. A serial data receiving device which is capable of identifying serial data received even though the received data contains some degrees of error and/or different numbers of bits, said serial data receiving device comprising:

first storage means for receiving serial data, storing said received serial data and shifting said received serial data in accordance with a predetermined signal;

second storage means for storing an identification data;

third storage means connected to said first storage means for receiving said shifted serial data from said first storage means in synchronization with said predetermined signal and for storing said received serial data; and

comparing means for comparing said serial data stored in said first storage means and said shifted serial data stored in said third storage means with said identification data stored in said second storage means and for outputting a detection signal in a case where a predetermined number of bits in said serial data is matched with a predetermined number of bits in said identification data; and

wherein said comparing means compares said stored serial data in said first storage means with said identification data stored in said second storage means in a case where said received serial data in said first storage means has a number of bits which is identical with a number of bits in said first storage means without comparing said serial data stored in said third storage means with said identification data stored in said second storage means.

5,414,722

## SELECTIVE DATA SYNCHRONIZER

Ronald E. Tolum, Simi Valley, Calif., assignor to Wangtek, Inc., Simi Valley, Calif.

Filed Jul. 14, 1992, Ser. No. 913,837

Int. Cl.<sup>6</sup> H04L 1/08

U.S. Cl. 371—69.1

31 Claims

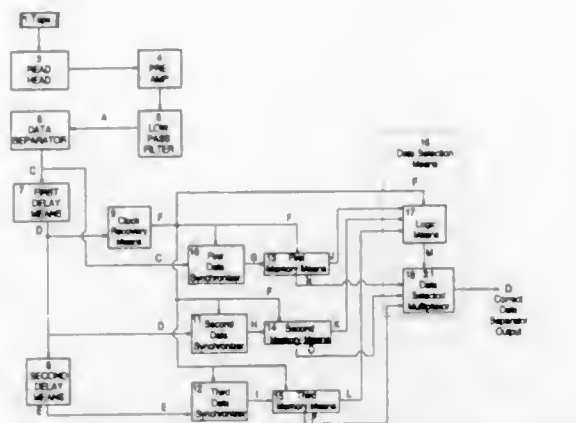
12. In a magnetic storage mechanism for reading data stored on a magnetic medium, said magnetic storage mechanism comprising a read head for reading said data stored on said magnetic medium and generating analog pulses, and a data separator coupled to the read head for generating as output a first digital signal comprising having digital read data pulses corresponding to said analog pulses, an apparatus for correction of incorrect digital read data pulses, said apparatus comprising:

a first delay means for receiving said first digital signal corresponding to an early signal and outputting a nominal signal delayed by a first predetermined time;

a second delay means for receiving said nominal signal and

outputting a late signal delayed by a second predetermined time;

comparison means for comparing a selected binary value of the early and late signals;



data selection means for selecting a determined correct output of said data separator from the selected binary values of said early, nominal and late signals.

5,414,723

## INFRARED LASER SYSTEM

Vladimir B. Krapchev, 80 Park St., Brookline, Mass. 02146

PCT No. PCT/US92/01230, § 371 Date Aug. 11, 1993, § 102(e)

Date Aug. 11, 1993, PCT Pub. No. WO92/15137, PCT Pub.

Date Sep. 3, 1992

Continuation-in-part of Ser. No. 657,641, Feb. 15, 1991, Pat. No.

5,153,887. This PCT application Feb. 14, 1992, Ser. No. 104,081

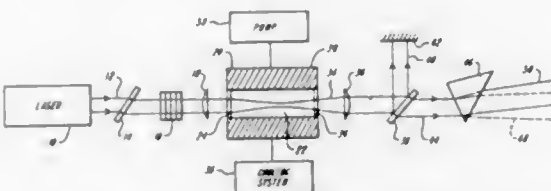
The portion of the term of this patent subsequent to Oct. 6, 2009,

has been disclaimed.

Int. Cl.<sup>6</sup> H01S 3/30

U.S. Cl. 372—3

27 Claims



1. An infrared laser system comprising:

a neodymium laser for generating a pulsed laser beam having a wavelength of 1.06 micrometers;

a Raman cell containing a Raman active medium selected from the group consisting of ethanol-d<sub>1</sub> and methanol-d<sub>1</sub>; and

means for coupling said laser beam through said Raman cell, said laser beam having sufficient power to cause emission of light from said Raman active medium.

5,414,724

## MONOLITHIC SELF Q-SWITCHED LASER

Shouhuan Zhou, Beijing, China; Ying-chih Chen; Kotik K. Lee, both of Scarsdale, N.Y., and Youxi Gul, Beijing, China, assignors to North China Research Institute of Electro-Optics, Beijing, China and Quantum Electronics Technology, Inc., Hartsdale, N.Y.

Filed Jan. 19, 1994, Ser. No. 183,735

Int. Cl.<sup>6</sup> H01S 3/11

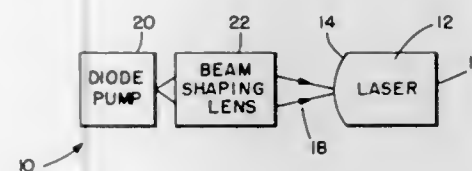
U.S. Cl. 372—10

10 Claims

1. A self Q-switched solid-state laser, comprising:

a length of solid-state laser host material, containing at least

a first dopant element to enable said host material to emit coherent radiation and at least a second dopant element which is a different species from said first dopant element and provides saturable absorption within said host material at the wavelength of said coherent radiation, said saturable absorption having a property of high absorbance at low intensity levels of coherent radiation and low absorbance at high intensity levels of coherent radiation, a first end surface of said length polished and coated with a reflecting coating to form a first end of a laser cavity, a second end surface of said length polished and coated with a reflecting coating that partially reflects coherent radiation within said length and partially transmits said coherent radiation; and



a pumping source coupled to said solid state laser for providing pump radiation which induces a population inversion of said first dopant element to produce coherent radiation in said solid state laser, said pump radiation having sufficient energy to induce coherent radiation in said host material, said coherent radiation saturating said second dopant species and reducing absorbance therein which further enhances said coherent radiation to an enhanced high intensity level, said coherent radiation extinguishing upon depletion of the population inversion.

5,414,725

## HARMONIC PARTITIONING OF A PASSIVELY MODE-LOCKED LASER

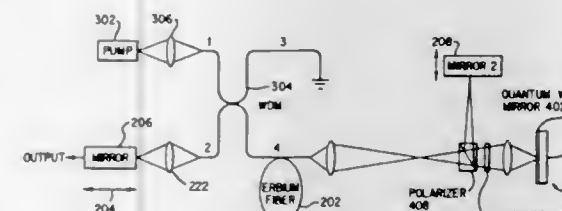
Martin E. Fermann, and Donald J. Harter, both of Ann Arbor, Mich., assignors to IMRA America, Inc. and The Regents of the University of Michigan, both of Ann Arbor, Mich.

Filed Aug. 3, 1993, Ser. No. 101,049

Int. Cl.<sup>6</sup> H01S 3/098

U.S. Cl. 372—18

21 Claims



1. A passively mode-locked laser comprising:

means for generating laser energy; and

means for pumping said laser energy generating means, said laser energy generating means having a harmonically partitioned cavity which includes:

a gain medium for amplifying energy in the cavity;

means for reflecting energy along an axis which passes through the gain medium;

a saturable absorber asymmetrically located along said axis to harmonically partition said axis within said cavity into first and second lengths for passive mode-locking of the laser, said first length being greater than said second length; and

means for outputting laser energy generated within said cavity.

5,414,726

## PROCESS AND APPARATUS FOR THE MODULATION AND AMPLIFICATION OF LIGHT BEAMS

Rama Raj, 9 Rue de la Clef, 75005 Paris; Marcel Bensoussan, 881 Coius Apuitaine, 92100 Boulogne; Jean-Louis Oudar, 22, rue des Torques, 92290 Chateauf-Malabry, and Juan-Ariel Levenson, 8, rue Georges Saché, 75014 Paris, all of France

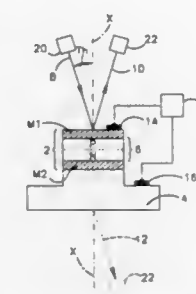
Filed Jun. 11, 1993, Ser. No. 75,673

Claims priority, application France, Jun. 15, 1992, 92 07182

Int. Cl.<sup>6</sup> H01S 3/085, 3/094, 3/19; G02F 1/015

U.S. Cl. 372—26

25 Claims



1. Process for the modulation of at least one light beam, wherein at least one input light beam (8, 8a; 32; 36, 38, 40) is supplied to at least one Fabry-Perot resonator (2) having an off state and an on state and having at least one resonance mode, defined by two mirrors (M1, M2) and produced by stacking layers on a substrate (4, 30), at least one of said layers forming an active medium (6) able to amplify said input light beam by stimulated emission, a wavelength of the input light beam being around the resonance of the Fabry-Perot resonator and in that free charge carrier density in the active medium is varied so as to make said active medium sometimes absorbent and sometimes amplifying with respect to the input light beam and so as to obtain at least one output light beam (9, 9a; 10, 12; 42, 44, 46) whose intensity is modulated and amplified relative to the input light beam and wherein, in the amplification regime, the wavelength of the amplified output beam is the same as the wavelength of the incident input beam.

5,414,727

## ACTIVE CURRENT CONTROL APPARATUS

Dale F. Berndt, Plymouth, and Joseph E. Killpatrick, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 30, 1991, Ser. No. 769,067

Int. Cl.<sup>6</sup> G01B 9/02

U.S. Cl. 372—38

22 Claims

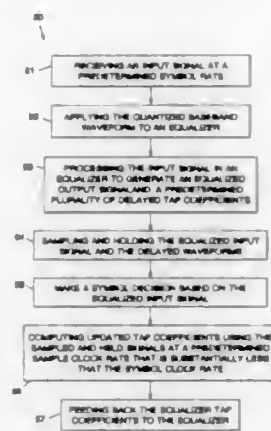
1. A current control apparatus for a ring laser gyro including a beam path, a first electrode having a first polarity, and a second electrode having the same polarity as the first electrode, wherein the current control apparatus comprises:

- total current control means for generating a control signal representative of a current value;
- first means coupled to the control signal for supplying actively controlled current to the first electrode of the ring laser gyro in response to the control signal wherein the actively controlled current supply means comprises active impedances including a first amplifying means and a first field effect transistor for stabilization and control; and
- second means coupled to the control signal for supplying actively controlled current to the second electrode of the ring laser gyro in response to the control signal wherein the actively controlled current supply means comprises





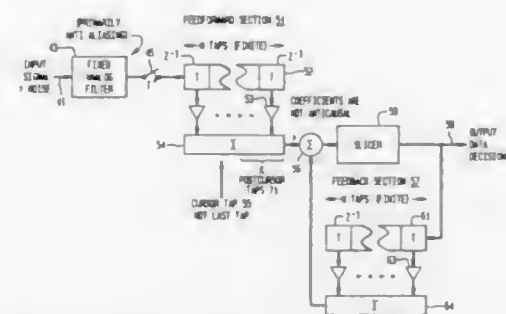
5,414,732  
**ADAPTIVE EQUALIZER AND METHOD FOR OPERATION AT HIGH SYMBOL RATES**  
 John Kaufmann, Palo Alto, Calif., assignor to Loral Aerospace Corp., New York, N.Y.  
 Filed May 17, 1993, Ser. No. 61,958  
 Int. Cl.<sup>6</sup> H03H 7/30, 7/40  
 U.S. Cl. 375—232 8 Claims



1. A processing method that provides for adaptive equalization of a quantized baseband waveform, said method comprising the steps of:

- receiving a quantized baseband waveform;
- applying the quantized baseband waveform to an equalizer;
- producing an equalized baseband waveform that are generated at a predetermined symbol clock rate;
- sampling and holding as many successive baseband samples as there are taps in the equalizer to generate sampled and held waveforms and sampling the equalized baseband waveform;
- computing updated tap coefficients using the sampled and held waveforms at a predetermined sample clock rate that is substantially less than the symbol clock rate; and
- feeding back the updated tap coefficients to the equalizer.

5,414,733  
**DECISION FEEDBACK EQUALIZER EMPLOYING FIXED RATIO POSTCURSOR TAPS FOR MINIMIZING NOISE AND INTERSYMBOL INTERFERENCE IN SIGNALS CONVEYED OVER HIGH SPEED DATA SERVICE LOOP**  
 Michael D. Turner, Madison, Ala., assignor to Adtran, Huntsville, Ala.  
 Filed Dec. 20, 1993, Ser. No. 170,412  
 Int. Cl.<sup>6</sup> H03H 7/30  
 U.S. Cl. 375—233 22 Claims



1. A decision feedback equalizer comprising:
- a linear transversal filter section to which successive received symbols of an input symbol sequence are sequentially introduced, said linear transversal filter section including a feedforward multistage delay line comprised of a series of 1st-Mth symbol value storage stages, M being

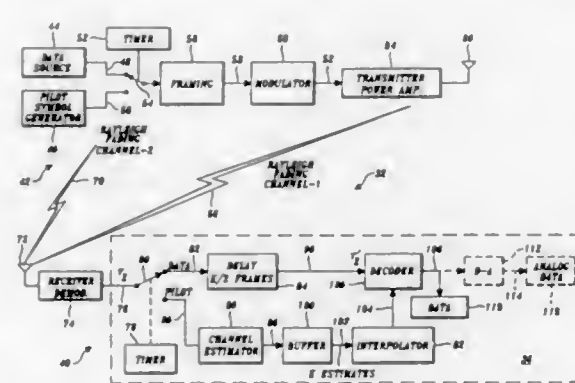
an integer greater than 1, and a feedforward weighting and summing stage operative to multiply respective ones of a plurality of 1st-Mth weighting coefficients  $W_1$ - $W_M$  by respective ones of a plurality of 1st-Mth received symbols stored in said feedforward multistage delay line, and thereby obtain a plurality of 1st-Mth products, said 1st-Mth products being summed to provide a weighted and summed feedforward symbol value output;

a symbol decision unit which is coupled to receive a differential symbol value associated with a difference between said weighted and summed feedforward symbol value output and a weighted and summed feedback symbol value output and being operative to generate a received symbol value estimate in accordance with said difference; and

a decision feedback transversal filter section to which successive symbol value estimates generated by said symbol decision unit are sequentially applied, said decision feedback transversal filter section including a feedback multistage delay line comprised of a series of 1st through Nth symbol value storage stages, N being an integer greater than 1, and a feedback weighting and summing stage operative to multiply respective ones of a plurality of 1st through Nth weighting coefficients by respective ones of a plurality of 1st through Nth symbol decision outputs stored in said feedback multistage delay line, and thereby obtain a plurality of 1st through Nth products, said 1st through Nth products being summed to provide a weighted and summed feedback output, said weighted and summed feedback output being differentially combined with said weighted and summed feedforward symbol value output of said linear transversal filter section and the resulting differential signal being applied to said symbol decision unit which outputs received symbol value estimates; and wherein

said feedforward weighting and summing stage of said linear transversal filter section has its largest valued, cursor weighting coefficient  $W_C$  associated with an M-Kth symbol stage of said feedforward multistage delay line, where K is an integer equal to or greater than 1, and K respective postcursor weighting coefficients  $W_{M-K}$  to  $W_M$  associated with the last K symbol stages of said feedforward multistage delay line having fractional weighting coefficients of said cursor weighting coefficients  $W_C$ .

5,414,734  
**COMPENSATION FOR MULTI-PATH INTERFERENCE USING PILOT SYMBOLS**  
 Robert F. Marchetto, Burnaby; Todd A. Stewart, Vancouver, and Paul K.-M. Ho, Surrey, all of Canada, assignors to Glenayre Electronics, Inc., Charlotte, N.C.  
 Filed Jan. 6, 1993, Ser. No. 1,061  
 Int. Cl.<sup>6</sup> H04L 1/02, 25/08; H04B 1/10, 15/00  
 U.S. Cl. 375—267 22 Claims

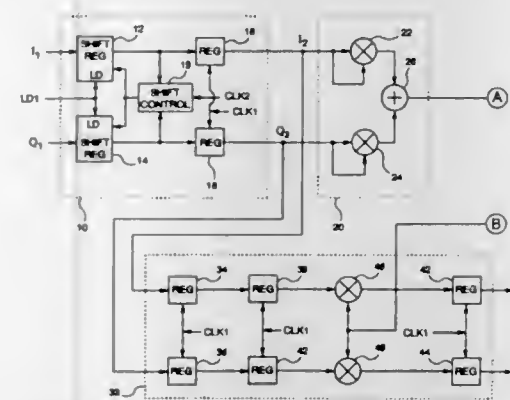


1. Circuitry for compensating a receiver for fading of signals

propagating as frames of data from at least one transmitter that includes pilot symbol generation circuitry that provides a predefined plurality of pilot symbols in each frame of data transmitted to the receiver, said circuitry comprising:

- (a) separating means, coupled to the receiver for input of a received signal, for separating the plurality of pilot symbols from a plurality of data symbols in each frame of data, producing a pilot symbol signal comprising said plurality of pilot symbols and a data signal comprising said plurality of data symbols, said pilot signal and said data signal being separate from each other;
- (b) delay means, coupled to receive the data signal, for delaying the data signal from a current frame until after the pilot symbol signal from at least one subsequent frame is received, said delay means thereby producing a delayed data signal;
- (c) pilot signal processing means, coupled to receive the pilot symbol signal, for determining an estimated channel impulse response for the plurality of pilot symbols in each frame of received signals;
- (d) interpolation filter means, coupled to receive the estimated channel impulse response for each frame of data and including storage means for storing an estimated channel impulse response from at least one prior frame, said interpolation filter means interpolating values of the estimated channel impulse response between the current and prior frames to determine, as a function of channel characteristics, an interpolated channel impulse response for each data symbol in a frame; and
- (e) decoder means, coupled to receive the interpolated channel impulse response and the delayed data signal, for recovering the data transmitted to the receiver as a function of the interpolated channel impulse response and the delayed data signal, thereby substantially compensating for fading and interference in the received signals.

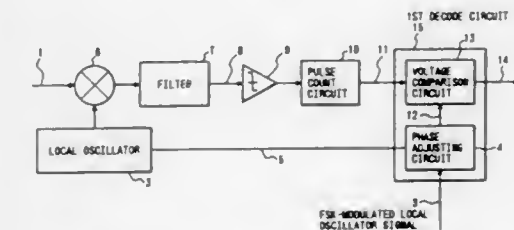
5,414,735  
**METHOD AND APPARATUS FOR NORMALIZING COMPONENTS OF A COMPLEX SIGNAL**  
 William J. Whitehart, Novi, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
 Filed Apr. 26, 1993, Ser. No. 51,919  
 Int. Cl.<sup>6</sup> H03D 3/22; H04L 27/22  
 U.S. Cl. 375—332 8 Claims



1. A method of processing digital signals to normalize multi-bit digital words representing the  $I_1$  and  $Q_1$  components of a complex signal of the form  $I_1 + jQ_1$  to produce corresponding components  $I_3$  and  $Q_3$ , such that the square root of the sum of the squares of  $I_3$  and  $Q_3$  is equal to 1, comprising the steps of:
- a. performing a coarse normalization of  $I_1$  and  $Q_1$  to produce components  $I_2$  and  $Q_2$  respectively,
  - b. calculating a value A equal to the sum of the squares of  $I_2$  and  $Q_2$  so that A is constrained to be equal to or greater than a minimum value R and less than a maximum value S,

- c. iteratively adjusting the value of a digital word K, until  $K^2A=R$
- d. producing the components  $I_3$  and  $Q_3$ , where  $I_3=G(KI_2)$  and  $Q_3=G(KQ_2)$ .

5,414,736  
**FSK DATA RECEIVING SYSTEM**  
 Makoto Hasegawa, Tokyo; Kazuaki Takahashi, Kawasaki; Masahiro Mimura, Tokyo; Kazunori Watanabe; Katsushi Yokozaki, both of Yokohama, and Hiroyuki Harada, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Aug. 7, 1992, Ser. No. 925,673  
 Claims priority, application Japan, Aug. 12, 1991, 3-201677; Aug. 12, 1991, 3-291678; Sep. 27, 1991, 3-249025  
 Int. Cl.<sup>6</sup> H03D 3/00 8 Claims



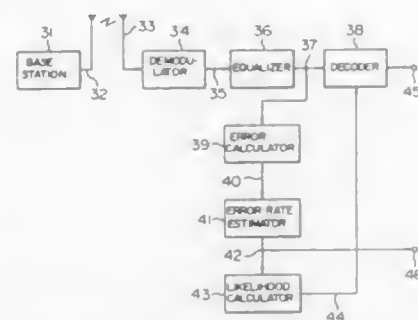
1. An FSK data receiving system comprising:
- a local oscillator for causing oscillation of substantially the same frequency as a carrier wave signal which is FSK (frequency-shift-keyed) modulated with a positive and a negative equi-frequency deviations;
  - an FSK-modulated local oscillator signal;
  - a phase adjusting circuit for adjusting a phase of the FSK-modulated local oscillator signal and outputting a first output signal to said local oscillator;
  - a frequency mixer for mixing frequencies of an output signal of said local oscillator and said carrier wave signal, said frequency mixer generating an output signal to be outputted through a filter as a base-band signal;
  - an amplitude limiting amplifier for limiting an amplitude of said base-band signal;
  - a pulse count circuit for converting a pulse number of output pulses fed from said limiting circuit into a voltage;
  - a voltage comparison circuit for comparing a second output signal fed from said phase adjusting circuit which executes the phase adjustment of said FSK-modulated local oscillator and the voltage from the pulse count circuit, said voltage comparison circuit generating an output signal as a first decode signal; whereby said phase adjusting circuit and said voltage comparison circuit constituting a first decode circuit so as to execute a data demodulation on the basis of said first decode signal.

5,414,737  
**DATA DECODING DEVICE WITH ERROR RATE ESTIMATION**  
 Mitsuru Uesugi; Yoshiko Saito; Kazuhisa Tsubaki, and Kouichi Honma, all of Yokohama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Nov. 13, 1992, Ser. No. 975,695  
 Claims priority, application Japan, Nov. 20, 1991, 3-304414  
 Int. Cl.<sup>6</sup> H04L 27/06 4 Claims

1. A data decoding device comprising:
- a demodulator for demodulating a received signal;
  - an equalizer for eliminating a distortion added in a transmission line from an output of said demodulator;
  - an error calculator for calculating a square error sum based on an output of said equalizer;



an error rate estimator for estimating an error rate based on the square error sum;  
a likelihood calculator for calculating a likelihood based on the error rate estimated by said error rate estimator; and



a decoder for decoding data based on the calculated likelihood and an output of said equalizer.

### 5,414,738 MAXIMUM LIKELIHOOD PATHS COMPARISON DECODER

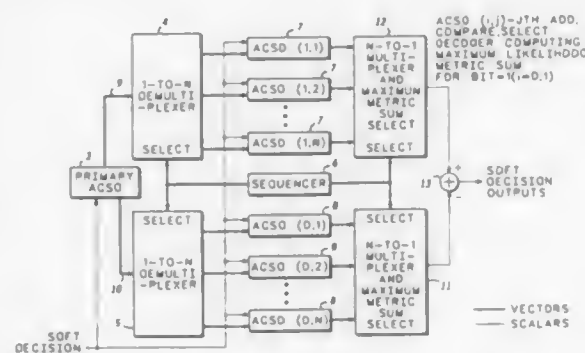
Richard A. Bienz, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 9, 1993, Ser. No. 151,581

Int. Cl.<sup>6</sup> H03D 1/00; H04L 27/06

U.S. Cl. 375—341

10 Claims



5. An apparatus for decoding information coded by an encoder having a memory length of  $m$  bits and transmitted through a noisy channel, comprising:

an input add-compare-select decoder for receiving the transmitted information and producing a first output containing information on the likelihood that an encoded bit was a one and a second output containing information on the likelihood that the encoded bit was a zero;

a first multiplicity of sequentially connected add-compare-select decoders, the first thereof receiving the first output and the last thereof producing a first further output;

a second multiplicity of sequentially connected add-compare-select decoders, the first thereof receiving the second output and the last thereof producing a second further output;

a first selector for receiving the first further output and selecting therefrom a first maximum sum of probabilities that the encoded bit was a one;

a second selector for receiving the second further output and selecting therefrom a second maximum sum of probabilities that the encoded bit was a zero; and

a subtractor for determining sign and magnitude of a difference between the first and second maximum sum of probabilities, wherein the sign of the difference indicates whether a one or zero was relatively more likely to have been encoded by the encoder and the magnitude of the

difference indicates the probability that such one or zero was encoded by the encoder.

### 5,414,739 TRANSMISSION SYSTEM CONSTITUTED OF MULTISTAGE REPRODUCTION NODES

Naoya Kobayashi, Musashino; Yoshitaka Takasaki, Tokorozawa; Sadao Mizokawa; Hisayuki Maruyama, both of Katsuta; Hiroshi Mabuchi, Hitachi, and Eiichi Amada, Tokyo, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of Tokyo, Japan

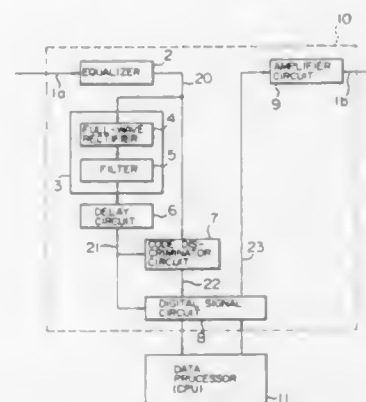
Filed Nov. 12, 1992, Ser. No. 974,992

Claims priority, application Japan, Nov. 12, 1991, 3-295475

Int. Cl.<sup>6</sup> H04L 7/00, 25/36, 25/40

U.S. Cl. 375—371

4 Claims



1. A transmission system including a plurality of reproduction nodes connected to each other in a cascade connection via a communication line, wherein each of the nodes comprises:  
a timing extraction circuit for extracting a timing signal from a signal received via the communication line;  
a discriminating circuit for converting the received signal into a digital signal according to the timing signal; and  
processing means for processing, based on the timing signal, the digital signal outputted from the discriminating circuit and outputting the processed digital signal to the communication line,

the timing extraction circuit including signal delay means for supplying the timing signal with a signal delay time greater than a delay time occurring in the processing means.

### 5,414,740 SYNCHRONOUS COMMUNICATION SYSTEM HAVING MULTIPLEXED INFORMATION TRANSFER AND TRANSITION PHASES

Monty M. Denneau, Brewster; Bruce D. Gavril, Chappaqua; Peter H. Hochschild, New York, all of N.Y., and Craig B. Stunkel, Bethel, Conn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 17, 1992, Ser. No. 992,400

Int. Cl.<sup>6</sup> H04L 7/00

U.S. Cl. 375—371

20 Claims

1. A communication system segment comprising:  
a system clock having a clock period, said system clock generating a clock signal each clock period;  
a source communication station comprising:  
a data source having an output for sequentially outputting a first series of data signals during a first series of clock periods from the system clock, said data source outputting one data signal from the series during each clock period of the first series;

a transition buffer having an output, and having an input connected to receive outputs from the output of the data source, said transition buffer having a first-in, first-out mode in which the transition buffer stores a series of  $Q$

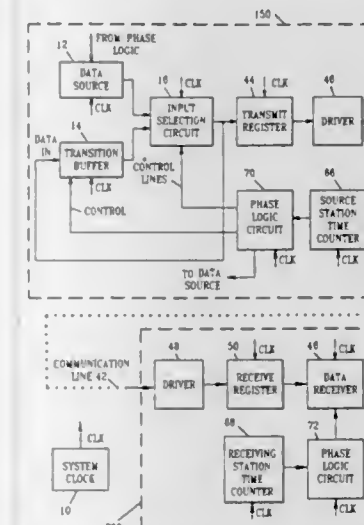
data signals output from the data source during the system clock's most recent  $Q$  clock periods, where  $Q$  is an integer greater than zero; and

the source communication station having a first source station information transfer phase, a second source station information transfer phase different from the first source station information transfer phase and a transition phase in which the data source does not output data signals;

a receiving communication station comprising a data receiver having an input for sequentially inputting a second series of data signals during a second series of clock periods from the system clock, said data receiver inputting one data signal from the series during each clock period of the second series;

the receiving communication station having a first receiving station information transfer phase during which the transition buffer of the source communication station operates in the first-in, first-out mode, a second receiving station information transfer phase different from the first receiving station information transfer phase and a transition phase in which the data receiver does not input data signals;

a communication line having an input connected to the output of the data source of the source communication station and having an output connected to the input of the data receiver of the receiving communication station;



a synchronizer for synchronizing of the first source station information transfer phase with the first receiving station information transfer phase, the first source station and the first receiving station information transfer phases being offset by a synchronization offset  $X$ , and for synchronizing of the second source station information transfer phase with the second receiving station information transfer phase, offset by the synchronization offset  $X$ , where the synchronization offset  $X$  equals a number of clock periods of the system clock by which each phase of the receiving communication station lags the corresponding phase of the source communication station;

wherein during the transition phase of the source communication station the output of the transition buffer is connected to the input of the communication line, and the  $Q$  data signals in the transition buffer are output from the transition buffer in an order which is the same as the order in which the  $Q$  data signals were output from the data source to the transition buffer; and

the synchronizer synchronizes the transition phase of the source communication station with the transition phase of the receiving communication station such that the transition phase of the receiving communication station lags occurrences of the transition phase of the source communication station by the synchronization offset  $X$ .

### 5,414,741 LOW PHASE NOISE OSCILLATOR FREQUENCY CONTROL APPARATUS AND METHOD

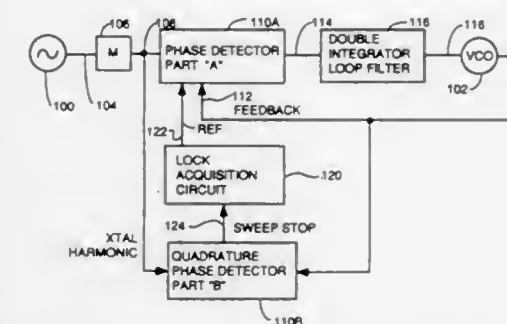
Kent K. Johnson, South Lake Tahoe, Calif., assignor to Litton Systems, Inc., Santa Clara, Calif.

Filed Oct. 14, 1993, Ser. No. 137,278

Int. Cl.<sup>6</sup> H03L 7/00; H03D 3/24

U.S. Cl. 375—376

9 Claims



1. A phase lock loop apparatus having a low phase noise and which is capable of tracking and eliminating microphonic disturbances and phase hits, comprising:

an input for receiving a crystal controlled reference signal;  
a voltage controlled oscillator having a control input for receiving a frequency control input signal and having an output, for outputting a carrier signal at said output having a frequency, phase and frequency rate of change controlled by said frequency control input signal received at said control input;

a phase detector means coupled to receive said crystal controlled reference signal and said carrier signal and having an output at which is generated an error signal, said phase detector means for comparing the phase of said carrier signal to the phase of said crystal controlled reference signal, and for generating at said output an error signal which is indicative of the degree to which said carrier signal is out of phase with said crystal controlled reference signal;

a loop filter means having an output coupled to said control input of said voltage controlled oscillator and having an input coupled to receive said error signal, said input coupled to at least two operational amplifiers coupled as integrators, said loop filter means having a predetermined open loop third order transfer function or a transfer function of an order higher than third order, said loop filter means for receiving and integrating said error signal using said predetermined open loop gain transfer function so as to generate said frequency control input signal to control the frequency of said voltage controlled oscillator, and wherein said predetermined open loop transfer function has a frequency response characterized by a gain magnitude which rolls off at  $-18$  dB/octave from a predetermined first frequency up to a predetermined second frequency, said predetermined first and second frequencies being spread apart far enough to encompass any Fourier frequency components having significant energy content of a carrier signal which has had its frequency and amplitude disturbed by any microphonic disturbance or phase hit, said third order transfer function also characterized by a phase angle which changes with frequency and an open loop gain which is high enough that the open loop gain of said phase lock loop is greater than one at all frequencies below the frequency at which said phase angle is  $-180$  degrees and is high enough such that said loop filter does not oscillate, said transfer function having sufficient gain to insure that the first component to enter nonlinear operation is an integrator in said loop filter means; and

a lock acquisition means coupled to said loop filter means for causing the phase lock loop apparatus to transition from an unlocked to a locked state wherein the frequency,

phase and frequency rate of change of said carrier signal tracks the frequency and phase of said crystal controlled reference signal during a lock acquisition mode, said lock acquisition means achieving said locked state by adding a lock acquisition voltage to said error signal and by increasing a lock acquisition voltage incrementally until said error signal plus said lock acquisition voltage causes said locked state to occur, and for holding said lock acquisition voltage constant at whatever voltage caused said locked state to occur.

5,414,742

# LEAK-DETECTION SYSTEM AND METHOD FOR DETECTING A LEAKING CONTAINER

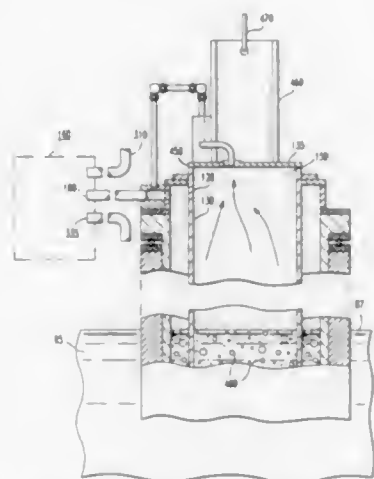
Leonard P. Hornak, Wilkins Township, Allegheny County; Ralph W. Tolino, Wilkinsburg, and Robert B. Salton, Plum Boro, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 10, 1993, Ser. No. 150,710

Int. Cl.<sup>6</sup> G21C 17/00

U.S. Cl. 376—251

20 Claims



10. A leak-detection system for detecting a leaking nuclear fuel rod having a radioactive fission product material leaking through a breach in an exterior surface of the fuel rod, the fuel rod having a predetermined internal pressure, the radioactive fission product material capable of adhering to the exterior surface of the fuel rod as the radioactive fission product material leaks through the breach, the leak-detection system comprising:

- a stationary enclosure defining a cavity surrounding the fuel rod for enclosing the fuel rod therein, the cavity containing a liquid medium covering the exterior surface of the fuel rod and defining a liquid-free volume in the cavity, the liquid medium defining a hydrostatic pressure acting against the exterior surface of the fuel rod;
- a radiation detector in communication with the liquid-free volume for detecting the radioactive fission product material leaking through the breach, said radiation detector including:
  - a suction pump in communication with the liquid-free volume for suctioning the radioactive fission product material therefrom;
  - a radiation-sensitive sensor in communication with said suction pump for sensing the radiation of the radioactive fission product material suctioned by said suction pump, said sensor adapted to generate a sensor output signal in response to the radiation sensed thereby;
  - an analyzer connected to said sensor for receiving the sensor output signal and for providing an analysis of the sensor output signal, said analyzer adapted to generate an analyzer output signal associated with the analysis provided thereby;

- a controller connected to said analyzer for controlling said analyzer;
- a display connected to said analyzer for receiving the analyzer output signal and for displaying the analyzer output signal received thereby;
- a gas injection manifold in communication with the liquid medium contained in the cavity defined by said enclosure for injecting a gas into the liquid medium to provide a multiplicity of upwardly rising gas bubbles in the liquid medium, the gas bubbles capable of removing the radioactive fission product material adhering to the liquid-free volume, so that the radioactive fission product material is suctioned from the liquid-free volume and into said suction pump and thereafter travels to said radiation detector for detecting the leaking fuel rod; and
- a movable elevator connected to said fuel rod for elevating the fuel rod in the cavity defined by said enclosure, so that the hydrostatic pressure acting against the exterior surface of the fuel rod is reduced to relieve the internal pressure in the fuel rod and so that the radioactive fission product material expands and thereafter leaks through the breach as the internal pressure is relieved to prevent the radioactive fission product material from hiding-out in the fuel rod.

5,414,743

# SECONDARY-SIDE RESIDUAL-HEAT REMOVAL SYSTEM FOR PRESSURIZED-WATER NUCLEAR REACTORS

Pramod Batheja, Erlangen; Otto Gremm, Spardorf; Werner Leidemann, Obermichelbach, and Jürgen Wirkner, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

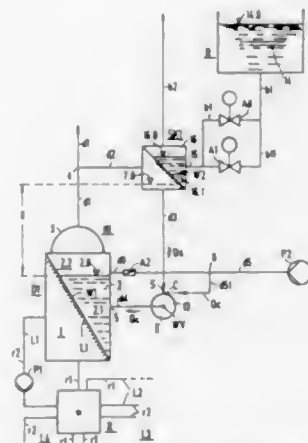
Filed Feb. 14, 1994, Ser. No. 195,630

Claims priority, application Germany, Aug. 12, 1991, 41 26 630.7

Int. Cl.<sup>6</sup> G21C 15/18

U.S. Cl. 376—299

6 Claims



- In a pressurized-water nuclear reactor having a primary loop, a secondary-side residual-heat removal system, comprising:
  - a steam generator having a primary side, a secondary side, heat-exchanging tubes on said primary side being connected into the primary loop of the nuclear reactor, a feed-water connection on said secondary side, a main feed-water pump connected to said steam generator;
  - a safety condenser, circuit lines having a cold leg leading from said safety condenser to said feed-water connection of said steam generator, said safety condenser having a secondary side connected to said secondary side of said steam generator by said circuit lines in a secondary circuit

and having a tertiary side allowing a throughflow of a tertiary medium for cooling said secondary side of said safety condenser, said safety condenser being disposed at a higher level than said steam generator, defining a difference in level between said safety condenser and said steam generator being dimensioned for achieving a natural circulation in said secondary circuit leading through said secondary side of said steam generator and said safety condenser in a residual-heat removal operation;

- a vortex chamber valve having a supply connection, an outlet, a control connection and an internal flow path leading from said supply connection to said outlet and into said cold leg of said circuit lines, said control connection shutting off said internal flow path with a secondary-side control pressure to be tapped off in normal operation of said steam generator, but releasing said control path in residual-heat removal operation, when the control pressure drops or disappears, for freely switching on said vortex chamber valve due to a reduced control pressure at said control connection and setting a circulating flow in motion in said secondary circuit through said vortex chamber valve, when said main feed-water pump is switched off; and
- a water reservoir having a water level, whereby said water level being geodetically higher level than said safety condenser for supplying said tertiary side of said safety condenser.

5,414,744

# SERIAL BIT INPUT CONTROLLER

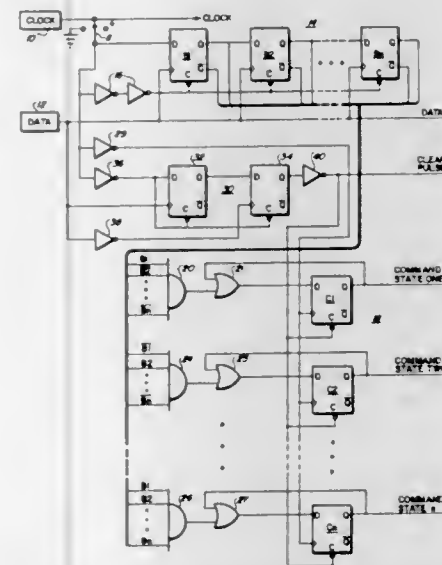
Paul S. Levy, Chandler, Ariz., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Sep. 24, 1993, Ser. No. 126,289

Int. Cl.<sup>6</sup> G11C 19/00; H03K 19/0175

U.S. Cl. 377—75

7 Claims



- A serial bit input controller including in combination:
  - a source of binary clock pulses having an output and supplying pulses alternating between first and second signal levels and further including means therein for holding the signal on the output thereof at either of said first and second levels;
  - a source of binary data pulses having first and second signal levels;
  - a command storage register circuit having an enabling input coupled with the output of said source of binary clock pulses and having a toggle input coupled with said source of binary data pulses, said command storage register circuit enabled by the output of said source of binary clock pulses being held at said first level by said holding means;
  - a command latch circuit coupled with the output of said

storage register circuit and coupled with said source of binary clock pulses for producing a command state signal corresponding to the output of said storage register circuit when the signal on the output of said source of binary clock pulses changes from the first level thereof to the second level thereof.

5,414,745

# SYNCHRONIZED CLOCKING DISABLE AND ENABLE CIRCUIT

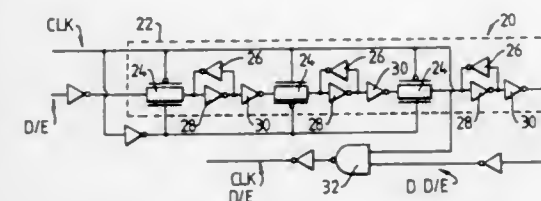
William M. Lowe, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jun. 1, 1993, Ser. No. 69,521

Int. Cl.<sup>6</sup> G11C 19/28

U.S. Cl. 377—114

11 Claims



- A clocking disable and enable circuit comprising:
  - a multiple stage latching circuit having a latching input and a latching output, said latching circuit is capable of receiving a disable signal at said input and is also capable of delaying said disable signal at said output until said latching circuit receives a clocking signal; and
  - a logic gate having two logic inputs and a single logic output, wherein one logic input is coupled to receive the delayed said disable signal and the other logic input is coupled to receive said clocking signal, said logic output produces a logic output signal synchronized with said clocking signal, and said logic output signal transitions to a steady state voltage at a time in which one input receives a transition of said clocking signal and coincident with a time during which said other input receives the delayed said disable signal, said logic output signal further transitions from said steady state voltage to become synchronized with and equal to said clocking signal at a time in which one input receives a transition of said clocking signal coincident with a time during which said other input ceases receiving the delayed said disable signal.

5,414,746

# X-RAY EXPOSURE MASK AND FABRICATION METHOD THEREOF

Kimiyoshi Deguchi, Atsugi; Yoh Somemura, Zama; Kazuoori Miyoshi, and Tadahito Matsuda, both of Atsugi, all of Japan, assignors to Nippon Telegraph & Telephone, Tokyo, Japan

Continuation of Ser. No. 871,959, Apr. 21, 1992. This application Nov. 1, 1993, Ser. No. 146,474

Claims priority, application Japan, Apr. 22, 1991, 3-116637; May 24, 1991, 3-148119; Jun. 28, 1991, 3-183470

Int. Cl.<sup>6</sup> G21K 5/00

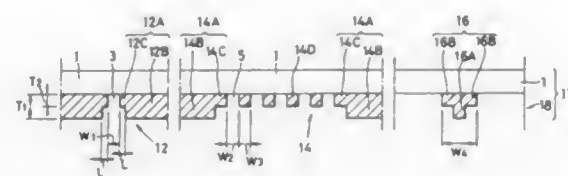
U.S. Cl. 378—35

18 Claims

- An X-ray exposure mask for exposing a sample by means of a 1:1 proximity printing method with an incident X-ray from an X-ray source comprising:
  - an X-ray transmission layer for transmitting an X-ray being incident on the X-ray exposure mask; and
  - an X-ray absorption layer for absorbing said X-ray being incident on the X-ray exposure mask, said X-ray absorption layer formed on said X-ray transmission layer and being composed of a single material and being patterned to have a plurality of patterns with substantially right-angle



gled edges and respective plane projection areas and thicknesses, the thickness of the respective patterns being



varied in accordance with the plane projection area of the respective patterns and larger where the plane projection area is larger.

5,414,747

# METHOD AND APPARATUS FOR IN-PROCESS ANALYSIS OF POLYCRYSTALLINE FILMS AND COATINGS BY X-RAY DIFFRACTION

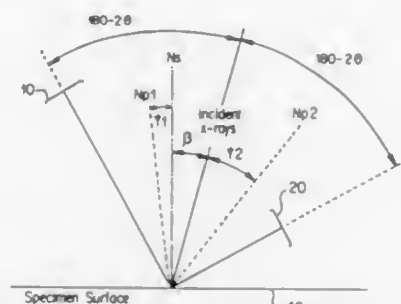
Clayton O. Ruud, State College, Pa., and Mark E. Jacobs, Wheelersburg, Ohio, assignors to The Penn State Research Foundation, University Park, Pa.

Continuation-in-part of Ser. No. 20,480, Feb. 22, 1993. This application Jan. 31, 1994, Ser. No. 189,464

Int. Cl.<sup>6</sup> G01N 23/207

U.S. Cl. 378—73

21 Claims



1. A method for real time analysis of a plated specimen the method including the steps of arranging two or more position sensitive detector surfaces with at least one first said detector surface positioned on either side of an incident x-ray beam and at least one second said detector surface positioned on either side of said incident x-ray beam for detecting x-rays diffracted from a plurality of crystallographic planes of said specimen at various angles, said detector surfaces positioned at different distances from said specimen, said method comprising the steps of:

applying x-radiation to a specimen comprising at least one polycrystalline plating on a substrate;  
measuring the spectra of diffracted peaks of said x-radiation diffracted from said at least one plating or substrate to said detector surfaces; and  
processing said spectra to yield an elemental content of the phase or phases of said at least one plating.

5,414,748

# X-RAY TUBE ANODE TARGET

Kamleshwar Upadhyay, Quartz Hill, Calif., assignor to General Electric Company, Milwaukee, Wis.

Filed Jul. 19, 1993, Ser. No. 93,610

Int. Cl.<sup>6</sup> H01J 35/10

U.S. Cl. 378—144

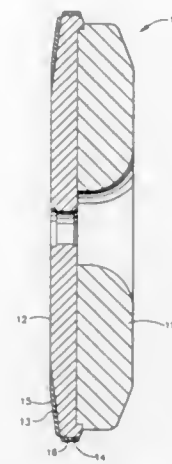
1 Claim

1. An x-ray tube rotating anode structure comprising in combination

(a) a circular graphite body,  
(b) a circular titanium, zirconium, molybdenum, alloy target section disc concentrically bonded to said graphite body,

(c) said target section disc having a peripheral axial rim surface,

(d) and an exposed high heat emissivity hafnium carbide coating on said target section rim surface, said coating having a heat emissivity greater than that of said target disc,



(e) said coating being further characterized by having a thickness from about 4.0 μm to about 5.0 μm and a heat emissivity which increases with an increase in its temperature.

5,414,749

# X-RAY FILM HOLDER WITH A COLLISION PREVENTIVE HOOD

Josephus A. M. Van Alst, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

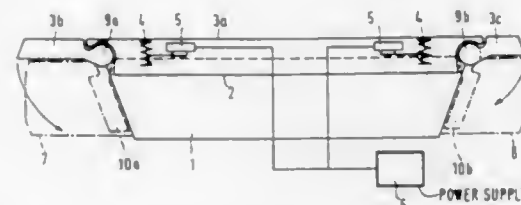
Continuation of Ser. No. 101,158, Aug. 3, 1993. This application Aug. 25, 1994, Ser. No. 296,259

Claims priority, application European Pat. Off., Aug. 5, 1992, 92202417

Int. Cl.<sup>6</sup> G03B 42/02

U.S. Cl. 378—172

8 Claims



1. An x-ray film holder adapted to be mounted on a frame supported by a moveable means of an X-ray examination apparatus, said x-ray film holder being provided with a collision preventive hood cooperating with switch means for in response to a collision of an object with said hood, interrupting a supply of power to said moveable means, characterized in that the collision preventive hood comprises a plurality of sections that are mutually displaceable.

5,414,750

# AUTOMATED SEAMLESS CELLULAR TELEPHONE NETWORK

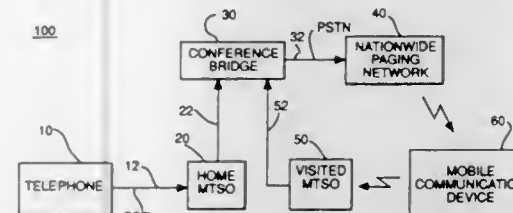
Jai P. Bhat, Jackson, Miss.; David W. Ackerman, Washington, D.C.; Ernest A. Oswald, Raymond, and William D. Hays, Jackson, both of Miss., assignors to Mobile Telecommunication Technologies, Jackson, Miss.

Filed Jun. 9, 1993, Ser. No. 73,527

Int. Cl.<sup>6</sup> H04M 11/00

U.S. Cl. 379—57

9 Claims



9. A communication system comprising:  
means for generating a communication signal;  
means for receiving the communication signal and generating a first signal in response to the communication signal;  
a first mobile switching center coupled to the receiving means;  
a conference bridge coupled to the first mobile switching center;  
a paging network coupled to the conference bridge;  
means for transmitting said first signal to the first mobile switching center, said first mobile switching center comprising:  
at least one first input port and at least one first output port;  
means for receiving said first signal at the one first input port;  
means responsive to said first signal for generating a second signal, said second signal including a conference bridge number corresponding to the conference bridge; and  
means for transmitting said second signal through the one first output port;  
said conference bridge comprising:  
at least one second input port and at least one second output port;  
means for receiving said second signal at the one second input port;  
means responsive to said second signal for generating a third signal, said third signal including a paging network number corresponding to the paging network; and  
means for transmitting said third signal through the one second output port;  
said paging network comprising:  
means for receiving said third signal;  
means responsive to said third signal for generating a page signal; and  
means for transmitting said page signal;  
a second mobile switching center, coupled to the paging network, comprising:  
at least one third input port and at least one third output port;  
means, responsive to the page signal, for receiving a fourth signal including a conference bridge callback number at the one third input port; and  
means for retransmitting said fourth signal to said conference bridge through the one third output port;  
said conference bridge further comprising:  
means for receiving said retransmitted fourth signal; and  
means responsive to said fourth signal for connecting the one first input port of the first mobile switching center to the one third output port of the second mobile switching center.

5,414,751

# PORTABLE TELEPHONE APPARATUS RESPONSIVE TO CONTROL SIGNALS OBTAINED THROUGH A CONNECTOR AND THROUGH A WIRED TELEPHONE LINE FOR AMENDING THE OPERATIONAL PROGRAM

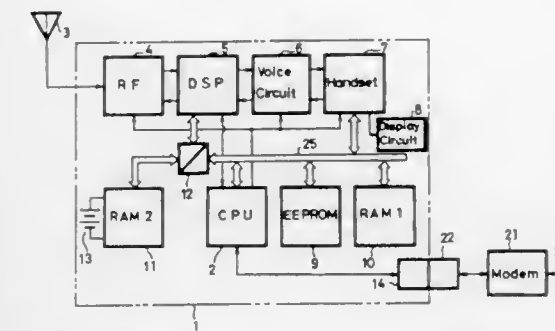
Akihiro Yamada, Satima, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 18, 1992, Ser. No. 884,827

Claims priority, application Japan, May 23, 1991, 3-118678  
Int. Cl.<sup>6</sup> H04Q 7/00, 7/32

U.S. Cl. 379—58

11 Claims



1. A portable telephone apparatus, comprising:  
radio means for communicating with a base station through a radio telephone channel;  
controller means for controlling operation of said apparatus in accordance with an operational program;  
a connector for making a wired connection from said apparatus to a wire telephone line; and  
amending means, responsive to control signals obtained through said connector, for amending said operational program for said controller, wherein said control signals are transmitted over said wired telephone line and received through said connector;  
an Electrically Erasable Programmable Read Only Memory (EEPROM) for storing said operational program; and  
a first Random Access Memory (RAM) for temporarily storing said control signals to be used for amending said operational program stored in said EEPROM;  
a digital signal processor for processing voice signals;  
a second RAM for storing a portion of said operational program used for controlling operation of said digital signal processor;  
switching means, responsive to said controller means, for selectively connecting said second RAM to either said controller means or said digital signal processor, and wherein said second RAM is connected to said digital processor during a normal operational mode and to said controller in a change mode wherein the second RAM's content is changed.

5,414,752

# METHOD FOR ACHIEVING COMMUNICATION BETWEEN A PLURALITY OF PARTICIPANTS

Björn E. R. Jonsson, Järfälla, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Feb. 16, 1993, Ser. No. 18,197

Claims priority, application Sweden, Feb. 17, 1992, 9200470  
Int. Cl.<sup>6</sup> H04M 11/00

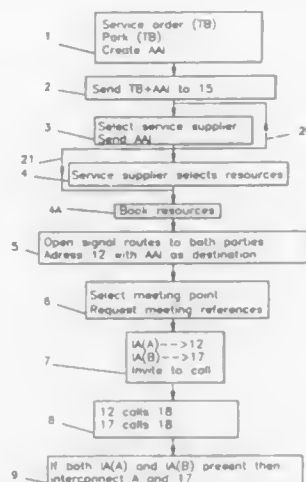
U.S. Cl. 379—58

15 Claims

1. A method for utilizing at least one telecommunication network for achieving communication between four participants, namely: a service customer who orders a service which is addressed with a destination address; a service order central which is able to identify that the destination address of an incoming call relates to a service; a service supplier which administers and supplies services and which is selected by the

service order central; and a service receiver for receiving an ordered service; said method comprising the following steps: the service customer orders a service; and directing the service order to an appropriate service order central in which the order arrives on an incoming connection,

wherein the service order central: parks the incoming call; starts an assignment process which creates a service order individual which allots the service order an order identity which relates the service order to the service customer; sends a unidirectional alert which includes the order identity and which is transmitted further via nodes, of which



one node finally establishes the service supplier from which the service ordered shall be delivered; the service supplier creates a signal connection to the service order individual in order to settle, with the service order individual, the conditions for establishing a connection via which the ordered service shall be delivered, said service supplier using the order identity as a reference when said signal connection cooperation is established, the service supplier books resources required for supplying the ordered service; the service supplier and the service customer decide their tasks of originating and of terminating said connection used for the delivery of the ordered service, and the service supplier supplies the ordered service to the service receiver.

5,414,753

**NUMBER ASSIGNMENT MODULE SETTING SYSTEM FOR PORTABLE TELEPHONE SET**  
Tatsuji Ehara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 21, 1993, Ser. No. 94,431

Claims priority, application Japan, Jul. 30, 1992, 4-204135  
Int. Cl.<sup>6</sup> H04Q 7/32

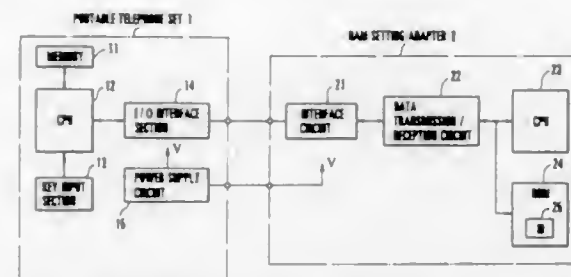
U.S. Cl. 379—58

5 Claims

1. A number assignment module setting system for a portable telephone set, comprising: a portable telephone set for inputting a number assignment module in a number assignment module setting mode; and a number assignment module setting adapter connected to said portable telephone set to set said portable telephone set in the number assignment module setting mode, said portable telephone set including main power supply means for supplying power within the portable telephone set, first data supply means for supplying first data to said num-

ber assignment module setting adapter in response to a predetermined first key input, analyzing means for receiving second data formed by said number assignment module setting adapter on the basis of the first data, and performing analysis to check whether the first data can be calculated back from the second data, and

mode setting means for setting the number assignment module setting mode in response to a predetermined second key input when an output from said analyzing means indicates that the first data can be calculated back from the second data, and said number assignment module setting adapter including



local power supply means for supplying power to the number assignment module setting adapter by the power supplied from the main power supply means, second data supply means for forming the second data from the first data received from said portable telephone set by a predetermined calculation method using pre-stored third data as a parameter, and supplying the second data to said portable telephone set,

first memory means for storing the third data as a self-management number, said analyzing means calculates back to the first and third data from the second data by a predetermined second calculation method, and connectors and cables for interconnecting the portable telephone set to the number assignment module setting adapter.

5,414,754

**SYSTEM FOR PROVIDING PROACTIVE CALL SERVICES UTILIZING REMOTE MONITORS**

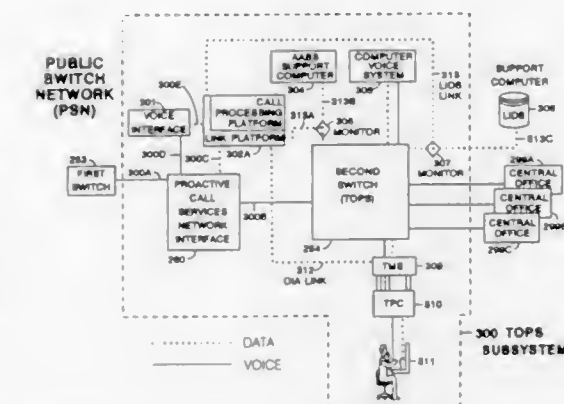
Joel A. Pugh, Dallas, and Robert E. Nimon, Arlington, both of Tex., assignors to Messenger Partners, Dallas, Tex.

Continuation-in-part of Ser. No. 524,633, May 16, 1990, Pat. No. 5,131,024. This application Jul. 9, 1992, Ser. No. 911,020  
The portion of the term of this patent subsequent to Jul. 14, 2009, has been disclaimed.

Int. Cl.<sup>6</sup> H04M 1/64

U.S. Cl. 379—67

20 Claims



1. In a telephone network having a calling station connect-

able to a first switch means and a called station connectable to a second switch means, with the first and second switch means being connectable by a first link for call completion, with at least said second switch means also connectable by a data link to means for furnishing information necessary for call completion, the improvement comprising:

means connectable in said first link for storing call setup signals passing between said first switch means and said second switch means; means connectable in said data link for storing call data; means connectable in said first link to monitor for entry of a predetermined service access code by a user of the calling station or a user of the called station after call completion between the calling station and the called station and before either of said users goes on-hook; and control means connected to said monitor and responsive to entry of the predetermined access code for controlling offer and acceptance of one or more predetermined services, said stored data from said data link being used to determine information necessary for call completion, wherein call completion is then controlled and paid for by the user requesting the service.

5,414,755

**SYSTEM AND METHOD FOR PASSIVE VOICE VERIFICATION IN A TELEPHONE NETWORK**  
Lawrence G. Bahler, and Alan L. Higgins, both of San Diego, Calif., assignors to ITT Corporation, New York, N.Y.

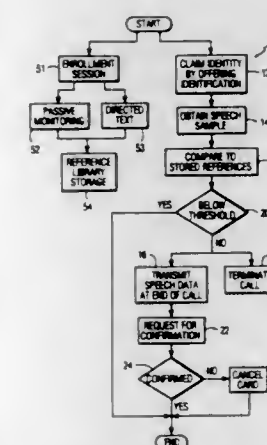
Filed Aug. 10, 1994, Ser. No. 105,849

The portion of the term of this patent subsequent to Dec. 14, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H04M 11/00

U.S. Cl. 379—67

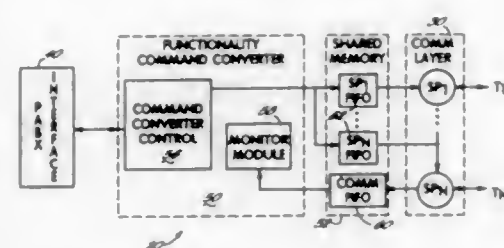
21 Claims







a PABX interface for transmitting said PABX commands to a PABX and for receiving PABX status information from



said PABX, whereby said command originating computer terminals may control and monitor said PABX.

5,414,763

**APPARATUS AND METHOD FOR PROVIDING ECHO SUPPRESSION TO A PLURALITY OF TELEPHONES**  
Osamu Hirata, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

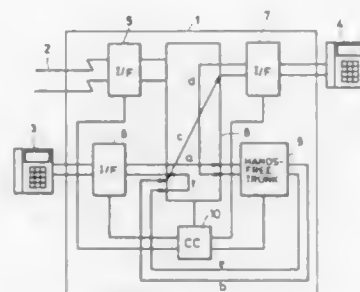
Filed Feb. 25, 1992, Ser. No. 840,531

Claims priority, application Japan, Apr. 9, 1991, 3-103829

Int. Cl.<sup>6</sup> H04M 3/42

U.S. Cl. 379-201

13 Claims



1. A telephone switching apparatus comprising: a line network to which a plurality of telephones including first and second telephones are connected; an echo suppressor whose input and output terminals are connected to said line network, for suppressing a second voice from the second telephone when the second voice is weaker than a first voice from the first telephone; and control means for controlling said line network, wherein said line network, under control by said control means, superposes respective voices from the first and second telephones on two time slots of a single highway to said input terminal of said echo suppressor, and transmits an output signal from said output terminal of said echo suppressor to the first telephone.

5,414,764

**COMMUNICATIONS APPARATUS**

Tsunehiro Watanabe, Tokyo; Hisao Terajima, and Teruyuki Nishii, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 803,438, Dec. 6, 1991, abandoned. This application Apr. 14, 1994, Ser. No. 227,583

Claims priority, application Japan, Dec. 10, 1990, 2-401062; Jan. 25, 1991, 3-007766

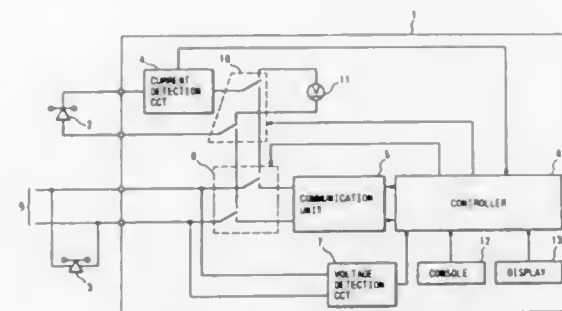
Int. Cl.<sup>6</sup> H04M 1/65

U.S. Cl. 379-377

13 Claims

1. A communication apparatus which is connectable in parallel with a first communication equipment to a two-wire telephone line, and to which a second communication equipment is connectable, said apparatus comprising:

communication means for communicating through the two-wire telephone line;  
switching means for selectively connecting the two-wire telephone line to said second communication equipment or said communication means;  
voltage detection means for detecting a voltage across the two-wire telephone line;  
current detection means arranged in a connection path be-



tween said switching means and said second communication equipment for detecting a current of the connection path;  
command means for commanding communication by said communication means; and  
control means for controlling said switching means and the communication by said communication means in accordance with detecting by said voltage and current detection means and commanding by said command means.

5,414,765

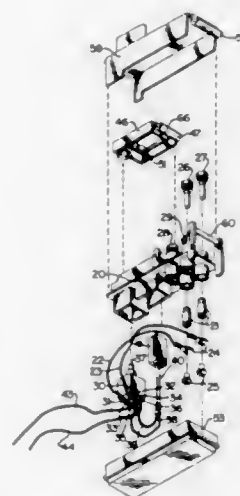
**NETWORK INTERFACE DEVICE HAVING SWITCH**  
Todd C. Lanquist, Watauga, and James W. Goodson, Fort Worth, both of Tex., assignors to Sicom Corporation, Hickory, N.C.

Filed Aug. 23, 1993, Ser. No. 111,323

Int. Cl.<sup>6</sup> H04M 1/00

U.S. Cl. 379-399

8 Claims



1. A network interface device for terminating network wiring at a subscriber's premises and for connecting the subscriber's wiring to the network wiring, comprising:

a set of terminals to which subscriber wiring may be connected;  
a test jack to which a device known to be operational may be connected;  
a switch in electrical connection with network wiring, the test jack, and the set of terminals, the switch placing the

network wiring in electrical communication with the test jack but not the set of terminals when the switch is in a first position and with the set of terminals but not the test jack when the switch is in a second position;  
a first door, not covering the set of terminals, which covers the test jack when the first door is closed and which does not cover the test jack when the first door is open; and  
activation means for causing the switch to be in its first position when the first door is open and in its second position when the first door is closed.

5,414,766

**PROCESS AND DEVICE FOR ADAPTIVE DIGITAL CANCELLATION OF THE ECHO GENERATED IN TIME-VARYING TELEPHONE CONNECTIONS**

Giacomo Cannalire, Cassano D'Adda, and Luigi Morini, Cervesina, both of Italy, assignors to Siemens Telecommunications S.p.A., Milan, Italy

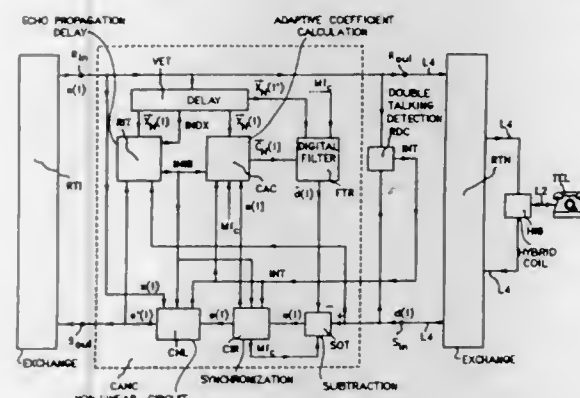
Filed Feb. 23, 1993, Ser. No. 21,522

Claims priority, application Italy, Feb. 24, 1992, MI92A0398

Int. Cl.<sup>6</sup> H04M 9/08

U.S. Cl. 379-410

20 Claims



1. A process for adaptive digital cancellation of an echo generated in telephone connections with electrical characteristics that vary rapidly in time, comprising the steps of:

estimating a pure propagation delay INDX between a voice signal  $x(t)$  of a far-end talker and an echo signal  $d(t)$  produced by reflection of said voice signal toward the far-end talker along an echo path,  $t$  being a temporal variable discretized at a sampling frequency of the voice and echo signals  $x(t)$  and  $d(t)$ ;  
non-recursive digital filtering with adaptive coefficients ( $c_i$ ) the voice samples of the far-end talker delayed by a value of said propagation delay INDX for generation of samples of an estimated signal  $\hat{d}(t)$  of the echo signal  $d(t)$ ;  
subtraction of said estimated signal  $\hat{d}(t)$  from the echo signal  $d(t)$  to obtain an echo residual signal  $e(t)$  sent to the far-end talker without effects due to the echo signal  $d(t)$ ;  
iteratively updating said adaptive coefficients ( $c_i$ ) by adding algebraically, upon each iteration, to a value of said adaptive coefficients in an immediately preceding iteration; calculating a correction term proportional to a value of the echo residual signal for a present iteration; and providing a frequency of the updating iterations of said adaptive coefficients ( $c_i$ ) that has a value which is a multiple  $M$  of said sampling frequency.

5,414,767

**ECHO CANCELLER**

Marianne Kerguiduff, Trebeuren, France, assignor to U.S. Philips Corporation, New York, N.Y.

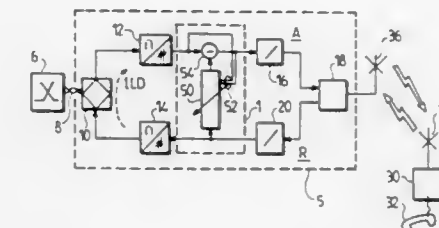
Filed Nov. 23, 1993, Ser. No. 156,487

Claims priority, application France, Nov. 25, 1992, 92 14187

Int. Cl.<sup>6</sup> H04M 9/08

U.S. Cl. 379-410

7 Claims



1. A transmit/receive station for use in a data communication system comprising a plurality of transmit/receive stations and wherein a data signal transmitted by a first station to another station results in an echo of the transmitted data signal accompanying a data signal received by said first-named station from said other station; said first-named station including an echo canceller circuit which comprises an adaptive filter for deriving a synthesized echo signal which approximates an echo signal which will be produced by a data signal transmitted by said first-named station, said echo canceller circuit further comprising a subtractor circuit for deriving an echo-corrected data signal by subtracting said synthesized echo signal from the transmitted data signal prior to transmission thereof; characterized in that said adaptive filter comprises:

delay means for successively delaying a data signal to be transmitted by a series of intervals ( $T$ ) each corresponding to a data symbol period of said data signal, and producing respective samples of said data signal at the respective delay intervals;  
means for multiplying the respective samples of said data signal by respective weighting factors and deriving a summation of the multiplied samples, said summation constituting said synthesized error signal; and  
calculating means coupled to said subtractor circuit for receiving said echo-corrected data signal and deriving said weighting factors based thereon; a weighting factor for a succeeding signal sample being derived by adding to the weighting factor for the preceding signal sample a correction term given by the product of the latter weighting factor by a constant ( $d$ ), said constant ( $d$ ) having a value less than one and an arithmetic sign determined by the difference between the preceding signal sample and the synthesized error signal relating to said preceding signal sample.

5,414,768

**APPARATUS FOR ELECTRICALLY AND MECHANICALLY CONNECTING AN AUXILIARY DEVICE TO A MAIN UNIT**

Wayne McKinnon, Georgetown; David Bryant, Austin; William McRight, Round Rock, and Edwin Kretzschmar, Austin, all of Tex., assignors to Rolm Systems, Santa Clara, Calif.

Continuation of Ser. No. 903,583, Jun. 25, 1992, abandoned.

This application May 12, 1994, Ser. No. 241,952

Int. Cl.<sup>6</sup> H04M 1/00

U.S. Cl. 379-428

4 Claims

1. An interconnect bracket which mechanically and electrically connects an auxiliary device having: (a) an aperture with a guide receiving portion and a tab receiving portion, (b) a first fastening means, and (c) an internal auxiliary device connector accessible through the aperture with a main unit having: (a) a base with a bottom surface, (b) a side wall with an inner surface adjacent to the bottom surface, (c) a recessed area within the



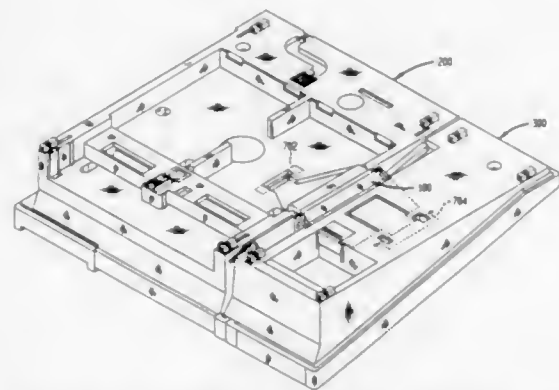
bottom surface and the inner surface, (d) a tab receiving slot, and (e) an internal main unit connector located within the tab receiving slot, the interconnect bracket comprising:

a main unit connector configured to be detachably connectable to the internal main unit connector;

a main unit bracket joined to and integral with the main unit connector, the main unit bracket being adapted to fit within the recessed area in the main unit and to position the main unit connector in connection with the internal main connector, the main unit bracket having one or more fastening holes for fastening the main unit bracket to the main unit;

a coupling member joined to and integral with the main unit bracket on a side opposite to said main unit connector; an auxiliary device connector joined to and integral with the coupling member on a side opposite the main unit bracket and configured to be detachably connectable to the internal auxiliary device connector; wherein the main unit connector, the main unit bracket, the coupling member, and the auxiliary device connector form a single integrated unit; and

one or more traces which are disposed on the surface of the interconnect bracket and which extend from the main unit connector to the auxiliary device connector, the traces



electrically connecting the main unit connector with the auxiliary device connector and the traces joined to the auxiliary device connector forming a means for electrically connecting the auxiliary device connector with the internal auxiliary device connector and the traces joined to the main unit connector forming a means for electrically connecting the main unit connector with the internal main unit connector;

the coupling member further comprising:  
second fastening means for removably mating with the first fastening means in the auxiliary device to secure the interconnect bracket with the auxiliary device;  
a guide, joined to and integral with said coupling member and configured to be received by the guide receiving portion of the auxiliary device, for cooperating with the guide receiving portion of the auxiliary device to restrict travel of the interconnect bracket into the auxiliary device for aligning the auxiliary device connector with the internal auxiliary device connector; and  
a riser, connected to the coupling member on a side opposite the main unit bracket and connected to the auxiliary device connector, the riser being configured to align the auxiliary device connector with the internal auxiliary connector.

5,414,769

## ARTICULATED HEADSET SUPPORT

Phillip A. Gattey, Los Gatos; Christlne Burris, Santa Cruz, and Wolfgang W. Jensen, Aptos, all of Calif., assignors to ACS Communications, Inc., Scotts Valley, Calif.

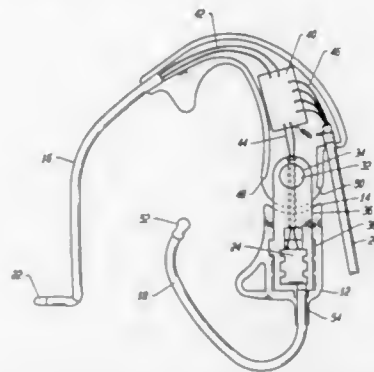
Continuation of Ser. No. 103,344, Aug. 6, 1993, abandoned, which is a continuation of Ser. No. 925,317, Aug. 4, 1992, Pat. No. 5,260,997, which is a continuation of Ser. No. 785,531, Oct. 31, 1991, abandoned. This application Jun. 7, 1994, Ser. No. 255,232

The portion of the term of this patent subsequent to Nov. 9, 2010, has been disclaimed.

Int. Cl.<sup>6</sup> H04M 1/00

U.S. Cl. 379—430

5 Claims



1. An articulated headset support, to be worn on an ear, comprising:

a main housing having an arcuate surface that rests on top of the ear and extends to the back of the ear behind the pinna;  
a secondary housing having an arcuate surface that adjustably contacts the lower-back portion of the ear behind the pinna; and

friction hinge means for pivotally connecting said main housing with said secondary housing, said hinge means being located behind the pinna at the back of the ear, said hinge means allowing the position of the main housing to be adjusted with respect to the secondary housing to permit the respective arcuate surfaces to be drawn closer together in a clamping motion so that a tight fit around the ear is achieved thereby providing enhanced stability.

5,414,770

## STRUCTURE OF MOBILE TELEPHONE RACK

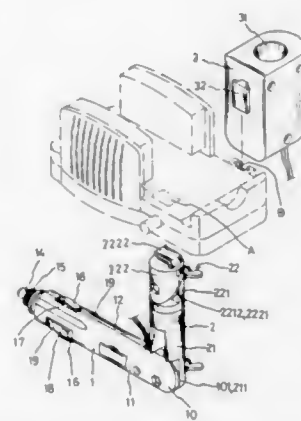
Fore S. Wang, No. 174, Lane 131, Sec. 2, True Hsing Rd., Pan-chiao City, Taipei Hsien, Taiwan, Prov. of China

Filed Apr. 11, 1994, Ser. No. 225,550

Int. Cl.<sup>6</sup> H04M 1/00

U.S. Cl. 379—446

2 Claims



1. A mobile telephone rack of the type having a rack body

for holding a mobile telephone permitting it to be charged to the saturation state, the improvement comprising:

a plug rod which comprises a plug rod body formed of a first half shell and a second half shell fastened together by screws, a contact metal plug tip fastened to said plug rod body at a front end thereof by a screw member and supported on a spring for making an electric contact with a center contact of a socket for cigarette-lighter on a motor vehicle's instrument board, a front contact metal plate received inside said plug rod body and connected to said contact metal plug tip, an intermediate contact metal plate connected to said front contact metal plate, a rear contact metal plate connected to said intermediate contact metal plate by a fuse, a curved contact metal spring plate supported on a positioning block inside said plug rod body and having two opposite sides projecting out of said plug rod body for making an electric contact with a side contact of the socket for cigarette-lighter, said first half shell having a rear extension, the rear extension having a toothed portion comprised of a plurality of radial teeth disposed around a circle;

a support which is comprised of a bottom supporting rod and a top supporting rod, said bottom supporting rod having a toothed portion comprised of a plurality of radial teeth disposed around a circle and meshed with the toothed portion on the rear extension of said first half shell of said plug rod and then fixed in position by a screw bolt and having a center hole on a top end thereof, said top supporting rod comprised of a bottom connecting rod and a top steering rod, said bottom connecting rod of said top supporting rod comprising a bottom extension rod and a toothed portion, the bottom extension rod of said bottom connecting rod of said top supporting rod being inserted into the center hole on said bottom supporting rod and fixed in position by a tightening-up screw, the toothed portion of said bottom connecting rod of said top supporting rod being comprised of a plurality of teeth disposed around a circle, said top steering rod having a toothed portion and a hooked top extension connected to the rack body of the mobile telephone rack by a hooked joint, the toothed portion of said top steering rod comprised of a plurality of teeth disposed around a circle and meshed with the toothed portion on said bottom connecting rod and fixed in position by a screw bolt; and

a cigarette lighting socket which comprises a center hole having a side contact and a center contact respectively connected to said curved contact metal spring plate and said rear contact metal plate, and a hooked side extension connected to the rack body of the mobile telephone rack by a hooked joint.

5,414,771

## SYSTEM AND METHOD FOR THE CREATION OF RANDOM SEQUENCES AND FOR THE CRYPTOGRAPHIC PROTECTION OF COMMUNICATIONS

Kenneth J. Fawcett, Jr., Falls Church, Va., assignor to MRJ, Inc., Oakton, Va.

Filed Jul. 13, 1993, Ser. No. 90,262

Int. Cl.<sup>6</sup> H04L 9/24

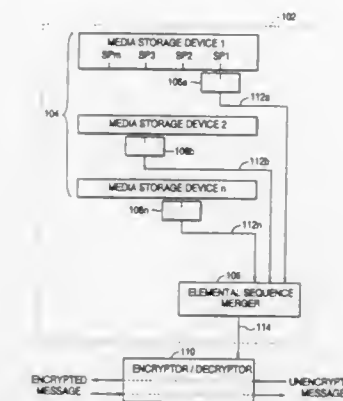
U.S. Cl. 380—44

19 Claims

1. A system for creating a combinational sequence, comprising:

two or more media storage means for storing elemental sequences, each of said two or more media storage means being accessible from a plurality of starting points;  
media reading means for reading a selected portion from each of at least two of said two or more media storage means,

wherein each said selected portion is accessed from a specified one of said plurality of starting points; and



combinational sequence generation means for combining each said selected portion to form a combinational sequence,  
said combinational sequence forming a random sequence.

5,414,772

## SYSTEM FOR IMPROVING THE DIGITAL SIGNATURE ALGORITHM

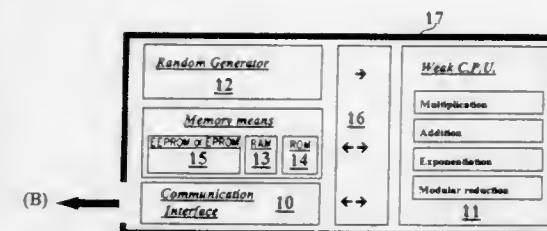
David Naccache, Maisons Alfort, and David M'raihi, Marseille, both of France, assignors to Gemplus Development, Gemenos, France

Filed Jun. 23, 1993, Ser. No. 82,228

Int. Cl.<sup>6</sup> H04K 1/00

U.S. Cl. 380—46

17 Claims



1. A system, comprising, at least, two parts, connected to each other by the means of a common communication interface wherein a first communicating apparatus A, having data processing means, communication means, memory means and pseudorandom generation means relies on the computational power of a second communicating apparatus B having data processing means, communication means and memory means in order to compute the inverse of a first number  $x$  modulo a second number  $n$ , wherein  $n$  is a whole number greater than 1, and use the resulting modular inverse in one of an encryption, decryption, key exchange, identification and digital signature cryptographic protocol.

5,414,773

## CATV SYSTEMS

Doron Handelman, Givataim, Israel, assignor to News Datacom Ltd., London, England

Filed Sep. 15, 1993, Ser. No. 121,349

Claims priority, application Israel, Aug. 19, 1993, 106746

Int. Cl.<sup>6</sup> H04M 11/06; H04H 1/02, 7/10; H04L 9/00

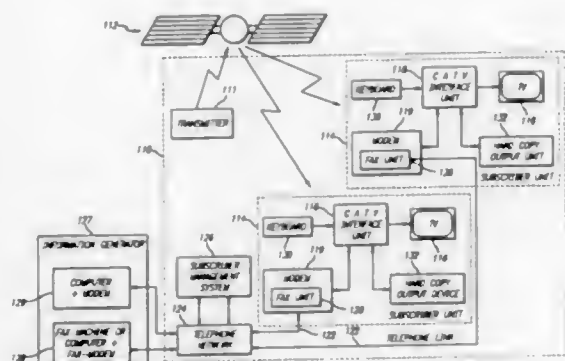
U.S. Cl. 380—49

16 Claims

7. A CATV system comprising:  
a CATV network;  
a multiplicity of subscriber units;  
apparatus for transmitting information over said CATV

network to at least some of said multiplicity of subscriber units, wherein at least some of said multiplicity of subscriber units comprise:

- a display;
- a hard copy output unit for providing a hard copy output of information received via the CATV network; and
- a subscriber operated selector for selectably directing information received at a subscriber unit to at least one of said



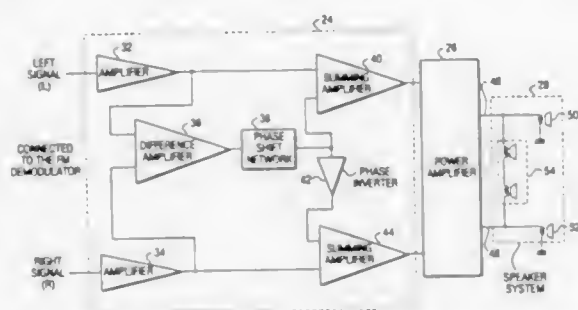
display and said hard copy output unit; said CATV system further comprising:

- a keyboard for entering information to be transmitted via a telephone link;
- a processor for preparing said information to be transmitted via a telephone link in a format suitable for transmission over said telephone link; and
- a unit for transmitting over said telephone link at least one of mail, facsimile, electronic-mail and voice-mail information.

**5,414,774**  
**CIRCUIT AND METHOD FOR CONTROLLING AN AUDIO SYSTEM**  
 Hideki Yumoto, Streamwood, Ill., assignor to Matsushita Electric Corporation of America, Secaucus, N.J.  
 Filed Feb. 12, 1993, Ser. No. 17,244  
 Int. Cl.<sup>6</sup> H03G 3/00

U.S. Cl. 381—1

19 Claims



1. A circuit for use in connection with a stereo audio system, the circuit comprising:

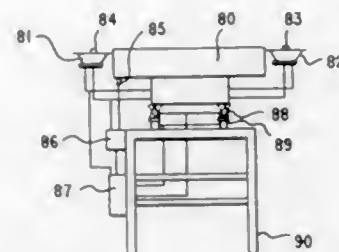
- a detection circuit for generating an output based on detection of a stereo signal; and
- a control circuit in electronic communication with said detection circuit and the stereo audio system for controlling, in response to said output from said detection circuit, a repercussion sound produced by a speaker system of said stereo audio system;

said speaker system including a left speaker, a right speaker, and a least one repercussion speaker connected in series between said left and right speakers.

**5,414,775**  
**NOISE ATTENUATION SYSTEM FOR VIBRATORY FEEDER BOWL**  
 Kelvin Scribner, Linthicum, and Doug Hodgson, Laurel, both of Md., assignors to Noise Cancellation Technologies, Inc., Linthicum, Md.

Filed May 26, 1993, Ser. No. 67,276  
 Int. Cl.<sup>6</sup> A61F 11/06; H03B 29/00  
 U.S. Cl. 381—71

17 Claims



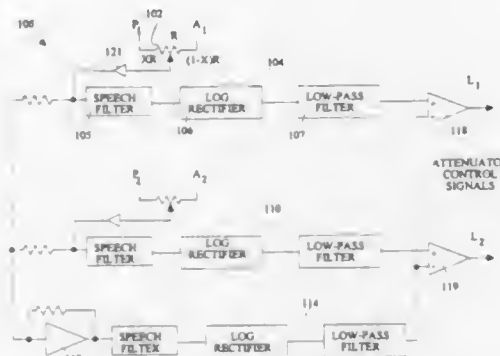
1. A system for attenuation of tonal noise in a vibratory feeder bowl mounted atop a support means, said system comprising

- a noise attenuation system means associated with said vibratory feeder bowl for canceling acoustic noise emanating from said bowl during operation,
- a vibration attenuation system means associated with said support means and for reducing vibration on said support means to attenuate tonal noise caused by mechanical vibration of said support means during bowl operation, and
- control means for sensing said acoustic noise and mechanical vibration and to provide signals to said noise attenuation and vibration attenuation means to effect operation thereof.

**5,414,776**  
**ADAPTIVE PROPORTIONAL GAIN AUDIO MIXING SYSTEM**  
 Travis M. Sims, Jr., Rio Rancho, N. Mex., assignor to Lectrosonics, Inc., Rio Rancho, N. Mex.  
 Filed May 13, 1993, Ser. No. 62,430  
 Int. Cl.<sup>6</sup> H04B 1/00

U.S. Cl. 381—119

5 Claims



1. An audio mixing system comprising:

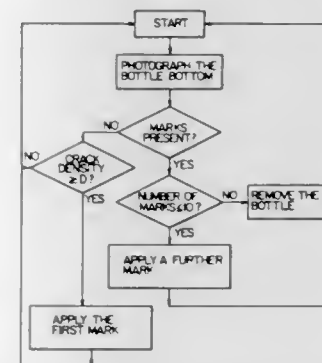
- a plurality of input channels, each said input channel comprising means for receiving an input signal; and means for generating an attenuated signal from said input signal, the degree of attenuation being specified by a channel control signal;
- means for combining all of said attenuated signals to form an output signal; and
- control means for generating each of said channel control signals in response to both a respective input signal for

each channel and a function generated from all of said input signals and all of said attenuated signals.

**5,414,777**  
**PROCESS FOR THE REMOVAL OF MULTI-TRIP BOTTLES FROM CIRCULATION**  
 Felix van der Schaar, Seuzach, and Daniel Wildmann, Dielsdorf, both of Switzerland, assignors to Elpatronic AG, Switzerland  
 Filed Nov. 2, 1993, Ser. No. 146,980  
 Claims priority, application Switzerland, Nov. 27, 1992, 03635/92; Feb. 4, 1993, 00381/93  
 Int. Cl.<sup>6</sup> B65G 47/49

U.S. Cl. 382—142

12 Claims



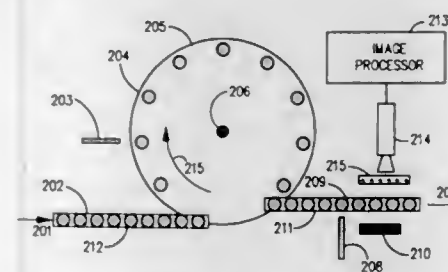
1. Process for the removal from circulation of multi-trip bottles, such as plastic multi-trip bottles, comprising the steps of:

- evaluating a bottle being returned for the presence or absence of a mark indicative of the presence of a predetermined level of fatigue cracks;
- testing a bottle for the presence of a predetermined level of fatigue cracks by means of a testing device as a result of determining an absence of indicative marks during the step of evaluating;
- marking individual tested bottles with a first indicative mark if it is determined during the step of testing that a predetermined level of fatigue cracks is present;
- adding at least one further indicative mark upon every return if an indicative mark is detected during the step of evaluating; and
- removing from circulation those bottles on which the number of indicative marks attains a predetermined number.

**5,414,778**  
**DYNAMIC FLUID LEVEL AND BUBBLE INSPECTION FOR QUALITY AND PROCESS CONTROL**  
 Nira Schwartz, Arie Shahar, and Richard Woods, all of 2800 Plaza Del Amo #187, Torrance, Calif. 90503  
 Filed Nov. 24, 1993, Ser. No. 157,734  
 Int. Cl.<sup>6</sup> G06K 9/00

U.S. Cl. 382—142

20 Claims



1. A method for inspecting containers filled with a liquid containing bubbles, while said liquid and said bubbles are in a dynamic state and are moving on a production line, with the

use of a sensor and a processing unit having a memory, comprising:

- (a) moving a series of containers along a production line past a filling station and an inspection station,
- (b) filling said series of containers with a liquid at said filling station, said liquid containing bubbles which are suspended in said liquid, said liquid and said suspended bubbles being in a dynamic state as a result of said filling,
- (c) illuminating said containers with light at said inspection station so that resultant light comes from said containers,
- (d) sensing said resultant light coming from said containers with said sensor at said inspection station and converting said resultant light to an electrical signal,
- (e) said containers being illuminated and sensed when said liquid and said suspended bubbles are still in said dynamic state,
- (f) creating, from said electrical signal, a product image comprising a multiplicity of pixels with:

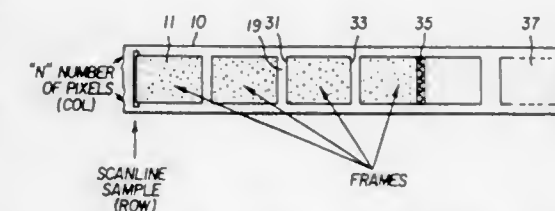
- (1) said pixels having a plurality of intensity levels expressed as a corresponding plurality of respective gray levels,
- (2) a first plurality of said multiplicity of pixels representing said liquid and having gray levels substantially on one side of a predetermined threshold level, and
- (3) a second plurality of said multiplicity of pixels representing said bubbles and having gray levels substantially on the other side of said predetermined threshold level,

- (g) modifying said product image to produce a modified product image so as to distinguish liquid from bubbles by assigning a predetermined single liquid gray level value to all pixels on said one side of said predetermined threshold level, and assigning a predetermined different and single bubble gray level value to all pixels on said other side of said predetermined threshold level,
- (h) counting the number of pixels having said liquid gray level value and saving the resultant liquid count in memory,
- (i) counting the number of pixels having said bubble gray level value and saving the resultant bubble pixel count in memory, and
- (j) analyzing said resultant liquid pixel count and said resultant bubble pixel count for liquid height and bubbles.

**5,414,779**  
**IMAGE FRAME DETECTION**  
 John Mitch, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
 Filed Jun. 14, 1993, Ser. No. 76,592  
 Int. Cl.<sup>6</sup> G06K 9/00

U.S. Cl. 382—199

17 Claims



1. A method of detecting the locations of respective image frames contained on an image recording medium, comprising the steps of:

- (a) scanning said image recording medium so as to produce digital pixel data representative of the contents of each successive scan line of said image recording medium;
- (b) processing such scanned digital pixel data in accordance with predetermined equations, including a scan line sum predictor equations and at least one of a previous delta predictor equation and a next delta predictor equation to generate a predictor space for frame identifiers;



- (c) producing a series of thresholds based upon a predetermined percentile of the predictor space;  
 (d) determining all the well formed image frames based upon the thresholds; and  
 (e) using the determined well formed image frames to produce frame statistics which are used to detect the location of image frames other than the well formed image frames.

5,414,780

## METHOD AND APPARATUS FOR IMAGE DATA TRANSFORMATION

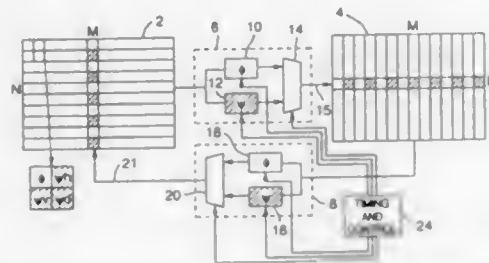
Shawn V. A. Carnahan, Nevada City, Calif., assignor to ImMIX, Grass Valley, Calif.

Filed Jan. 27, 1993, Ser. No. 9,891

Int. Cl.<sup>6</sup> G06K 9/36, 9/46; H04N 7/12

U.S. Cl. 382-276

30 Claims



1. An apparatus for transforming input image data, including:

first memory means having at least N rows and M columns of memory locations, where N and M are integers divisible by  $2^K$  where K is a positive integer;  
 second memory means having at least N rows and M columns of memory locations;  
 analyzer means connected between the first memory means and the second memory means, including means for receiving horizontal vectors of data stored in the first memory means, transforming each of the horizontal vectors into an interleaved orthogonal representation thereof, writing each said interleaved orthogonal representation into a different row of the second memory means, receiving vertical vectors of data stored in the second memory means, transforming each of the vertical vectors into a second interleaved orthogonal representation thereof, and writing each said second interleaved orthogonal representation into a different column of the first memory means, wherein each said interleaved orthogonal representation consists of interleaved portions of one of the horizontal vectors received from the first memory means, and each said second interleaved orthogonal representation consists of interleaved portions of one of the vertical vectors received from the second memory means; and  
 control means for controlling the analyzer means to implement K transformation iterations, each of said iterations including transformation by the analyzer means of a set of horizontal vectors of data stored in the first memory means followed by further transformation by the analyzer means of a set of vertical vectors of data stored in the second memory means.

5,414,781  
METHOD AND APPARATUS FOR CLASSIFYING DOCUMENTS

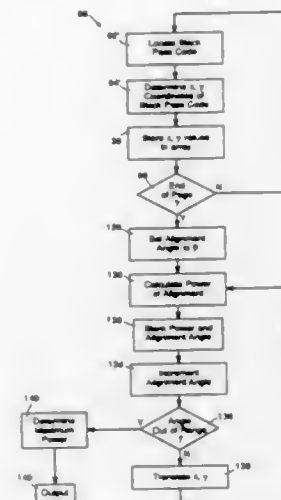
A. Lawrence Spitz, Palo Alto, and Lynn D. Wilcox, Portola Valley, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 803,253, Dec. 5, 1991, abandoned. This application Nov. 24, 1993, Ser. No. 158,831

Int. Cl.<sup>6</sup> G06K 9/32

U.S. Cl. 382-296

14 Claims



1. A computer-implemented method for classifying a document comprising the steps:

(a) providing on the document a logotype distinctive of the classification of the document, said logotype comprising structures having alignment angles which generate a known and repeatable angular distribution of pass codes having at least two alignment peaks in said distribution,  
 (b) machine scanning at least the portion of said document or a facsimile thereof containing the logotype to produce data signals corresponding to information on the document including the logotype,  
 (c) subjecting the data signals obtained in step (b) to compression to obtain compressed data,  
 (d) computer-processing said compressed data obtained in step (c) to produce information comprising pass codes in said compressed data and their distribution including angular locations thereof,  
 (e) computer-processing the information obtained in step (d) to determine the power of an alignment angle of the locations of said pass codes produced in step (d) at a plurality of different alignment angles,  
 (f) providing known powers of alignment angles of the locations of pass codes generated from different known logotypes each distinctive of a different document classification,  
 (g) comparing said power determined in step (e) with said known powers of step (f) to find the closest match and to identify the classification of the document.

5,414,782

## PROCEDURE FOR DIGITAL IMAGE RESTORATION

Alfred S. Carasso, North Potomac, Md., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Dec. 16, 1992, Ser. No. 991,105

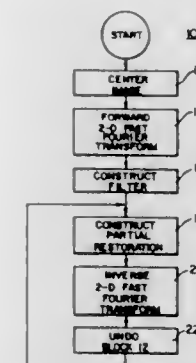
Int. Cl.<sup>6</sup> G06K 9/40

U.S. Cl. 382-270

12 Claims

1. An image restoration method in a system having an image sensor and a digitizer, comprising the steps of:  
 (a) providing an imaging system described by an integral operator P;

- (b) transmitting an ideal image  $f(x,y)$  through an image blurring and degrading transmission medium to provide a degraded image  $g(x,y)$  wherein the degraded image  $g(x,y)$  may be represented as  $Pf=g$ ;  
 (c) receiving said degraded image  $g(x,y)$  from said transmission medium by said image sensor;  
 (d) digitizing said degraded image  $g(x,y)$  by said digitizer;  
 (e) transforming said degraded image  $g(x,y)$  to provide a time modified representation  $w(x,y,t)=P^t f$  wherein  $w(x,y,0)=P^0 f$  represents the ideal image  $f(x,y)$  at time  $t=0$  prior to the operation of the integral operator P upon f and  $w(x,y,1)=P^1 f=g$  represents the degraded image  $g(x,y)$  when the image is received by said image sensor;



- (f) requiring the magnitude of the difference between the ideal image f and a blurred version of f to be less than a preassigned tolerance value by minimizing  $\|f-P^s f\|$  wherein  $P^s f$  represents an image at time  $t=s$  as s approaches 0;  
 (g) determining a plurality of values of  $w(x,y,t)$  in accordance with said minimizing;  
 (h) adjusting said image in accordance with said determined plurality of values to provide a plurality of adjusted images;  
 (i) selecting an adjusted image of said plurality of adjusted images; and  
 (j) displaying said selected image.

5,414,783

## WRITE HEAD FOR A MICR READER HAVING AN ADJUSTABLE FIELD PROFILE

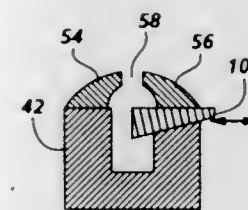
Raphael F. Bov, Jr., Pittsford, and Jose R. Diaz, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 24, 1993, Ser. No. 125,722

Int. Cl.<sup>6</sup> G06K 7/08; G11B 5/23; H01F 3/00

U.S. Cl. 382-320

4 Claims



1. A write head for a magnetic-character recognition system, comprising:  
 a magnetic assembly including a first magnetic pole in a first location and a second magnetic pole in a second location with the second magnetic pole being of an opposite polarity to the first magnetic pole;  
 a first pole piece and a second pole piece, the first pole piece and the second pole piece defining a gap therebetween, the first pole piece disposed adjacent the first location and

conductive of magnetic flux from the first pole to the gap; and  
 a selectably positionable member disposed between the second location and the second pole piece, the positionable member being adapted to affect magnetic flux from the second location through the second pole piece to the gap, thereby facilitating selectable alteration of a magnetic field profile across the gap, the positionable member being of a wedge shape interacting with a surface on the magnetic assembly adjacent the second magnetic pole, and being movable so that adjustment of the position of the positionable member causes an alteration of a position of the second pole piece relative to the gap.

5,414,784

## ROLLER BEARING ASSEMBLY

Günther Schulte, Volkertshausen, Germany, and Fritz Mahnig, Schaffhausen, Switzerland, assignors to Georg Fischer Automobilguss GmbH, Singen, Germany

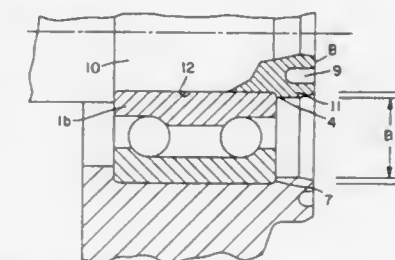
Filed Aug. 30, 1993, Ser. No. 114,418

Claims priority, application Switzerland, Sep. 9, 1992, 02843/92

Int. Cl.<sup>6</sup> F16C 43/04

U.S. Cl. 384-537

4 Claims



1. A bearing assembly, comprising:  
 a bearing having an inner race and an outer race having opposite end faces; and  
 a support part for supporting the outer race of the bearing; wherein the support part includes (1) a bearing seat having a diameter A for receiving the outer race and having an inner shoulder for engaging one of the opposite end faces of the outer race and (2) an outer deformable portion of diameter B smaller than diameter A having a shoulder for engaging another of the opposite end faces of the outer race thereby to retain the bearing against axial displacement wherein the deformable portion is deformed by the outer race only during insertion of the bearing onto the bearing seat.

5,414,785

## OPTICAL DATA BUS HAVING COLLISION DETECTION CAPABILITY

Ernest E. Bergmann, Fountain Hill, Pa., assignor to AT&amp;T Corp., Murray Hill, N.J.

Filed Sep. 13, 1993, Ser. No. 120,617

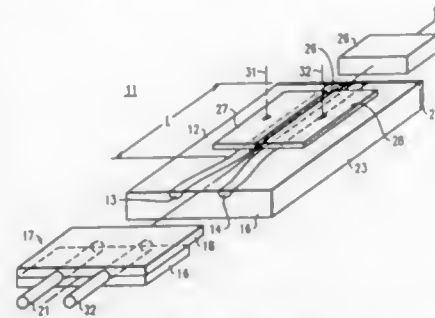
Int. Cl.<sup>6</sup> G02B 6/00, 6/36

U.S. Cl. 385-24

17 Claims

1. An optical fiber communication system having two or more individual stations for the transmission of information signals between the stations comprising:  
 an optical fiber bus for optically connecting said stations in a series array having an input to each of said stations and an output separate from said input from each of said stations;  
 a light source for substantially continuously applying light energy independently of said stations to said bus and to each of said stations in seriatim in a first direction, said source being independent of the stations in the system; each of said stations further having modulating means for modulating optical energy received from said bus in ac-

cordance with a modulating signal to modulate the optical energy on said bus; and



detecting means at each of said stations for substantially continuously detecting the presence or absence of a modulated signal on said bus.

5,414,786

# OPTICAL WAVEGUIDE COMPONENT WITH A MOLDED RESIN PORTION HAVING ACCURATELY ALIGNED GUIDE PIN HOLES THEREIN

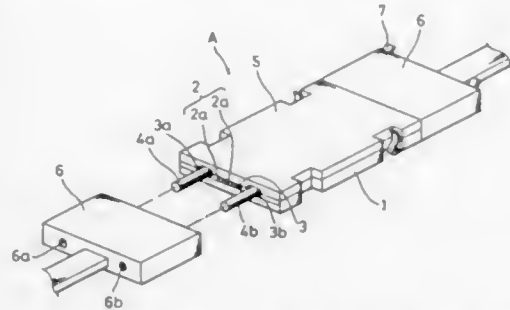
Toshihiko Ohta; Takashi Shigematsu; Takeo Shimizu, and Shiro Nakamura, all of Tokyo, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Oct. 4, 1993, Ser. No. 132,138

Claims priority, application Japan, Oct. 9, 1992, 4-271511  
Int. Cl.<sup>6</sup> G02B 6/38

U.S. Cl. 385—63

14 Claims



1. A substantially flat optical waveguide component (A) which has end faces which are to be connected with respective faces of optical fiber connectors by means of guide pins, the optical waveguide component comprising:

a substantially flat optical waveguide component body (A<sub>1</sub>) having a cladding portion (3) formed on a substrate (1), and a core portion (2) embedded in the cladding portion (3), said optical waveguide component body (A<sub>1</sub>) having end faces at said end faces of said optical waveguide component (A);

a resin mold portion (A<sub>2</sub>) covering all of the surfaces of said optical waveguide component body (A<sub>1</sub>) except for said end faces thereof, said resin mold portion (A<sub>2</sub>) having end faces at said end faces of said optical waveguide component (A); and

said end faces of said resin mold portion (A<sub>2</sub>) having guide pin holes (9a, 9b) therein, and wherein said guide pin holes (9a, 9b) are positioned using said optical waveguide core portion (2) as a reference, whereby accurate positioning of said guide pin holes (9a, 9b) relative to said optical waveguide core portion (2) is obtained.

## 5,414,787 COUPLING STRUCTURE BETWEEN OPTICAL SEMICONDUCTOR AND OPTICAL WAVEGUIDE, AND COUPLING METHOD OF THE SAME

Kazuhiko Kurata, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

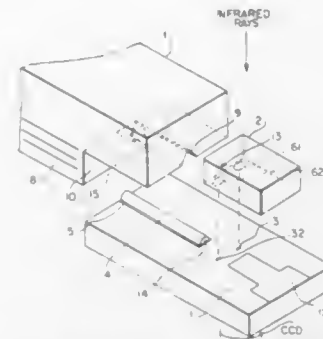
Filed Jul. 26, 1994, Ser. No. 280,609

Claims priority, application Japan, Jul. 27, 1993, 5-184880

Int. Cl.<sup>6</sup> G02B 6/00, 6/36

U.S. Cl. 385—92

12 Claims



1. A structure for optically coupling an optical semiconductor and an optical waveguide having a core which propagates light while confining said light, said structure comprising:

said optical semiconductor mounted on a surface of a first substrate;

a short optical fiber received in a groove formed in said first substrate and positioned such that a core of said short optical fiber is located at a same height, as measured from said surface of said first substrate, as a light emitting portion of said optical semiconductor; and

said optical waveguide formed on a second substrate and having a terminating end portion on a surface of said second substrate, said terminating end having a mirror-finished end;

said second substrate comprising a groove formed in said surface thereof on an imaginary extension of said core of said optical waveguide, part of said short optical fiber which rises above said surface of said first substrate being received in said groove of said second substrate;

the height of said core of said short optical fiber being the same as a height of said core of said optical waveguide, whereby said optical semiconductor and said optical waveguide are coupled to each other.

5,414,788

## METHOD AND APPARATUS FOR FUSION SPLICING OPTICAL FIBERS

Guenther W. Kammlott, Watchung; Sandra G. Kosinski, Murray Hill; John T. Krause, New Providence, and Richard S. Riggs, Branchburg Township, Somerset County, all of N.J., assignors to AT&T Corp., Murray Hill, N.J.

Continuation of Ser. No. 56,971, May 3, 1993, abandoned. This application Jun. 28, 1994, Ser. No. 267,704

Int. Cl.<sup>6</sup> G02B 6/36

U.S. Cl. 385—96

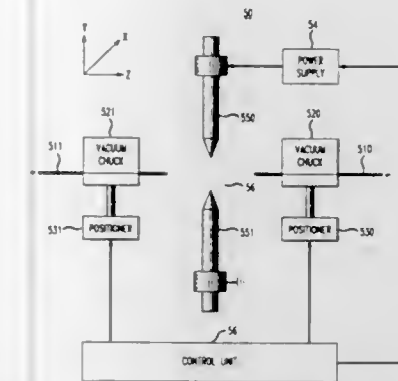
6 Claims

1. A method for fusion splicing two lengths of optical fiber comprising:

providing at least two electrodes having an electric arc-forming space therebetween, said electrodes having associated therewith a rate of particle emission including an initial rate of particle emission at the time the arc is started, positioning an end of each of two lengths of optical fiber such that the fiber ends are substantially aligned in a linearly opposed manner and such that the fiber ends are positioned outside the electric arc-forming space;

initiating an electric arc between said at least two electrodes for at least a time  $t_0$ , where  $t_0$  is the time at which the rate

of particle emission is 50% of the initial rate of particle emission; positioning the fiber ends within the electric arc-forming space;



fusing the fiber ends by heating with an electric arc formed within the electric arc-forming space.

5,414,789

## OPTICAL LOGIC GATES WITH HIGH EXTINCTION RATIO USING INVERSE SCATTERING TECHNIQUE AND METHOD USING SAME

Lakshman S. Tamil, Dallas, Tex., and Arthur K. Jordan, Alexandria, Va., assignors to United States of America, Washington, D.C. and Board of Regents, University of Texas, Austin, Tex.

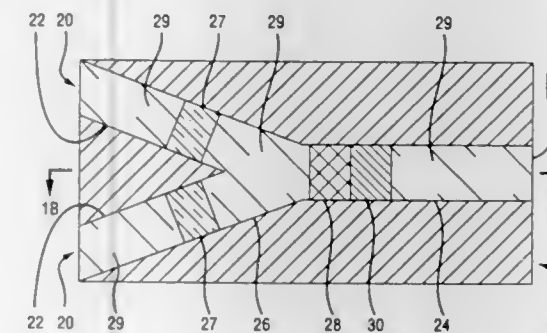
Filed Jul. 30, 1992, Ser. No. 923,113

Int. Cl.<sup>6</sup> G02B 6/12, 6/26; G06E 1/04

U.S. Cl. 385—122

50 Claims

U.S. Cl. 385—143



1. An optical logic device for performing Boolean logic operations on optical inputs, said device comprising a plurality of optical logic inputs;

an optical summer for optically summing intensities of said logic inputs to form a summed input intensity signal;

a spatial intensity optical filter for filtering said summed input intensity signal to form a filtered summed input intensity signal; and

an optical waveguide connected to receive said filtered summed input intensity signal, and having a first inhomogeneous permittivity profile which changes to a second inhomogeneous permittivity profile when said filtered summed input intensity signal is above an intensity threshold.

## 5,414,790 ACTUATION TOOL AND CAP FOR FIBER OPTIC CONNECTOR

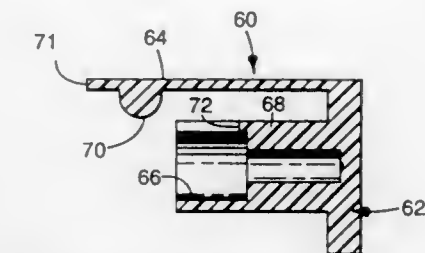
Nicholas A. Lee, Woodbury; Michael A. Meis, Maplewood, and Theodore J. Stone, Minneapolis, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 9, 1993, Ser. No. 149,641

Int. Cl.<sup>6</sup> G02B 6/36

U.S. Cl. 385—139

22 Claims



1. A device for securing an optical fiber in a connector having a fiber gripping actuation member, the device comprising:

a body having a cavity therein for receiving a forward end of the connector; and

means attached to said body for forcibly contacting the actuation member of the connector, said contacting means exerting a force which is generally perpendicular to an axis of a fiber retained in the connector.

5,414,791

## THERMALLY STABLE ELECTRO-OPTIC DEVICE AND METHOD

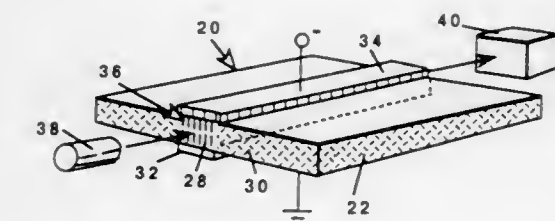
Susan P. Ermer, Redwood City; Doris S. Leung, Palo Alto, and Steven M. Lovejoy, San Francisco, all of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Oct. 5, 1993, Ser. No. 132,089

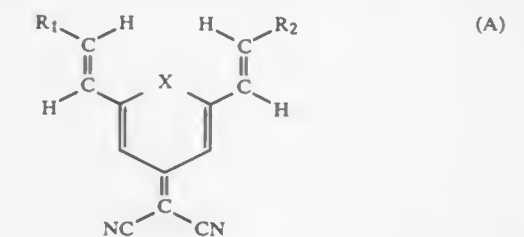
Int. Cl.<sup>6</sup> G02F 1/35; C07C 229/00

U.S. Cl. 385—143

24 Claims

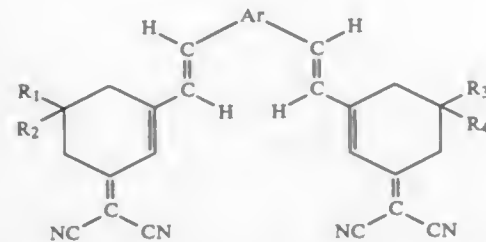


1. An electro-optic waveguide material comprising a polyimide matrix having dissolved therein, guest dipole molecules having one of the general forms:



where X is O, S, CH<sub>2</sub>, or NR, and R is a lower alkyl or substituted lower alkyl group; and R<sub>1</sub> and R<sub>2</sub> are N-substituted carbazole groups, or





where Ar is an aromatic fused ring structure having a ring-contained tertiary amine, and R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> are the same or different and are each selected from the group consisting of H, an alkyl group or substituted alkyl group,

the guest molecules having net dipole moments, and these dipole moments being oriented in regions of the material, such that the index of refraction of said regions can be modulated for optical switching purposes by applying an electric field across the regions.

5,414,792

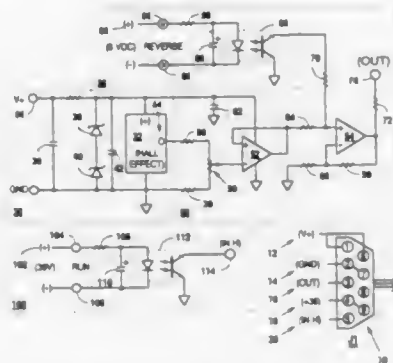
## ELECTRIC THROTTLE AND MOTOR CONTROL CIRCUITRY

James L. Shorey, Austin, Tex., assignor to DAX Industries, Inc., Houston, Tex.

Filed Jan. 27, 1994, Ser. No. 186,971  
Int. Cl.<sup>6</sup> H02P 5/17

U.S. Cl. 388—811

4 Claims



1. A motor control circuit that provides efficient control over a direct current electric motor by translating the mechanical position of a manipulable throttle into a current flow from a direct current power source, comprising:

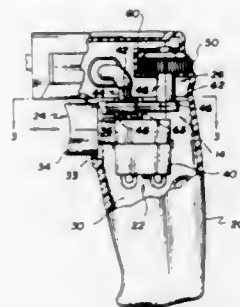
- a Hall Effect throttle position transducer;
- a throttle signal amplifier circuit for amplifying and conditioning a throttle signal from said Hall Effect transducer;
- a reverse condition sensor for modifying said throttle signal in response to a reverse condition in a vehicle propelled by said electric motor;
- a voltage regulator circuit;
- a pulse width modulation (PWM) circuit for generating a first square waveform wherein the duration of each square wave pulse is inversely related to a voltage level of said throttle signal;
- an inhibitor circuit for sensing an absence of an operational voltage and for canceling said first square waveform upon said absence or upon sensing an over-voltage condition;
- an inverter circuit for inverting said first square waveform and converting it to a second square waveform; and
- at least one MOSFET circuit acting as a current switch to regulate a flow of current through said electric motor, said MOSFET circuit controlled by said second square waveform.

5,414,793  
SPEED CONTROL MECHANISM FOR A POWER TOOL  
Hiroshi Morikawa, Clemson, S.C., assignor to Ryobi Motor Products Corp., Easley, S.C.

Filed Apr. 27, 1993, Ser. No. 54,774  
Int. Cl.<sup>6</sup> H01H 9/06

U.S. Cl. 388—824

14 Claims



1. A speed control mechanism allowing a user to control an operating speed of a power tool, the speed control mechanism comprising:

- a drive motor; and
- a handle connected to the power tool including a trigger, a speed governor and a cam assembly, the cam assembly including a thumb wheel operable by the user, the thumb wheel connected to the handle for rotation relative thereto, and a cam disk connected to the thumb wheel for rotation therewith, and
- the trigger being displaced from a first position by the user to initiate operation of the drive motor, the trigger cooperating with the speed governor to vary the operating speed of the drive motor based on a displacement of the trigger, the cam assembly being operated by the user and cooperating with the trigger to control an extent to which the trigger can be displaced from the first position by the user, thereby limiting the operating speed of the power tool.

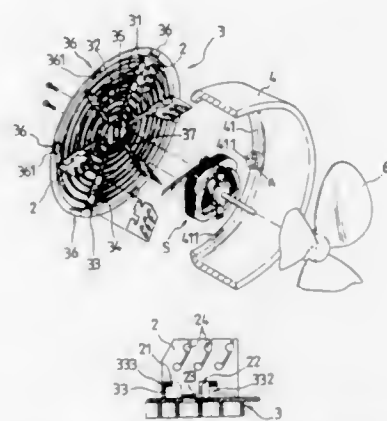
5,414,794

QUICKLY-MOUNTABLE SECURING STRUCTURE FOR ELECTRIC HEATING ELEMENT IN A HEATER FAN  
Steve Shao, 3F, No. 348, Sec. 2, Ming-Chi Rd., Taisan Taipei, Taiwan, Prov. of China

Filed Oct. 26, 1993, Ser. No. 141,658  
Int. Cl.<sup>6</sup> H05B 3/06

U.S. Cl. 392—365

6 Claims



1. A heating device structure having a rear casing for mounting a heater and fan of a heater fan combination comprising:
- a rear mesh disk;
  - a plurality of heat insulating plates, which are secured in said rear mesh disk;
  - said plates being adapted to mount an electric heating coil

and its associated wiring; said rear mesh disk being adapted to be quickly mounted in a frame in said rear casing of a heater fan so as to form a complete unit, the surface of the rear mesh disk being provided with stencil holes to allow air flow, and further including a plurality of protruded bases for securing the heat insulating plates; each of the protruded bases of the rear mesh disk have a block shade that protrudes upward, each of said protruded bases further having elongated gaps that communicate with each other, said elongated gaps being provided for the insertion of the heat insulating plates for securing said heat insulating plates in place, the inside of each of the gaps being provided with a stepping member corresponding to the insert portion of the heat insulating plate, a uni-directional protruded resilient plate being further provided adjacent each protruded base, and a slot corresponding to the base being provided in the corresponding insert portion of the heat insulating plate whereby when the slot in the heat insulating plate receives the protruded base to engage said plates and base, the resilient plate will function to prevent the disengagement thereof wherein when an electric heating coil is wound around the heat insulating plates, and is connected to the heater fan a heating device structure will be provided which is convenient to assemble and economical to produce.

5,414,795

## HIGH EFFICIENCY DIGITAL DATA ENCODING AND DECODING APPARATUS

Kyoya Tsutsui, and Osamu Shimoyoshi, both of Kanagawa, Japan, assignors to Sony Corporation, Japan

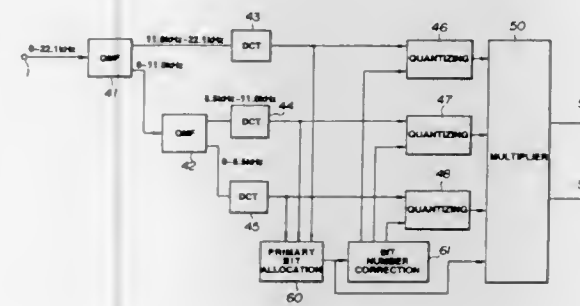
Filed Mar. 26, 1992, Ser. No. 857,772

Claims priority, application Japan, Mar. 29, 1991, 3-091183; Mar. 29, 1991, 3-091185

Int. Cl.<sup>6</sup> G10L 9/00

U.S. Cl. 395—2.13

29 Claims



1. An apparatus for compressing a digital input signal divided into frames of plural samples to provide a compressed signal, the apparatus comprising:
- plural orthogonal transform means for orthogonally transforming the digital input signal in blocks derived by dividing each frame by a different set of divisors, each set of divisors including at least one divisor, each orthogonal transform means deriving spectral coefficients from the digital input signal, quantizing the spectral coefficients by adaptively allocating a number of quantizing bits among the spectral coefficients, each orthogonal transform means allocating an equal number of quantizing bits, and providing the quantized spectral coefficients as an output signal; and
  - means for selecting the output signal from one of the orthogonal transform means as the compressed signal in response to a selection signal from each of the orthogonal transform means.

5,414,796

## VARIABLE RATE VOCODER

Paul E. Jacobs; William R. Gardner; Chong U. Lee; Klein S. Gilhousen; S. Katherine Lam, and Ming-Chang Tsai, all of San Diego, Calif., assignors to QUALCOMM Incorporated, San Diego, Calif.

Continuation of Ser. No. 713,661, Jun. 11, 1991, abandoned.

This application Jan. 14, 1993, Ser. No. 4,484

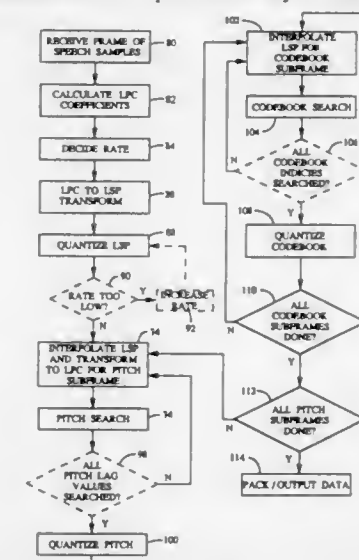
Int. Cl.<sup>6</sup> G10L 3/02

U.S. Cl. 395—2.3

48 Claims

1. A method of speech signal compression, by variable rate coding of frames of digitized speech samples, comprising the steps of:

- determining a level of speech activity for a frame of digitized speech samples;
- selecting an encoding rate from a set of rates based upon said determined level of speech activity for said frame;



coding said frame according to a coding format of a set of coding formats for said selected rate wherein each rate has a corresponding different coding format and wherein each coding format provides for a different plurality of parameter signals representing said digitized speech samples in accordance with a speech model; and generating for said frame a data packet of said parameter signals.

5,414,797

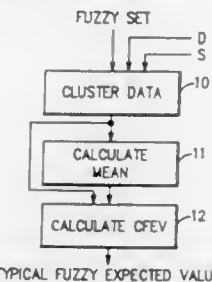
CLUSTERING FUZZY EXPECTED VALUE SYSTEM  
Stamatis Vassiliadis; George Triantafyllos, and Walid Kobrosly, all of Vestal, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation-in-part of Ser. No. 701,558, May 16, 1991, abandoned. This application Jul. 28, 1992, Ser. No. 920,723

Int. Cl.<sup>6</sup> G06F 15/40, 9/44

U.S. Cl. 395—51

13 Claims



1. A computer system for processing a database having language text records to evaluate their relevance to a predetermined subject of interest, the system comprising:
- processors for processing instructions and the text records;
  - database storage means for storing the text records in the database;

a unique word generator for generating and storing a list of unique words contained in the database;  
 a relevant word generator for generating and storing a list of relevant words including a system user's selections from the stored list of unique words;  
 a modified database generator for generating and storing a modified database, the modified database including the list of relevant words and synonyms, if any, associated with each word in the list of relevant words, whereinafter the unique word generator generates a list of unique words of the modified database;  
 a relevant word table including the list of unique words of the modified database; and  
 means for calculating and storing confidence values associated with each word in the relevant word table, each of the confidence values based on input values from a plurality of personnel other than the system user that reflects their perceptions of a relevance of said each word in the relevant word table to the subject of interest;  
 said means for calculating and storing confidence values including a clustering fuzzy expected value system for determining a membership grade for said each word in the relevant word table;  
 said clustering fuzzy expected value system determining said membership grade for a word in the relevant word table including grouping the confidence values for said word in the relevant word table into a plurality of clusters according to a predetermined formula, determining a mean of all the confidence values for said word in the relevant word table, and determining a plurality of mean confidence values each associated with one of said plurality of clusters of said confidence values.

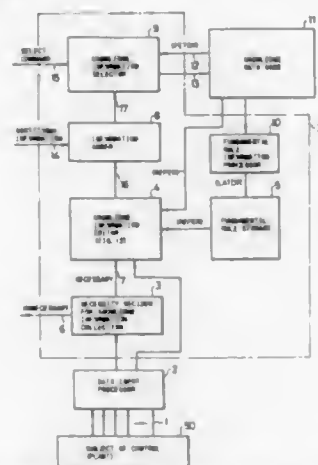
5,414,798

**KNOWLEDGE INFORMATION GENERATING SYSTEM**  
 Seitsu Nigawara, Shigeaki Namba, and Masayuki Fukai, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 PCT No. PCT/JP88/00597, § 371 Date Jan. 29, 1990, § 102(e) Date Jan. 29, 1990, PCT Pub. No. WO89/12852, PCT Pub. Date Dec. 28, 1989

PCT Filed Jun. 17, 1988, Ser. No. 460,093  
 Int. Cl.<sup>6</sup> G05B 23/02, 13/00

U.S. Cl. 395—75

9 Claims



2. A knowledge information generating system comprising:
  - a fundamental rule storage device for storing, for each of first process data indicating a current state of a subject of control to be monitored, second process data related to said first process data and fundamental rules indicating relations between said first and second process data, said second process data representing previously collected information concerning previous states of said subject of control;
  - a process data input processor for inputting said first process data from said subject of control;
  - a knowledge information collection necessity decider for deciding whether process data for knowledge information

generation is to be collected by detecting whether said first process data input by said process data input processor has either changed from a normal state or deviated from a predetermined relation between said first process data and said second process data beyond a preset threshold value and outputting a necessary signal when it is detected that said first process data has either changed or deviated;

a knowledge information editor for fetching said fundamental rules and said process data from said fundamental rule storage device in response to said necessary signal, editing said process data based on relations between said first process data input by said process data input processor and said second process data indicated by said fundamental rules, and generating knowledge information for use in operating said subject of control based on said edited second process data; and

a knowledge data base for storing said knowledge information generated by said knowledge information editor.

5,414,799

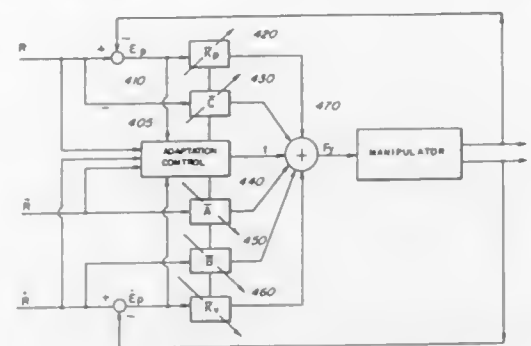
**METHOD AND APPARATUS FOR ADAPTIVE FORCE AND POSITION CONTROL OF MANIPULATORS**  
 Homayoun Seraji, La Crescenta, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Continuation of Ser. No. 638,880, Jan. 7, 1991, abandoned, which is a division of Ser. No. 253,510, Sep. 30, 1988, Pat. No. 5,023,808, which is a continuation-in-part of Ser. No. 35,061, Apr. 6, 1987, Pat. No. 4,860,215. This application Jun. 16, 1993, Ser. No. 78,893

Int. Cl.<sup>6</sup> G06F 15/46

U.S. Cl. 395—95

3 Claims



1. A controller for a manipulator wherein the manipulator and an environment of the manipulator form a complex, dynamic model with unknown parameter values; the controller comprising:

an adaptive feedforward controller and an adaptive feedback controller including means for applying a feedback equation having position and velocity control terms; said feedforward and feedback controllers being independent and multivariable;  
 means for generating an auxiliary signal;  
 means for summing said auxiliary signal and adaptive gains and for outputting a control signal to said manipulator;  
 said feedforward and feedback controllers having adaptive position feedforward and feedback control loops, respectively and adaptive position control means operating in accordance with the following position control law:

$$F_p(t) = f(t) + K_p(t)E_p(t) + K_d(t)E_p(t) + C(t)R(t) + B(t)R(t) + A(t)R(t)$$

wherein  $R(t)$  is the desired position trajectory,  $E_p$  is the position tracking error,  $A$ ,  $B$  and  $C$  are adaptive feedforward gains,  $K_p$  and  $K_d$  are adaptive feedback gains,  $f(t)$  is an auxiliary signal and  $F_p(t)$  is an applied force.

# 5,414,800 **IMAGE DATA PROCESSING APPARATUS IN WHICH THE STATE OF MOUNTING IN DELAY MEMORY IS DETECTED**

Toshikazu Kawaguchi, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

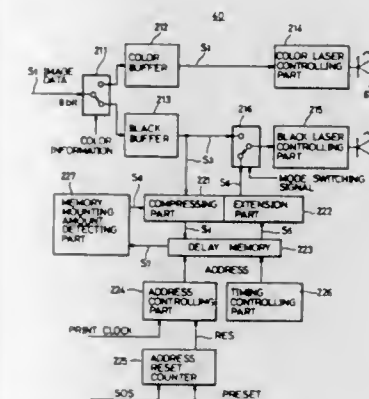
Continuation of Ser. No. 881,138, May 11, 1992. This

application Mar. 10, 1994, Ser. No. 212,392

Claims priority, application Japan, May 10, 1991, 3-135914  
 Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 395—115

9 Claims



1. An image data processing apparatus for processing image data having a plurality of bits which represent tones, comprising:

compressing means for compressing image data by decreasing the number of bits of image data which represent tones;  
 memory means for storing the image data compressed by said compressing means, said memory means having a variable storage capacity;  
 detecting means for automatically detecting the storage capacity of said memory means; and  
 setting means for controlling said compressing means by setting the rate of the decrease in the number of bits of the image data which represent tones in said compressing means on the basis of the storage capacity of said memory means detected by said detecting means.

5,414,801

# **COMPUTERIZED METHOD AND APPARATUS USING CONTAINMENT RELATIONSHIPS TO REPRESENT OBJECTS IN A THREE-DIMENSIONAL SPACE, AND FOR MOVING THEREABOUT**

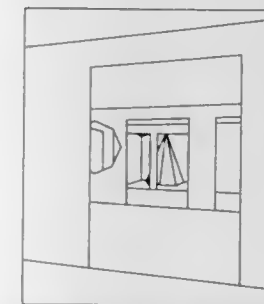
David A. Smith, Cary, and David W. Easter, Raleigh, both of N.C., assignors to Virtus Corporation, Cary, N.C.

Filed Jun. 11, 1991, Ser. No. 714,387

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—119

45 Claims



1. A graphics display system comprising:
  - two-dimensional graphics displaying means; and
  - graphics processing means for a plurality of three-dimen-

sional objects, a first one of said objects being contained within a second one of said objects, said graphics processing means comprising:

means for representing said plurality of three-dimensional objects as a corresponding plurality of convex polyhedra;

means for indicating containment relationships among said plurality of convex polyhedra corresponding to containment relationships among said plurality of three-dimensional objects, including said first object which is contained within said second object; and

means for rendering a two-dimensional representation of the plurality of three-dimensional objects by selectively rendering only some of said convex polyhedra on said graphics displaying means, based upon the containment relationships in said containment indicating means, such that said first object is not rendered on said graphics displaying means upon rendering said second object from a perspective outside said second object, and said second object is not rendered on said graphics displaying means upon rendering said first object from a perspective inside said first object.

5,414,802

# **THREE-DIMENSIONAL GEOMETRY PROCESSING SYSTEM**

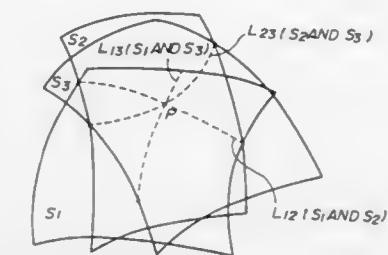
Teiji Takamura, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 15, 1992, Ser. No. 820,978

Claims priority, application Japan, Jan. 17, 1991, 3-018315  
 Int. Cl.<sup>6</sup> G06F 15/60

U.S. Cl. 395—119

8 Claims



1. A three-dimensional geometry processing system for generating an intersection curve between two surfaces, comprising:

checking means for checking whether or not there is an intersection between convex hulls of the surfaces by obtaining the convex hulls of the surfaces at control points;  
 start-point generating means for generating candidate points of endpoints of the intersection curve by obtaining results of calculations of intersection points between a surface and a curve and results of calculations of internal intersection points between two surfaces based on the convex hulls of the surfaces, and for storing the candidate points in a table;

direction generating means for determining a direction in which a tracing of intersection is performed with a tracing vector based on each of the candidate points stored in the table;

selecting means for extracting a point and a vector from the table in which the candidate points are stored, said extracted point having a vector with which the tracing of intersection is not performed;

tracing means for generating a set of points lying on the intersection curve and generating a set of direction vectors at said points on the intersection curve by performing the tracing of intersection with the extracted point and vector;

curve-sequence generating means for generating a sequence



of curves based on the points and direction vectors generated by said tracing means; and  
dividing means for dividing the intersection curve at intersection points between the curves, which curves are generated by said curve-sequence generating means, by generating said intersection points between the curves.

5,414,803

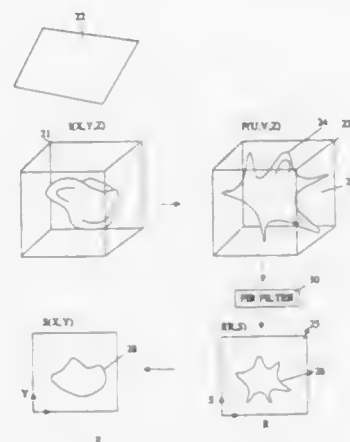
# METHOD UTILIZING FREQUENCY DOMAIN REPRESENTATIONS FOR GENERATING TWO-DIMENSIONAL VIEWS OF THREE-DIMENSIONAL OBJECTS

Thomas Malzbender, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
Continuation of Ser. No. 639,863, Jan. 11, 1991, abandoned. This application Jul. 7, 1993, Ser. No. 88,398

Int. Cl.<sup>6</sup> G06T 5/10

U.S. Cl. 395—127

4 Claims



1. A method for operating a digital computer to generate a projection view of a three-dimensional object for display to an observer comprising the steps of:  
defining a spatial coordinate system relative to said object;  
defining a three-dimensional representation of said object relative to said spatial coordinate system;  
defining a view screen having an orientation selected by the observer relative to said spatial coordinate system;  
defining a frequency domain coordinate system;  
generating a three-dimensional frequency domain representation,  $F(u,v,w)$ , of said object by transforming said three-dimensional spatial representation of said object into said frequency domain coordinate system using a spatial-to-frequency domain transformation;  
defining a frequency domain slicing plane having the same orientation in said frequency domain coordinate system as said view screen has in said spatial coordinate system, said frequency domain slicing plane passing through the origin of said frequency domain coordinate system, said frequency domain slicing plane having a two-dimensional coordinate system defined thereon;  
defining a two-dimensional frequency domain function comprising  $F(u, v, w)$  for values of  $(u,v,w)$  on said frequency domain slicing plane;  
generating the projection view from said two-dimensional frequency domain function by applying a two-dimensional frequency-to-spatial domain transformation to said two-dimensional frequency domain function;  
defining a second view screen having a second orientation selected by the observer relative to said spatial coordinate system;  
defining a second frequency domain slicing plane having the same orientation in said frequency domain coordinate system as the second view screen has in said spatial coordinate system;  
defining a second two-dimensional frequency domain func-

tion comprising  $F(u,v,w)$  for values of  $(u,v,w)$  on said second frequency domain slicing plane; and  
generating a second projection view from said second two-dimensional frequency domain function by applying said two-dimensional frequency-to-spatial domain transformation to said second two-dimensional frequency domain function.

5,414,804

# FAST IMAGE DECODER

Janet McWaid, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

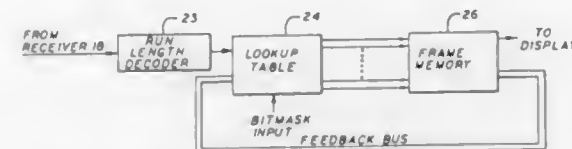
Continuation of Ser. No. 422,336, Oct. 16, 1989, abandoned.

This application Jul. 28, 1992, Ser. No. 921,424

Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 395—133

28 Claims



1. A fast image decoder for producing a reconstructed image from compressed images encoded using the Poisson picture processing algorithm, said fast image decoder comprising:  
run length decoder means for run length decoding said compressed image to form a sparse array of pixel values;  
processing means coupled to said run length decoder means for receiving said sparse array of pixels and for iteratively processing pixels to produce said reconstructed image; and  
frame memory means coupled to said processing means for receiving said reconstructed image and for successively storing said reconstructed image and feeding back pixels for said reconstructed image to said processing means for successive processing iterations, said processing means for iteratively receiving and processing pixels for said successive reconstructed images to increase the quality of said reconstructed image.

5,414,805

# VISUAL DISPLAY TRANSITION EFFECTS USING SORTED TABLE OF DISPLAY CELLS

Robert D. Gordon, Sunnyvale; Joseph F. Sinnott, Jr., Palo Alto, and Lonnie S. Walling, Ben Lomond, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 6, 1992, Ser. No. 972,696

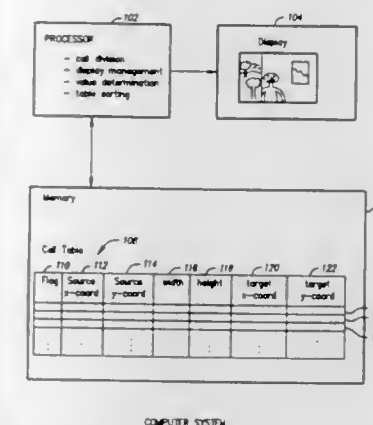
Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—133

20 Claims

1. A computer-based system for generating transition effects of source images into target image locations, comprising:  
means for dividing a display into cells;  
memory means for storing display data;  
means for generating a cell table in said memory means, said cell table including a plurality of rows, each row corresponding to one of said cells, each row including a first location field;  
means for selecting a transition effect function having a solution value which varies with horizontal and vertical cell position;  
means for solving said transition effect function for each row;  
means for ordering said rows and sub-ordering rows of said cell table having identical solution values in accordance

with said transition effect function solutions including; and



means for placing cells of a source image into a target image location sequentially in accordance with said ordered rows of said cell table.

5,414,806

# PALETTE AND PARTS VIEW OF A COMPOSITE OBJECT IN AN OBJECT ORIENTED COMPUTER SYSTEM

Justin J. C. Richards, Hatton, England, assignor to International Business Machines Corporation, Armonk, N.Y.

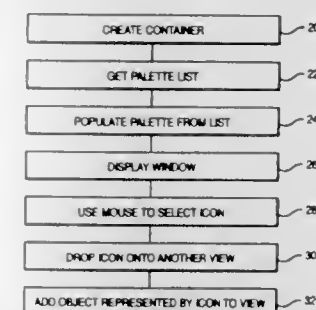
Filed Aug. 12, 1993, Ser. No. 105,837

Claims priority, application United Kingdom, Aug. 29, 1992, 9218458

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—135

5 Claims



1. An object-oriented computer system wherein the computer system is controlled by a hierarchy of objects, the hierarchy including a composite object incorporates a plurality of mutually interacting subobjects, said computer system supporting a graphical user interface, comprising:  
means for maintaining within the composite object a first list of potential subobjects incorporable in the composite object;  
means for displaying said first list as a set of icons each corresponding to a respective potential subobject in said first list;  
means responsive to user selection of one of said set of icons for incorporating the potential subject corresponding to the selected icon within the composite object; and  
means for displaying a second list of subobjects as a set of icons, the subobjects in the second lists a subset of the first list and converted from potential to currently incorporated subobjects in the composite object.

5,414,807

# METHOD OF NC DATA PREPARATION FOR REPEATED PATTERNS

Masaki Seki, Tokyo; Takashi Takegahara, Hachioji, and Toru Matsunaka, Yanai, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP91/00083, § 371 Date Oct. 17, 1991, § 102(e) Date Oct. 17, 1991, PCT Pub. No. WO91/11761, PCT Pub. Date Aug. 8, 1991

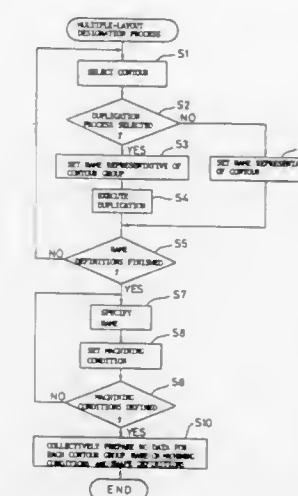
PCT Filed Jan. 25, 1991, Ser. No. 752,548

Claims priority, application Japan, Jan. 25, 1990, 2-13656

Int. Cl.<sup>6</sup> G06F 15/62

U.S. Cl. 395—142

2 Claims



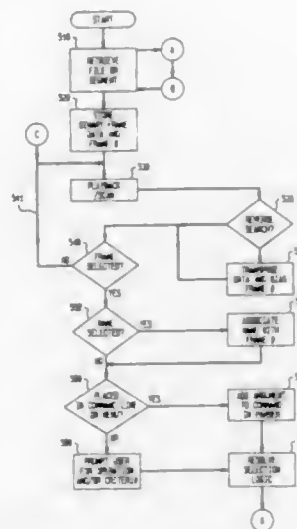
1. A multiple-layout designation method for automatic numerical control data preparation, comprising the steps of:  
(a) judging whether an original contour should be duplicated;  
(b) automatically duplicating, on a graphic display, said original contour manually selected from original contours displayed on the graphic display, to thereby generate, at a location different from said original contour, at least one duplicated contour having a shape and size matching the original contour, when said judging in step (a) determines that said original contour should be duplicated;  
(c) automatically generating contour data representative of a contour group consisting of said original contour and said at least one duplicated contour when said judging in step (a) determines that said original contour should be duplicated;  
(d) inputting a name of said contour group when said judging in step (a) determines that said original contour should be duplicated;  
(e) storing machining condition data associated with the name of said contour group when said judging in step (a) determines that said original contour should be duplicated;  
(f) automatically preparing, based on said contour data and said machining condition data, numerical control data for machining associated with said contour group when said judging in step (a) determines that said original contour should be duplicated;  
(g) inputting a name of said original contour when said judging in step (a) determines that duplication of said original contour is unnecessary;  
(h) storing machining condition data associated with the name of said original contour when said judging in step (a) determines that duplication of said original contour is unnecessary; and  
(i) preparing numerical control data for machining associated with said original contour instead of preparing the numerical control data for machining associated with said

contour group when duplication is judged unnecessary in step (a).

5,414,808  
METHOD FOR ACCESSING AND MANIPULATING  
LIBRARY VIDEO SEGMENTS  
Marvin L. Williams, Lewisville, Tex., assignor to International  
Business Machines Corporation, Armonk, N.Y.  
Filed Dec. 30, 1992, Ser. No. 998,352  
Int. Cl.<sup>6</sup> G06F 17/30

U.S. Cl. 395-154

## 15 Claims

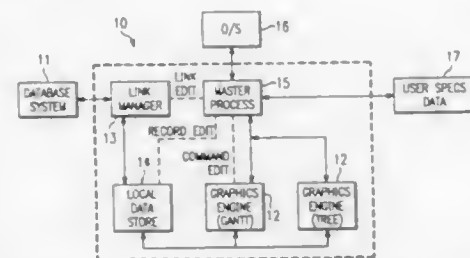


1. A method of manipulating isochronous digital data including the steps of  
retrieving an item of isochronous data from a library storage means,  
transmitting at least a portion of said isochronous data to a terminal of a data processing system,  
reproducing at least a frame of said portion of isochronous data utilizing said terminal,  
selecting at least one of said at least a frame of said portion of isochronous data,  
searching said isochronous data for correspondence with said selected frame of said portion of isochronous data,  
retrieving at least one frame of isochronous data responsive to results of said searching step,  
displaying a logical operation using said at least a frame of said portion of isochronous data as an argument, and  
selectively performing said logical operation.

5,414,809  
GRAPHICAL DISPLAY OF DATA  
Patrick M. Hogan; Rhonda L. Alexander; Lars Greninger, and  
Lloyd J. Arrow, all of Austln, Tex., assignors to Texas Instru-  
ments Incorporated, Dallas, Tex.

U.S. Cl. 395—155

## 20 Claims



1. A method of using a computer to display a graph illustrat-

ing data and to permit a user to edit the data by directly manipulating the graph, comprising the steps of:

- storing a graphics engine, comprised of a set of rules for displaying graphical objects and graphical attributes;
- storing a local database comprised of user-specified records and fields of data, accessible by said graphics engine;
- receiving data specifying at least one record type of records in said local database and at least one field of said records, which are to be illustrated with said graph;
- matching each data value of said record type with a graphical object;
- matching each data value of said field with a graphical attribute of said graphical object;
- displaying a graph comprised of each of said graphical objects and said graphical objects corresponding graphical attributes;
- receiving data representing a user's selection of a data value to be changed;
- receiving editing input from said user representing a changed data value;
- changing the appearance of the graphical object that illustrates the changed data value; and
- updating said local database in accordance with said change.

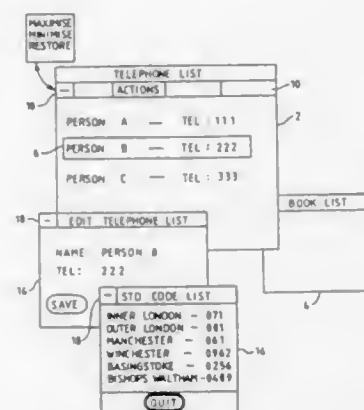
5,414,810  
METHOD AND APPARATUS FOR MAINTAINING DATA  
INTEGRITY WHEN DISPLAYING MULTIPLE DIALOG  
WINDOWS

Mary T. Doyle, Shankill, and Jacqueline Kane, Beaumont, both of Ireland, assignors to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 724,086, Jul. 1, 1991, abandoned. This application Feb. 22, 1994, Ser. No. 200,816  
Claims priority, application European Pat. Off., Jun. 28, 1990, 90307114

<sup>e</sup> U.S. Cl. 395—157

Int. Cl.<sup>6</sup> G06F 3/00

## 27 Claims



1. A method of manipulating data by performing a user selected action on said data within a dialog window stored by a data processing apparatus having a windowing user interface comprising the steps of:

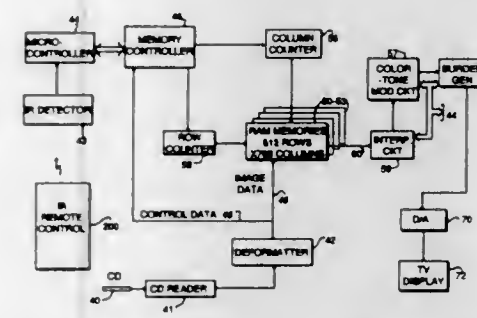
- detecting by said windowing user interface a first request by said user for manipulating data within a first logically defined division of an application program executing on said data processing apparatus,
- creating and displaying a first dialog window having a first mode data identifier in response to said first request for manipulating data by said user,
- storing said first mode data identifier for said first dialog window within a data structure for said first logically defined division in said data processing apparatus indicating said first dialog window is being displayed, and
- detecting by said windowing user interface a second request by said user for manipulating data within a second logi-

cally defined division of said application program executing on said data processing apparatus, creating a second mode data identifier for said second logically defined division in response to said second request, and rejecting said second request when said first mode data identifier stored for said first logically defined division conflicts with said second mode data identifier by comparing said first mode data identifier with said second mode data identifier.

5,414,811  
METHOD AND APPARATUS FOR CONTROLLING  
RAPID DISPLAY OF MULTIPLE IMAGES FROM A  
DIGITAL IMAGE DATABASE  
Kenneth A. Parulski, and David L. Funston, both of Rochester,  
N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Continuation of Ser. No. 796,207, Nov. 22, 1991, abandoned.  
This application Feb. 25, 1994, Ser. No. 202,853

U.S. Cl. 395—162

## 20 Claims



1. A method, for use with a digital image processing system including a digital database having a plurality of images digitized as image data and stored in respective image data files therein, a plurality of image memories, and an output for coupling thereto an image display device having a screen for display of images, for controlling the display of the images, the method comprising the steps of:

defining the screen to contain a plurality of sections;  
selecting a plurality of image data files;  
reading image data from the selected plurality of image data files and loading the image data into respective image memories;  
allocating at least two image memories containing image data to at least two sections of the screen, respectively;  
displaying the image data from the at least two image memories on the respective screen sections;  
selecting a plurality of the images displayed on the screen sections for manipulation; and  
manipulating each of the selected images responsive to a single user command so that each selected image is manipulated in the same way at the same time.

5,414,812

SYSTEM FOR USING OBJECT-ORIENTED  
HIERARCHICAL REPRESENTATION TO IMPLEMENT  
A CONFIGURATION DATABASE FOR A LAYERED  
COMPUTER NETWORK COMMUNICATIONS  
SUBSYSTEM

Michael J. Filip, Saratoga, Calif.; Kathy L. Karunungan, Rome, Italy; Jeffrey C. Kramer, Apple Valley, Minn.; Lucille C. Lee; Danielle L. Moore, both of Rome, Italy; Charles C. Shih, Mountain View, and Jaroslaw J. Sydir, Campbell, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 858,784, Mar. 27, 1992, abandoned.

This application Aug. 26, 1994, Ser. No. 296,990

Int. Cl.<sup>6</sup> G06F 15/00, 15/40, 15/403

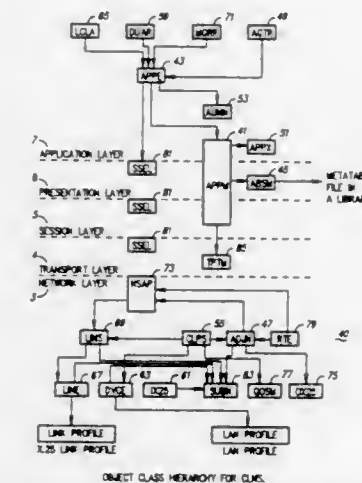
U.S. Cl. 395—200

## 11 Claims

6. A computer system implementing a communications sub-

system coupling said computer system to a computer network, said computer system comprising:

- a at least one user application implemented by said computer system for providing one or more desired user services;
- b communications support means coupled to said user application for implementing a layered computer network communications subsystem, said layered computer network communications subsystem coupling said computer system to said computer network and providing communications services between said user application and other computer systems on said computer network; and
- c a configuration database subsystem coupled to said communications support means for building and maintaining a configuration database and for providing configuration data to said communications support means for configuration of said layered computer network communications subsystem, said configuration database subsystem imple-



menting an object-oriented, hierarchical presentation of said layered computer network communications subsystem, said object-oriented, hierarchical presentation comprising a plurality of object classes, each of said object classes corresponding to at least one function of a plurality of functions defined for said layered computer network communications subsystem, each of said functions being associated with at least one layer of said layered computer network communications subsystem each said object class being defined by a set of attributes, said plurality of object classes being related in a hierarchical relationship corresponding to a functional relationship defining the relationship of each said function associated with a layer to at least one other of said functions associated with layers above or below said layer in said layered communications subsystem the attributes of a higher level object class including one or more lower level object classes.

5,414,813  
DIRECT TRANSFER FROM A RECEIVE BUFFER TO A  
HOST IN A TOKEN-PASSING TYPE NETWORK DATA  
TRANSMISSION SYSTEM

Yasuhisa Shiebara, Tokyo, Japan, assignor to Kabushiki Kaisha  
Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 653,290, Feb. 11, 1991, abandoned.  
This application Nov. 1, 1993, Ser. No. 144,491  
Claims priority, application Japan, Feb. 13, 1990, 2-32108  
Int. Cl.<sup>6</sup> G06F 13/00

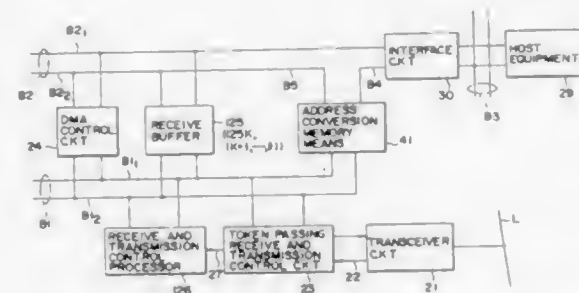
U.S. Cl. 395—200

## 9 Claims

1. A data transmission system using media access control of a token-passing type, comprising:  
multiple nodes each having a respective destination address and connected to a common transmission path, wherein each node transmits data in a predetermined period in order in a broadcasting or multicasting manner, and each



non-transmitting node receives the data transmitted by the transmitting node, determines whether its respective destination address is designated in the received data, and if so, stores the received data; wherein each node comprises, bus means for transmitting data and address signals, transceiver means for receiving a data frame over said common transmission path and transmitting the received data frame to an output of the transceiver means, token passing receive and transmission control means coupled to the output of the transceiver means for receiving said data frame, detecting a destination address included in said received data frame, determining whether or not the detected destination address corresponds to its respective destination address, outputting at an output of said token passing receive and transmission control means a data frame reception end signal when it is confirmed that a detected destination address corresponds to its respective destination address and then also outputting on said bus means the received data frame, DMA control means coupled to said bus means for extracting predetermined received data and corresponding address information included in said received data frame in response to said data frame reception end signal from said



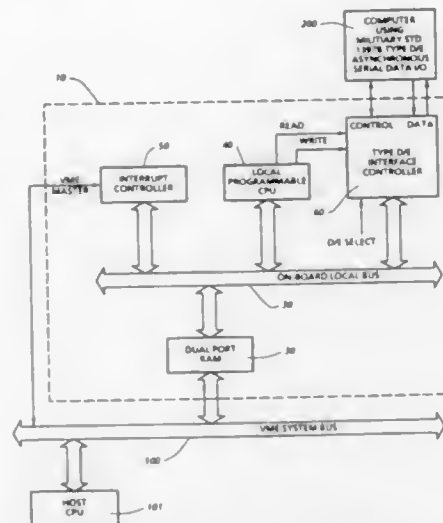
token passing receive and transmission control means, and transmitting said predetermined received data and corresponding address information on said bus means, receive buffer means coupled to said bus means for receiving and storing said extracted predetermined received data and corresponding address information transmitted by said DMA control means, address conversion memory means for storing an updated address of said received data stored in said receive buffer means, receiving an externally input specific address from a host to access the received data stored in said buffer means, converting said specific address and said updated address into a conversion address, and applying said conversion address to said receive buffer means to access corresponding received data and the corresponding address information stored in said receive buffer means; and receive and transmission control processing means coupled to said receive buffer means via said bus means for generating said updated address in correspondence to the received data and the corresponding address information stored in said receive buffer means as said received data is stored in said buffer means and causing the updated address to be stored in said address conversion memory means in correspondence to said received data stored in said buffer means.

5,414,814  
I/O INTERFACE BETWEEN VME BUS AND ASYNCHRONOUS SERIAL DATA COMPUTER  
Dale W. McKim, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 8, 1992, Ser. No. 880,271  
Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 395—275

7 Claims



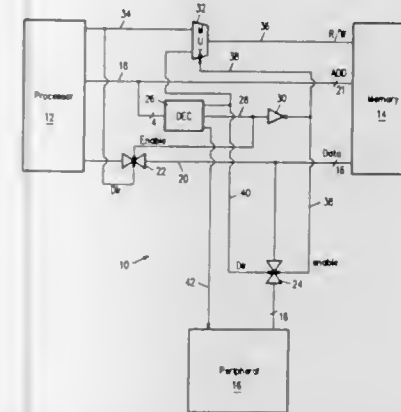
1. A computer interface for supporting communication between a host processor's VMEbus and a computer having its input/output (I/O) interface based on MIL-STD 1397B Type D or E asynchronous serial data specifications, comprising: memory means coupled to the VMEbus for temporary storage of VMEbus data being transferred from the VMEbus to the computer; a local bus coupled to said memory means; interrupt control means coupled to the VMEbus and said local bus, said interrupt control means for generating a processor interrupt on said local bus in response to an interrupt control signal passed on the VMEbus by the host processor; processor means coupled to said local bus for generating a write control signal in response to the processor interrupt and for transferring the VMEbus data stored in said memory means onto said local bus in response to the processor interrupt; interface control means, coupled to said local bus and the computer, said interface control means responsive to the write control signal, for transferring the VMEbus data on said local bus to the computer as asynchronous serial data in accordance with one of MIL-STD 1397B type D or E I/O interface specifications; said processor means, in response to a request-to-send control signal generated by the computer, further for generating a read control signal for passage to said interface control means and for generating an interrupt control signal on said local bus; said interface control means, in response to the read control signal, further for transferring, from the computer to said memory means via said local bus, asynchronous serial data in accordance with one of MIL-STD 1397B type D or E I/O interface specifications as computer data for temporary storage in said memory means; and said interrupt control means further for generating a VME interrupt on the VMEbus in response to the interrupt control signal on said local bus, wherein the host processor accesses said memory means via the VMEbus in response to the VME interrupt.

5,414,815  
METHOD AND APPARATUS FOR TRANSFERRING DATA DIRECTLY BETWEEN A MEMORY DEVICE AND A PERIPHERAL DEVICE IN A SINGLE ADDRESS CYCLE UNDER THE CONTROL OF A PROCESSOR  
Gary W. Schwede, 337 Calcaterra Ct., Palo Alto, Calif. 94306  
Continuation of Ser. No. 583,501, Sep. 17, 1990, abandoned. This application Dec. 23, 1992, Ser. No. 995,332

Int. Cl.<sup>6</sup> G06F 13/28

U.S. Cl. 395—275

17 Claims



1. A computer system having an address bus, a data bus, a processor means connected to said address bus and said data bus, a memory means connected to said address bus and said data bus, for receiving an address signal from said address bus during a memory address cycle and for reading data from or writing data to said data bus in response to the address signal on said address bus, a peripheral device means connected to said data bus for reading data from or writing data to said data bus, wherein the data bus directly interconnects said processor means, memory means, and peripheral device means, and wherein said processor means generates an address signal provided on said address bus during said memory address cycle, the system further comprising: decoding means connected to said address bus for decoding said address signal on said address bus generated by said processor means during said memory address cycle, and for asserting a first control signal in response to a particular decoding during said memory address cycle; and transceiver means electrically segmenting said data bus and responsive to said first control signal during said memory address cycle for permitting data flow on said data bus directly between said peripheral device means and said memory means during said memory address cycle.

5,414,816  
DATA TRANSFER APPARATUS HAVING MEANS FOR CONTROLLING THE DIFFERENCE IN SPEED BETWEEN DATA INPUT/OUTPUT PORTS AND MEMORY ACCESS

Hajime Oyadomari, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
Continuation of Ser. No. 873,694, Apr. 21, 1992, abandoned, which is a continuation of Ser. No. 451,990, Dec. 18, 1989, abandoned. This application Sep. 3, 1993, Ser. No. 115,754  
Claims priority, application Japan, Dec. 19, 1988, 63-318428; Dec. 19, 1988, 63-318429

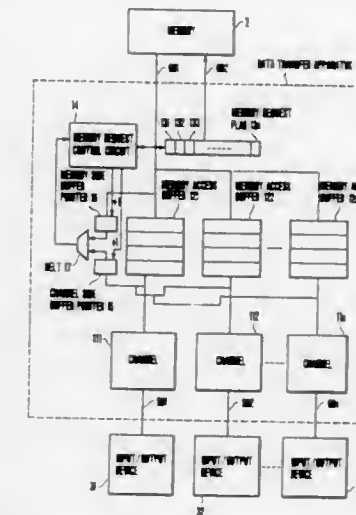
Int. Cl.<sup>6</sup> G06F 13/00

U.S. Cl. 395—275

3 Claims

1. A data transfer apparatus, comprising: a plurality of channels, each channel connected to a respective input/output device to which channel numbers are respectively assigned; transfer speed control means interconnected between said channels and a memory, further including monitoring means for monitoring a number of waiting memory ac-

cesses from said input/output devices to said memory in each of said channels, the each waiting memory access being generated in response to a difference between a memory access speed and a data entering/exiting speed of said input/output devices; and adjusting means, when the monitoring result detects a predetermined difference, for controlling said input/output devices based on the predetermined difference; wherein, said adjusting means includes a plurality of memory access buffers interconnected between said memory and each of said channels, for storing plural transfer data and accessing said memory; said monitoring means includes a plurality of memory access slot flip-flops arranged in correspondence with the channel numbers, for controlling a memory access time slot of said memory in said respective channels storing the trans-

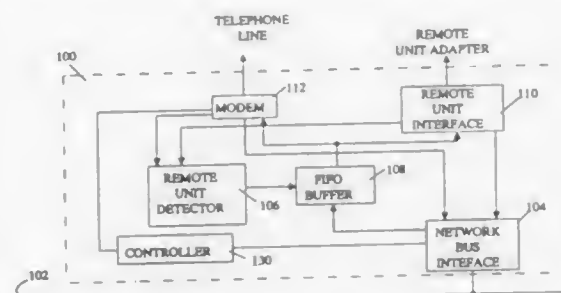


fer data in said memory access buffers, a memory-side buffer pointer for counting access counts between said memory and each of said memory access buffers in accordance with said channel numbers, and a channel-side buffer pointer for counting access counts between each of said channels and each of said memory access buffers in accordance with said channel numbers; and said adjusting means further includes an arithmetic circuit for calculating a difference between the content of said memory-side buffer pointer and that of said channel-side buffer pointer to output a difference signal in each of said channels, and a changing means for changing a memory access timing when the difference signal exceeds a predetermined value, said changing means multiplexing the memory access time slots corresponding to one of said channels of which the difference signal represents the predetermined value.

5,414,817  
ADAPTER UNIT FOR CONNECTING A MOBILE COMPUTER TO A NETWORK AND FOR SIMULATING THE PRESENCE OF THE MOBILE COMPUTER WHEN THE MOBILE COMPUTER IS NOT PRESENT  
Ali S. Ezzet, Sunnyvale; Carol E. Bassett, Cupertino, both of Calif.; Mark L. Brown, Boise, Id.; Mark A. Thompson, San Jose, and Richard M. Archuleta, Mountain View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.  
Continuation of Ser. No. 982,961, Nov. 30, 1992, abandoned. This application Jan. 24, 1994, Ser. No. 185,763  
Int. Cl.<sup>6</sup> G06F 13/00  
U.S. Cl. 395—275  
3 Claims  
1. An adapter unit for connecting a mobile computer to a computer network, said mobile computer and said computer

network communicating by exchanging messages, said adapter unit comprising:

- network interface means, connected to said computer network, for connecting said adapter unit to said computer network;
- mobile interface means for connecting said adapter unit to said mobile computer and for exchanging said messages therewith when said adapter unit is connected to said mobile computer;
- means, connected to said mobile interface means, for detecting the presence of said mobile computer and for generating a mobile unit present signal indicative of the presence of said mobile computer;
- buffer means connected to said network interface means, said detecting means, and said mobile interface means, for



storing said messages from said computer network to said mobile computer and for copying said messages to said mobile interface means in the order said messages were received from said computer network in response to the generation of said mobile unit present signal; and control means, connected to said network interface means, for acknowledging receipt of said messages to said computer network if said mobile unit present signal is not generated, said acknowledgment being the same as that provided by said mobile computer to messages from said network when said mobile computer is connected to said mobile interface means and for causing said messages received from said computer network to be stored in said buffer means until said mobile unit present signal is generated.

5,414,818

#### METHOD AND APPARATUS FOR CONTROLLING RESELECTION OF A BUS BY OVERRIDING A PRIORITIZATION PROTOCOL

Larry P. Henson, Santa Clara; Kumar Gajjar, San Jose, and Thomas E. Idleman, Santa Clara, all of Calif., assignors to MTI Technology Corporation, Anaheim, Calif.

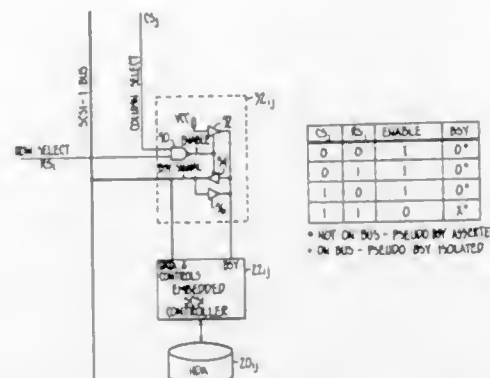
Filed Apr. 6, 1990, Ser. No. 505,746  
Int. Cl. G06F 13/42

U.S. Cl. 395—325

4 Claims

1. A reselection inhibitor, comprising:
  - a first and a second SCSI type device, each having a busy terminal;
  - a bus, having a busy channel, for coupling said initiator to said busy terminal of said first and second SCSI type device;
  - a reselection control circuit for asserting a select signal identifying a particular one of said SCSI type devices to be inhibited during reselection; and
  - logic means, coupled to said first and second SCSI type device and disposed intermediate said bus and said SCSI type device and responsive to said select signal, for:

asserting a pseudo busy signal to said busy terminal of only said particular one SCSI type device;  
isolating said pseudo busy signal from said bus; and



merging a busy signal from said bus to said busy terminal of said particular one SCSI type device.

5,414,819

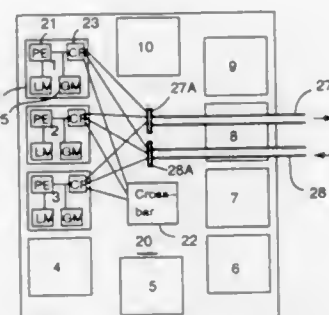
#### OPTICAL INTERCONNECTION NETWORK

Ian Redmond, Princeton, and Eugen Schenfeld, Monmouth Junction, both of N.J., assignors to NEC Research Institute, Inc., Princeton, N.J.

Filed Dec. 18, 1992, Ser. No. 994,220  
Int. Cl. G06F 13/00

U.S. Cl. 395—325

3 Claims



1. An interconnection network for an information processing system comprising:

- N processing elements grouped in N/k clusters of k processing elements;
- a plurality of local electronic switching means one for each cluster for interconnecting the processing elements in a single cluster;
- a plurality of light-emitting means grouped in N/k arrays of N light-emitting means in each array, one array for each cluster;
- N light-detecting means, strayed in N/k groups of k light-detecting means, one group for each cluster;
- means for forming an optical network comprising N separate optical channels each channel terminating at a respective light-detecting means, and
- a plurality of communication processing means, one for each processing element, for controlling the routing of signal information between processing elements,
- the routing between processing elements in the same cluster being solely by way of the local electronic switching means associated with the respective cluster, and
- the routing between processing elements from a sending cluster to a receiving cluster being either directly by way of a light-emitting means associated with said sending cluster, the optical network and a light-detecting means associated with said receiving cluster or by way of the local electronic switching means in said sending cluster

and/or in said receiving cluster and by way of a light-emitting means associated with said sending cluster, the optical network and a light-detecting means associated with said receiving cluster.

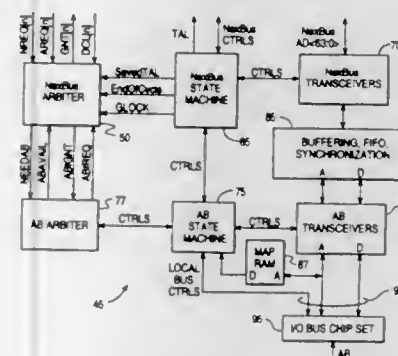
5,414,820

#### CROSSING TRANSFERS FOR MAXIMIZING THE EFFECTIVE BANDWIDTH IN A DUAL-BUS ARCHITECTURE

Harold L. McFarland, San Jose, and Allen P. Ho, Fremont, both of Calif., assignors to NexGen, Inc., Milpitas, Calif.  
Division of Ser. No. 748,768, Aug. 23, 1991, Pat. No. 5,369,748.  
This application Mar. 21, 1994, Ser. No. 215,232  
Int. Cl. G06F 13/36, 13/40

U.S. Cl. 395—325

21 Claims



1. A bus interface unit for a computer system having at least a first bus and a second bus, wherein the architecture of said first bus supports coupling to a first bus master for generating a first bus transfer, said first bus transfer including an address, said architecture having a first bus control signal selectively indicating said first bus transfer is claimed by a device addressed by said address, said bus interface unit comprising:

- bidirectional first bus interface logic coupled to said first bus;
- bidirectional second bus interface logic coupled to said second bus;
- a bidirectional path coupled between said first bus interface logic and said second bus interface logic;
- address mapping logic having programmable storage for first bus configuration data for a plurality of address regions to permit said address regions to be associated with said first bus; and
- control logic means, coupled to said first and second bus interface logic, for enabling a crossing transfer from said first bus to said second bus without waiting for assertion of said first bus control signal if said address of said first bus transfer is not mapped to one of said address regions that is associated with said first bus.

5,414,821

#### METHOD OF AND APPARATUS FOR RAPIDLY LOADING ADDRESSING ENVIRONMENT BY CHECKING AND LOADING MULTIPLE REGISTERS USING A SPECIALIZED INSTRUCTION

John Z. Nguyen, Roseville, and Merwin H. Alferness, New Brighton, both of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Dec. 17, 1991, Ser. No. 809,389  
Int. Cl. G06F 9/00

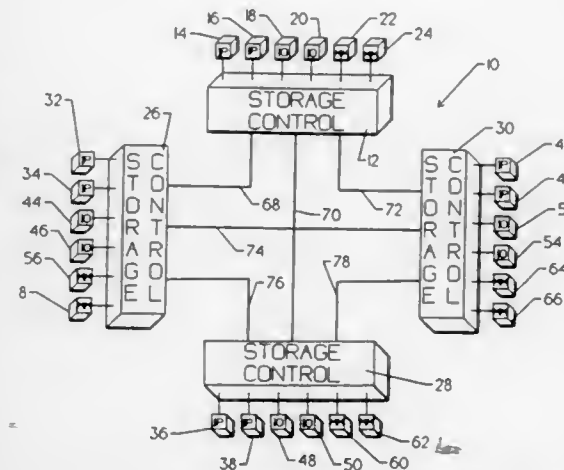
U.S. Cl. 395—375

4 Claims

1. An apparatus comprising:
  - a memory for storing instructions and operands accessible using absolute addresses;
  - an instruction processor having a virtual address port coupled to said memory for executing said instructions using said operands under control of a program which

references said operands using a plurality of virtual addresses;

- c. an active base table having a plurality of registers and also having a data input port and a data output port wherein the contents of each of said plurality of registers can be accessed with an active base table index and wherein said data input port of said active base table is coupled to said virtual address port of said instruction processor where said active base table receives said plurality of virtual addresses from said virtual address port of said instruction processor;
- d. a comparator coupled to said virtual address port of said instruction processor for comparing each of said plurality of virtual addresses being transmitted by said instruction processor to said plurality of registers of said active base table with a predetermined set of valid values;
- e. a plurality of flag register bits each bit corresponding to one of said plurality of registers of said active base table;
- f. a priority controller coupled to said plurality of flag register bits for indicating which of said plurality of flag register bits are set;
- g. a microcontroller coupled to said comparator, said active base table, said plurality of flag register bits, and said



- priority controller for providing said active base table index to said active base table for loading said plurality of virtual address from said instruction processor into said plurality of registers of said active base table and for setting the appropriate one of said plurality of flag register bits if said comparator indicates that said corresponding one of said plurality of registers of said active base table contains a valid virtual address and for receiving the output of said priority controller to control said active base table index such that only said plurality of registers of said active base table which contain a valid virtual address are read out of said active base table;
- h. a plurality of base descriptor tables coupled to said active base table for converting said valid virtual addresses provided from said active table into a plurality of absolute base addresses;
- i. a plurality of base registers coupled to said plurality of base descriptor tables for storing said plurality of absolute base addresses; and
- j. a translator circuit coupled to said plurality of base registers and to said instruction processor for adding said plurality of absolute base addresses to a plurality of relative addresses of said instruction processor to produce a plurality of absolute address for accessing said memory.



5,414,822

# METHOD AND APPARATUS FOR BRANCH PREDICTION USING BRANCH PREDICTION TABLE WITH IMPROVED BRANCH PREDICTION EFFECTIVENESS

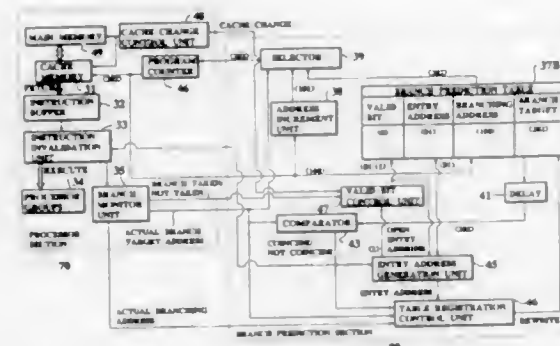
Mitsuo Salto, Yokosuka; Takeshi Aikawa, Chofu, and Junji Mori, Fujisawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 3, 1992, Ser. No. 863,181

Claims priority, application Japan, Apr. 5, 1991, 3-073329 Int. Cl.<sup>6</sup> G06F 9/38

U.S. Cl. 395—375

21 Claims



10. An apparatus for branch prediction, comprising: processor means for executing instructions; a branch prediction table, formed by an associative memory, for registering entries, each entry including a branching address indicating instructions to be executed concurrently containing a predicted branch instruction, and an entry address indicating a location of said each entry in said associative memory of said branch prediction table; instruction fetch means for fetching said instructions to be executed concurrently by said processor means by fetching said instructions indicated by said branch target address of said predicted branch instruction for the presently fetched instructions at a next processing timing, wherein said predicted branch instruction for said presently fetched instructions is registered in one entry in said branch prediction table having the branching address which coincides with an address of said presently fetched instructions; prediction judging means for judging the predicted branch instruction for said presently fetched instructions as correct when said predicted branch instruction is actually encountered during actual execution of said presently fetched instruction; predicted instruction invalidation means for invalidating instructions indicated by said branch target address of said predicted branch instruction for said presently fetched instructions which are fetched by said instruction fetch means at the next processing timing, when said prediction judging means does not judge said predicted branch instruction as correct; and table registration means for rewriting said entry registering said predicted branch instruction for said presently fetched instructions in said branch prediction table when said prediction judging means does not judge said predicted branch instruction as correct, by using the entry address of said entry registering said predicted branch instruction for said presently fetched instructions.

5,414,823

Patent Not Issued For This Number

5,414,824

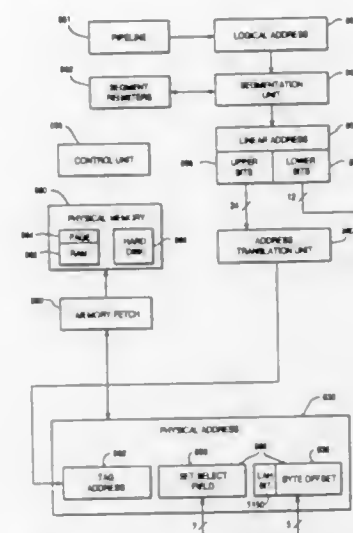
# APPARATUS AND METHOD FOR ACCESSING A SPLIT LINE IN A HIGH SPEED CACHE

Edward T. Grochowski, San Jose, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Jun. 30, 1993, Ser. No. 87,637

Int. Cl.<sup>6</sup> G06F 12/00, 12/04; G11C 15/00 U.S. Cl. 395—400

7 Claims



1. In a computer processor having a set associative cache in which data is stored in a series of adjacent cache lines that include upper bytes and lower bytes, a circuit for performing a split line access in which two adjacent lines are accessed simultaneously to access data stored on a first cache line that continues into a second, adjacent cache line, comprising: (a) a physical address circuit for supplying a physical address including a set field and a byte offset field including a LAH bit indicative of one of a split line access and a straight line access; (b) a data decoder for decoding said set field to select a data decoder output line associated with the first cache line; (c) a cache drive circuit responsive to said data decoder output line for driving the upper bytes of said first cache line; (d) an access selection circuit, responsive to said LAH bit and said cache line driver, for driving the first lower bytes of said first cache line if said LAH bit indicates a straight line access and for driving second lower bytes of said second, adjacent cache line, if said LAH bit indicates a split line access.

5,414,825

# METHOD OF PROGRAMMING A SEMICONDUCTOR MEMORY DEVICE WITHIN A MICROCOMPUTER ADDRESS SPACE

Yasuhiko Sakakibara, Kodaira; Isamu Kobayashi, Tokyo, and Yoshinori Suzuki, Kodaira, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering, Ltd., both of Tokyo, Japan

Continuation of Ser. No. 843,235, Feb. 28, 1992, abandoned, which is a division of Ser. No. 485,499, Feb. 27, 1990, Pat. No. 5,109,359, which is a division of Ser. No. 96,912, Sep. 16, 1987, Pat. No. 4,905,140, which is a division of Ser. No. 768,112, Aug. 21, 1985, Pat. No. 4,701,886. This application Mar. 21, 1994, Ser. No. 210,770

Claims priority, application Japan, Aug. 22, 1984, 59-173329 Int. Cl.<sup>6</sup> G11C 7/00, 11/34

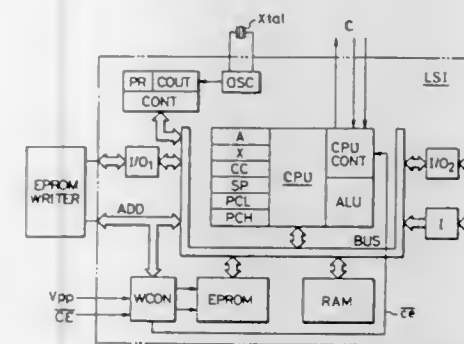
U.S. Cl. 395—400

4 Claims

1. A method for writing data into an electrically programmable read only memory included in an integrated microcomputer by writing means under the control of a writing control-

ler, wherein said writing means includes means for performing a verify operation to verify data of the electrically programmable read only memory after data has been written into the electrically programmable read only memory from the writing means, said method comprising:

- an address signal setting step, wherein an address signal is generated by said writing means and forwarded to said electrically programmable read only memory; a data setting step, wherein data is generated by said writing means and forwarded to said electrically programmable read only memory;



- a step of writing the data from said writing means into the electrically programmable read only memory if the writing controller determines that an address designated by the address signal from the writing means is within an address space of the electrically programmable read only memory; and a step of providing a preset data signal having a predetermined level to the writing means when said writing means is performing the verify operation if the writing controller determines that an address designated by the address signal is not within an address space of the electrically programmable read only memory.

5,414,826

# SYSTEM AND METHOD FOR MEMORY MANAGEMENT IN MICROCOMPUTER

Philip Garcia, Stanford, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 31, 1990, Ser. No. 472,055

Int. Cl.<sup>6</sup> G06F 13/00, 12/02

U.S. Cl. 395—425

8 Claims



1. A computing system comprising: a data memory area, having a first end and a second end, the data memory area containing a pointer table, the pointer

table containing at least one data pointer and the pointer table being at the first end of said data memory area; first means for obtaining from said pointer table a next available data memory location for placement of a data block within a data field, where said data field begins from said second end of said data memory area; second means for, upon placement of the data block within the data field, placing in the pointer table a new data pointer which indicates a new next available data memory location for placement of a next data block within the data field; and

an overlap means responsive to said first means and said second means for determining whether a placing of said data block in said data field and a placing of the new data pointer in said pointer table would cause said data field and said pointer table to overlap and not placing said data pointer and said data block within said data memory if by doing so they were to overlap as determined by said overlap means; where said pointer table and said data field grow towards each other from said first end and said second end, respectively, of said data memory area.

5,414,827

# AUTOMATIC CACHE FLUSH

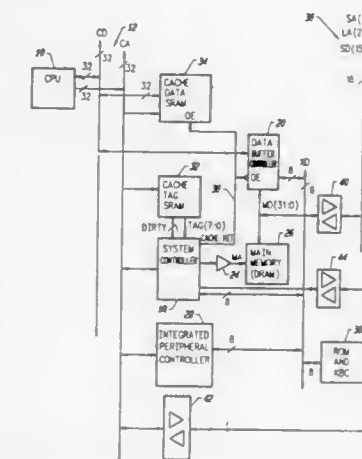
Fong-Lu Lin, San Jose, Calif., assignor to OPTi, Inc., Santa Clara, Calif.

Filed Dec. 19, 1991, Ser. No. 812,074

Int. Cl.<sup>6</sup> G06F 12/12

U.S. Cl. 395—425

16 Claims



1. A method for managing a cache memory having a plurality of entries, each entry having a tag portion and a data portion,

for use with a secondary memory having storage for bytes of data at secondary memory addresses, said storage being organized into a plurality of secondary memory data lines, each of said secondary memory addresses designating at least one of the data bytes in one of said secondary memory data lines,

said cache memory having a mapping which maps each cache memory entry to a predetermined plurality of said secondary memory data lines, each cache memory entry being associated, according to a tag in its tag portion, with at most one of the secondary memory data lines to which the entry maps, at least one range of secondary memory addresses being defined as noncacheable,

for use further in a computer system permitting enablement and disablement of caching,

said method comprising the steps, in response to a read access to a provided secondary memory read address, of: returning data from the data portion of a given one of said cache memory entries, which entry maps to the second-

a local source delay circuit having a data input connected to the output of the local data source for receiving input data signals from the local data source, said local source delay circuit having a data output for outputting an output data signal corresponding to each input data signal, each output data signal being delayed by an amount ( $mT + \Delta pT$ ) relative to its corresponding input data signal, where  $m$  is a positive integer or zero, and where  $0 < \Delta p < 1$ ; characterized in that:



processor means coupled to said display, input means and memory and responsive to user inputs to create in said memory a data base defining a tree structure that includes a plurality of said nodes, each node comprising a node data structure, each said OR node data structure connected by plural links to a plurality of child node data structures and upon a tree traversal, is operable to place in one said test case, information contained in one child node data structure, each link including an associated probability value, said processor means randomly selecting one said link to a child node data structure from among said plural links, said selecting occurring in accordance with said link's associated probability value.

5,414,837

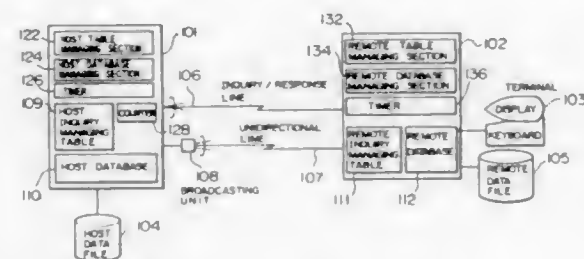
SYSTEM FOR DETERMINING AND RETURNING FREQUENTLY REQUESTED INFORMATION BY AN ALTERNATE PATH IN A DISTRIBUTED DATABASE  
Nobuo Kotatsu, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 22, 1991, Ser. No. 704,084

Claims priority, application Japan, May 23, 1990, 2-133616  
Int. Cl.<sup>6</sup> G06F 15/40

U.S. Cl. 395—600

6 Claims



1. An information service system comprising:
  - bidirectional communication paths;
  - unidirectional paths;
  - a plurality of terminals, each of which generates an inquiry as a terminal inquiry associated with a target item of information and receives a remote response to said terminal inquiry to represent a remote response;
  - a plurality of remote units, each of which is connected to one or more of said terminals, a corresponding one of said bidirectional communication paths and a corresponding one of said unidirectional communication paths and includes a remote database for storing a plurality of first item information, wherein said remote units determine whether or not said target item of information is stored in said remote database, transmits said target item of information to said connected terminal as said remote response when it is determined that said target item of information is stored in said remote database and transmits said terminal inquiry, as said remote inquiry, on to said connected bidirectional communication path when it has been determined that said target item of information is not stored in said remote database, and transmits terminal inquiry counts on said connected bidirectional communication paths when a predetermined remote condition is satisfied; and
  - a host connected to said bidirectional communication paths and said unidirectional communication paths, said host including a host database for storing a plurality of second items of information, for receiving said remote inquiry through said bidirectional communication paths to receive said target item of information from said host database, for transmitting said target item of information to one of said remote units which has transmitted said remote inquiry through said bidirectional communication paths which are connected to said remote unit, for receiving said terminal inquiry counts from said remote units through said bidirectional communication paths and for broadcasting items of information, through said unidirectional communication paths, selected from said second items of information based on inquiry frequencies determined in accordance with said terminal inquiry counts to said remote units, wherein each of said remote units include:
    - a remote inquiry count table for storing said terminal inquiry count for each of said first items of information; and
    - remote table managing means for increasing said terminal inquiry count for said target item of information when said target item of information is stored in said remote database, for setting a terminal inquiry count of "1" for said target item of information in said remote inquiry count table when said target item of information is not stored in said remote database, for setting terminal inquiry counts of "0" for said selected items of information in said remote inquiry count table when said selected items of informa-

tion are received from said host, for transmitting said terminal inquiry counts to said host when said remote condition is satisfied, and for resetting all of said terminal inquiry counts, and

wherein one of said remote units receives said target item of information from said host to transmit said target item of information to said connected terminal and to store said target item of information in said remote database and receives selected items of information from said host to store said selected items of information in said remote database.

5,414,838

SYSTEM FOR EXTRACTING HISTORICAL MARKET INFORMATION WITH CONDITION AND ATTRIBUTED WINDOWS

Anthony D. Kolton, Chicago, Ill.; Ruben A. Gamboa, and Dorette S. Chimenti, both of Austin, Tex., assignors to Logical Information Machine, Chicago, Ill.

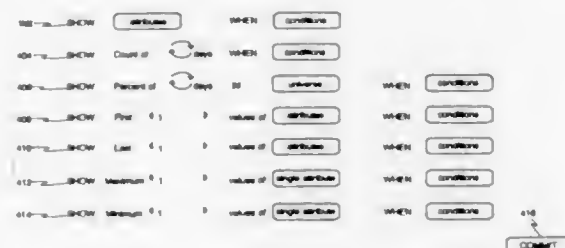
Continuation-in-part of Ser. No. 713,359, Jun. 11, 1991. This

application Jun. 11, 1992, Ser. No. 897,622

Int. Cl.<sup>6</sup> G06F 15/40

U.S. Cl. 395—600

7 Claims



1. A system for extracting historical market information identifying recurring trends relating to securities traded in a market, the system comprising:
  - a computer having a digital storage medium;
  - a computer data base operable with said computer for organizing historical market information according to attributes;
  - means for providing a first menu of attributes for presentation in a report;
  - means for providing a second menu for selecting a condition defining temporal fluctuations of the attributes;
  - means for selecting one or more attributes from said first menu providing a SHOW ATTRIBUTE query construction;
  - means for selecting one or more conditions from said second menu providing a WHEN CONDITION query construction;
  - means for limiting said WHEN CONDITION selecting means to a time interval during which said conditions are satisfied for a predetermined number of occurrences;
  - means for retrieving, according to said selected SHOW ATTRIBUTE-WHEN CONDITION query construction and said limiting means, the selected attributes of the computer data base for each point in history corresponding to the satisfaction of the selected conditions; and
  - means for generating, for each point in history according to the satisfaction of the selected conditions, a report presentation for each of the retrieved attributes, whereby a plurality of report presentations is generated, one for each point in history satisfying the selected conditions, allowing comparison among said plurality of report presentations for identifying recurring trends relating to the commodities traded in the market.

5,414,839

HYBRID LOCK ESCALATION AND DE-ESCALATION PROTOCOLS

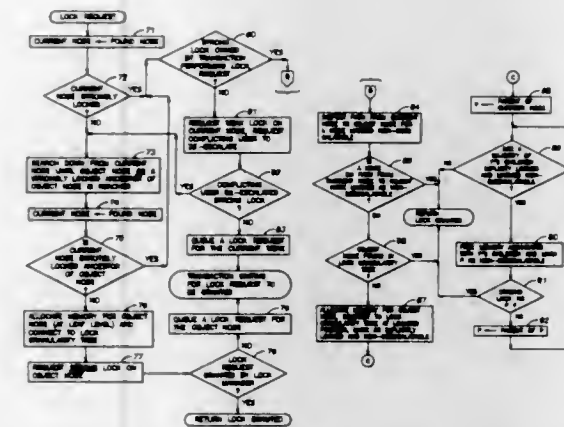
Ashok M. Joshi, Nashua, N.H., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 19, 1992, Ser. No. 901,590

Int. Cl.<sup>6</sup> G06F 12/00

U.S. Cl. 395—600

17 Claims



1. A method of operating a digital computer for processing requests for memory locks upon nodes of a predefined resource hierarchy of addressable memory of said digital computer, wherein a pre-existing lock on a node precludes a granting of a subsequent request for a conflicting lock on the node until the pre-existing lock is released, said resource hierarchy having a multiplicity of levels, said method comprising the steps of:
  - a) responding to a first request for a memory lock upon a first node at a lower level in said resource hierarchy by placing a memory lock on a higher-level second node in said resource hierarchy that is an ancestor of the first node, and recording in memory a leaf-node instance for said first node;
  - b) responding to a second request for a memory lock upon a third node at a lower level in said resource hierarchy than said second node by detecting a lock conflict between the lock requested by the second request and said lock on said second node, de-escalating the lock on the second node to a lower-level fourth node which is a descendant of said second node and an ancestor of said first node but not an ancestor of said third node to avoid conflict with the lock requested by the second request;
  - c) responding to a third request for a memory lock upon a fifth node at a lower level in said resource hierarchy that is at the same level as said first node by escalating said leaf-node instance from said first node to a sixth node in said resource hierarchy that is an ancestor of both of said first and fifth nodes and is not an ancestor of said fourth node; and
  - d) responding to a fourth request for a lock upon a seventh node at a level in said resource hierarchy that is lower than the level in said resource hierarchy of said sixth node by detecting a lock conflict between the lock requested by said fourth request and the lock on said fourth node, and denying said fourth request upon detecting that said sixth node has a leaf-node instance, thereby prohibiting de-escalation of the lock on the fourth node to below said sixth node.

5,414,840

METHOD AND SYSTEM FOR DECREASING RECOVERY TIME FOR FAILED ATOMIC TRANSACTIONS BY KEEPING COPIES OF ALTERED CONTROL STRUCTURES IN MAIN MEMORY

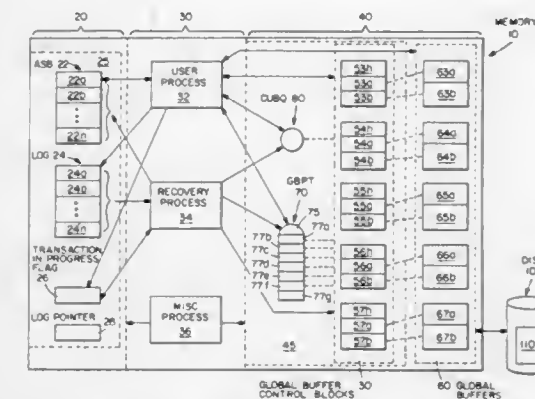
T. K. Rengarajan; Peter Spiro, both of Nashua, N.H.; Ananth Raghavan, San Francisco, Calif., and David B. Lomet, Westford, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 25, 1992, Ser. No. 905,555

Int. Cl.<sup>6</sup> G06F 15/40, 11/00

U.S. Cl. 395—600

20 Claims



1. In a computer having multiple processes, nonvolatile storage accessed by the multiple processes, and volatile memory including a buffer memory and a control structure having a plurality of control data items shared by the multiple processes for local access to data partitions retrieved from nonvolatile storage, the buffer memory having a state represented by the control structure, a method of managing a database system comprising the steps of:
  - a) from a process, initiating an atomic modification transaction to modify a select control data item;
  - b) in response to the initiated atomic modification transaction, storing in the volatile memory an image of the select control data item and maintaining the stored image until completion of the atomic modification transaction;
  - c) modifying the select control data item; and
  - d) in response to a termination of the process during the atomic modification transaction, returning the select control data item to a state determined by the stored images so as to maintain consistency between the control structure and the buffer memory.

5,414,841

COMPUTERIZED SYSTEM FOR REPRESENTING DATA ITEMS USING TOKEN IDENTIFIERS

Ronald E. Bingham, Capitola; Michael J. Dockter, Hollister; Joel F. Farber, San Jose, all of Calif., and Kevin D. Seppi, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 19, 1992, Ser. No. 963,885

Int. Cl.<sup>6</sup> G06F 5/00

U.S. Cl. 395—600

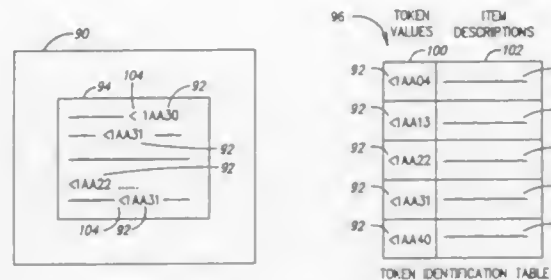
17 Claims

9. A computer system providing a computerized token identification system using tokens generated by said computer system for uniquely representing a plurality of items, said computer system comprising:
  - a plurality of unique tokens;
  - computer generation means for generating one of said plurality of unique tokens;
  - computer assignment means for associating said one of said plurality of unique tokens with an item;
  - computer recognition means for recognizing said one of said plurality of unique tokens; and



computer identification means for identifying the item associated with said one of said plurality of unique tokens, wherein each of said plurality of unique tokens comprises:

- a delimiter field containing at least one token recognition character;
- a version field immediately following the delimiter field containing a version string of varying length having at least one character, identifying a unique token version; and



a variable field immediately following said version field, containing a variable string of a varying length of at least one character, conforming to a format specification for said unique token version, each variable string being unique for a unique token version, wherein the characters of said version string and said variable string that are adjacent are from different character set types.

5,414,842

# EXTERNAL SORTING USING VIRTUAL STORAGE AS A WORK DEVICE

Gary D. Archer, Campbell; Douglas R. Case, and Hilda J. Wu, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 389,243, Aug. 2, 1989, abandoned. This application Jan. 22, 1993, Ser. No. 8,048

Int. Cl.<sup>6</sup> G06F 7/06

U.S. Cl. 395—600

5 Claims



1. A new use for an LRU managed virtual store (VS) of a CPU as a work device during the sort and merge phases of an external sort operation on key based records, said VS being supported by fast internal (real) memory formed from a byte addressable extent and a page addressable extent and a slower higher capacity backing store such as direct access storage devices (DASDs), comprising the steps of:

(a) during the sort phase, reading subsets of record keys from

the backing store into the byte addressable extent of the fully internal memory backed VS, arranging the record keys into ordered strings, and writing the ordered strings out into the page addressable extent of the internal memory backed portions of VS, each ordered string or element thereof being written into the byte or page addressable extents of the internal memory backed VS by VS address modification; and

(b) during the merge phase, reading preselected elements of the sorted strings from the page addressable extent into the byte addressable extent of fully internal memory backed VS and performing a multiple-way merge operation on said read pre-selected string elements.

5,414,843

# METHOD AND SYSTEM FOR GENERATING A PROJECT SCHEDULE USING WEIGHTED WORK PROCESSES

Akihiro Nakamura, Yokohama, and Takeshi Imanishi, Kawasaki, both of Japan, assignors to Hitachi, Ltd. and Hitachi System Engineering Ltd., both of Tokyo, Japan

Continuation of Ser. No. 797,026, Nov. 25, 1991, abandoned.

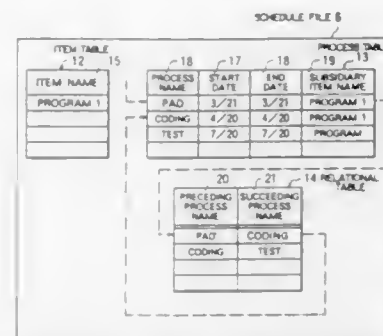
This application Aug. 11, 1994, Ser. No. 289,441

Claims priority, application Japan, Nov. 28, 1990, 2-326498

Int. Cl.<sup>6</sup> G06F 15/21

U.S. Cl. 395—600

7 Claims



1. A schedule table producing system comprising:

a product table file for storing a table which includes product names to be produced;

a work procedure file for storing a work table which includes work processes associated with a product, and a first process sequence table which indicates a sequence in which said work processes are executed, each of said work processes being attached with a weight which represents a ratio of time required for completing the work process and time required for completing a whole sequence of said work processes associated with the product;

a schedule file for storing a process table which includes a start date and an end date of a whole sequence of work processes, and a second process sequence table which indicates another sequence in which said work processes are executed; and

schedule editing processing means coupled to said product table file, said work procedure file and said schedule file, for calculating and editing a schedule of each work process from the start and end dates of the whole sequence of work processes for the product to be produced on the basis of the weight of each work process with reference to said tables of said work procedure file and said product table file to collectively produce a schedule of the sequence of work processes, and storing said edited schedule into said schedule file.

5,414,844

# METHOD AND SYSTEM FOR CONTROLLING PUBLIC ACCESS TO A PLURALITY OF DATA OBJECTS WITHIN A DATA PROCESSING SYSTEM

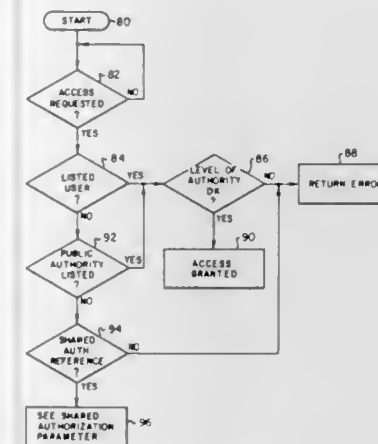
Diana S. Wang, Trophy Club, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 24, 1990, Ser. No. 528,624

Int. Cl.<sup>6</sup> G06F 12/14

U.S. Cl. 395—650

4 Claims



1. A method in a data processing system for controlling public access to a plurality of data objects stored therein, said data processing system having an access control profile associated with each data object stored therein, each access control profile including: an explicit authorization parameter listing the identity of a user and the authorization level granted to that user; a shared authorization parameter setting forth a shared authorization list associated with the access control profile of each of a plurality of data objects and containing the identities of a plurality of users and the authorization level granted to each listed user; and, a public authorization parameter listing the authorization level granted to each user not specifically identified within said access control profile, said method comprising the data processing system implemented steps of:

creating and storing within said shared authorization list a "public" user identity for users not specifically identified within the access control profiles of the plurality of data objects;

listing within said shared authorization list within said data processing system an authorization level for said "public" user identity for all of a plurality of data objects within said data processing system;

listing said shared authorization list within a shared authorization parameter within the access control profile of each of said plurality of data objects within said data processing system;

storing a reference within said public authorization parameter to said shared authorization parameter within the access control profile of each of said plurality of data objects within said data processing system; and

thereafter, controlling public access for each of said plurality of data objects by:

accessing said shared authorization parameter by accessing said reference to said shared authorization parameter stored within said public authorization parameter within the access control profile of a selected one of said plurality of data objects in response to an attempted access by a user after it is determined that the user is not listed within said explicit authorization parameter for said selected one of said plurality of data objects;

accessing said shared authorization list set forth within said shared authorization parameter within the access control profile of said selected one of said plurality of data objects; and

granting access to said selected one of said plurality of data objects by said user not listed within said explicit

authorization parameter for said selected one of said plurality of data objects in accordance with an authorization level granted to said "public" user identity within said shared authorization list for said selected one of said plurality of data objects.

5,414,845

# NETWORK-BASED COMPUTER SYSTEM WITH IMPROVED NETWORK SCHEDULING SYSTEM

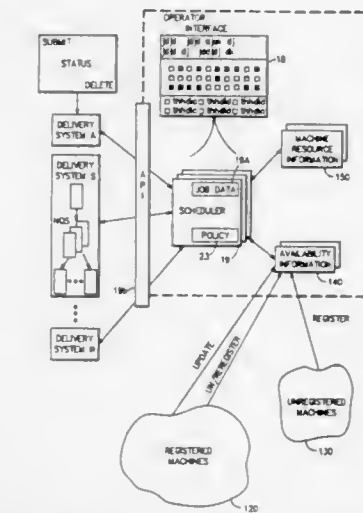
Jason L. Behm; Govind Balakrishnan, and Daniel G. Eisenbaur, all of Kingston, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 26, 1992, Ser. No. 904,760

Int. Cl.<sup>6</sup> G06F 15/163

U.S. Cl. 395—650

12 Claims



1. A network-based computer system comprising:

a network,

a plurality of processors coupled to said network and thereby to each other with some of said processors operating as user nodes for sending jobs to be run at batch nodes and some of said processors being the batch nodes and some being both batch and user nodes,

a resource management system for said computer system coupled to said network, said resource management system comprising:

a common scheduler for the computer system scheduling all jobs from user nodes to said batch nodes, said common scheduler including a policy module, said policy module for setting scheduling policy for said common scheduler for deciding the routing of jobs to batch nodes independently of the operation of said common scheduler so that said policy module can be replaced while the computer system is in operation to change said scheduling policy;

a delivery system responsive to jobs from said user nodes for sending scheduling requests to said common scheduler and in response to the decision of the scheduler, routing each job to one of said batch nodes said delivery system and said common scheduler being independent entities so that job delivery is separate from job scheduling, and

said common scheduler having a database storing job status and node availability information to run a job at a batch node, said common scheduler being responsive to said scheduling requests made through an application programming interface (API) from said delivery system and policy from said policy module for determining which job is scheduled next and on which node it is run.

5,414,846

## METHOD FOR FACILITATING THE CONFIGURATION OF PROGRAMS

Philippe Lemble, Saint Laurent du Var; Guy Menanteau, Nice; Stephen Pacchiano, Six Fours les Plages; Germain Sagols, Cagnes sur Mer, and Alain Truchl, Saint Laurent du Var, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

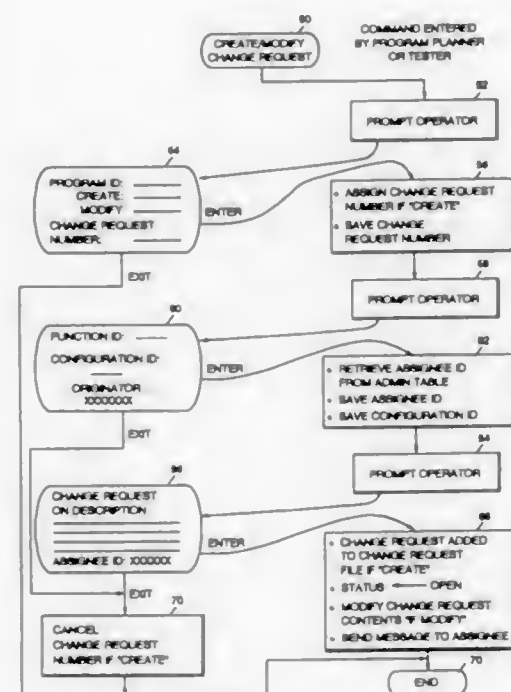
Filed Sep. 30, 1992, Ser. No. 953,363

Claims priority, application European Pat. Off., Nov. 15, 1991, 91480169

Int. Cl.<sup>6</sup> G06F 15/40

U.S. Cl. 395—650

7 Claims



1. A method for facilitating the configuration of programs having a plurality of functions by using a data processing system accessible by a plurality of users through workstations, said method comprising the steps of:

- building a first table in response to data entered by a first user at a workstation, said first table representing the correspondence between each function of a program and a user assigned to said function;
- building a second table in response to requests for creating or modifying specified functions, said requests originating from second users and said second table containing for each request, a request number and related information including a description of the requested work and a function assignee retrieved from the first table;
- sending a message to the function assignee corresponding to each request stored in the second table, said message including the request number and the description of the requested work corresponding to said each request;
- building a third table in response to third users starting the work requested per a selected request, said third table including for each request number, a status set to a first value (USER) when a user is performing the work, to a second value when the work is completed, and to a third value when the function is integrated in a program configuration; and
- reading said third table in response to a command from a fourth user indicating that a configuration is to be started, for preparing a report of the status of the requests.

5,414,847

## DESIGN METHOD AND APPARATUS OF COMPUTER PROGRAM FOR BUSINESS PROCESSING

Toshiharu Tsukakoshi, Kawasaki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

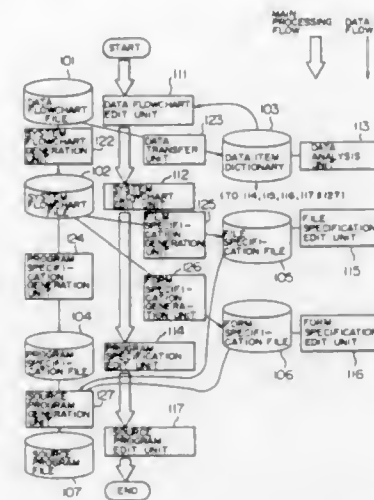
Filed Mar. 11, 1993, Ser. No. 29,599

Claims priority, application Japan, Mar. 13, 1992, 4-054654

Int. Cl.<sup>6</sup> G06F 9/44

U.S. Cl. 395—650

4 Claims



1. A computer-implemented method for designing an application program for a data processing operation having a plurality of processes, said method comprising the steps of:

- editing a data flowchart designating a flow of data for a sequence of said processes in said data processing operation by interactive operation on said computer by an operator, said data including names of said processes, names of data items to be input to said processes and corresponding attributes of said data items;
- producing a system flowchart on the basis of said data flowchart by the steps of:
  - converting said processes into symbols representing programs for executing said unit functions,
  - converting said data into symbols representing files and forms processed in said programs, and
  - concatenating said programs and said files and forms in a processing sequence;
- editing program specifications by further interactive operation on said computer by the operator on the basis of said system flowchart, wherein said program specifications indicate a program name, a program pattern name, input file name and output file name; and
- producing a source program on the basis of a program pattern designated by said program specifications and the attributes corresponding to the program pattern name.

5,414,848

## METHOD AND APPARATUS FOR SHARING A COMMON ROUTINE STORED IN A SINGLE VIRTUAL MACHINE WITH OTHER VIRTUAL MACHINES OPERATING IN A PREEMPTIVE MULTI-TASKING COMPUTER SYSTEM

David A. Sandage, Forest Grove; James C. Stanley; Stewart W. Hunt, both of Portland, and Arland D. Kunz, Beaverton, all of Oreg., assignors to Intel Corporation, Santa Clara, Calif.

Filed Apr. 1, 1993, Ser. No. 41,785

Int. Cl.<sup>6</sup> G06F 9/40

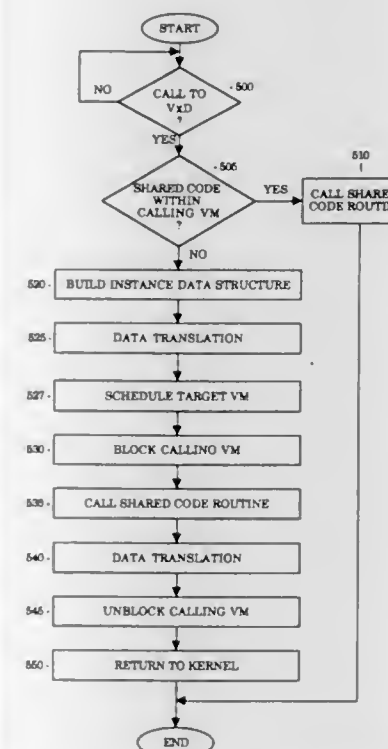
U.S. Cl. 395—650

16 Claims

1. In a multi-tasking computer system comprising a central processing unit (CPU) and a system memory operating in a Windows enhanced mode operating system environment, a method for sharing code between more than one virtual ma-

chine (VM) operating in said multi-tasking computer system, said method comprising the steps of:

- loading into said system memory at least one calling virtual machine (VM) comprising a calling process and a target virtual machine (VM) comprising a shared code routine;
- loading into said system memory a shared code virtual device driver (VxD) capable of being called from both said calling VM and said target VM;
- executing said calling process in said multi-tasking computer system;
- transferring control of said multi-tasking computer system from said calling process in said calling VM to said shared code VxD when access to said shared code routine is desired;
- storing information to identify said calling VM and said target VM including storing a handle to a semaphore to identify said calling VM to said Windows enhanced mode operating system;
- scheduling said target VM with said Windows enhanced mode operating system;



transferring control of said multi-tasking computer system from said shared code VxD to said target VM when said Windows enhanced mode operating system selects said target VM as an active task;

blocking on said calling VM based on said handle to said semaphore such that said Windows enhanced mode operating system does not select said calling VM as an active task;

calling said shared code routine in said target VM;

executing said shared code routine;

calling said shared code VxD from said target VM;

unblocking said calling VM such that said Windows enhanced mode operating system may select said calling VM as an active task; and

transferring control from said target VM to said Windows enhanced mode operating system such that selection of said calling VM by said Windows enhanced mode operating system as an active process results in resuming execution in said calling VM.

5,414,849

## EVALUATING METHOD OF DATA DIVISION PATTERNS AND A PROGRAM EXECUTION TIME FOR A DISTRIBUTED MEMORY PARALLEL COMPUTER SYSTEM, AND PARALLEL PROGRAM PRODUCING METHOD USING SUCH AN EVALUATING METHOD

Fujio Yamamoto, Higashiyamato, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

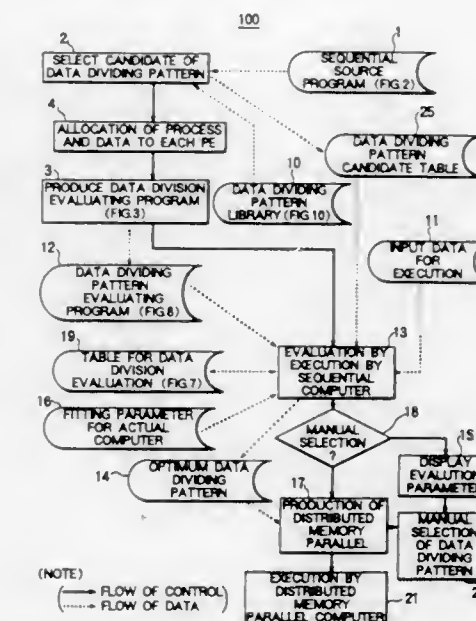
Filed Jun. 9, 1993, Ser. No. 74,228

Claims priority, application Japan, Oct. 30, 1992, 4-292435

Int. Cl.<sup>6</sup> G06F 9/40

U.S. Cl. 395—650

19 Claims



1. A method for evaluating a data dividing patterns used in converting a sequential program into parallel programs, executed by an apparatus, comprising the steps of:

- (a) dividing data which is processed by a sequential source program to be converted into parallel programs, into a plurality of data groups to be processed in parallel in accordance with one of a plurality of data dividing pattern candidates;
- (b) allocating each of said data groups to one of a plurality of processors included in a distributed memory parallel computer system, based on a predetermined data allocation rule;
- (c) allocating each of a plurality of partial processes required to execute a process requested by said sequential source program, to a corresponding one of said processors, based on a predetermined process allocation rule;
- (d) estimating, as evaluation information of said one of the data dividing pattern candidates for suitably allocating said plurality of data groups and partial processes to each of said plurality of processors, an amount related to an executing time required to execute in parallel the plurality of partial processes as allocated to said processors in the step (c), in a state in which said plurality of data groups are allocated to said processors in said step (b);
- (e) repeating said steps (a) to (d) with respect to each of others of said plurality of dividing patterns candidates; and
- (f) assigning said evaluation information to said amount related to said executing time estimated to each of said plurality of dividing patterns candidates based on predetermined priority, and ordering said plurality of dividing patterns candidates with ascending order of said evaluation information.



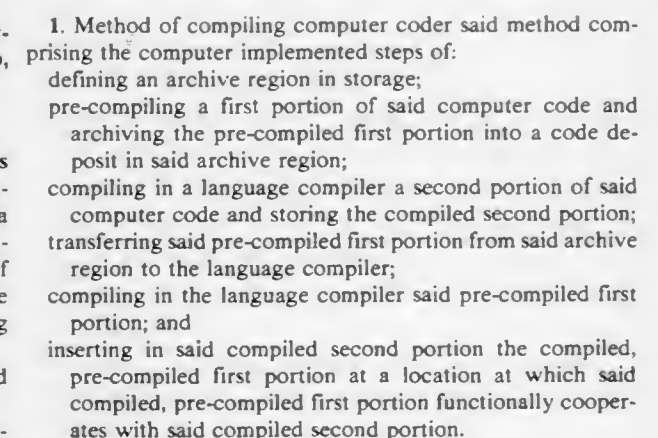
## 7 Claims



## 12 Claims



## 24 Claims



nonvolatile memory means for storing data, said nonvolatile memory means requiring electric power for transferring data into and out of said nonvolatile memory means but capable of maintaining data without electric power; memory access control means connected to said volatile memory means, to said host computer system, and to said nonvolatile memory means for accessing and transferring data into and out of said volatile memory means to and from said host computer system and to and from said nonvolatile memory means, said memory access control



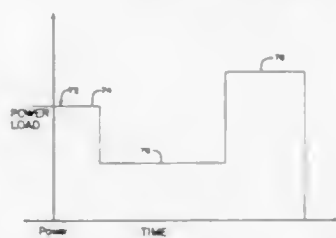
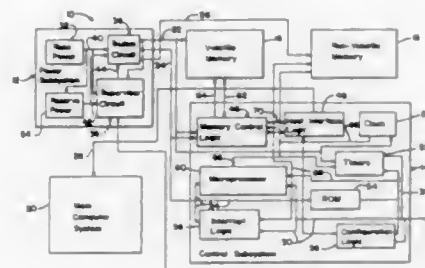
means requiring electric power for said accessing and transferring data;

main power supply means for supplying electric power from an external electric power source to said volatile memory means, to said nonvolatile memory means, and to said memory access control means;

reserve power supply means having a limited electric power source that is capable of supplying a limited amount of electric power to said volatile memory means, to said nonvolatile memory means, and to said memory access control means for respective limited times;

switch means connected to said main power supply means, to said reserve power supply means, to said volatile memory means, and to said memory access control means for selectively connecting either said main power supply means or said reserve power supply means to selected ones of said volatile memory means, said nonvolatile memory means, and said memory access control means; and

supervisor circuit means connected to said main power supply means, to said reserve power supply means, to said switch means, and to said memory access control means for generating on-line main power mode signals to said switch means and to said memory access control means when said main power supply means is providing ade-



quate electric power to operate both said volatile memory means and said memory access control means, for sensing when said main power supply means is not providing said adequate electric power and in response generating on-line reserve power mode signals to said switch means and to said memory access control means immediately upon sensing that said main power supply means is not providing said adequate electric power, for sensing when a first time period has elapsed after generation of said on-line reserve power mode signals and said main power supply means is still not providing said adequate electric power and in response generating near on-line reserve power mode signals to said switch means and to said memory access control means, and for sensing when a second time period has elapsed after generation of said near on-line reserve power mode signals and said main power supply means is still not providing said adequate electric power and in response generating back-up data transfer mode signals to said switch means and to said memory access control means;

said switch means being responsive to said on-line main power mode signals to connect said main power supply means to said volatile memory means and to said memory access control means, and said memory access control means being responsive to said on-line main power mode signals to facilitate transferring data into and out of said

volatile memory means to and from said host computer system;

said switch means being responsive to said on-line reserve power mode signals to connect said reserve power supply means to said volatile memory means and to said memory access control means, and said memory access control means being responsive to said on-line reserve power mode signals to facilitate transferring data into and out of said volatile memory means to and from said host computer system said reserve power supply means supplying a first level of electric power;

said switch means being responsive to said near on-line reserve power mode signals to maintain said connect of said reserve power supply means to said volatile memory means and to disconnect said reserve power supply means from said memory access control means, said reserve power supply means supplying a second level of electric power which is less than said first level; and

said switch means being responsive to said back-up data transfer mode signals to maintain said connect of said reserve power supply means to said volatile memory means, to reconnect said reserve power supply means to said memory access control means, and to connect said reserve power supply means to said nonvolatile memory means; said memory access means being responsive to said back-up data transfer mode signals to transfer data out of said volatile memory means to said nonvolatile memory means said reserve power supply means supplying a third level of electric power which is greater than said second level.

5,414,862

APPARATUS FOR CONTROLLING A POWER SOURCE  
Koji Suzuki, Yokohama; Tadashi Ishikawa, Tokyo; Joji Nagahira, and Hajime Motoyama, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 336,413, Apr. 10, 1989, abandoned.

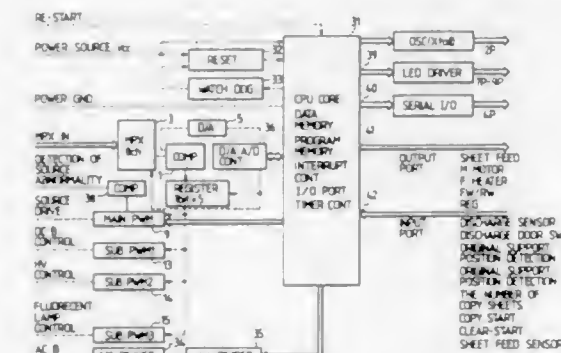
This application Aug. 10, 1992, Ser. No. 925,425

Claims priority, application Japan, Apr. 12, 1988, 63-88146; May 27, 1988, 63-128515; Jun. 17, 1988, 63-148307; Jun. 17, 1988, 63-148309; Jun. 23, 1988, 63-153542

Int. Cl.<sup>6</sup> G06F 1/26

U.S. Cl. 395—750

18 Claims



1. A controller, comprising:

an analog circuit for controlling a power source to generate power for an apparatus, said analog circuit including a comparator for comparing an output of said power source with a reference signal so as to output a pulse width modulated signal for controlling said power source;

a digital circuit connected to said analog circuit, said digital circuit including a CPU for performing process steps to control said apparatus and for performing process steps to control said analog circuit; and

a chip on which said analog circuit and said digital circuit are integrally formed, wherein said analog circuit causes an input of either said

reference signal or a signal corresponding to the output from said power source, to said comparator.

5,414,863

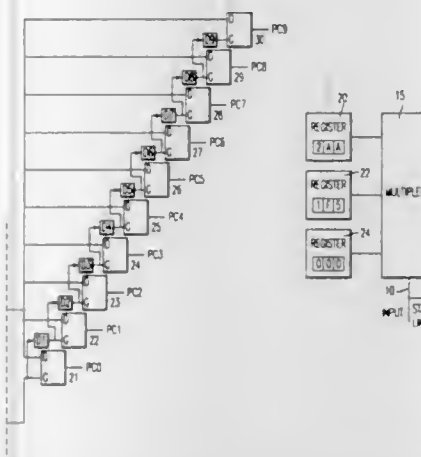
POWER CONTROL STAGGERING CIRCUIT FOR POWERING DIFFERENT COMPONENTS AT DIFFERENT DELAY TIMINGS

Robert H. J. Lee, Palo Alto, and John D. Kenny, Sunnyvale, both of Calif., assignors to Cirrus Logic, Inc., Fremont, Calif.  
Filed Apr. 2, 1993, Ser. No. 41,456

Int. Cl.<sup>6</sup> G06F 1/26, 1/32

U.S. Cl. 395—750

8 Claims



1. A power control apparatus for controlling an application of power control signals to a plurality of components to be powered, comprising:

at least one memory for storing power control state data; a multiplexer for receiving the power control state data stored in the at least one memory; and

a plurality of serially connected power control outputs connected to the multiplexer for outputting the power control signals based on the power control state data stored in the at least one memory, and wherein a first of the plurality of serially connected power control outputs has a minimum delay and each succeeding of the plurality of serially connected power control outputs has an increasing delay.

5,414,864

METHOD FOR SELECTIVELY SAVING/RESTORING FIRST REGISTERS AND BYPASSING SECOND REGISTERS IN REGISTER UNITS BASED ON INDIVIDUAL LOCK/UNLOCK STATUS THEREOF

Shinobu Koizumi, Sagami, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 19, 1990, Ser. No. 555,162

Claims priority, application Japan, Jul. 20, 1989, 1-189976

Int. Cl.<sup>6</sup> G06F 12/02

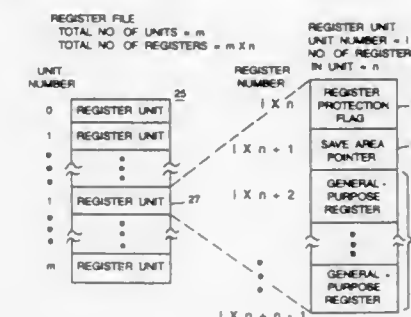
U.S. Cl. 395—775

8 Claims

1. A method for saving and restoring contents of a plurality of first registers being used in a plurality of register units between a main memory and a central processing unit, and bypassing for either saving and restoring a plurality of second registers not being used in the plurality of register units, comprising the steps of:

when register save instruction is issued, checking a register protection flag of a designated one register unit, wherein the register protection flag includes a plurality of bits for identifying the plurality of first registers and the plurality of second registers and if the flag is set to designate that the one register unit is being used, selectively saving only the contents of a first set of the registers in the designated one register unit identified as being used by the register

protection flag in an area of said main memory appointed by a save area pointer of said designated one register unit and bypassing a second set of registers in the designated one register unit identified as not being used by the register protection flag wherein the second set of registers are not saved in the memory;



wherein when a register lock instruction is issued, setting said register protection flag of the designated one register unit, and setting said save area pointer for appointing said area of said main memory in which the contents of the registers being used are to be saved;

wherein when a register unlock instruction is issued, resetting said register protection flag of the designated one register unit.

5,414,865

SELF-PROGRAMMING WITH LIMITED SEQUENTIAL MEMORY CAPACITY

James T. Beran, 2106 Oberlin St., Palo Alto, Calif. 94306

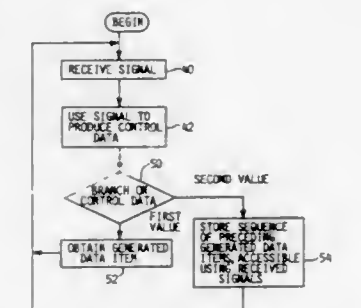
Continuation-in-part of Ser. No. 776,819, Sep. 17, 1985,

abandoned. This application Jun. 27, 1991, Ser. No. 722,093

Int. Cl.<sup>6</sup> G06F 15/00

U.S. Cl. 395—800

39 Claims



1. A method of operating a machine, the method comprising a sequence of steps performed by the machine, each step in the sequence comprising substeps of:

using an input signal received by the machine to obtain a received signal, the received signal being a data item having a value that is one of two or more possible received values;

obtaining a control data item using said received signal; the control data item having one of a set of control values including a first control value and a second control value; if said control data item has the first control value, using said received signal to generate a generated data item having one of two or more possible generated values; and

if said control data item has the second control value, storing the generated data item of a preceding step in the sequence so that the preceding step's generated data item can be accessed using a data item having the value of the preceding step's received signal.

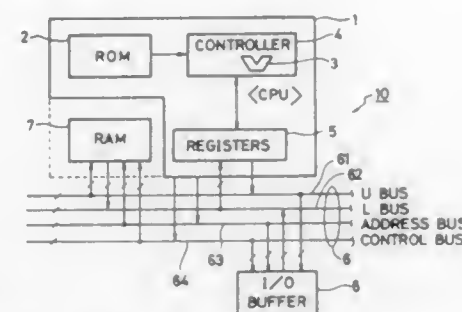
5,414,866  
**ONE-CHIP MICROCOMPUTER WITH PARALLEL  
 OPERATING LOAD AND UNLOAD DATA BUSES**  
 Hideo Ohmae, Kobe, Japan, assignor to Rohm Co., Ltd., Kyoto,  
 Japan

Filed Oct. 29, 1991, Ser. No. 783,906

Int. Cl.<sup>6</sup> G06F 13/40

U.S. Cl. 395—800

13 Claims



1. A one-chip microcomputer, comprising:  
 buses including a data bus,  
 a central processor unit, CPU, having a register connected  
 to said data bus,  
 RAM connected to said data bus,  
 an I/O buffer connected to said data bus,  
 said data bus having a first bus for transferring data to said

register and a second bus for receiving data from said  
 register,

said processor constituting means that controls, during data  
 exchange processing, parallel transfer of first data in said  
 register to the second bus and transfer of second data in  
 either said RAM or said I/O buffer to the first bus in  
 accordance with first clock timing in one machine cycle,  
 said means also controls parallel loading of the second data  
 on the first bus to said register and loading of the first data  
 on the second bus to either said RAM or said I/O buffer  
 in accordance with later second clock timing of the one  
 machine cycle,

said processor produces, during the data exchange process-  
 ing, a first control signal for controlling transferring the  
 first data in said register to the second bus and a second  
 control signal for controlling transferring the second data  
 in either said RAM or said I/O buffer to the first bus in  
 accordance with the first clock timing in the one machine  
 cycle, and

wherein said means controls suspension of the first and  
 second control signals in accordance with the second  
 clock timing in said one machine cycle, the loading of the  
 second data on the first bus to said register in response to  
 the suspension, and the loading of the first data on the  
 second bus to either said RAM or said I/O buffer in re-  
 sponse to the suspension.

## DESIGN PATENTS

GRANTED MAY 9, 1995

### ERRATA

For CLASS	See PATENT NO.
D7-302 .....	D 358,056
7-332 .....	D 358,057
7-334 .....	D 358,059
7-350 .....	D 358,061
7-360 .....	D 358,062
6-334 .....	D 358,077
6-480 .....	D 358,078
6-629 .....	D 358,079
34-023 .....	D 358,117
4-104 .....	D 358,206
32-022 .....	D 358,241
32-032 .....	D 358,242
32-043 .....	D 358,243
32-044 .....	D 358,244



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## DESIGNS

MAY 9, 1995

358,018

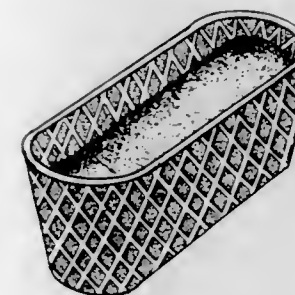
## ICE CREAM CONE CONFECTION

Gilbert W. Lindemann, 1032 W. Iowa Ave., St. Paul, Minn. 55117

Filed Oct. 17, 1990, Ser. No. 599,237

Term of patent 14 years

U.S. Cl. D1—101



358,019

## BOOT BOLO

Harla J. Lakin, 16603 SE. Gordon St., Milw, Ore. 97267

Filed Aug. 19, 1993, Ser. No. 11,934

Term of patent 14 years

U.S. Cl. D2—607



358,020

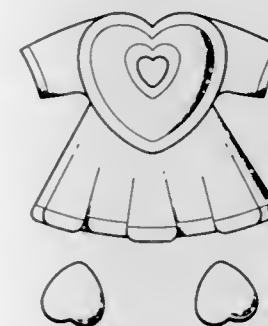
## ENSEMBLE COMPRISING A DRESS AND SHOES FOR A DOLL

Marilyn D. Mintz, P.O. Box 1411, Los Gatos, Calif. 95031

Filed Dec. 30, 1991, Ser. No. 816,082

Term of patent 14 years

U.S. Cl. D2—777



358,021

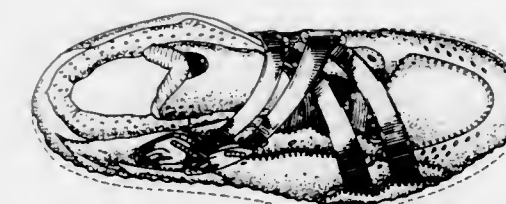
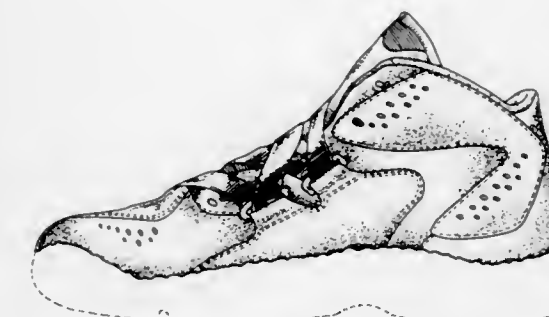
## SHOE UPPER

Ricardo Vestuti, Portland, Ore., assignor to Reebok International Ltd., Stoughton, Mass.

Filed Sep. 27, 1994, Ser. No. 29,016

Term of patent 14 years

U.S. Cl. D2—970



358,022

## DECORATIVE WALKING CANE

Lucile Williams, 18606 Oak Dr., Detroit, Mich. 48221

Filed Sep. 2, 1993, Ser. No. 12,518

Term of patent 14 years

U.S. Cl. D3—6



358,023

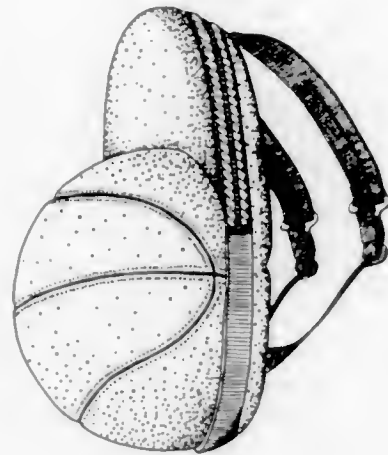
## BACKPACK

Ernest J. Poire, Laconia, N.H., assignor to Cormier Corporation, Laconia, N.H.

Filed Sep. 14, 1992, Ser. No. 948,772

Term of patent 14 years

U.S. Cl. D3—217



358,024

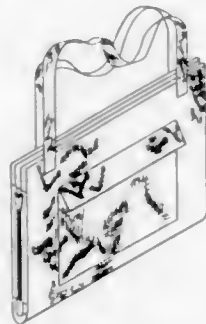
## CONVERTIBLE TOTE BAG

Mary E. Wilson, 33 Baker Pl., Arden, N.C. 28704

Filed Sep. 10, 1993, Ser. No. 12,819

Term of patent 14 years

U.S. Cl. D3—233



358,025

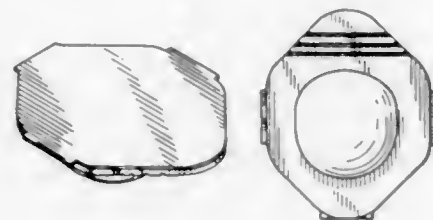
## CONTACT LENS PACKAGE

W. Anthony Martin, 2603 Sandlewood Ct., Orange Park, Fla. 32065; Ture Kindt-Larsen, Sollerodvej, 2840 Holte, Denmark, and Darren S. Keene, 11260 Southington Pl., Jacksonville, Fla. 32257

Filed Apr. 21, 1994, Ser. No. 21,666

Term of patent 14 years

U.S. Cl. D3—264



358,026

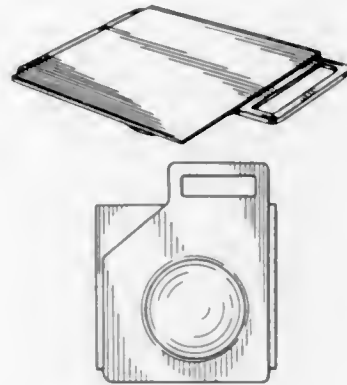
## CONTACT LENS PACKAGE

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville, Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd., Jacksonville, Fla. 32211, and John E. Studer, 106 Burnham Rd., Morris Plains, N.J. 07950

Filed Apr. 21, 1994, Ser. No. 21,673

Term of patent 14 years

U.S. Cl. D3—264



358,027

## PACKAGE FOR A CONTACT LENS

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville, Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd., Jacksonville, Fla. 32211, and John E. Studer, 106 Burnham Rd., Morris Plains, N.J. 07950

Filed Apr. 21, 1994, Ser. No. 21,678

Term of patent 14 years

U.S. Cl. D3—264

358,028

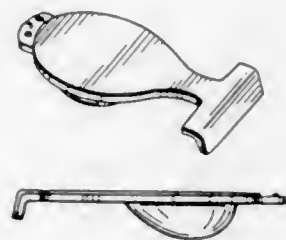
## CONTACT LENS PACKAGE

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville, Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd., Jacksonville, Fla. 32211, and John E. Studer, 106 Burnham Rd., Morris Plains, N.J. 07950

Filed May 9, 1995, Ser. No. 21,784

Term of patent 14 years

U.S. Cl. D3—264



358,029

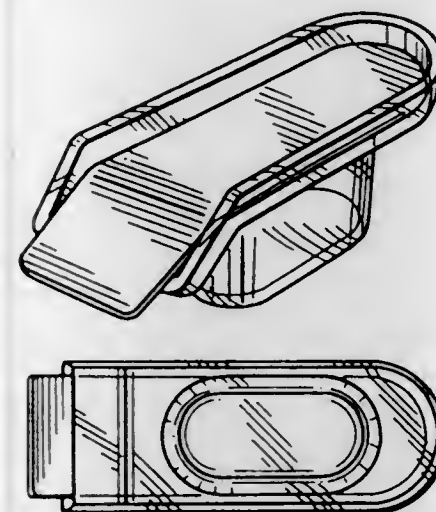
## CONTACT LENS PACKAGE

Richard W. Abrams, 3889 Habersham Forest Dr., Jacksonville, Fla. 32223; Russell J. Crossman, 4496 Charter Point Blvd., Jacksonville, Fla. 32211, and Charles R. Ashley, P.O. Box 5325, Clinton, N.J. 08809

Filed Apr. 21, 1994, Ser. No. 21,785

Term of patent 14 years

U.S. Cl. D3—264



358,031

## FRONT AND SIDE PANELS FOR A PIECE OF LUGGAGE

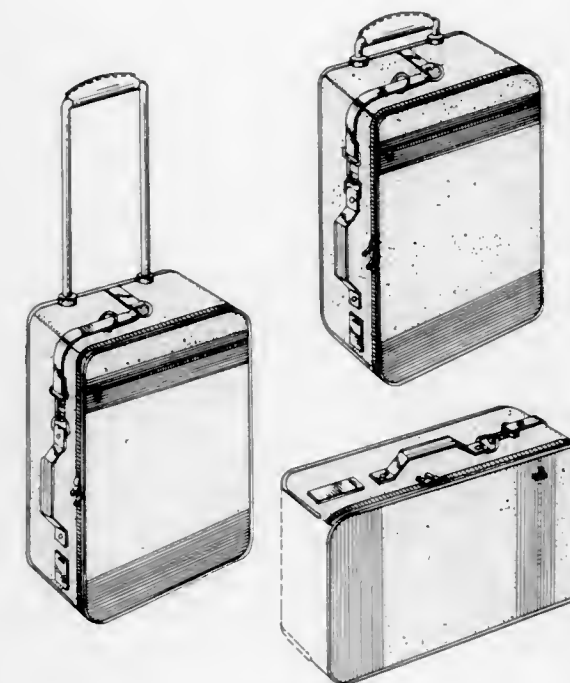
Michel Aumasson, Rueil-Malmaison, France, assignor to Delsey (Societe Anonyme), Bibigny, France

Filed Jun. 9, 1993, Ser. No. 9,256

Claims priority, application France, Dec. 14, 1992, 92 7575

Term of patent 14 years

U.S. Cl. D3—318



358,030

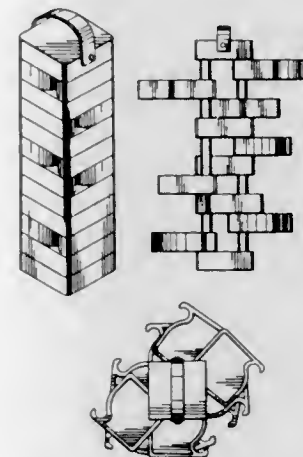
## STACKED TRAYS CONVERTIBLE TO OPEN DISPLAY CASES

Nelson Ying, 7123 Caloosa Ct., Orlando, Fla. 32819

Filed Oct. 4, 1993, Ser. No. 13,824

Term of patent 14 years

U.S. Cl. D3—284



358,032

## TRANSPARENT TOOTHBRUSH HANDLE

Peter Schneider, Königstein, and Juergen Greubel, Heidenrod, both of Germany, assignors to Gillette Canada Inc., Kirkland, Canada

Filed Mar. 24, 1993, Ser. No. 6,108

The portion of the term of this patent subsequent to Aug. 16, 2008, has been disclaimed.

Term of patent 14 years

U.S. Cl. D4—104





358,033

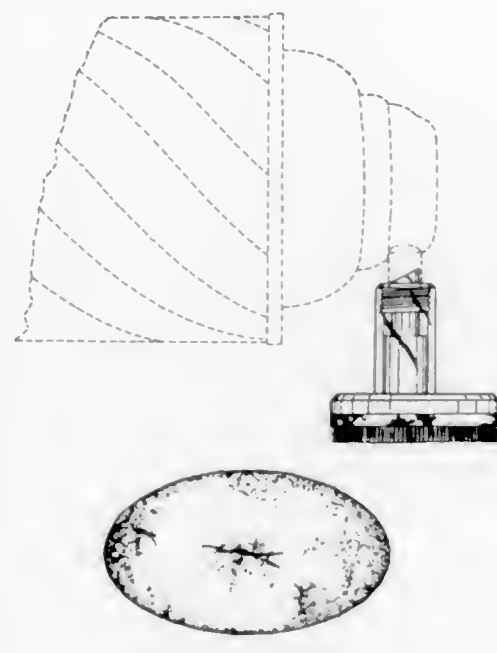
COMBINED BRUSH AND SPONGE SHAVING CREAM  
APPLICATOR

Warren L. Klump, 450 N. Windsor Ave., Stockton, Calif. 95205

Filed Feb. 5, 1992, Ser. No. 832,483

Term of patent 14 years

U.S. Cl. D4—114



358,035

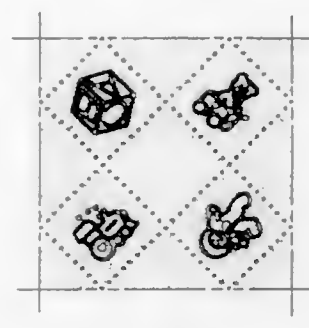
## EMBOSSED WIPE

Teresa M. Zander, Appleton, and Thomas J. Kopacz, Omro,  
both of Wis., assignors to Kimberly-Clark Corporation, Nee-  
nah, Wis.

Filed Jan. 10, 1994, Ser. No. 17,298

Term of patent 14 years

U.S. Cl. D5—53



358,036

## HANGER FOR A GARMENT

Yoshihiro Miyahara, Osaka, Japan, assignor to Kabushiki Kai-  
sha On Off International, Osaka, Japan

Filed Jul. 12, 1993, Ser. No. 10,611

Term of patent 14 years

U.S. Cl. D6—317



358,034

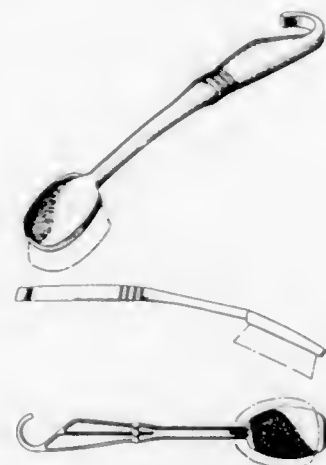
## BATH AND BODY BRUSH HANDLE

Mary M. Hoagland, Cincinnati, Ohio, assignor to Vining Indus-  
tries Inc., Springfield, Ohio

Filed Jan. 11, 1993, Ser. No. 3,411

Term of patent 14 years

U.S. Cl. D4—138



358,037

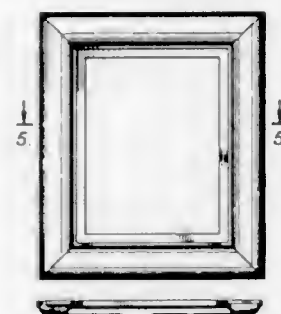
## PICTURE FRAME

Kurt R. Monroe, 6128 Harvard, Raytown, Mo. 64133

Filed Aug. 5, 1993, Ser. No. 11,423

Term of patent 14 years

U.S. Cl. D6—300



358,038

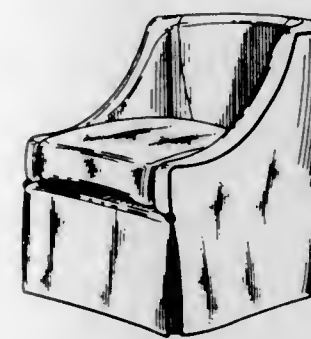
## LOUNGE CHAIR

Sally S. Lewis, 8727 Melrose Ave., Los Angeles, Calif. 90069-5086

Filed Dec. 13, 1993, Ser. No. 16,253

Term of patent 14 years

U.S. Cl. D6—334



358,041

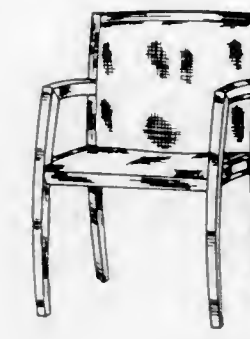
## SEAT

R. Craig Watts, Boca Raton, Fla., assignor to Loewenstein, Inc.,  
Pompano Beach, Fla.

Filed May 11, 1993, Ser. No. 8,404

Term of patent 14 years

U.S. Cl. D6—379



358,039

## STADIUM SEAT

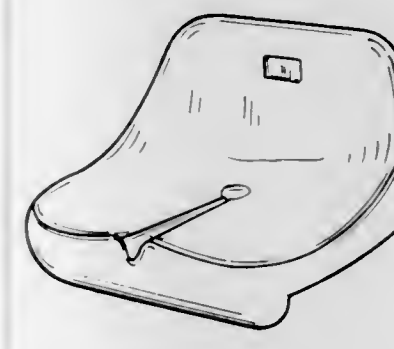
Giampietro Fornaro, Padua, Italy, assignor to F.LLI SIMONI  
S.p.A., Arzergrande, Italy

Filed Jul. 31, 1989, Ser. No. 387,306

Claims priority, application Italy, Feb. 2, 1989, 306068/89

Term of patent 14 years

U.S. Cl. D6—349



358,042

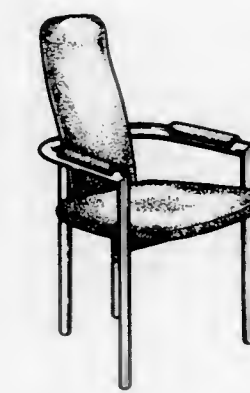
## CHAIR

Richard S. Klein, Los Angeles, Calif., assignor to Cal-Style  
Furniture Mfg. Co., Compton, Calif.

Filed Sep. 1, 1993, Ser. No. 12,454

Term of patent 14 years

U.S. Cl. D6—379



358,040

## CHAIR

Richard S. Klein, Los Angeles, Calif., assignor to Cal-Style  
Furniture Mfg. Co., Compton, Calif.

Filed Sep. 7, 1993, Ser. No. 12,696

Term of patent 14 years

U.S. Cl. D6—373



358,043

## CHAIR

Richard S. Klein, Los Angeles, Calif., assignor to Cal-Style  
Furniture Mfg. Co., Compton, Calif.

Filed Sep. 7, 1993, Ser. No. 12,694

Term of patent 14 years

U.S. Cl. D6—380



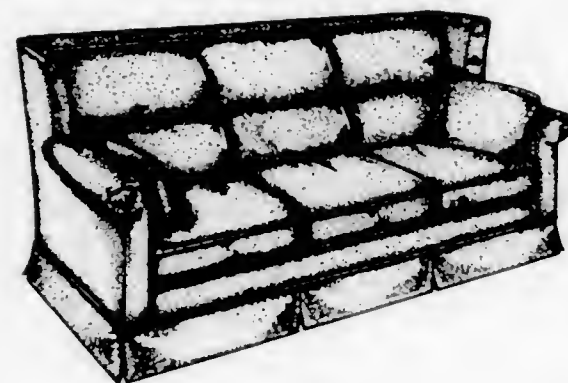
358,044  
SOFA

Darrell G. Lowman, Hickory, N.C., assignor to Lexington Furniture Industries, Inc., Lexington, N.C.

Filed Jun. 11, 1993, Ser. No. 9,446

Term of patent 14 years

U.S. Cl. D6—381



358,046

ENTERTAINMENT CENTER

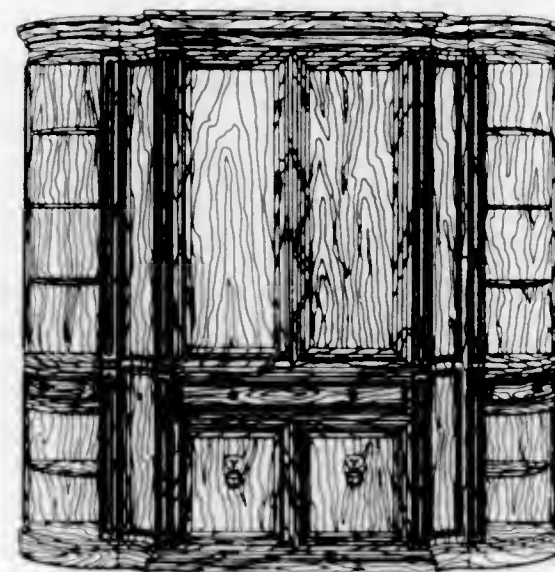
Darrell C. Ferguson, Charleston, S.C., assignor to Lineage Home Furnishings, Inc., High Point, N.C.

Continuation of Ser. No. 885,410, May 19, 1992, abandoned.

This application Apr. 7, 1994, Ser. No. 21,010

Term of patent 14 years

U.S. Cl. D6—437



358,045

HAMMOCK CONSTRUCTION

Gary Wolf, Weston, Mass., assignor to Heliotrope, LLC, Providence, R.I.

Filed Feb. 25, 1994, Ser. No. 19,243

Term of patent 14 years

U.S. Cl. D6—387



358,047

ENTERTAINMENT UNIT

Darrell C. Ferguson, Charleston, S.C., assignor to Lineage Home Furnishings, Inc., High Point, N.C.

Continuation of Ser. No. 885,385, May 18, 1992, abandoned.

This application Apr. 8, 1994, Ser. No. 21,059

Term of patent 14 years

U.S. Cl. D6—445

358,048  
STAND

Darrell A. Schoenig, and Jonathan P. Workman, both of Fort Collins, Colo., assignors to Ultimate Support Systems, Inc., Fort Collins, Colo.

Filed Sep. 7, 1993, Ser. No. 12,701

Term of patent 14 years

U.S. Cl. D6—466



358,050

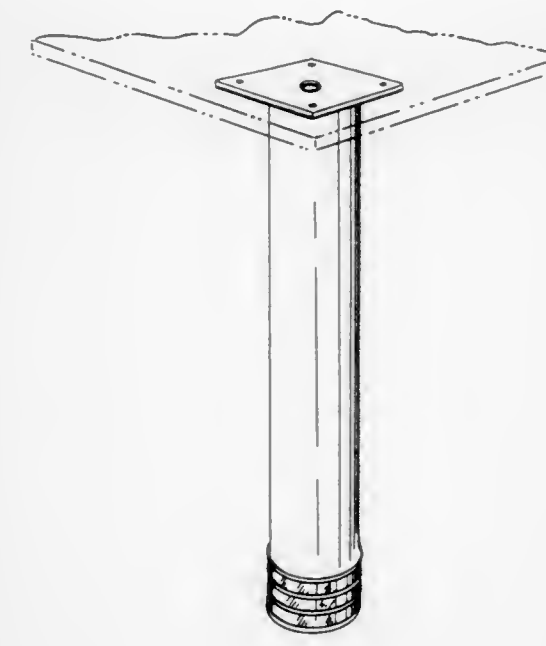
SUPPORT FOR AN ARTICLE OF FURNITURE

Paul F. Koning, 37 W. 33rd St., Holland, Mich. 49423

Filed Sep. 13, 1993, Ser. No. 12,933

Term of patent 14 years

U.S. Cl. D6—499

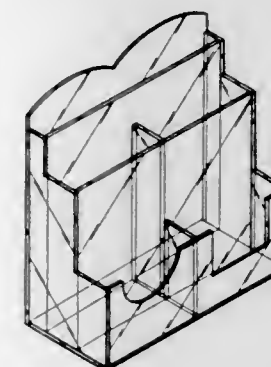
358,049  
CADDY

Henry L. Wilson, 170 W. 81st St., New York, N.Y. 10024

Filed Jul. 12, 1994, Ser. No. 25,802

Term of patent 14 years

U.S. Cl. D6—475



358,051

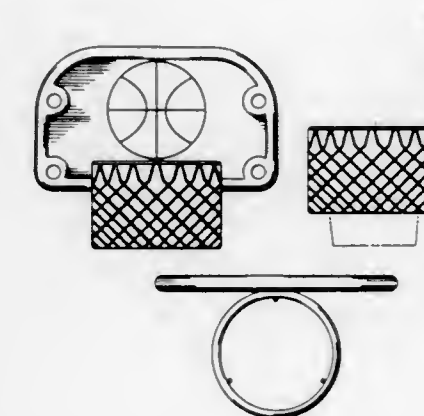
WALL MOUNTED CUP DISPENSER

Phelan R. Thomas, 4500 Bel Aire Rd., Des Moines, Iowa 50310

Filed Dec. 6, 1993, Ser. No. 15,982

Term of patent 14 years

U.S. Cl. D6—516





358,052

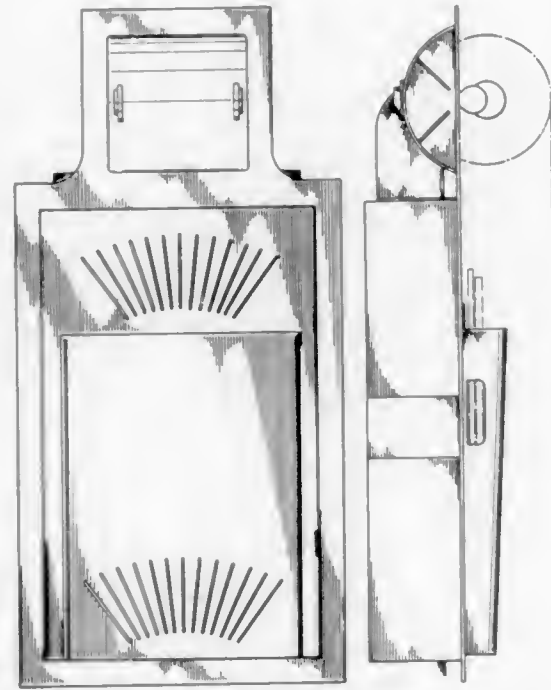
**BATHROOM CONVENIENCE CABINET**

Clarence J. Carpenter, 2135 Preswick Dr., Unlontown, Ohio 44685

Filed Aug. 26, 1993, Ser. No. 12,244

Term of patent 14 years

U.S. Cl. D6—519



358,054

**CONVERTIBLE CUSHION**

Jean P. Burdorf, Godelindeweg 8, 1217 HR Hilversum, and Vital van der Horst, Orttswarande 53, 3621 XN Breukelen, both of Netherlands

Filed Sep. 1, 1993, Ser. No. 12,485

Term of patent 14 years

U.S. Cl. D6—597



358,055

**CASE FOR COMPACT DISCS**

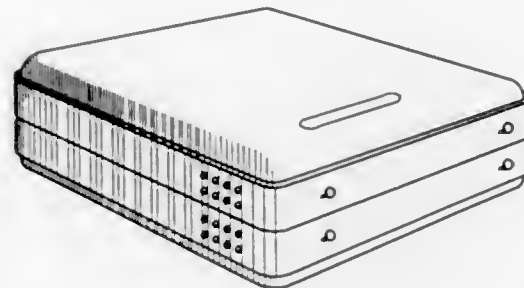
Jerry M. Long, Stockton; Christopher G. Palmer, Tracy, and Peter J. Palmer, San Jose, all of Calif., assignors to Creative Point, Inc., Fremont, Calif.

Filed Aug. 20, 1992, Ser. No. 933,041

The portion of the term of this patent subsequent to Aug. 30, 2008, has been disclaimed.

Term of patent 14 years

U.S. Cl. D6—632



358,056

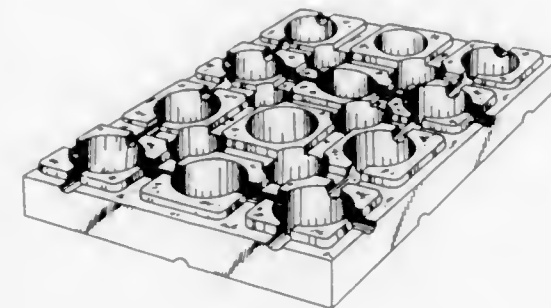
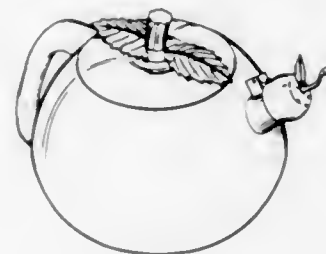
**TEAKETTLE**

1-Chen Lin, 3F., No. 282, Chung-San 2 Road, Lu-Chou Shiang, Taipei Hsien, Taiwan, Prov. of China

Filed Mar. 23, 1993, Ser. No. 6,238

Term of patent 14 years

U.S. Cl. D7—302



358,053

**FLOOR MAT**

John Austin, 708 Triana Pl., Monterey Park, Calif. 91754

Filed May 20, 1993, Ser. No. 8,624

Term of patent 14 years

U.S. Cl. D6—585

358,057

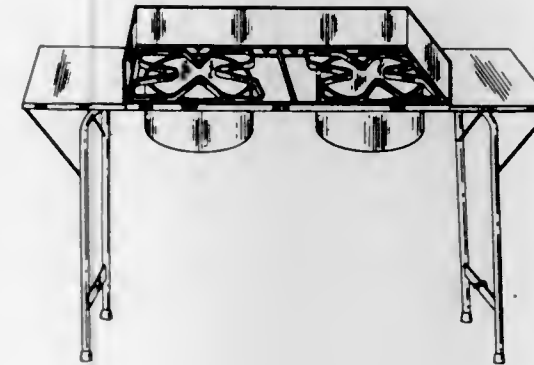
**TWO BURNER COOKER**

William A. Dutro, Cove, and Ty Measom, Logan, both of Utah, assignors to Dutro Company, Emeryville, Calif.

Filed Sep. 27, 1993, Ser. No. 13,557

Term of patent 14 years

U.S. Cl. D7—332



358,059

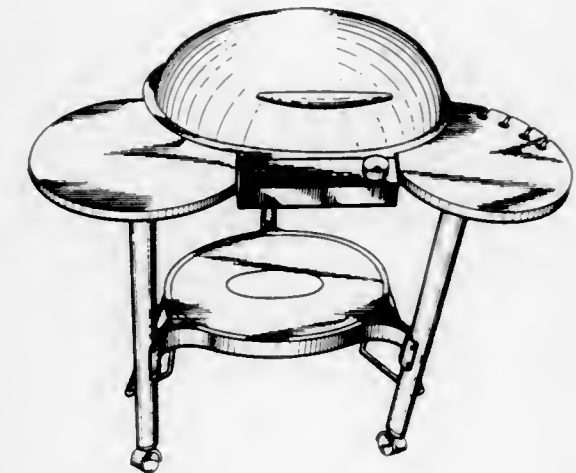
**BARBECUE GRILL HAVING STABILIZERS**

Monte L. Peterson, Barrington; James M. Fitzgerald, Schaumburg; Patrick L. Francomb, Galena, all of Ill.; Greg Breiding, Columbus, Ohio; Mark Ciesko, Westerville, Ohio, and Andreas Roessner, Columbus, Ohio, assignors to The Thermos Co., Freeport, Ill.

Filed Sep. 9, 1992, Ser. No. 942,076

Term of patent 14 years

U.S. Cl. D7—334



358,058

**INFANT CAR SEAT HAVING RETRACTABLE LEGS**

Catherine T. Anthony, and Winifred Anthony, both of P.O. Box 658, Bear, Del. 19701

Filed Feb. 16, 1994, Ser. No. 18,830

Term of patent 14 years

U.S. Cl. D6—333



358,060

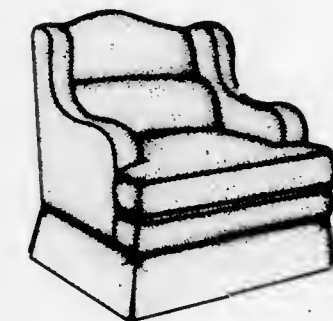
**SEAT**

Darrell G. Lowman, Hickory, N.C., assignor to Lexington Furniture Industries, Inc., Lexington, N.C.

Filed Aug. 13, 1993, Ser. No. 11,737

Term of patent 14 years

U.S. Cl. D6—334



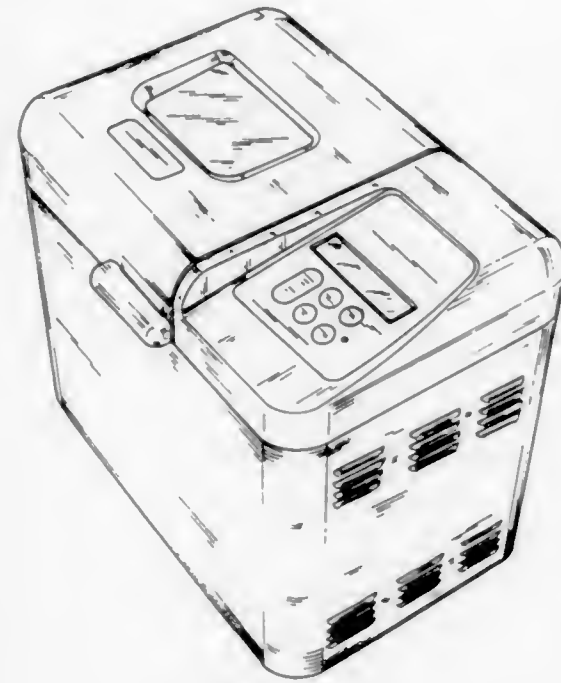
358,061

## BREAD MAKING APPLIANCE

Edward J. Duquaine, West Bend, Wis., and William C. Cesaroni, Glenview, Ill., assignors to The West Bend Company, West Bend, Wis.

Filed Sep. 7, 1993, Ser. No. 12,586  
Term of patent 14 years

U.S. Cl. D7—350



358,063

## CHAIR

Robert F. Larkin, High Point, N.C., assignor to Miller Desk, Inc., High Point, N.C.

Filed Aug. 10, 1993, Ser. No. 11,585  
Term of patent 14 years

U.S. Cl. D6—366



358,064

## CHAIR

Robert F. Larkin, High Point, N.C., assignor to Miller Desk, Inc., High Point, N.C.

Filed Aug. 10, 1993, Ser. No. 11,586  
Term of patent 14 years

U.S. Cl. D6—366



358,062

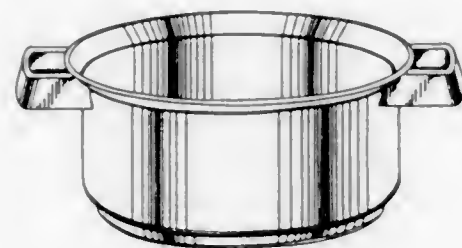
## COOK POT

Makio Hasuike, Milan, Italy, assignor to WMF Waerttembergische Metallwarenfabrik Aktengesellschaft, Geislingen, Germany

Division of Ser. No. 778,692, Oct. 16, 1991, Pat. No. Des. 349,420. This application Mar. 14, 1994, Ser. No. 19,897  
Claims priority, application WIPO, May 22, 1991, DM/019659

Term of patent 14 years

U.S. Cl. D7—360



358,065

## CHAIR

Robert F. Larkin, High Point, N.C., assignor to Miller Desk, Inc., High Point, N.C.

Filed Aug. 10, 1993, Ser. No. 11,587  
Term of patent 14 years

U.S. Cl. D6—366



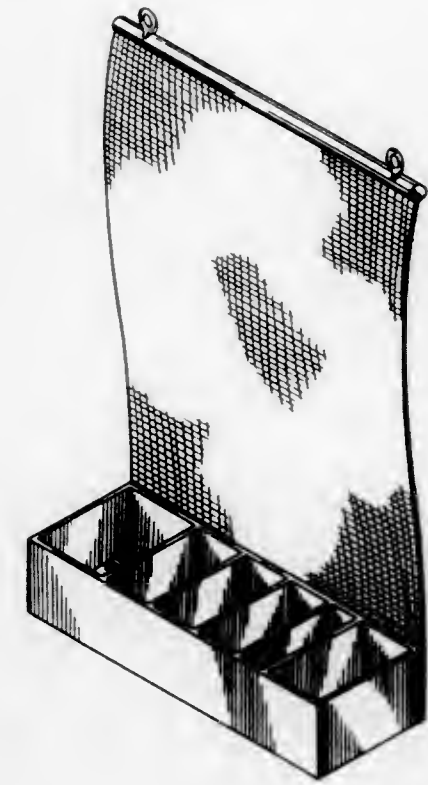
358,067

## EARRING HOLDING NET AND CONTAINER

Melisa D. Graves, 16267 Weir St., Omaha, Nebr. 68135-1216

Filed Feb. 3, 1994, Ser. No. 18,297  
Term of patent 14 years

U.S. Cl. D6—466



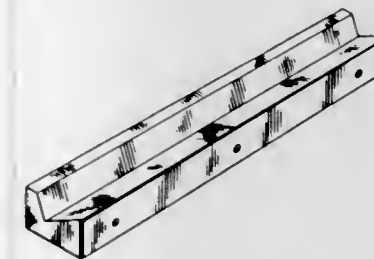
358,066

## SPORTS CARD DISPLAY RACK

Thomas M. Blackwood, 12733 Cheshire St., Norwalk, Calif. 90650

Filed Dec. 6, 1993, Ser. No. 14,290  
Term of patent 14 years

U.S. Cl. D6—449



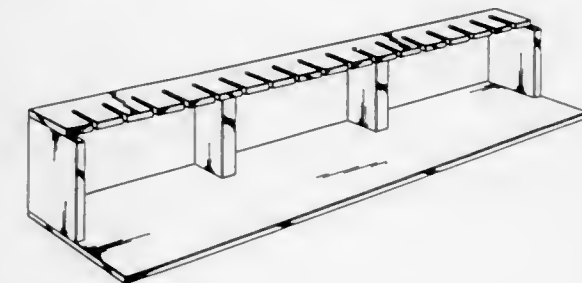
358,068

## HOLDING RACK FOR COURIER BAGS

Howard E. Wilson, 167 S. Fountain, Wichita, Kans. 67218

Filed Jun. 21, 1993, Ser. No. 9,732  
Term of patent 14 years

U.S. Cl. D6—467

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358,069

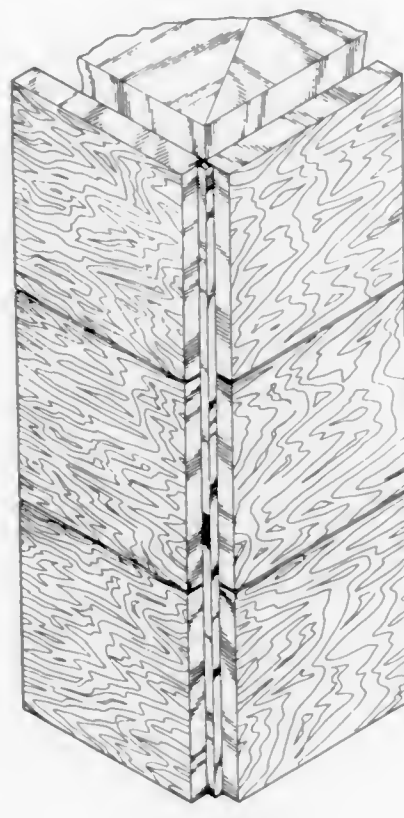
## FURNITURE CORNER

Donald G. Brinkmann, New York, N.Y., assignor to Steelcase Inc., Grand Rapids, Mich.

Division of Ser. No. 2,135, Nov. 30, 1993. This application Jun. 3, 1994, Ser. No. 24,033

Term of patent 14 years

U.S. Cl. D6—491



358,071

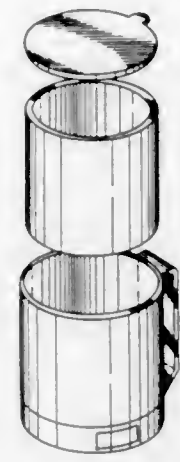
## ELECTRICALLY HEATED BEVERAGE CONTAINER

Linda L. Gill, 15067 Warwick St., Detroit, Mich. 48223

Filed Nov. 4, 1993, Ser. No. 14,900

Term of patent 14 years

U.S. Cl. D7—605



358,072

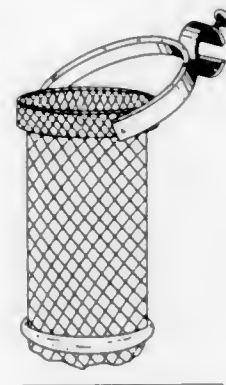
## DRINK CADDY

James T. Hutniak, 4031 Rundiehorn Drive N.E., Calgary, Alberta, Canada T1Y 2K2

Filed Mar. 10, 1993, Ser. No. 5,734

Term of patent 14 years

U.S. Cl. D7—621



358,073

## COOKING GRILL LIFTING TOOL

David C. Eckert, 1346 S. Warner Rd., Apache Junction, Ariz. 85220

Filed Feb. 16, 1994, Ser. No. 18,815

Term of patent 14 years

U.S. Cl. D7—690



358,070

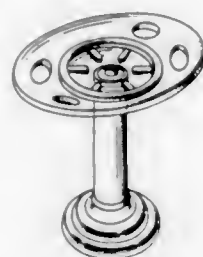
## SELF-STANDING TOOTHBRUSH AND TUMBLER HOLDER

Norton Sharpe, Los Angeles, Calif., assignor to Franklin Brass Manufacturing Company, Los Angeles, Calif.

Filed Aug. 23, 1993, Ser. No. 12,082

Term of patent 14 years

U.S. Cl. D6—531



358,074

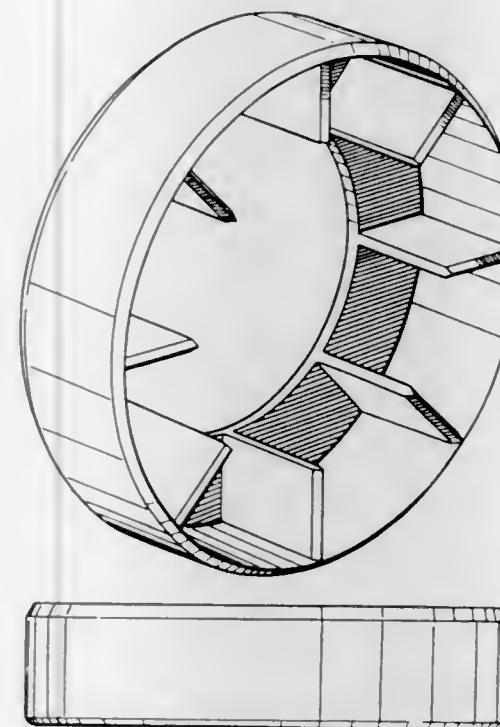
## PIE DOUGH CUTTER

Stephen J. McClean, Beverly Hills, Australia, assignor to Breville Pty. Ltd., Pyrmont, Australia

Filed Feb. 1, 1994, Ser. No. 18,198

Term of patent 14 years

U.S. Cl. D7—672



358,076

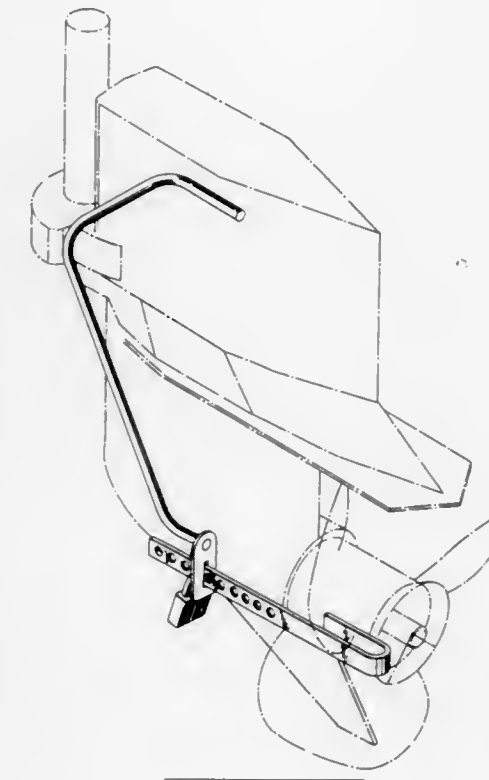
## OUTBOARD MARINE ENGINE LOWER UNIT AND PROPELLER LOCK

Ronald R. Woller, John A. Woller, Jr., both of Decatur, and Harlan J. Haight, Madison, all of Ala., assignors to Pinnacle Products, Inc., Decatur, Ala.

Filed Aug. 12, 1993, Ser. No. 11,715

Term of patent 14 years

U.S. Cl. D8—331

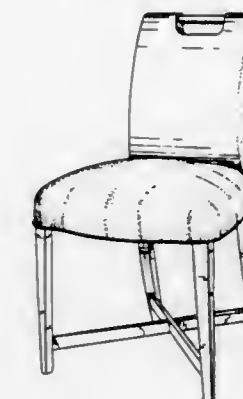
358,077  
CHAIR

John Hutton, New York, N.Y., assignor to Donghia Furniture, New York, N.Y.

Filed Jan. 5, 1994, Ser. No. 17,156

Term of patent 14 years

U.S. Cl. D6—334



358,075

## MECHANICAL FAN BLADE PULLER

Peter F. Ulmer, P.O. Box 436, Empire, La. 70050

Filed Jan. 13, 1994, Ser. No. 17,435

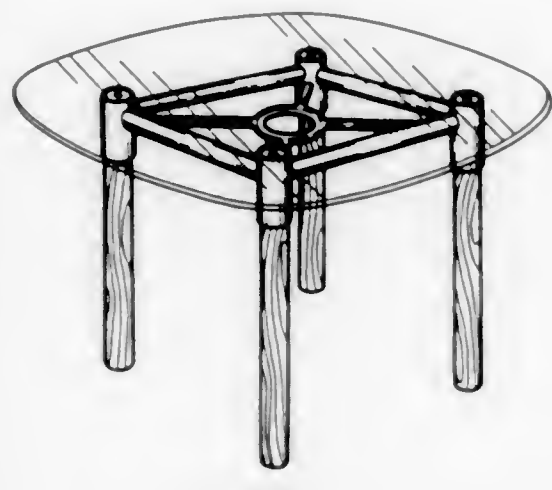
Term of patent 14 years

U.S. Cl. D8—51



358,078  
TABLE

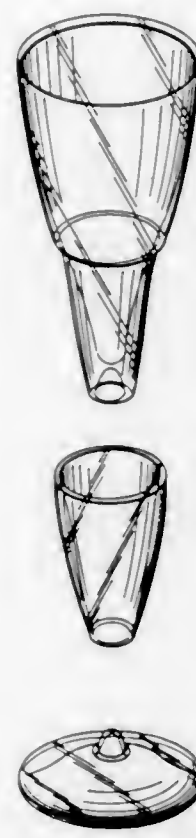
Richard S. Klein, Los Angeles, Calif., assignor to Cal-Style Furniture Mfg. Co., Compton, Calif.  
Filed Sep. 7, 1993, Ser. No. 12,643  
Term of patent 14 years  
U.S. Cl. D6—480



358,080

THREE PIECE PLASTIC GLASS

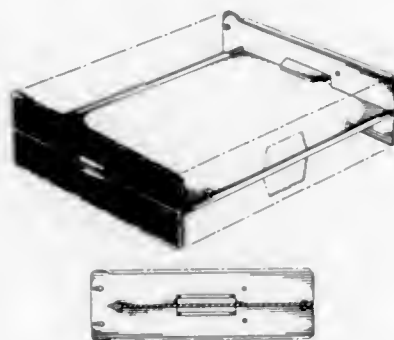
Laura Handler, New York, N.Y., assignor to Metrokane Inc., New York, N.Y.  
Filed Mar. 17, 1993, Ser. No. 6,027  
Term of patent 14 years  
U.S. Cl. D7—509



358,079

DIVIDER FOR A DOUBLE DISC COVER

Yoshihiko Tanlyama, 9380 Old Southwick Pass, Alpharetta, Ga. 30202  
Filed Mar. 11, 1993, Ser. No. 5,754  
Term of patent 14 years  
U.S. Cl. D6—629



358,081

ROOF DECKING PUNCH TOOL JAW

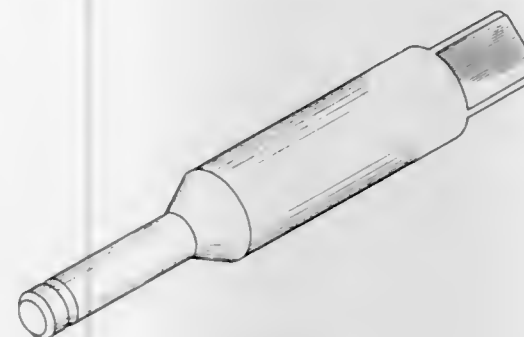
John B. Tallon, 260 Garden Pl., Oradell, N.J. 07641  
Filed May 27, 1994, Ser. No. 23,624  
Term of patent 14 years  
U.S. Cl. D8—19



358,082

SOCKET DRIVE ADAPTER FOR POWER DRILL

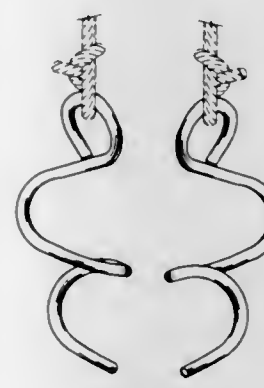
Phillip A. Trezza, 9901 Saybrook Ct., Richmond, Va. 23236  
Filed Dec. 20, 1993, Ser. No. 16,523  
Term of patent 14 years  
U.S. Cl. D8—70



358,083

SPIRAL HOOK

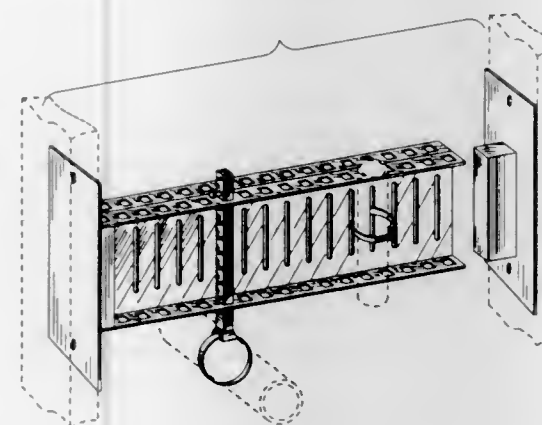
Mitchell D. Pate, 415 Hollyvale, Houston, Tex. 77060, assignor to Mitchell D. Pate, Houston, Tex.  
Filed Mar. 4, 1994, Ser. No. 19,564  
Term of patent 14 years  
U.S. Cl. D8—370



358,084

PIPE HANGING UNIT

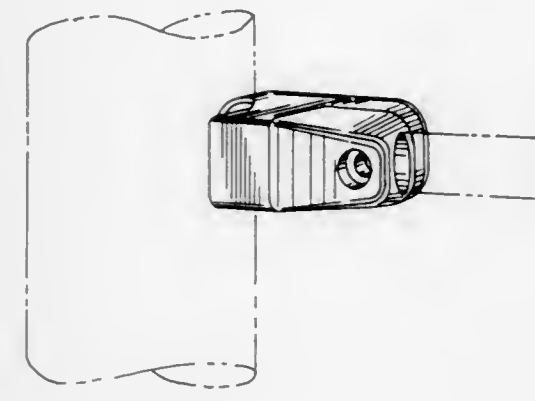
Jeffrey V. Middlebrook, 7 Primrose Cir., Seaside, Calif. 93955  
Filed Oct. 26, 1992, Ser. No. 818  
Term of patent 14 years  
U.S. Cl. D8—373



358,085

PIPE CLAMP FOR A ROUND PIPE

Ross D. Siragusa, Jr.; Wesley D. Sutton, both of Fort Wayne, Ala., and Timothy W. Pope, Rome, Ga., assignors to Game Time, Inc., Payne, Ala.  
Filed Nov. 18, 1993, Ser. No. 15,490  
Term of patent 14 years  
U.S. Cl. D8—382



358,086

DISPENSING CONTAINER

Norman H. Nye, 1348 Highbridge Rd., Cuyahoga Falls, Ohio 44223  
Filed Dec. 14, 1993, Ser. No. 16,421  
The portion of the term of this patent subsequent to Jun. 22, 2007, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D9—300

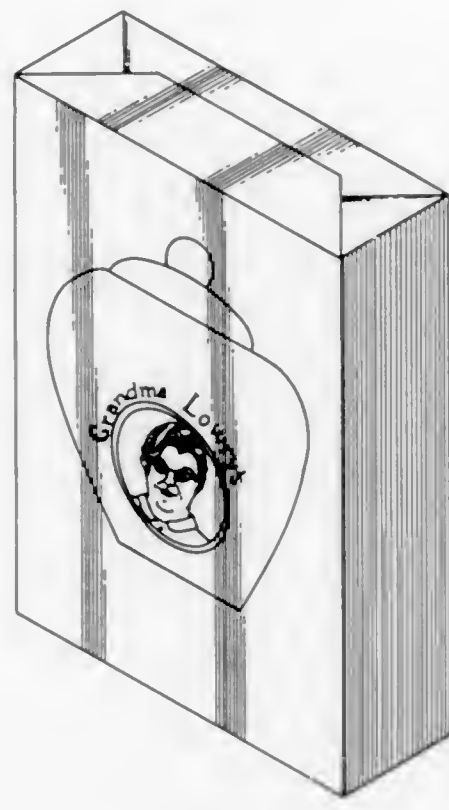




358,087

**PACKAGE FOR COOKIES**

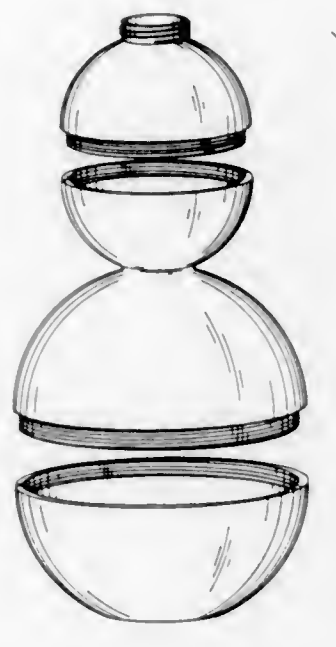
Neil D. Lowry, 238 Wilson Blvd., Rochester, N.Y. 14620  
 Filed Sep. 23, 1993, Ser. No. 13,372  
 Term of patent 14 years  
 U.S. Cl. D9—311



358,089

**CONTAINER**

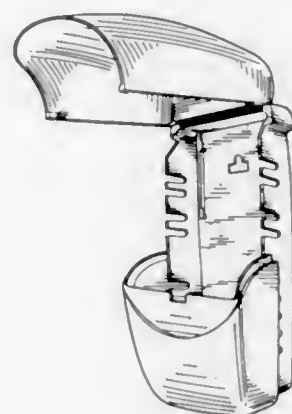
Peter K. Wong, and Shirley A. Wong, both of 334 Stephens,  
 Grosse Pointe Farms, Mich. 48236  
 Filed Feb. 22, 1994, Ser. No. 19,050  
 Term of patent 14 years  
 U.S. Cl. D9—347



358,090

**PACKAGING CONTAINER**

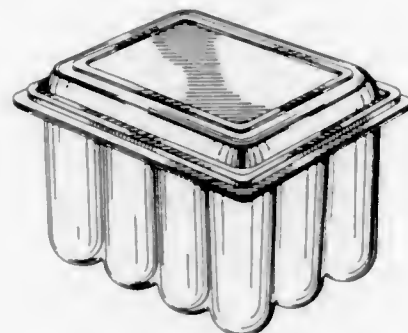
Tomohiro Morikawa, Kyoto, Japan, assignor to Refre Co., Ltd.,  
 Kyoto, Japan  
 Filed Sep. 2, 1993, Ser. No. 12,520  
 Claims priority, application Japan, Aug. 11, 1993, 5-24721  
 Term of patent 14 years  
 U.S. Cl. D9—420



358,088

**GOLF BALL CONTAINER**

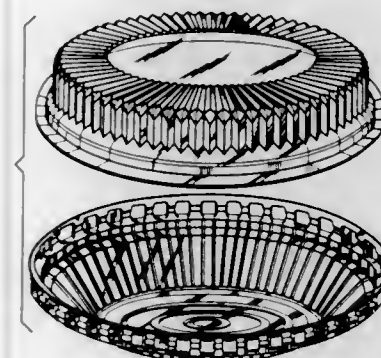
James S. Reid, 7301 Somerset Shores Port, Orlando, Fla. 32820  
 Filed Feb. 14, 1994, Ser. No. 18,696  
 Term of patent 14 years  
 U.S. Cl. D9—341



358,091

**FOOD CONTAINER**

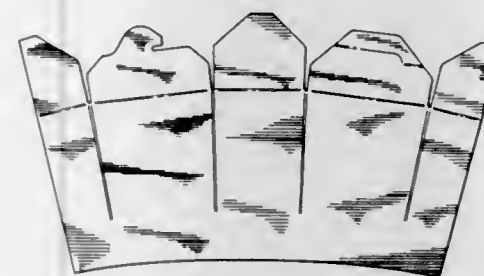
Richard T. Warburton, Canandaigua, N.Y., assignor to Mobil  
 Oil Corporation, Fairfax, Va.  
 Division of Ser. No. 852,743, Mar. 16, 1992, which is a  
 continuation of Ser. No. 606,225, Oct. 31, 1990, abandoned. This  
 application Jul. 8, 1993, Ser. No. 10,461  
 Term of patent 14 years  
 U.S. Cl. D9—429



358,092

**BLANK FOR CUP WITH TOP CLOSURE**

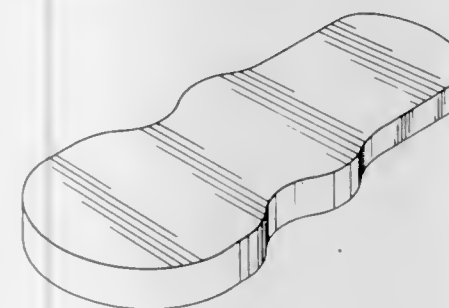
Liming Cai, West Chester, Pa., assignor to Dopaco, Inc., Down-  
 ingtown, Pa.  
 Continuation of Ser. No. 33,475, Mar. 17, 1993, Pat. No.  
 5,358,175. This application Jun. 30, 1994, Ser. No. 25,330  
 Term of patent 14 years  
 U.S. Cl. D9—433



358,093

**GAME CONTAINER**

Norm Lanteigne, and Diane Lanteigne, both of Mississauga,  
 Canada, assignors to Bud Games Inc., Bramalea, Canada  
 Filed Apr. 9, 1993, Ser. No. 6,919  
 Claims priority, application Canada, Oct. 16, 1992,  
 16-10-92-12  
 Term of patent 14 years  
 U.S. Cl. D9—430



358,094

**BAG CARRIER**

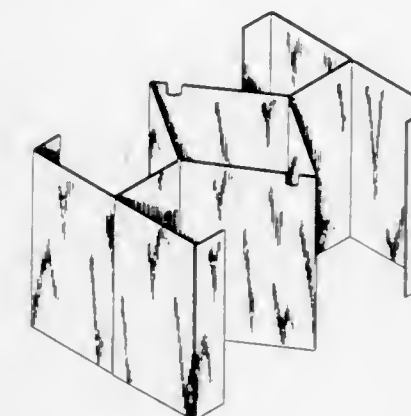
Michael DeGiacomo, Jr., 926 Webster Ave., New Rochelle, N.Y.  
 10804  
 Filed Mar. 1, 1993, Ser. No. 5,293  
 Term of patent 14 years  
 U.S. Cl. D9—434



358,095

**CARTON PARTITION UNIT**

Charles P. Weimer, Danielson, Conn., assignor to International  
 Paper Company, Purchase, N.Y.  
 Filed Aug. 26, 1993, Ser. No. 12,751  
 Term of patent 14 years  
 U.S. Cl. D9—456



358,096

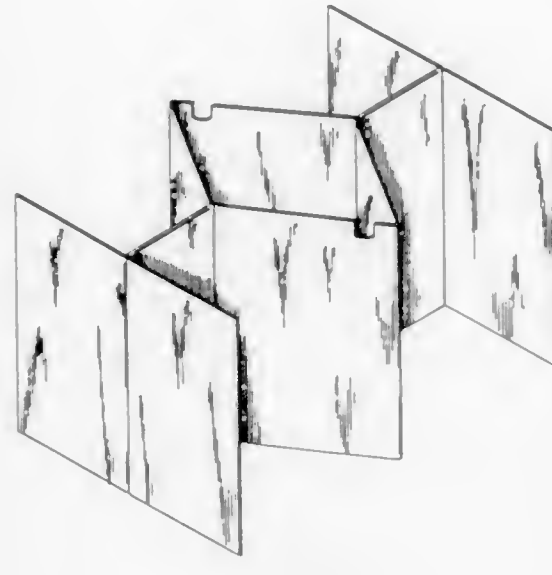
## CARTON PARTITION UNIT

Charles P. Welmer, Danielson, Conn., assignor to International Paper Company, Purchase, N.Y.

Filed Aug. 26, 1993, Ser. No. 13,713

Term of patent 14 years

U.S. Cl. D9—456



358,098

## BOTTLE

Alain Carre, Paris, and Laurent Del Bianco, Deuil La Barre, both of France, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 25, 1994, Ser. No. 20,442

Term of patent 14 years

U.S. Cl. D9—529



358,097

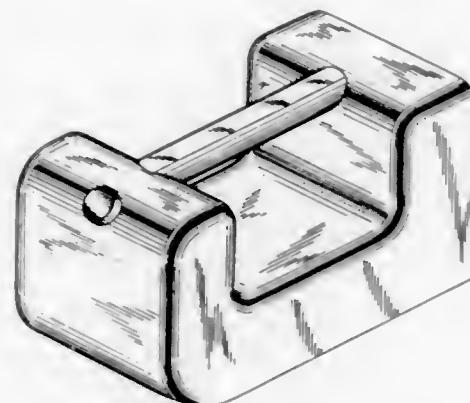
## CONTAINER

Alissa Leibowitz, 750-92 Lido Blvd., Lido Beach, N.Y. 11561

Filed May 16, 1994, Ser. No. 22,931

Term of patent 14 years

U.S. Cl. D9—527



358,099

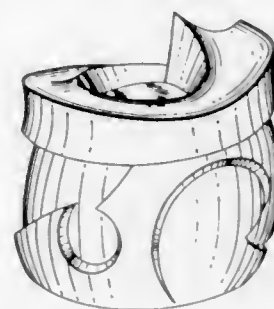
## JAR AND CLOSURE

Stephan Weiss, 211 E. 70th St., New York, N.Y. 10021

Filed Sep. 29, 1993, Ser. No. 13,654

Term of patent 14 years

U.S. Cl. D9—549



358,100

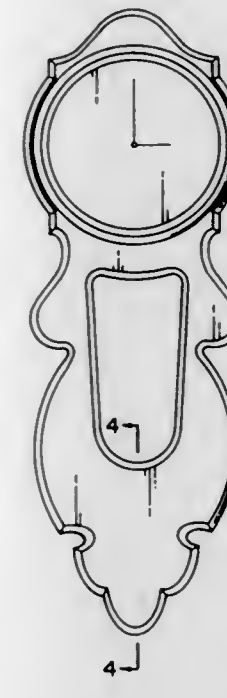
## CLOCK

Bonnie Dlugosz, and Philip Panella, both of 2011 State St., Schenectady, N.Y. 12304

Filed Aug. 10, 1993, Ser. No. 11,623

Term of patent 14 years

U.S. Cl. D10—28



358,102

## WATCH

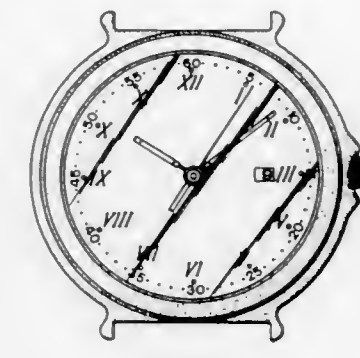
Jean-Louis Dumas, Paris, France, assignor to La Montre Hermes, S.A., Bienne, Switzerland

Filed Mar. 8, 1993, Ser. No. 5,594

Claims priority, application WIPO, Sep. 8, 1992, DM/023839

Term of patent 14 years

U.S. Cl. D10—39



358,103

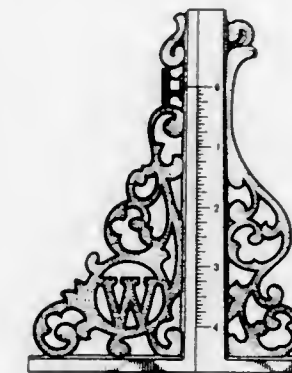
## SET-UP GAUGE

Kenneth J. Munkel, Des Moines, Iowa, assignor to Woodsmith Corporation, Des Moines, Iowa

Filed May 4, 1994, Ser. No. 22,355

Term of patent 14 years

U.S. Cl. D10—65



358,101

## WATCH AND BRACELET

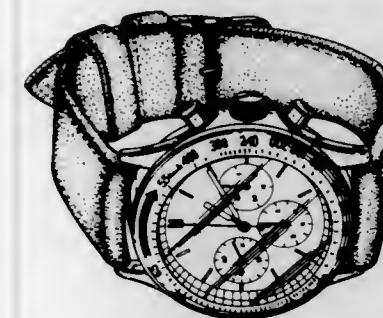
Karl-Friedrich Scheufele, Promethoux, Switzerland, assignor to Le Petit-Fils de L. U. Chopard & Cie S.A., Meyrin/GE, Switzerland

Filed Oct. 3, 1991, Ser. No. 770,953

Claims priority, application Hague Agreement, Apr. 4, 1991, 34/1194

Term of patent 14 years

U.S. Cl. D10—32



358,104

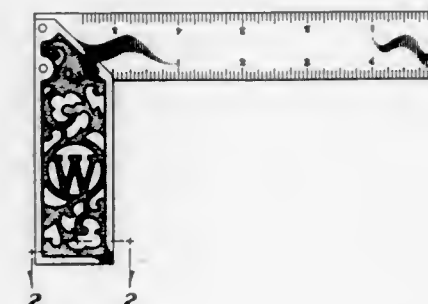
## TRY SQUARE

Kenneth J. Munkel, Des Moines, Iowa, assignor to Woodsmith Corporation, Des Moines, Iowa

Filed May 4, 1994, Ser. No. 22,393

Term of patent 14 years

U.S. Cl. D10—65





358,105

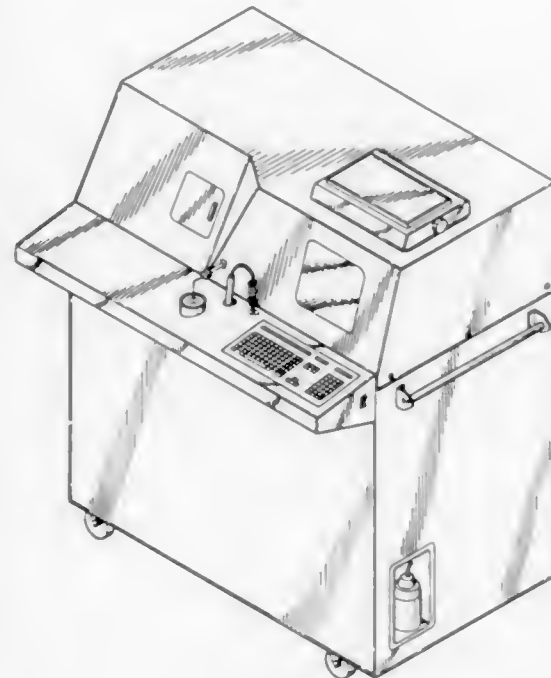
## ON-SITE OIL ANALYZING APPARATUS

Carlton S. Joyce, Atlanta, Ga., assignor to On-Site Analysis, Inc., Atlanta, Ga.

Filed Feb. 28, 1994, Ser. No. 19,337

Term of patent 14 years

U.S. Cl. D10—81



358,107

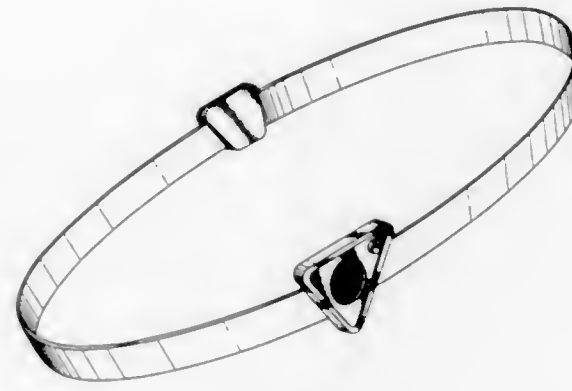
## TRANSMITTER FOR LOCATING LOST CHILDREN

David V. Bossen, 181 Misty Hollow Way, Woodstock, Ga. 30188

Filed Sep. 23, 1993, Ser. No. 13,351

Term of patent 14 years

U.S. Cl. D10—104



358,108

## INFRA-RED SENSOR LIGHT

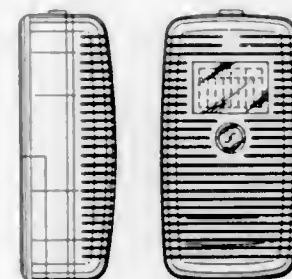
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong

Filed Oct. 5, 1993, Ser. No. 13,883

Claims priority, application United Kingdom, Apr. 15, 1993, 2030401

Term of patent 14 years

U.S. Cl. D10—106



358,106

## FRONT PANEL

Craig S. Zaplatynsky, Algonquin, and Vijay J. Nadkarni, Naperville, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 17, 1993, Ser. No. 16,623

Term of patent 14 years

U.S. Cl. D10—103



358,109

## FIRE DETECTOR

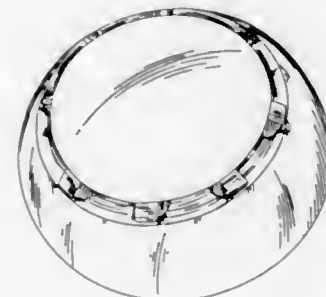
Toshiyuki Ozawa, Sagami, Japan, assignor to Hochiki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 23, 1994, Ser. No. 24,890

Claims priority, application Japan, Dec. 28, 1993, 5-40330

Term of patent 14 years

U.S. Cl. D10—106



358,110

## VEHICLE LOCATOR

Leon S. Gross, Philadelphia, Pa., assignor to Enterprises, Inc., Philadelphia, Pa.

Filed Sep. 9, 1994, Ser. No. 28,286

Term of patent 14 years

U.S. Cl. D10—110



358,111

## CRUSHABLE TRAFFIC MARKER

Eugene Gregory, 800 Pacific Coast Hwy., #8293, Redondo Beach, Calif. 90277

Filed May 11, 1994, Ser. No. 22,782

Term of patent 14 years

U.S. Cl. D10—113



358,112

## EXPANSION BRACELET

George T. Butler, Warwick, R.I., assignor to Textron Inc., Providence, R.I.

Filed May 25, 1993, Ser. No. 8,749

Term of patent 14 years

U.S. Cl. D11—24



358,113

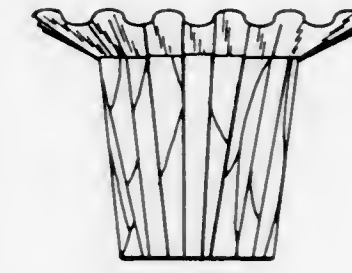
## FLOWER POT COVER

Donald E. Weder, Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation of Ser. No. 282,836, Dec. 8, 1988, abandoned, which is a continuation of Ser. No. 652,881, Sep. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 613,053, May 22, 1984, Pat. No. Des. 293,224. This application Sep. 22, 1989, Ser. No. 411,249

Term of patent 14 years

U.S. Cl. D11—164



358,114

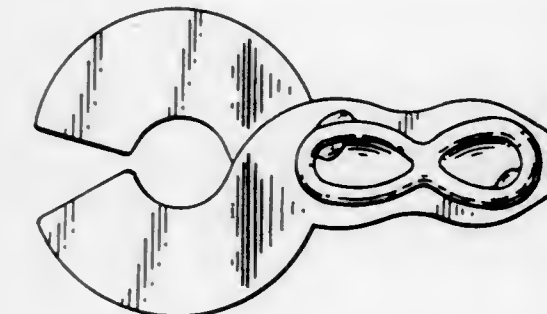
## CHAIN END CAP

Tracy D. Botsford, Warwick, R.I., assignor to Leach & Garner Company, North Attleboro, Mass.

Filed Jan. 13, 1994, Ser. No. 17,462

Term of patent 14 years

U.S. Cl. D11—87



358,115

## VASE

Peter N. Rahr, 19 Corinne Road, Tufnell Park, London, United Kingdom N19 5EZ

Filed Nov. 24, 1993, Ser. No. 15,751

Claims priority, application United Kingdom, Jun. 7, 1993, 2031568

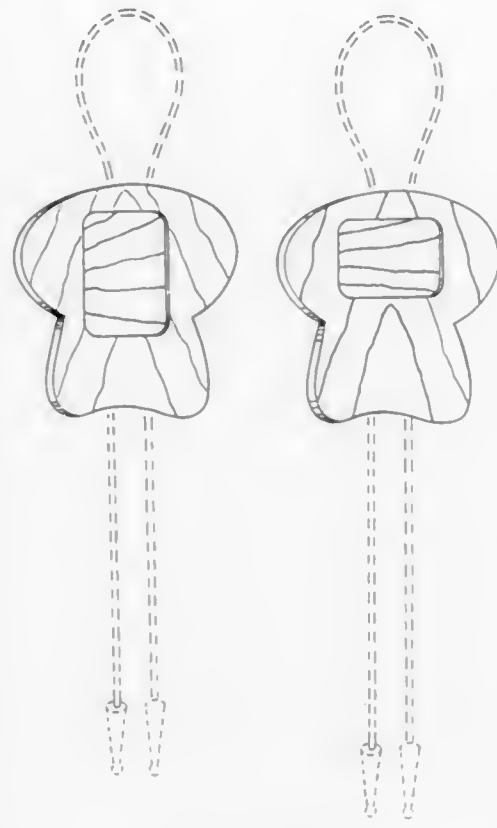
Term of patent 14 years

U.S. Cl. D11—144

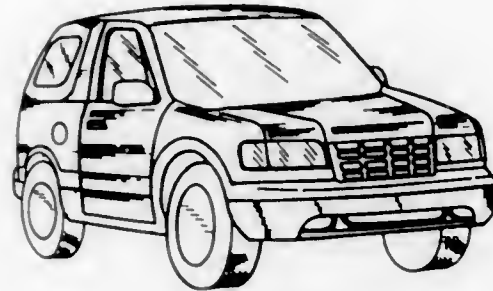


358,116  
COMBINED NECKWEAR CLASP AND PICTURE  
DISPLAY

Vincent Hughes, 2022 18th Ave., San Francisco, Calif. 94116  
Filed Feb. 1, 1993, Ser. No. 4,320  
Term of patent 14 years  
U.S. Cl. D11—202



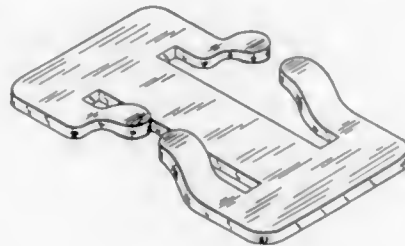
358,118  
PASSENGER CAR  
Dong-Young Lee, Seoul, and Dong-Hee Lee, Kwangmyong, both  
of Rep. of Korea, assignors to Kia Motors Corporation, Seoul  
and Kia Service Co., Ltd., Kyunggi, both of Rep. of Korea  
Filed Apr. 10, 1992, Ser. No. 867,034  
Claims priority, application Rep. of Korea, Oct. 15, 1991,  
15063; Oct. 15, 1991, 15064  
Term of patent 14 years  
U.S. Cl. D12—91



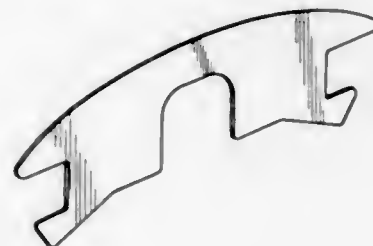
358,119  
AXLE WITH BALL DRIVE DESIGN  
Vaughn Winter, 1635 W. Orange St., York, Pa. 17404  
Filed Jan. 10, 1994, Ser. No. 17,255  
Term of patent 14 years  
U.S. Cl. D12—160



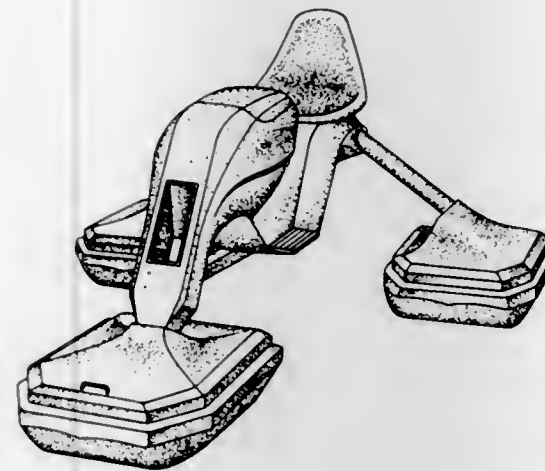
358,117  
GARMENT STRAPS RETAINER  
J. Bernice Norris, 5102 Walnut Grove Rd., Memphis, Tenn.  
38117  
Filed Dec. 27, 1993, Ser. No. 16,863  
Term of patent 14 years  
U.S. Cl. D11—218



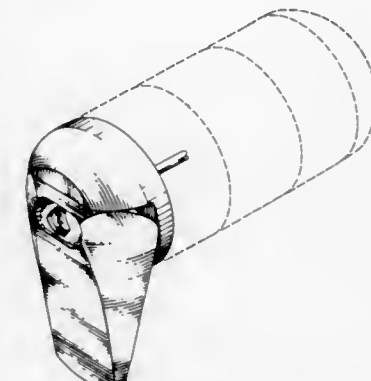
358,120  
DISC BRAKE SHIM  
Gustav J. Steinke, and Starla D. Huffer, both of Lima, Ohio,  
assignors to International Brake Industries, Inc., Lima, Ohio  
Filed Mar. 2, 1994, Ser. No. 19,394  
Term of patent 14 years  
U.S. Cl. D12—180



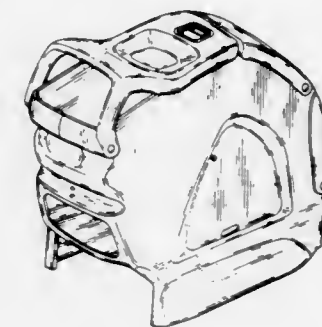
358,121  
BOAT  
James W. Price, Fort Worth, Tex., assignor to James D. Price,  
Fort Worth, Tex.  
Filed Oct. 8, 1993, Ser. No. 14,003  
Term of patent 14 years  
U.S. Cl. D12—300



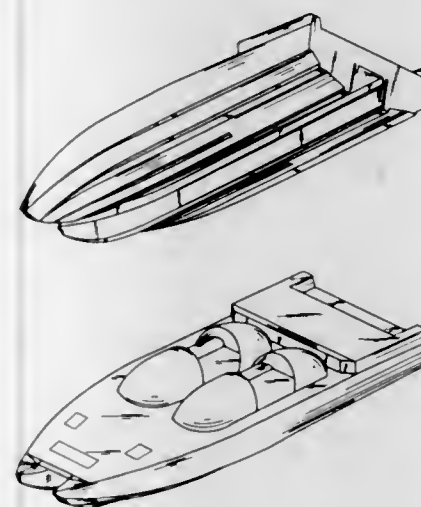
358,123  
QUICK RELEASE HUB WITH CAM LEVER  
Dixon Newbold, Providence, R.I., and Ian Gilley, W. Boylston,  
Mass., assignors to Bell Sports, Inc., East Providence, R.I.  
Filed Aug. 3, 1992, Ser. No. 924,326  
Term of patent 14 years  
U.S. Cl. D12—408



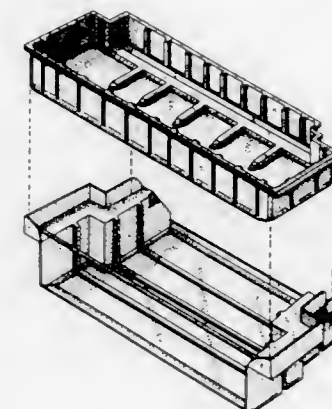
358,124  
VEHICLE CONSOLE  
Richard P. Landry, 1347 Fountain, Troy, Mich. 48098  
Filed Dec. 3, 1993, Ser. No. 15,978  
Term of patent 14 years  
U.S. Cl. D12—423



358,122  
CATAMARAN TYPE BOAT AND BOAT HULL  
Robert J. Perette, 1183 Nantasket Ave., Unit H5, Hull, Mass.  
02045  
Filed Jun. 10, 1994, Ser. No. 24,232  
Term of patent 14 years  
U.S. Cl. D12—310



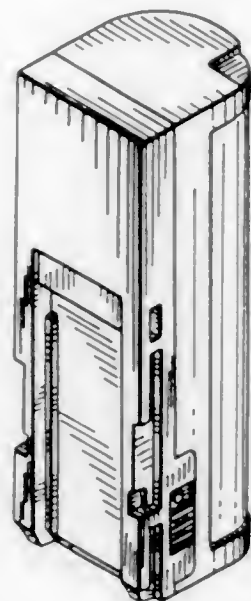
358,125  
MINI VAN STORAGE UNIT  
Claude T. Jackson, P.O. Box 1597, Henderson, N.C. 27536  
Filed Feb. 10, 1993, Ser. No. 4,656  
Term of patent 14 years  
U.S. Cl. D12—425





358,126

**BATTERY FOR A PORTABLE AUDIO/VIDEO DEVICE**  
Kazuhiko Sakuma, and Takayuki Aita, both of Fukushima, Japan, assignors to Sony Corporation, Tokyo, Japan  
Filed Mar. 25, 1994, Ser. No. 20,364  
Claims priority, application Japan, Oct. 21, 1993, 5-32025  
Term of patent 14 years  
U.S. Cl. D13—103



358,128

**BATTERY HOUSING FOR A RADIO TELEPHONE**  
Adrian Berry, and Adam White, both of London, England, assignors to Nokia Mobile Phones Ltd., Salo, Finland  
Filed Jul. 25, 1994, Ser. No. 26,290  
Claims priority, application United Kingdom, Mar. 1, 1994, 2037420  
Term of patent 14 years  
U.S. Cl. D13—103



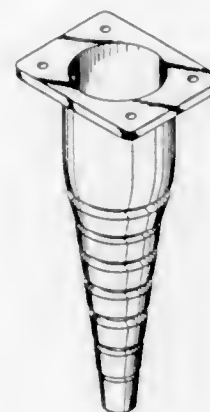
358,127

**BATTERY HOUSING FOR A MOBILE PHONE**  
Adrian Berry, London, England, assignor to Nokia Mobile Phones Ltd., Salo, Finland  
Filed Mar. 29, 1994, Ser. No. 20,548  
Claims priority, application United Kingdom, Sep. 30, 1993, 2034236  
Term of patent 14 years  
U.S. Cl. D13—103



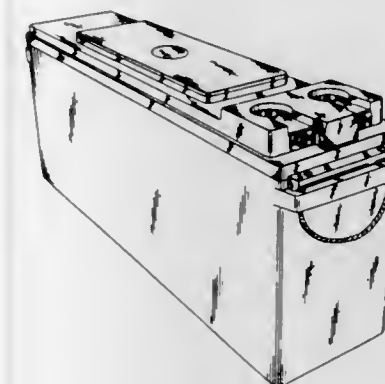
358,129

**BUSHING FOR CABLE**  
Kunitaka Mizobe, Gurin Haitu Jounan Bdg., 303 31-38 Hoshikuma, 2-chome, Jounan-ku, Fukuoka-shi, Fukuoka, Japan  
Filed Nov. 22, 1993, Ser. No. 15,562  
Claims priority, application Japan, May 20, 1993, 5-14895  
Term of patent 14 years  
U.S. Cl. D13—154



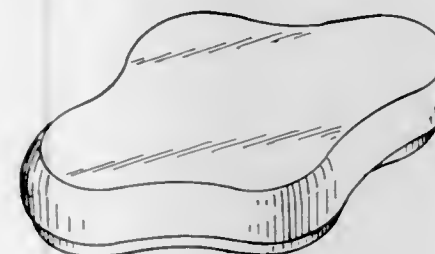
358,130

**BATTERY**  
John K. Humphreys; John H. Watters, both of Manchester, and Brian Collier, Bolton, all of England, assignors to Chloride Industrial Batteries Limited, United Kingdom  
Filed May 16, 1994, Ser. No. 22,990  
Claims priority, application United Kingdom, Dec. 1, 1993, 2035583  
Term of patent 14 years  
U.S. Cl. D13—104



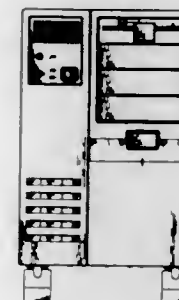
358,131

**CONTROL UNIT FOR AN ELECTRIC LIFT**  
Lena L. Lorentzen, Enskede, Sweden, assignor to Curt Landin Production AB, Johannesbo, Sweden  
Filed Mar. 26, 1993, Ser. No. 6,389  
Claims priority, application Sweden, Sep. 30, 1992, 92-1990  
Term of patent 14 years  
U.S. Cl. D13—162



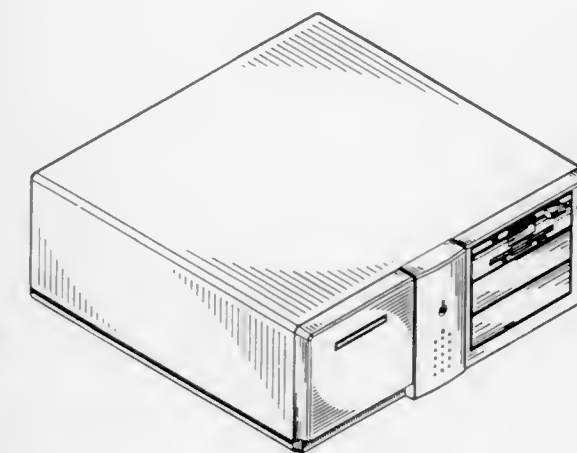
358,132

**FLOOR STANDING COMPUTER**  
Mark Kimbrough, and Randall Decker, both of Austin, Tex., assignors to Dell USA, L.P., Austin, Tex.  
Filed Jan. 12, 1994, Ser. No. 17,404  
Term of patent 14 years  
U.S. Cl. D14—100



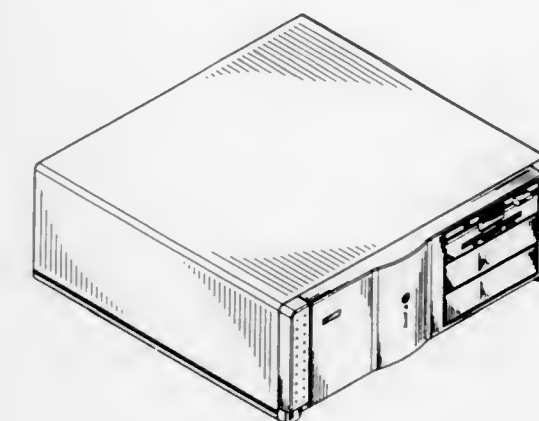
358,133

**DESKTOP COMPUTER**  
Mark Kimbrough, and Julie Heard, both of Austin, Tex., assignors to Dell USA, L.P., Austin, Tex.  
Filed Jan. 12, 1994, Ser. No. 17,417  
Term of patent 14 years  
U.S. Cl. D14—100



358,134

**DESKTOP COMPUTER**  
Mark Kimbrough; Julie Heard, and Kyle Anderson, all of Austin, Tex., assignors to Dell USA, L.P., Austin, Tex.  
Filed Jan. 12, 1994, Ser. No. 17,418  
Term of patent 14 years  
U.S. Cl. D14—100



358,135

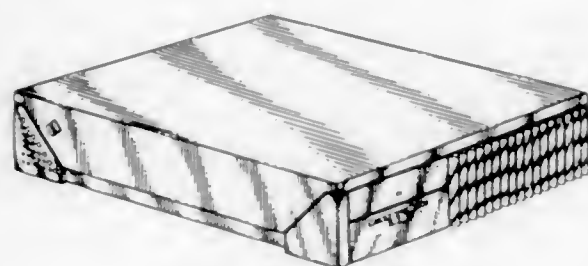
## COMPUTER ENCLOSURE

Christopher E. Chiodo, Brookline; Joseph M. Spano, North Reading, both of Mass.; Paul S. Montgomery, and Herbert H. F. Pfelfer, both of San Francisco, Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.

Filed Mar. 11, 1994, Ser. No. 19,890

Term of patent 14 years

U.S. Cl. D14—100



358,137

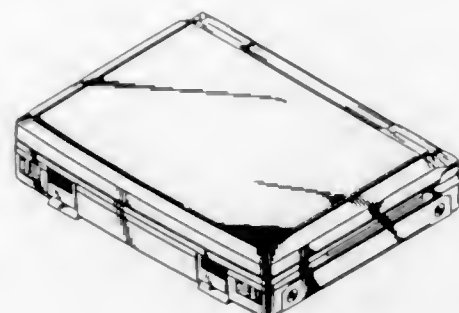
## LAPTOP COMPUTER

Lai-Chung Lee, Taipei, Taiwan, Prov. of China, assignor to Getac Corporation, Hsinchu, Taiwan, Prov. of China

Filed Dec. 10, 1993, Ser. No. 16,238

Term of patent 14 years

U.S. Cl. D14—106



358,136

## INTEGRATED PORTABLE COMPUTER AND PRINTER

Robert R. Samuelson, Kettering, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Feb. 10, 1993, Ser. No. 4,847

Term of patent 14 years

U.S. Cl. D14—106



358,138

## PORTABLE HARD DISK DRIVE

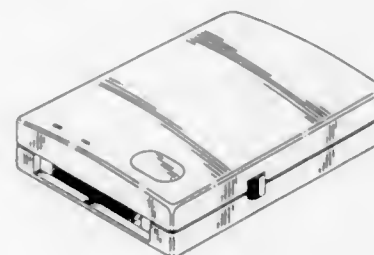
Ichiroh Koyanagi, Yokohama; Yoshiyuki Manabe, Ebina; Makoto Ohtsuki, Yokohama, and Hisashi Shima, Fujisawa, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 12, 1992, Ser. No. 1,339

Claims priority, application Japan, May 12, 1992, 4-13594

Term of patent 14 years

U.S. Cl. D14—109



358,139

## DISC DRIVE

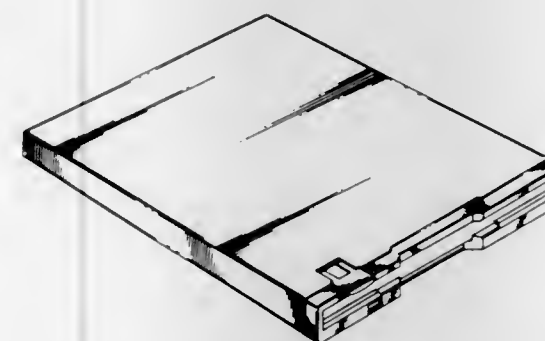
Takashi Watanabe, Ichikawa, Japan, assignor to TEAC Corporation, Japan

Filed Jan. 28, 1993, Ser. No. 4,173

Claims priority, application Japan, Jul. 30, 1992, 4-23059

Term of patent 14 years

U.S. Cl. D14—109



358,141

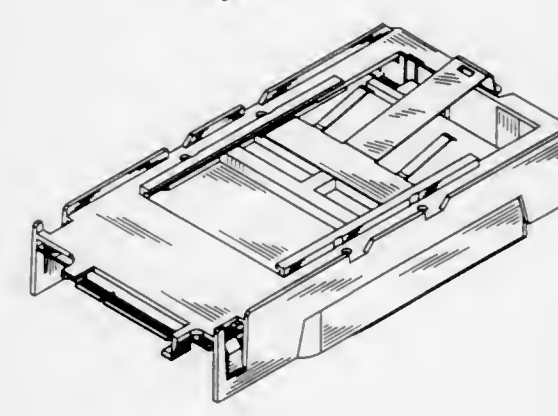
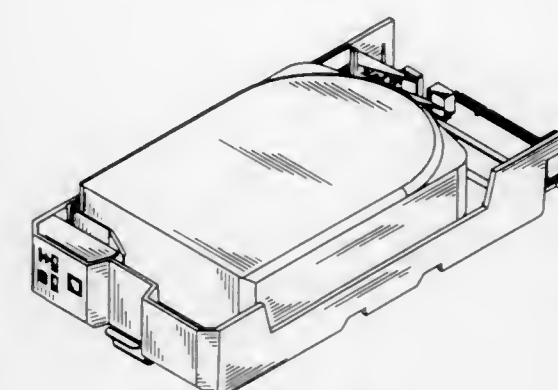
## HARD DISK DRIVE CARRIER

Victor Pecone, and James D. Curlee, both of Austin, Tex., assignors to Dell USA, L.P., Austin, Tex.

Filed Jan. 13, 1994, Ser. No. 17,556

Term of patent 14 years

U.S. Cl. D14—109



358,142

## CONNECTING TERMINAL FOR CHIP CARDS

Jean-Pierre Gloton, Aix en Provence, France, assignor to Gemplus Card International, Gemenos, France

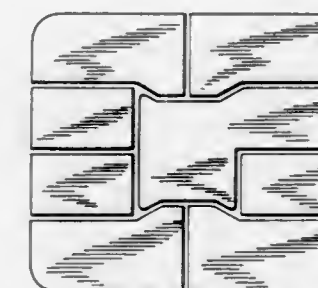
Filed Aug. 18, 1992, Ser. No. 932,010

Claims priority, application France, Mar. 2, 1992, 92 1318

The portion of the term of this patent subsequent to Aug. 11, 2006, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



358,140

## DISK DRIVE UNIT

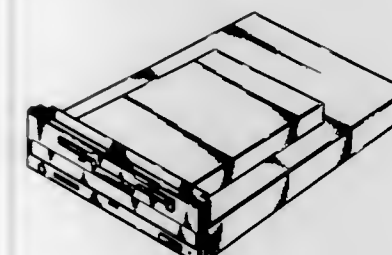
Daihachiro Takasu, Niiza, and Kenji Matsumoto, Houya, both of Japan, assignors to TEAC Corporation, Japan

Filed Dec. 16, 1993, Ser. No. 16,502

Claims priority, application Japan, Jul. 12, 1993, 5-21346

Term of patent 14 years

U.S. Cl. D14—109





358,143

## COMPUTER MOUSE

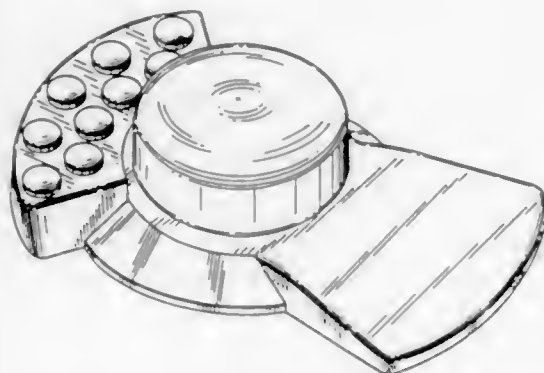
Bernd Gombert, Malching, and Johannes Dietrich, Gilching, bot. of Germany, assignors to Space Control Gesellschaft fur 3D-Systeme mbH, Malching, Germany

Filed Dec. 16, 1992, Ser. No. 2,569

Claims priority, application Germany, Aug. 29, 1992, 92 06 515.5

Term of patent 14 years

U.S. Cl. D14—114



358,145

## KEYBOARD

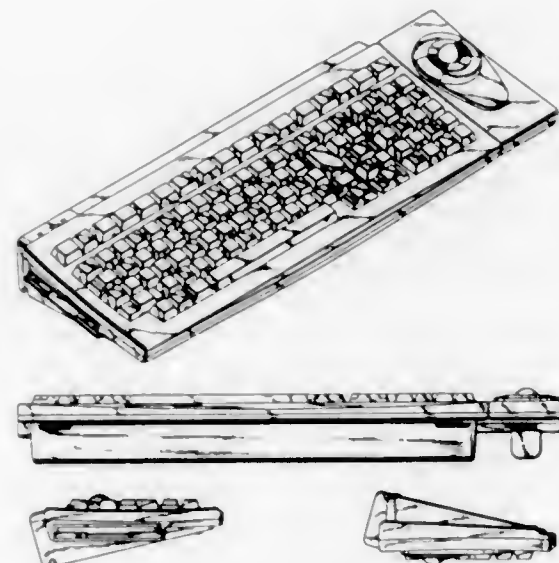
Toshihiko Harada, Kanagawa, Japan, assignor to Alpha Data Corporation, Kanagawa, Japan

Filed Jan. 4, 1994, Ser. No. 17,037

Claims priority, application Japan, Oct. 14, 1993, 5-30982

Term of patent 14 years

U.S. Cl. D14—115



358,144

## ELECTRONIC COMPUTER STAND

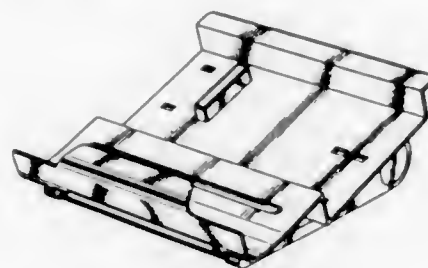
Iino Masaaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jan. 4, 1993, Ser. No. 9,044

Claims priority, application Japan, Jan. 12, 1993, 5-338

Term of patent 14 years

U.S. Cl. D14—114



358,146

## ELECTRONIC VIDEO SCANNER

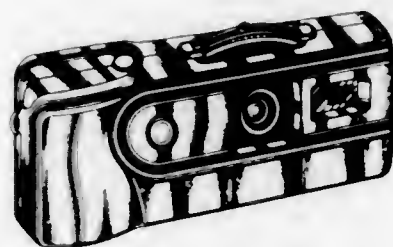
Koichi Kamiyama, and Atsushi Shigemura, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1994, Ser. No. 20,987

Claims priority, application Japan, Jan. 7, 1994, 6-41

Term of patent 14 years

U.S. Cl. D14—116



358,147

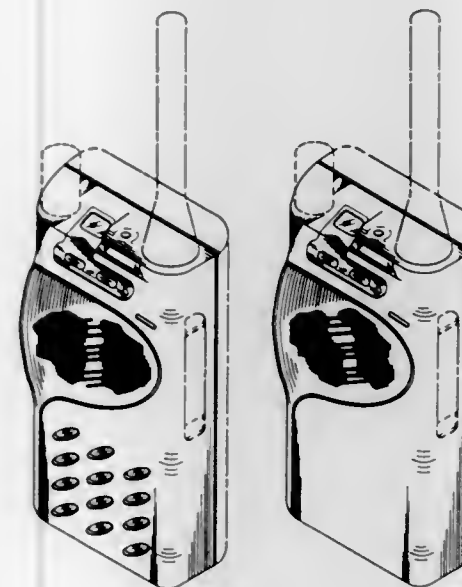
## PORTABLE COMMUNICATION DEVICE

Craig F. Siddoway, Davie; Scott H. Richards, Plantation; Bruce A. Claxton, Coral Springs, and David H. Karl, Tamarac, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 14, 1992, Ser. No. 2,640

Term of patent 14 years

U.S. Cl. D14—137



358,149

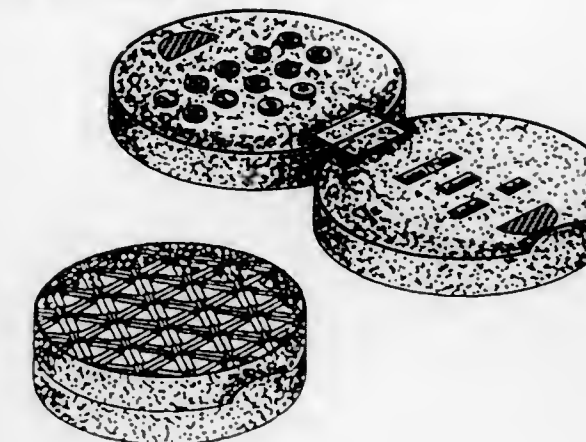
## TELEPHONE HANDSET

Linda Fellingner, 703 Polo Cir., Bryn Mawr, Pa. 19010

Filed May 5, 1993, Ser. No. 7,854

Term of patent 14 years

U.S. Cl. D14—138



358,150

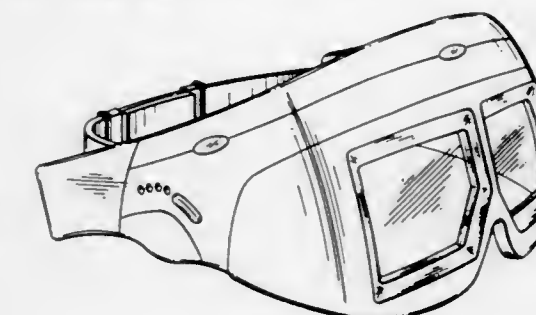
## COMBINED 3D AUDIO HEADSET AND GLASSES

Charles R. Lewis, Jr.; Dan Harden, both of Palo Alto, and Sonja Schiefer, San Francisco, all of Calif., assignors to Sonics Associates Incorporated, Birmingham, Ala.

Filed May 27, 1994, Ser. No. 23,619

Term of patent 14 years

U.S. Cl. D14—205



358,148

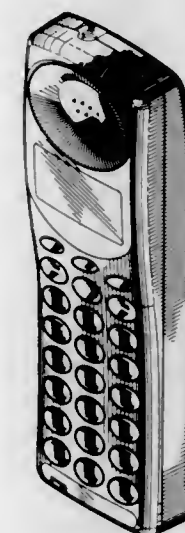
## TELEPHONE HANDSET

Albert L. Nagele, Wilmette, and Chris A. Murzanski, Cary, both of Ill., assignors to Motorola Inc., Schaumburg, Ill.

Filed May 10, 1994, Ser. No. 22,684

Term of patent 14 years

U.S. Cl. D14—138



358,151

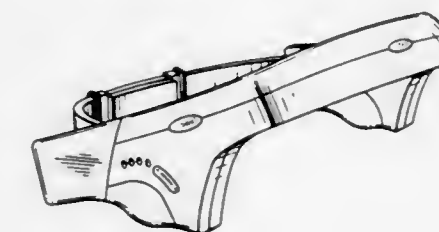
## 3-D AUDIO HEADSET

Charles R. Lewis, Jr.; Dan Harden, both of Palo Alto, and Sonja Schiefer, San Francisco, all of Calif., assignors to Sonics Associates Incorporated, Birmingham, Ala.

Filed May 27, 1994, Ser. No. 23,626

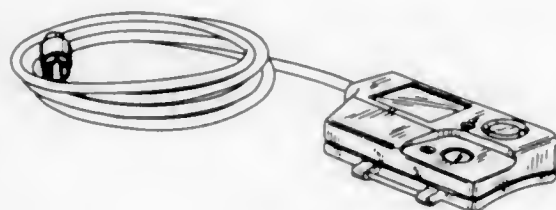
Term of patent 14 years

U.S. Cl. D14—205



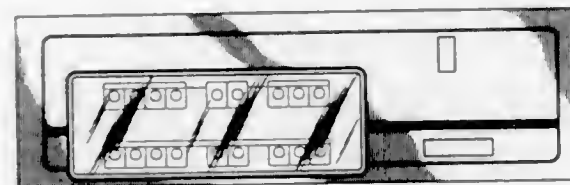
358,152

**REMOTE CONTROLLER FOR VIDEO TAPE RECORDER**  
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Katsuhiro Takashima, Urawa, and Yasunobu Shimizu, Tokyo, all of Japan, assignors to Teac Corporation, Tokyo, Japan  
Filed Dec. 1, 1993, Ser. No. 15,889  
Claims priority, application Japan, Jun. 2, 1993, 5-16274  
Term of patent 14 years  
U.S. Cl. D14—218



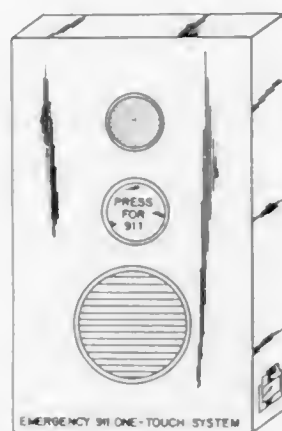
358,155

**FRONT HOUSING CONTROL PANEL FOR A RADIO BASE STATION CONTROLLER**  
Roman P. Rak, Delta, and Kenneth N. Lam, Richmond, both of Canada, assignors to Motorola, Schaumburg, Ill.  
Filed Mar. 18, 1993, Ser. No. 6,197  
Term of patent 14 years  
U.S. Cl. D14—257



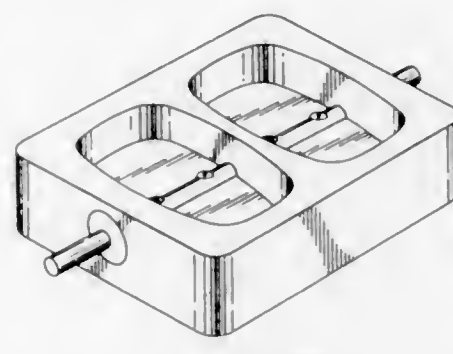
358,153

**TWO-WAY EMERGENCY COMMUNICATION SYSTEM**  
Glenn D. Jackson, 766 County Rd., #187, Athens, Tenn. 37303  
Filed Dec. 20, 1993, Ser. No. 16,583  
Term of patent 14 years  
U.S. Cl. D14—245



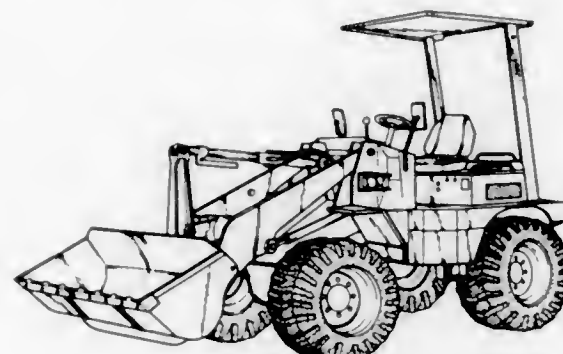
358,156

**BUTTERFLY AIR CONTROL VALVE**  
James R. Bendell, Victoria, Australia, assignor to Motec Australia Pty Ltd., Victoria, Australia  
Filed Oct. 21, 1993, Ser. No. 14,434  
Claims priority, application Australia, Apr. 22, 1993, 1170/93  
Term of patent 14 years  
U.S. Cl. D15—5



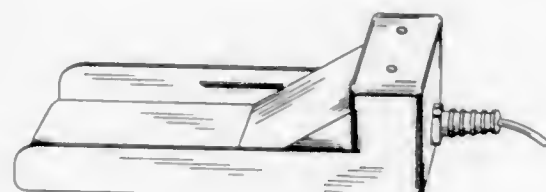
358,157

**WHEEL LOADER**  
Tadashi Kusunoki, and Kouji Masutani, both of Sakai, Japan, assignors to Kubota Ltd., Japan  
Continuation-in-part of Ser. No. 483,538, Feb. 21, 1990, abandoned. This application Dec. 3, 1992, Ser. No. 2,172  
Term of patent 14 years  
U.S. Cl. D15—25



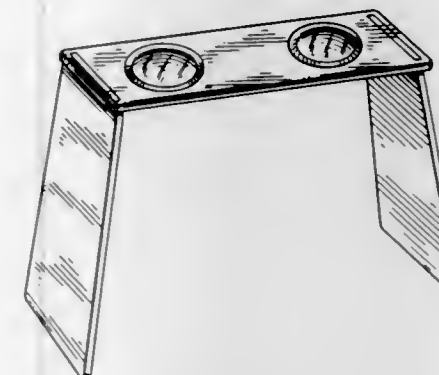
358,154

**MOUNTING BRACKET FOR MOBILE TELEPHONES**  
Björn Jondelius, Riviere, Tewkesbury Road, Cheltenham, Great Britain GL 51 9 SG  
Filed Feb. 23, 1994, Ser. No. 19,106  
Claims priority, application Sweden, Aug. 23, 1993, 931877  
Term of patent 14 years  
U.S. Cl. D14—253



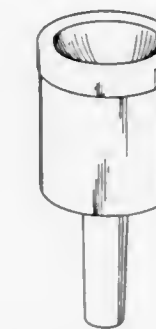
358,158

**STEREOSCOPIC VIEWER**  
Timothy H. Bush, 19 Mohawk Dr., Clarendon Hills, Ill. 60514  
Filed Nov. 1, 1993, Ser. No. 14,852  
Term of patent 14 years  
U.S. Cl. D16—222

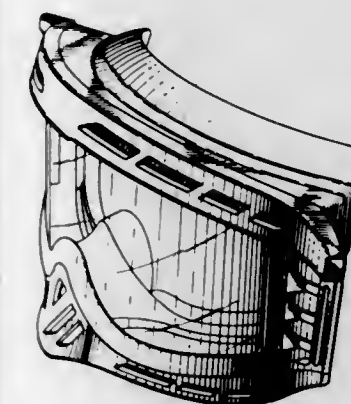


358,161

**COMBINED TONE INTENSIFIER AND MOUTHPIECE FOR BRASS MUSICAL INSTRUMENTS**  
John M. Kubala, 932 Jefferson St., N.E., Albuquerque, N. Mex. 87110-6208  
Filed Dec. 28, 1993, Ser. No. 16,839  
Term of patent 14 years  
U.S. Cl. D17—13

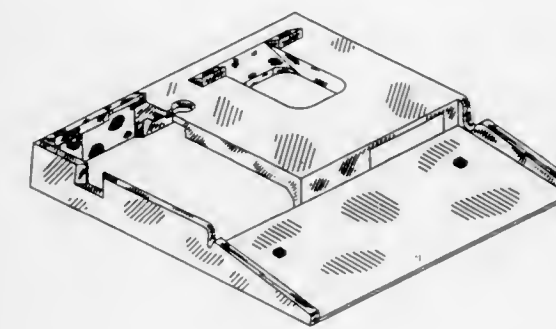
358,159  
GOGGLES

John W. Lai, San Francisco, Calif., assignor to Smith Sport Optics, Inc., Ketchum, Id.  
Filed Feb. 16, 1994, Ser. No. 18,855  
Term of patent 14 years  
U.S. Cl. D16—312



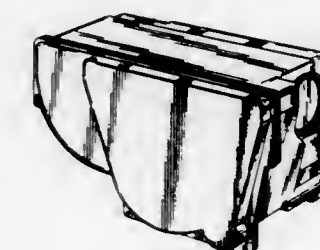
358,162

**SUPPORT SHOE FOR POINT OF SALE EQUIPMENT**  
Robin S. Buie; Bruce L. Mann, and Philip E. Stephens, all of Shelbyville, Ind., assignors to Indiana Cash Drawer Company, Inc., Shelbyville, Ind.  
Filed Jan. 15, 1993, Ser. No. 3,843  
Term of patent 14 years  
U.S. Cl. D18—4

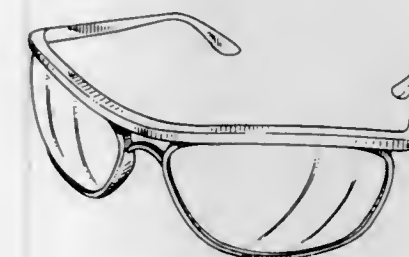


358,163

**TONER CONTAINER FOR AN ELECTRONIC COPYING MACHINE**  
Susumu Nomura, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Sep. 7, 1993, Ser. No. 12,624  
Claims priority, application Japan, Mar. 17, 1993, 5-7426  
Term of patent 14 years  
U.S. Cl. D18—43

358,160  
SUNGLASSES

Simon M. Conway, Lima, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.  
Filed Jul. 22, 1993, Ser. No. 10,988  
Term of patent 14 years  
U.S. Cl. D16—326





358,164

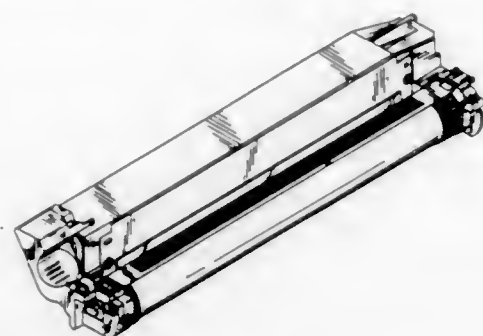
PHOTOCONDUCTOR UNIT FOR FORMING AN IMAGE  
Masahiro Hashizume, Yao; Hiroshi Ishida, Ikoma, and  
Masayuki Mizuno, Osaka, all of Japan, assignors to Mita  
Industrial Co., Ltd., Osaka, Japan

Filed Sep. 27, 1993, Ser. No. 13,525

Claims priority, application Japan, Apr. 13, 1993, 5-10980

Term of patent 14 years

U.S. Cl. D18—43



358,165

INK RIBBON CASSETTE FOR LABELING

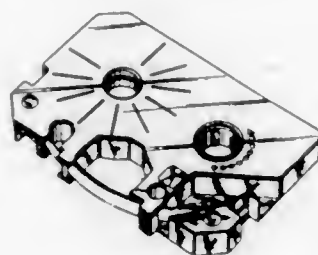
Nobutoshi Ehara, Morioka, Japan, assignor to Alps Electric Co.,  
Ltd., Tokyo, Japan

Filed Dec. 15, 1993, Ser. No. 16,501

Claims priority, application Japan, Jun. 24, 1993, 5-19038

Term of patent 14 years

U.S. Cl. D18—56



358,166

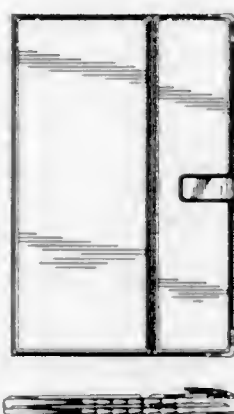
CARD HOLDER

Sidney S. Deultch, Woodbridge, Canada, assignor to Data Ac-  
cessories Corporation, Woodbridge, Canada

Filed Jun. 18, 1993, Ser. No. 9,599

Term of patent 14 years

U.S. Cl. D19—26



358,167

WRITING INSTRUMENT

Walter B. Herbst, Evanston; John D. Hartman, and Mikael R.  
Backstrom, both of Chicago, all of Ill., assignors to The  
Gillette Company, Boston, Mass.

Filed Feb. 28, 1994, Ser. No. 19,323

Term of patent 14 years

U.S. Cl. D19—48



358,168

AUTOMATIC PENCIL

Minoru Osada, Torrance, Calif., assignor to Pentel of America,  
Ltd., Torrance, Calif.

Filed Mar. 30, 1994, Ser. No. 20,713

Term of patent 14 years

U.S. Cl. D19—48



358,169

RETRACTABLE ERASER

Minoru Osada, Torrance, Calif., assignor to Pentel of America,  
Ltd., Torrance, Calif.

Filed Mar. 30, 1994, Ser. No. 20,712

Term of patent 14 years

U.S. Cl. D19—53



358,170

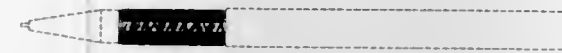
GRIP FOR A WRITING INSTRUMENT

Minoru Osada, Torrance, Calif., assignor to Pentel of America,  
Ltd., Torrance, Calif.

Filed Mar. 30, 1994, Ser. No. 20,714

Term of patent 14 years

U.S. Cl. D19—55



358,173

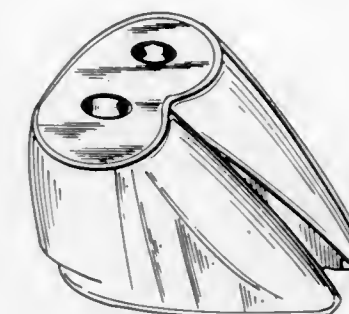
DEER HOOF PEN HOLDER

James R. Stoudt, 2378 Highway 12 SW, #96, Montrose, Minn.  
55363

Filed Mar. 22, 1994, Ser. No. 20,238

Term of patent 14 years

U.S. Cl. D19—82



358,171

ELECTRONIC EDUCATIONAL GAME HOUSING

Wai Y. Cheng, Shatin, Hong Kong, assignor to Vtech Industries,  
Inc., Wheeling, Ill.

Filed Nov. 13, 1992, Ser. No. 1,414

Term of patent 14 years

U.S. Cl. D19—60



358,174

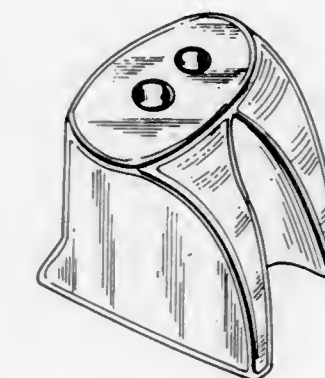
GOAT HOOF PEN HOLDER

James R. Stoudt, 2378 Highway 12 Southwest #96, Montrose,  
Minn. 55363

Filed Mar. 22, 1994, Ser. No. 20,239

Term of patent 14 years

U.S. Cl. D19—82



358,175

LABEL FOR PRICE MARKING

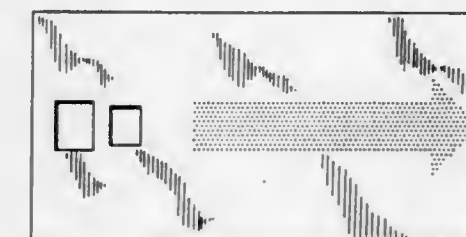
Ola Ödmark, Upsala, Sweden, assignor to Pricer Norden AB,  
Upsala, Sweden

Filed Aug. 19, 1993, Ser. No. 11,990

Claims priority, application Sweden, Feb. 22, 1993, 930449

Term of patent 14 years

U.S. Cl. D20—11



358,176

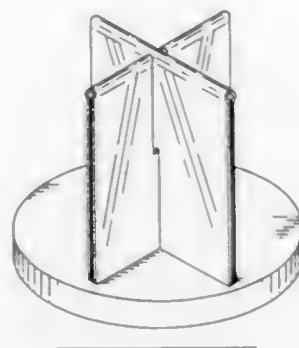
## ADVERTISING DISPLAY

Charles M. Atkinson, Arkadelphia, Ark., assignor to People You Need, Inc., Arkadelphia, Ark.

Filed Jun. 13, 1994, Ser. No. 24,344

Term of patent 14 years

U.S. Cl. D20—21



358,177

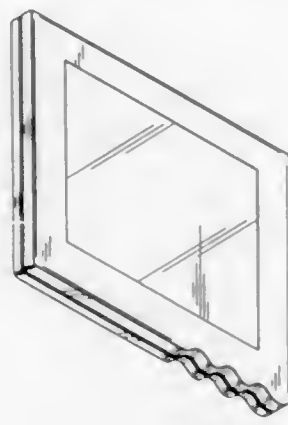
## DISPLAY PANEL

Toshitaka Imai, Sagami-hara, Japan; Karen M. MacMurtrie, Austin, Tex., and Robert E. Mora, Columbus, Ohio, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 17, 1994, Ser. No. 26,287

Term of patent 14 years

U.S. Cl. D20—42



358,178

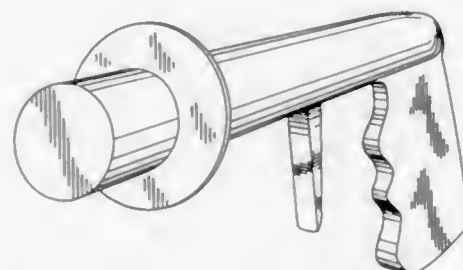
## PISTOL-GRIPPED MAGNETIC WAND FOR BINGO CHIPS

Gary O'Dell, P.O. Box 38, Rutland, Ohio 45775

Filed Jul. 6, 1993, Ser. No. 10,745

Term of patent 14 years

U.S. Cl. D21—145



358,179

## TOY CAT FIGURE

Jay M. Bro, and Philip M. Baerenwald, both of Plano, Tex., assignors to Today's Kids, Inc., Boonesville, Ark.

Filed Feb. 2, 1994, Ser. No. 18,362

Term of patent 14 years

U.S. Cl. D21—163



358,180

## REMOTE-CONTROLLED RODENT

Bill M. Gonzales, 527 E. Braddock Dr., Fresno, Calif. 93720

Filed Sep. 23, 1993, Ser. No. 13,447

Term of patent 14 years

U.S. Cl. D21—188



358,181

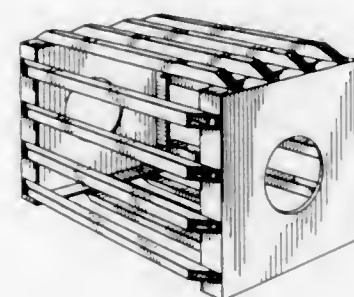
## MULTI-PIECE FRAME FOR PHYSICAL THERAPY

David C. Smith, 3717 Barrington Bridge Pl., Richmond, Va. 23233

Filed Jul. 19, 1991, Ser. No. 732,709

Term of patent 14 years

U.S. Cl. D21—191



358,182

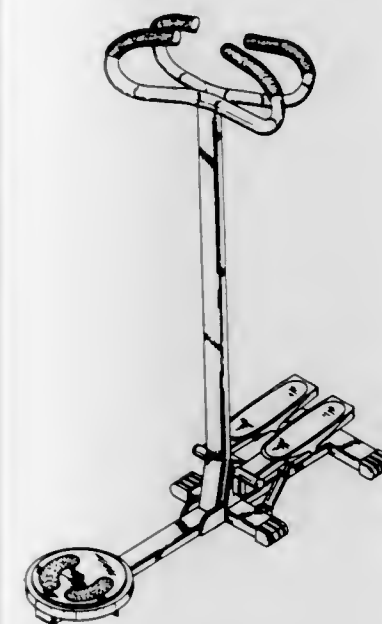
## COMBINED STEPPING AND TWISTING EXERCISER

Lien-Chuan Yang, 11F.-1, No. 149, Sec. 3, Roosevelt Rd., Taipei, Taiwan, Prov. of China

Filed Jan. 4, 1994, Ser. No. 17,083

Term of patent 14 years

U.S. Cl. D21—191



358,184

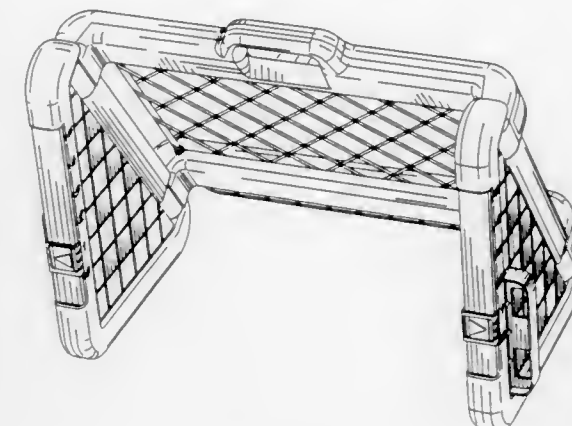
## FOLDING SOCCER AND HOCKEY GOAL

James D. Amburgey, Richardson, and Peter C. Hill, Plano, both of Tex., assignors to Today's Kids, Inc., Boonesville, Ark.

Filed Feb. 4, 1994, Ser. No. 18,386

Term of patent 14 years

U.S. Cl. D21—200



358,185

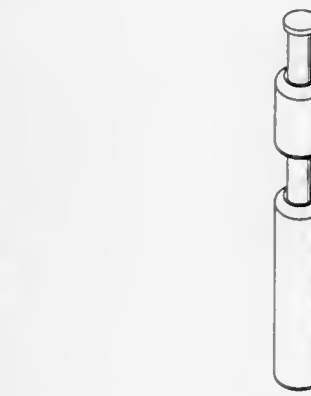
## BAT FOR PLAYING THE GAME OF BUNTBALL

Wayne A. Hope, II, 5238 Birchcrest Dr., Swartz Creek, Mich. 48473

Filed Mar. 21, 1994, Ser. No. 20,178

Term of patent 14 years

U.S. Cl. D21—211



358,183

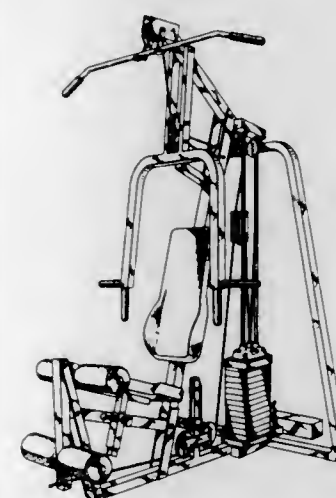
## PHYSICAL EXERCISER

Theodore G. Habing, Long Beach; Ronald S. Gibson, Valencia, and Mark Ulves, Anaheim Hills, all of Calif., assignors to Pacific Fitness Corporation, Cypress, Calif.

Filed Jun. 17, 1993, Ser. No. 9,701

Term of patent 14 years

U.S. Cl. D21—195



358,186

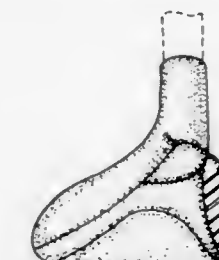
## GOLF CLUB HEAD

Steven C. Mollison, and Gary H. Barwick, both of Washington, N.C., assignors to Mollison Golf, Inc., Washington, N.C.

Filed Nov. 12, 1993, Ser. No. 15,257

Term of patent 14 years

U.S. Cl. D21—214





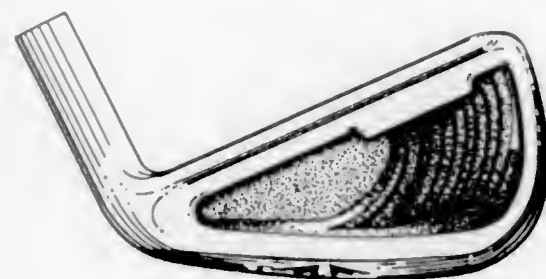
358,187

GOLF CLUB HAVING A COLLAPSIBLE SHAFT  
Michael G. Simonds, 625 S. 425 West, Tooele, Utah 84074  
Filed Apr. 30, 1993, Ser. No. 7,709  
Term of patent 14 years  
U.S. Cl. D21—217



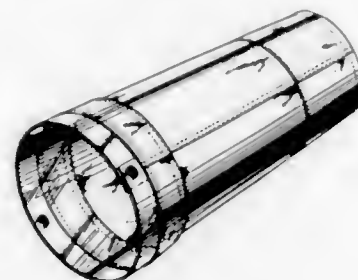
358,188

GOLF CLUB HEAD  
Frank Fenton, South Hadley, Mass., assignor to Lisco, Inc., Tampa, Fla.  
Filed Jun. 1, 1993, Ser. No. 9,006  
Term of patent 14 years  
U.S. Cl. D21—220



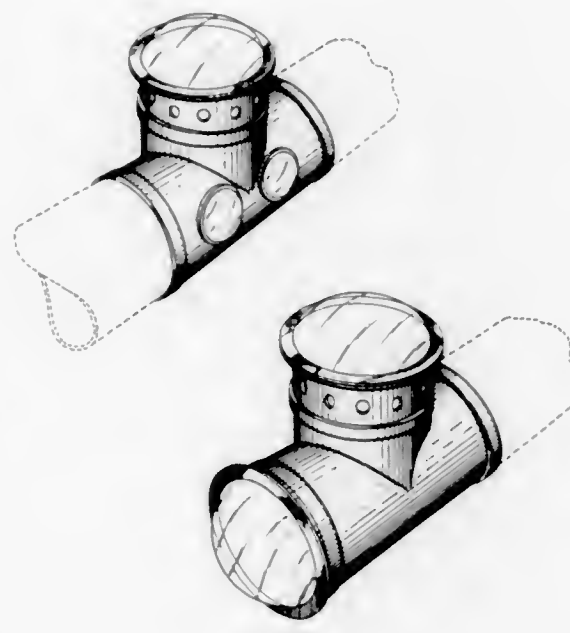
358,189

GOLF PIN MARKER  
Peter Popowicz, 180 George Craig Blvd. N.E., Calgary, Alberta, Canada T2E 7H2  
Filed Jan. 11, 1993, Ser. No. 3,613  
Term of patent 14 years  
U.S. Cl. D21—234



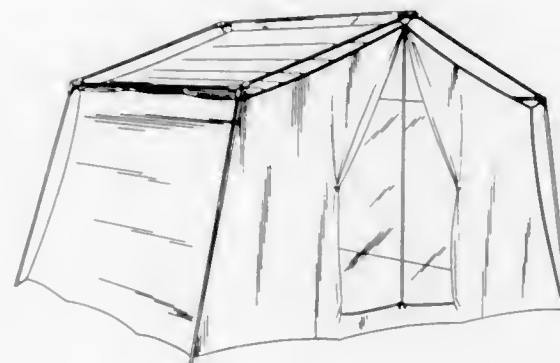
358,190

PLAY ENCLOSURE  
Grant M. Strawcutter, and Richard J. Petersheim, both of Charlotte, N.C., assignors to Discovery Zone, Inc., Chicago, Ill.  
Filed Jul. 15, 1993, Ser. No. 10,728  
Term of patent 14 years  
U.S. Cl. D21—242



358,191

TENT  
Carl J. November, 70 Beach Rd., P.O. Box 1728, W. Hampton Beach, N.Y. 11978  
Filed Nov. 9, 1993, Ser. No. 15,157  
Term of patent 14 years  
U.S. Cl. D21—253



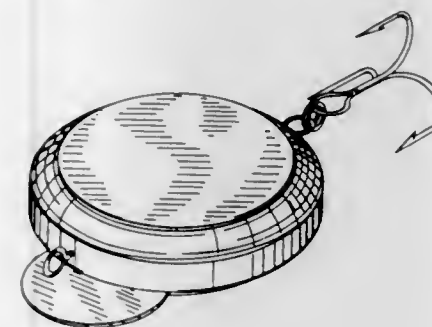
358,192

TENT STAKE  
Len Smith, 4 Guay St., Concord, N.H. 03301  
Filed Sep. 27, 1993, Ser. No. 13,536  
Term of patent 14 years  
U.S. Cl. D21—255



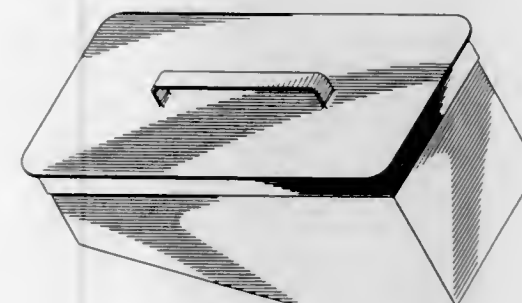
358,193

FISHING LURE  
Donald Kender, 1423 Sherman Ave., South Milwaukee, Wis. 53172  
Filed May 11, 1993, Ser. No. 8,199  
Term of patent 14 years  
U.S. Cl. D22—126



358,194

DRAINAGE RECEPTACLE ADAPTER FOR STORAGE DRUMS  
Theodore D. Schroeder, Rt. 1, Box 133, Wilbur, Wash. 99185  
Filed Oct. 7, 1993, Ser. No. 13,990  
Term of patent 14 years  
U.S. Cl. D23—202



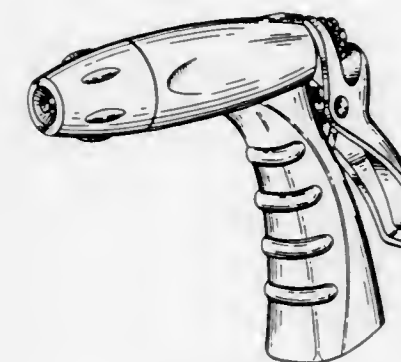
358,195

SPRINKLING GUN  
Cheng-Hsien Tsai, No. 103, Da-Ming 1st Rd., Tien-Tzu Hsiang, Taichung Hsien, Taiwan, Prov. of China  
Filed Jun. 28, 1994, Ser. No. 25,232  
Term of patent 14 years  
U.S. Cl. D23—213



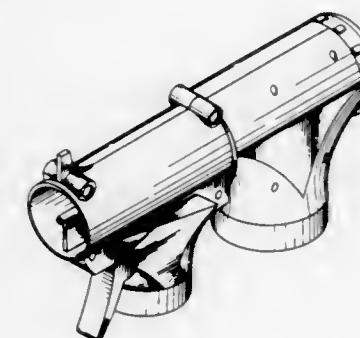
358,196

TRIGGER NOZZLE  
Lawrence G. McCain, Beverly Hills, Calif., assignor to Arcadia, San Diego, Calif.  
Filed Aug. 11, 1994, Ser. No. 27,028  
Term of patent 14 years  
U.S. Cl. D23—226



358,197

HEAD FOR AN INSECTICIDE APPLICATION APPARATUS  
Alan D. Brite, 1482 E. Valley Rd., Box 50610, Santa Barbara, Calif. 93108  
Continuation-in-part of Ser. No. 24,663, Mar. 1, 1993, Pat. No. 5,279,256. This application Jan. 18, 1994, Ser. No. 17,676  
Term of patent 14 years  
U.S. Cl. D23—225



358,198

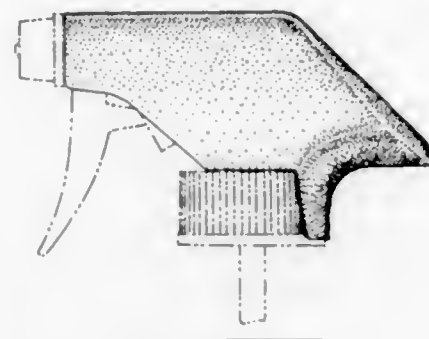
## SPRAYER SHROUD

Ronald Wadsworth, Cambria, Calif., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Aug. 24, 1994, Ser. No. 27,573

Term of patent 14 years

U.S. Cl. D23—226



358,199

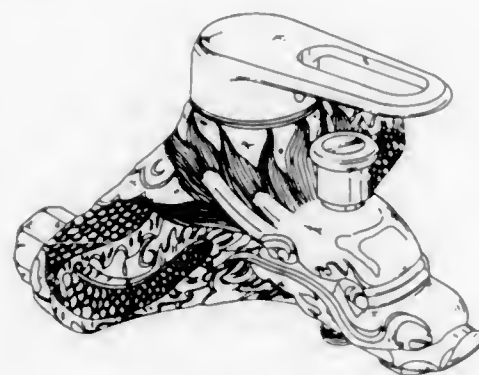
## FAUCET

Wen-Mu Wang, No. 32, Lane 266, Fu Te I Rd., Hsi Tze Chen, Taipei Hsien, Taiwan, Prov. of China

Filed Mar. 30, 1994, Ser. No. 20,673

Term of patent 14 years

U.S. Cl. D23—238



358,200

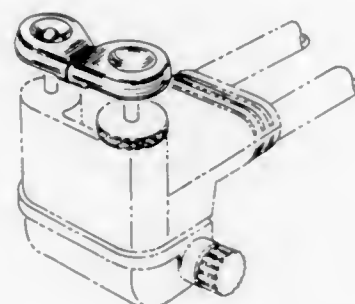
## VALVE ACTUATOR

Joseph J. Cerola, Delray Beach, Fla., assignor to American Hydro-Surgical Instruments, Inc., Delray Beach, Fla.

Continuation of Ser. No. 802,309, Dec. 4, 1991, Pat. No. 5,303,735. This application Jun. 21, 1993, Ser. No. 9,758

Term of patent 14 years

U.S. Cl. D23—252



358,201

## COMBINED TOILET AND TOILET SEAT CLEANING UNIT

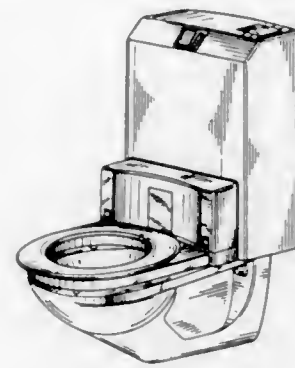
Werner Wilhelm, Oberrieden, and Ulrich Lehmann, Birmensdorf, both of Switzerland, assignors to CWS International AG, Baar, Switzerland

Filed Sep. 13, 1993, Ser. No. 12,879

Claims priority, application WIPO, Mar. 16, 1993, DM/025525

Term of patent 14 years

U.S. Cl. D23—260



358,202

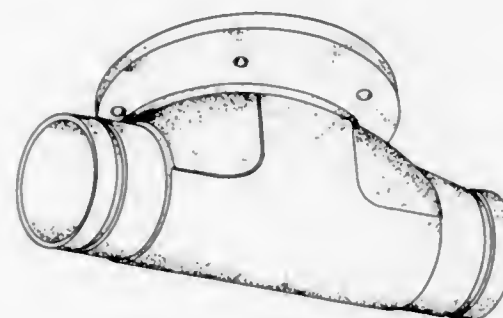
## REINFORCED STRUCTURAL TEE

David E. Sisk, 7353 Hillsborn Rd., Bonne Terre, Mo. 63628

Filed Jan. 10, 1994, Ser. No. 17,277

Term of patent 14 years

U.S. Cl. D23—263



358,203

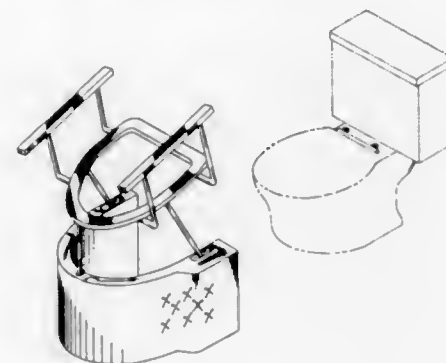
## INVALID LIFTER FOR TOILETS

Greg S. Smith, 512 Wardell St., Corning, Ark. 72422

Filed May 28, 1991, Ser. No. 705,892

Term of patent 14 years

U.S. Cl. D23—309



358,204

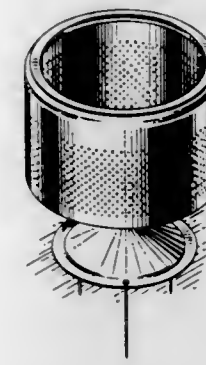
## OUTDOOR FIRE HOLDER

Lawrence A. Ferrier, 1167 Highway 7 North, Tonasket, Wash. 98855

Filed Jan. 7, 1994, Ser. No. 17,227

Term of patent 14 years

U.S. Cl. D23—314



358,205

## GRILL FOR A VENT

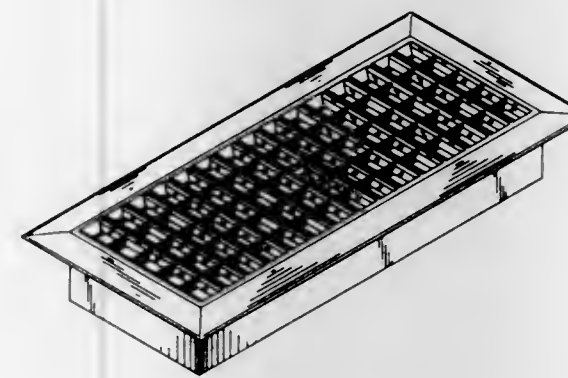
John Ruhland, Cumberland, Canada, assignor to Ottawa Mould Craft Ltd., Canada

Filed Aug. 27, 1993, Ser. No. 12,260

Claims priority, application Canada, Mar. 1, 1993, 01-03-93-1

Term of patent 14 years

U.S. Cl. D23—393



358,206

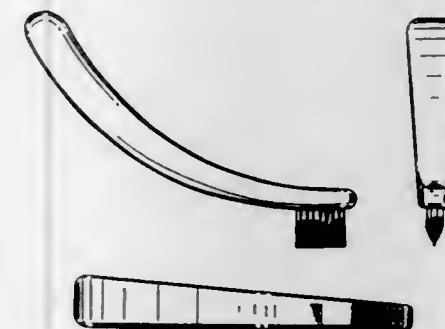
## CANINE TOOTHBRUSH

Lee Smith, 7040 W. Palmetto Park Rd., Boca Raton, Fla. 33433

Filed Jul. 9, 1993, Ser. No. 10,535

Term of patent 14 years

U.S. Cl. D4—104



358,207

## SANITARY NAPKIN

Frank Glaug, Spotswood, N.J., assignor to Johnson & Johnson Inc., Montreal, Canada

Continuation of Ser. No. 561,482, Aug. 2, 1990, which is a continuation of Ser. No. 242,270, Sep. 12, 1988. This application Mar. 2, 1992, Ser. No. 845,748

Term of patent 14 years

U.S. Cl. D24—125



358,208

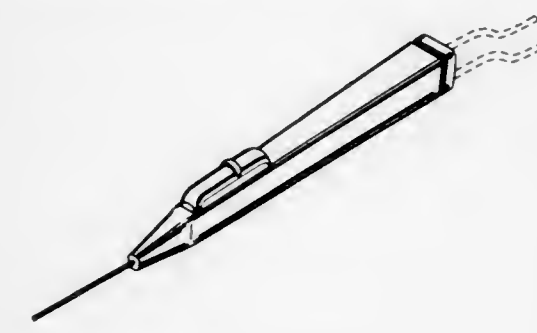
## MEDICAL LASER HANDPIECE

Gregg D. Niven, Salt Lake City, Utah, assignor to William H. McMahan, Robertson, Wyo.

Filed Mar. 23, 1993, Ser. No. 6,076

Term of patent 14 years

U.S. Cl. D24—133



358,209

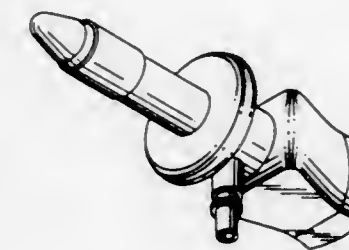
## DISPOSABLE SURGICAL TROCAR

Haans K. Petruschke, Kirtland, and Scott C. Marlow, Chesterland, both of Ohio, assignors to Marlow Surgical Technologies, Inc., Willoughby, Ohio

Filed Nov. 30, 1992, Ser. No. 2,133

Term of patent 14 years

U.S. Cl. D24—146





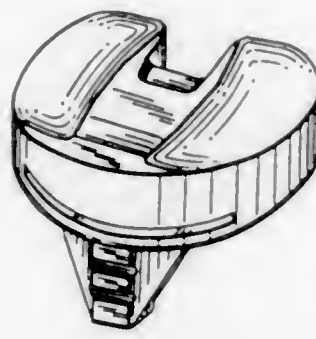
### 358,210 EARRING STUD GUN ADAPTOR

Vladimir Reil, 30524 Ganado Dr., Palos Verdes, Calif. 90274  
Filed Oct. 4, 1993, Ser. No. 13,863  
Term of patent 14 years  
U.S. Cl. D24—146



### 358,211 UNITARY TIBIAL COMPONENT FOR PROSTHETIC KNEE IMPLANT

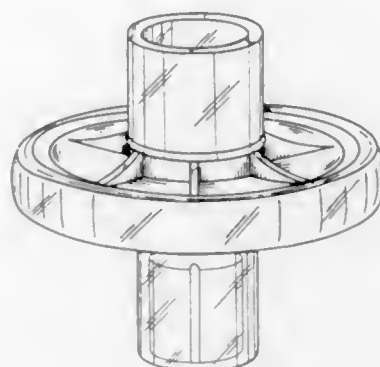
Robert C. Cohen, Rockaway Township, Morris County, N.J.,  
assignor to Osteonics Corp., Allendale, N.J.  
Filed Feb. 28, 1992, Ser. No. 844,823  
Term of patent 14 years  
U.S. Cl. D24—155



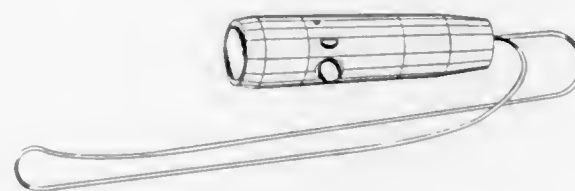
358,212  
DENTAL POST  
Jerry F. Sullivan, Ridgewood, N.J., assignor to Coltene/Whaledent, Inc., Mahwah, N.J.  
Filed Oct. 13, 1993, Ser. No. 14,123  
Term of patent 14 years  
U.S. Cl. D24—156



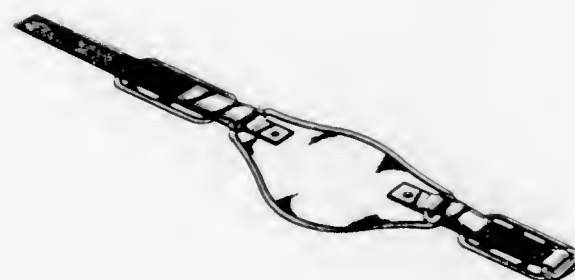
358,213  
MEDICAL FILTER  
Robert Sutton, Willoughby, and Brian Whitehead, Clayton, both of Australia, assignors to Medical Manufacturers Pty Limited, New South Wales, Australia  
Filed Aug. 14, 1992, Ser. No. 930,209  
Claims priority, application Australia, Feb. 14, 1992, 349/92  
Term of patent 14 years  
U.S. Cl. D24—162



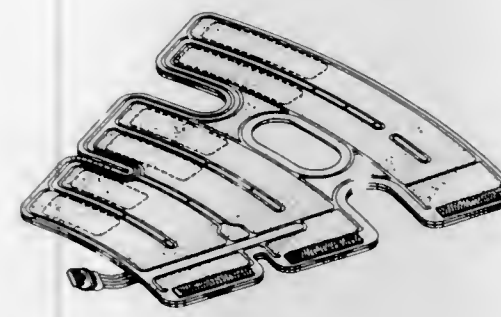
358,214  
COMBINED ELECTRONIC ARTIFICIAL LARYNX AND NECK CORD  
Eugene J. Breski, 10688 Executive Dr., Boise, Id. 83704  
Filed Sep. 7, 1993, Ser. No. 12,693  
Term of patent 14 years  
U.S. Cl. D24—175



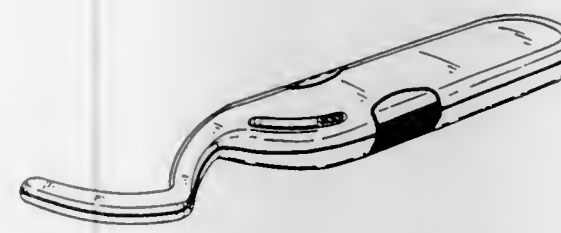
358,215  
BACK SUPPORT  
Helen Reed, 21 Parkes Drive, Ajax, ONT L1S 4W4, Canada  
Filed Feb. 24, 1994, Ser. No. 19,168  
Term of patent 14 years  
U.S. Cl. D24—190



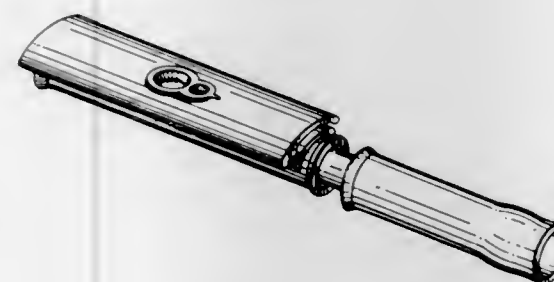
358,216  
SLEEVE FOR APPLYING COMPRESSIVE PRESSURE TO THE LEG  
John F. Dye, Bridgewater, Mass., assignor to The Kendall Company, Mansfield, Mass.  
Filed Sep. 16, 1993, Ser. No. 13,026  
Term of patent 14 years  
U.S. Cl. D24—206



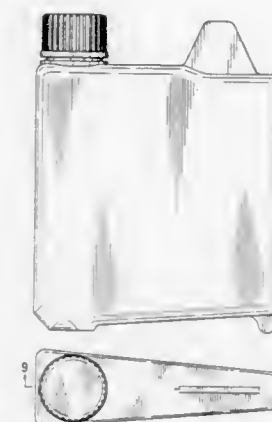
358,217  
MASSAGER  
Ram Shalvi, Hong Kong, Hong Kong, assignor to Solar Wide Industrial Ltd., New Territories, Hong Kong  
Filed Jun. 29, 1993, Ser. No. 10,179  
Claims priority, application United Kingdom, Jan. 4, 1993, 2028132  
Term of patent 14 years  
U.S. Cl. D24—215



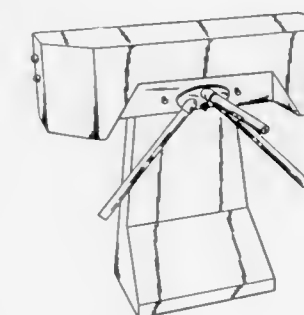
358,218  
COMBINED PREGNANCY TESTING STICK AND END CAP  
Theodorus J. J. Groothuizen, and Jozef H. M. Raijmakers, both of Rotterdam, Netherlands, assignors to Chefaro International B.V., Rotterdam, Netherlands  
Filed Dec. 1, 1993, Ser. No. 15,890  
Claims priority, application Netherlands, Jun. 3, 1993, 68774-01/04  
Term of patent 14 years  
U.S. Cl. D24—223



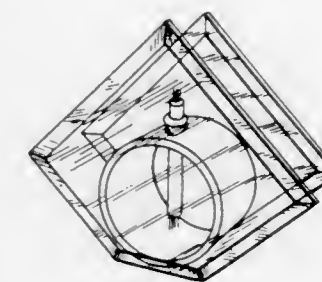
358,219  
REAGENT CONTAINER FOR A CHEMICAL ANALYZER  
Masao Ushikubo, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
Division of Ser. No. 612, Oct. 20, 1992, Pat. No. Des. 353,464.  
This application Mar. 16, 1994, Ser. No. 20,073  
Claims priority, application Japan, Apr. 22, 1992, 4-12030; Apr. 22, 1992, 4-12032  
Term of patent 14 years  
U.S. Cl. D24—224



358,220  
TURNSTILE  
Marco O. Detassis, Trento, Italy, assignor to Italdis Industria S.p.A., Lavis, Italy  
Filed May 14, 1993, Ser. No. 8,409  
Term of patent 14 years  
U.S. Cl. D25—51



358,221  
OIL LAMP  
David R. Perkins, Manchester, Mass., assignor to Glass Dimensions, Inc., Essex, Mass.  
Filed Feb. 16, 1993, Ser. No. 4,823  
Term of patent 14 years  
U.S. Cl. D26—11



358,222

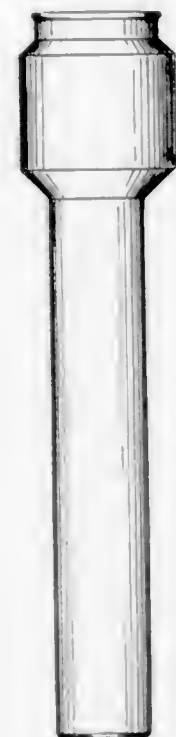
## DISPOSABLE FUEL CELL FOR A LIQUID CANDLE

Richard J. Kane, Middlesex, N.J., assignor to Standex International Corporation, Salem, N.H.

Filed Mar. 17, 1992, Ser. No. 854,919

Term of patent 14 years

U.S. Cl. D26—23



358,224

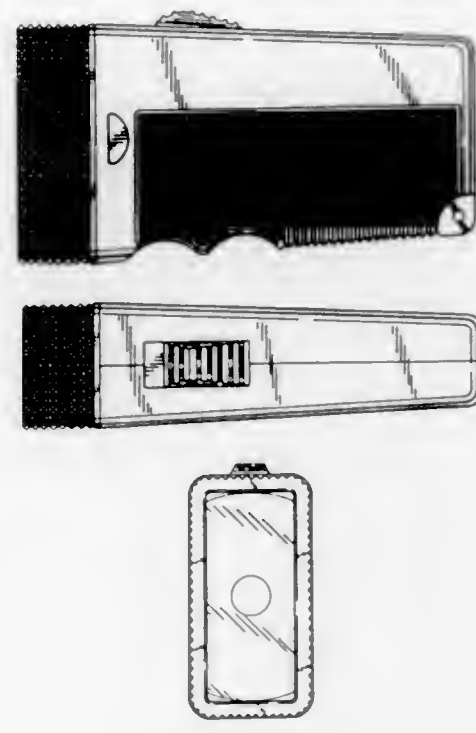
## FLASHLIGHT

Bruce Burns, Portland, Oreg., assignor to Burns Bros., Inc., Portland, Oreg.

Filed Nov. 2, 1993, Ser. No. 14,774

Term of patent 14 years

U.S. Cl. D26—46



358,223

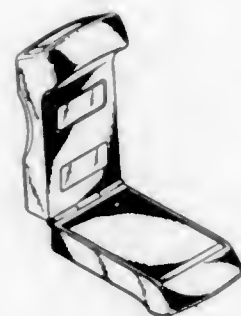
## TRAVEL NIGHT LIGHT

Allen J. Ferrell, Denver, Colo., and Allan C. Branch, Cambridge, Australia, assignors to Samsonite Corporation, Denver, Colo.

Filed Nov. 3, 1993, Ser. No. 14,929

Term of patent 14 years

U.S. Cl. D26—37



358,225

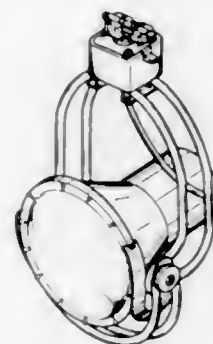
## ADJUSTABLE TRACKLIGHT

Shan C. Lin, No. 2, Lane 111, Ta Chu Road, Lu Chu Hsiang, Taoyuan Hsien, Taiwan, Prov. of China

Filed Jun. 13, 1994, Ser. No. 24,350

Term of patent 14 years

U.S. Cl. D26—63



358,226

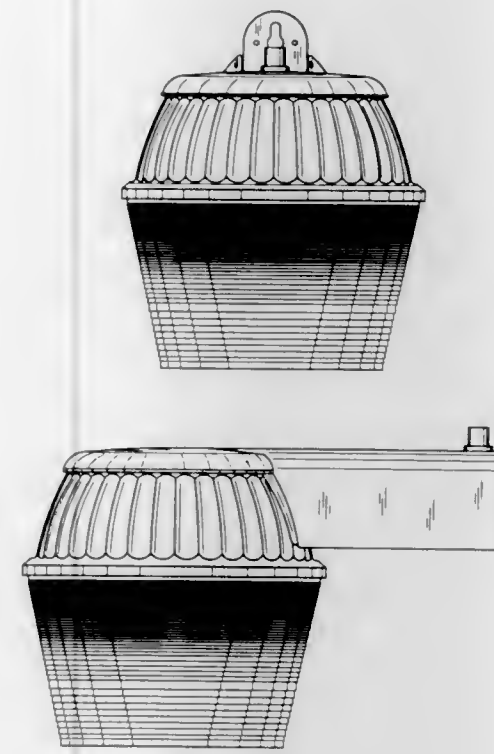
## EXTERIOR LUMINAIRE

Mitchell M. Osteen, Zirconia, and Suleyman O. Sumer, Chapel Hill, both of N.C., assignors to Regent Lighting Corporation, Burlington, N.C.

Filed Jul. 7, 1994, Ser. No. 25,623

Term of patent 14 years

U.S. Cl. D26—71



358,228

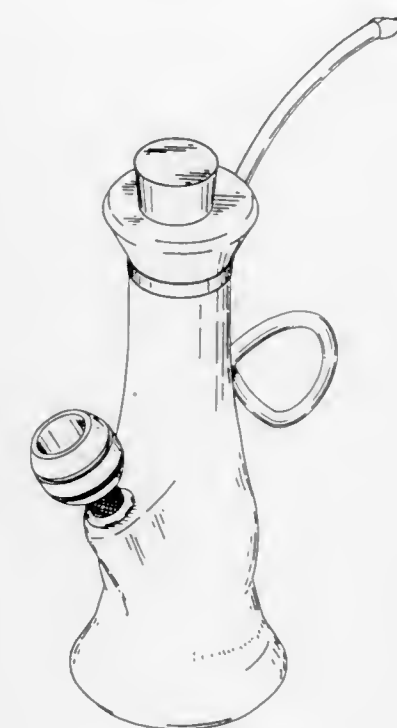
## TOBACCO HOOKAH

Randolph A. Heine, Pinellas Park, Fla., assignor to New Tradition Pipe Company, Pinellas Park, Fla.

Filed Jun. 28, 1994, Ser. No. 25,240

Term of patent 14 years

U.S. Cl. D27—162



358,227

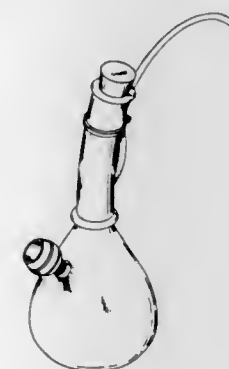
## TOBACCO HOOKAH

Randolph A. Heine, Pinellas Park, Fla., assignor to New Tradition Pipe Company, Pinellas Park, Fla.

Filed May 18, 1994, Ser. No. 23,117

Term of patent 14 years

U.S. Cl. D27—162



358,229

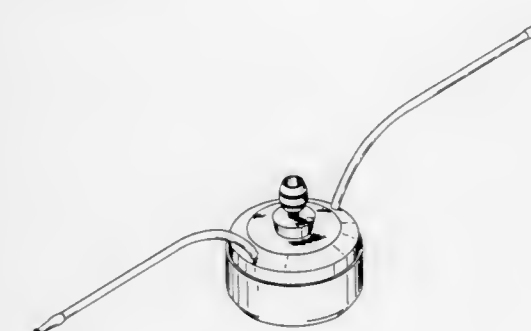
## TOBACCO HOOKAH

Randolph A. Heine, Pinellas Park, Fla., assignor to New Tradition Pipe Company, Pinellas Park, Fla.

Filed Jun. 28, 1994, Ser. No. 25,242

Term of patent 14 years

U.S. Cl. D27—162





358,230

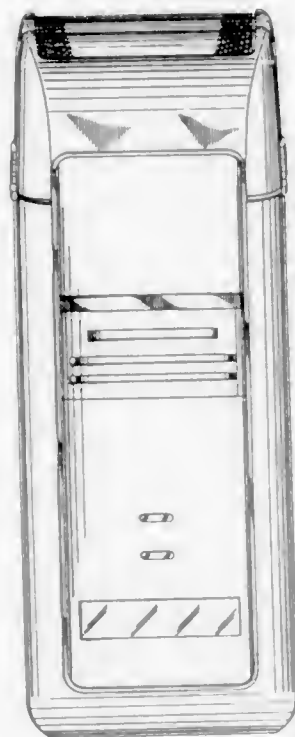
**ELECTRIC SHAVER**

Joseph M. Sulik, Bridgeport, and Robert A. Mockovak, Newtown, both of Conn., assignors to Remington Products Company, Bridgeport, Conn.

Filed Jul. 12, 1993, Ser. No. 10,573

Term of patent 14 years

U.S. Cl. D28—49



358,232

**GOALTENDER'S MASK FOR ICE HOCKEY**

T. Blaine Hoshizaki, Montreal West; René Bourque, Laval, and Jacques Durocher, St. Jerome, all of Canada, assignors to Canstar Sports Group Inc., Ville Mont Royal, Canada

Filed Dec. 3, 1993, Ser. No. 15,963

Term of patent 14 years

U.S. Cl. D29—106



358,233

**WALL-MOUNTED ANIMAL FEEDING LEDGE WITH BOWL PORTS AND POP-UP HOUSING FOR A CAN OPENER**

Douglas R. Weaver, 20 Glendell Ter., Springfield, Mass. 01108

Filed Dec. 27, 1993, Ser. No. 16,813

Term of patent 14 years

U.S. Cl. D30—133



358,231

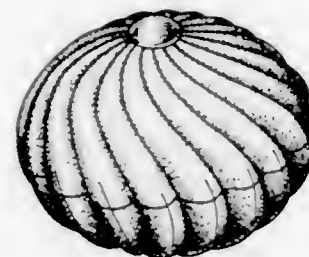
**COSMETIC POWDER CASE**

Celia Liu, 1F, No. 12, Lane 180, Sec. 2, Fu-Hsing S. Rd., Taipei City, Taiwan, Prov. of China

Filed Mar. 5, 1993, Ser. No. 5,449

Term of patent 14 years

U.S. Cl. D28—82



358,234

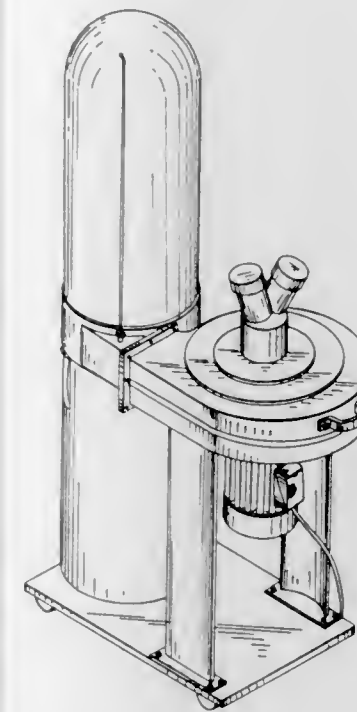
**DUST COLLECTOR**

Kun-Yih Lin, Taichung, , assignor to Chang Tjer Industrial Co., Ltd., Taichung,

Filed Jan. 13, 1993, Ser. No. 3,667

Term of patent 14 years

U.S. Cl. D32—1



358,236

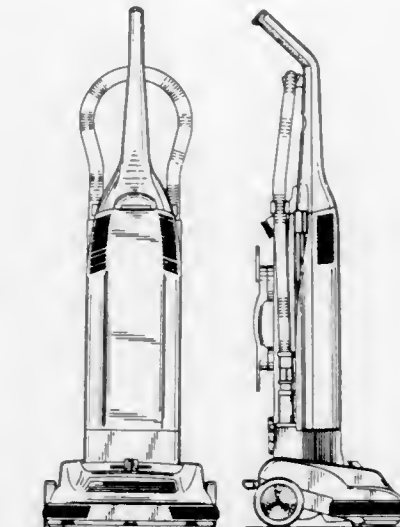
**VACUUM CLEANER**

James J. Kopco, Mentor-on-the-Lake; Craig M. Saunders, Rocky River; Richard C. Farone, Wickliffe; Jeffrey J. Malish, Willoughby, and Michael E. Ksiezyk, Garfield Height, all of Ohio, assignors to Royal Appliance Mfg. Co., Cleveland, Ohio

Filed Jan. 8, 1993, Ser. No. 3,482

Term of patent 14 years

U.S. Cl. D32—22



358,237

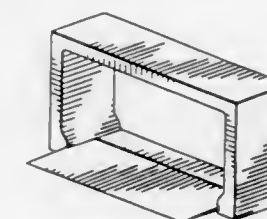
**AUTOMOTIVE ADHESIVE EMBLEM REMOVER**

Dennis Kasprzak, 25311 Loretta, Warren, Mich. 48091

Filed Oct. 29, 1991, Ser. No. 784,814

Term of patent 14 years

U.S. Cl. D32—46



358,235

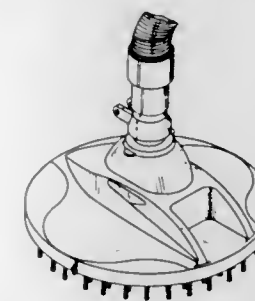
**AUTOMATIC SWIMMING POOL CLEANER**

Gary L. Brooks, Lake Geneva, Wis., and Christopher S. Labak, Chicago, Ill., assignors to Sta-Rite Industries, Inc., Dalavan, Wis.

Filed Nov. 3, 1993, Ser. No. 15,003

Term of patent 14 years

U.S. Cl. D32—1



358,238

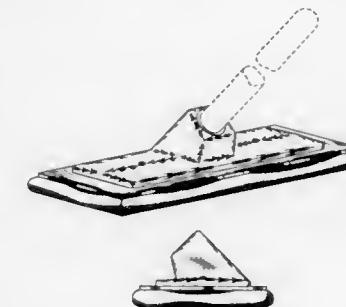
**MOP**

Cynthia J. Barnett, 245 Mt. Hermon Rd.-Ste. 324, Scotts Valley, Calif. 95066

Filed Jun. 11, 1993, Ser. No. 9,402

Term of patent 14 years

U.S. Cl. D32—50



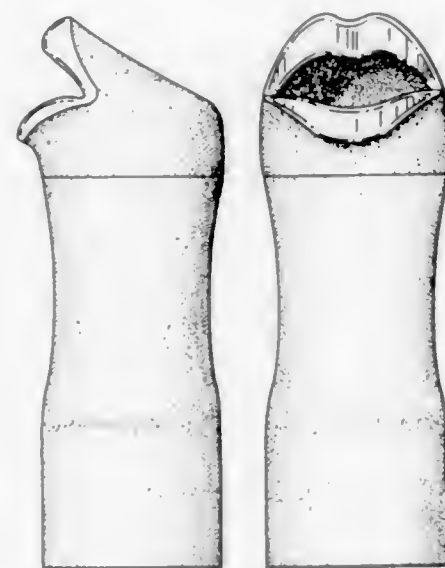
358,239  
TRASH BIN

David A. S. Abram, Ayshire, Scotland, assignor to John W. Hannay & Company Ltd., East Kilbride, United Kingdom  
Filed Mar. 8, 1994, Ser. No. 19,665

Claims priority, application United Kingdom, Sep. 8, 1993, 2033612

Term of patent 14 years

U.S. Cl. D34—1

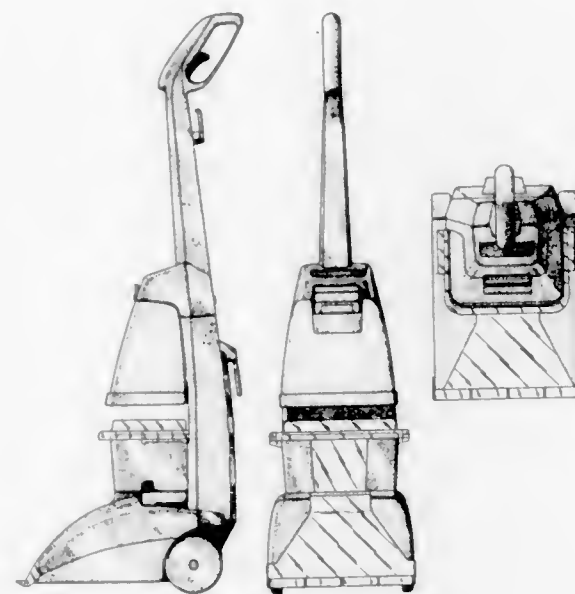
358,241  
CARPET EXTRACTOR

Sidney H. Bradd, Solon, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Feb. 5, 1993, Ser. No. 5,972

Term of patent 14 years

U.S. Cl. D32—22

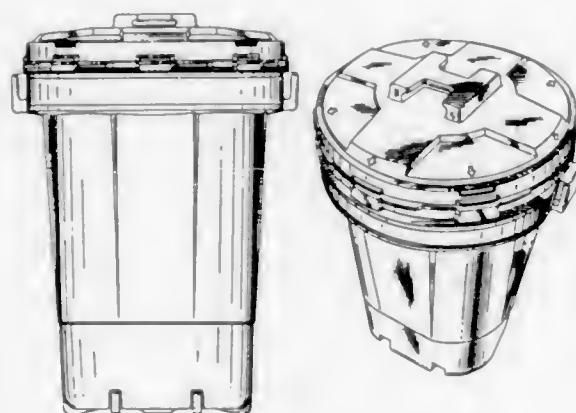
358,240  
BIOHAZARDOUS WASTE CONTAINER

Donald J. Mosior, Lake Geneva, Wis., assignor to Sage Products, Inc., Crystal Lake, Ill.

Filed Jul. 8, 1993, Ser. No. 10,474

Term of patent 14 years

U.S. Cl. D34—7

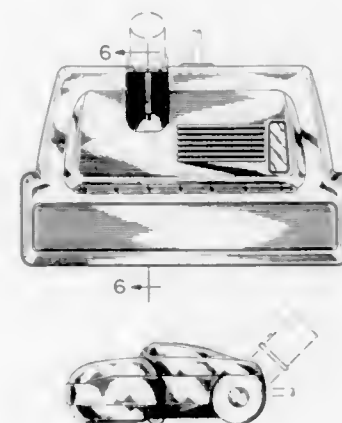
358,242  
VACUUM CLEANER NOZZLE

Darwin T. McKnight, Louisville, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Mar. 15, 1993, Ser. No. 5,893

Term of patent 14 years

U.S. Cl. D32—32

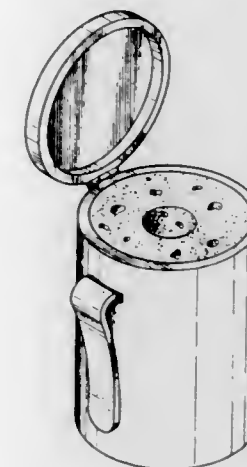
358,243  
BABY PACIFIER AND BOTTLE NIPPLE CLEANER

Diane R. Ferguson, 1116 Bismarck La., Alameda, Calif. 94501

Filed May 12, 1993, Ser. No. 8,220

Term of patent 14 years

U.S. Cl. D32—43

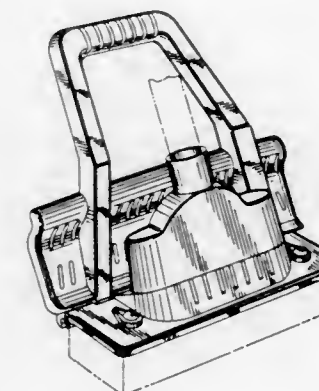
358,244  
SPONGE MOP WITH COMPOSITE CURVED WRINGER PLATE

Rainer B. Teufel, Columbus; Paul R. Burger, Milford; Diana W. Juratovac, and Thomas J. Ward, both of Columbus, all of Ohio, assignors to Vining Industries, Inc., Springfield, Ohio

Filed Jul. 20, 1993, Ser. No. 10,853

Term of patent 14 years

U.S. Cl. D32—44





## LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF MAY, 1995

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

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M.; Malinowski, Paul A.; Meritt, Allan S.; Oakes, Kenneth J.; Rathjen, John C., Jr.; Sachs, Martin W.; Stucki, David E.; and Wyman, Leslie W., to International Business Machines Corporation. Method and means for sharing I/O resources by a plurality of operating systems. 5,414,851, Cl. 395-650.000.

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Waite, Donald T.; and Banner, James A., 5,413,003, Cl. 73-170.180.

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Cannondale Corporation: See—  
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Amemiya, Koji; Suzuki, Akio; Takeuchi, Tatsuo; Fukushima, Hisashi; Hasegawa, Takashi; Moriguchi, Haruhiko; Saito, Rie; Ogata, Takao; and Sasanuma, Nobuatsu, 5,414,531, Cl. 358-465.000.

Fujii, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.

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Ito, Hiroyasu, 5,414,525, Cl. 358-426.000.

Kadowaki, Shuichi; and Takahashi, Koji, 5,414,457, Cl. 348-14.000.

Kadowaki, Toshihiro, 5,414,539, Cl. 358-529.000.

Kawagishi, Hideyuki; Enomoto, Takashi; and Iwamoto, Hirofumi, 5,414,542, Cl. 359-48.000.

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Watanabe, Nobuo; Okunuki, Masahiko; and Tsukamoto, Takeo, 5,414,272, Cl. 257-10.000.

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Yamagata, Shigeo, 5,414,572, Cl. 360-75.000.

Yamashita, Masataka; Terada, Masahiro; Mori, Shousei; and Katagiri, Kazuharu, 5,413,735, Cl. 252-299.610.

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Obara, Robert Z., 5,413,508, Cl. 439-729.000.

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Ramsey, Christopher P., 5,413,244, Cl. 220-671.000.

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Carter, Thomas M.; Coleman, Charles R.; Criss, Russell C.; Gillery, Frank H.; Martino, Pamela L.; Roginski, Amy M.; Winter, John A.; Wolfe, Terry L.; and Finley, James J., to PPG Industries, Inc. Electrically heatable transparency. 5,414,240, Cl. 219-203.000.

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Iliff, Robert J.; Mitchell, James D.; Carty, Daniel T.; Latham, James R.; and Kong, Stephen B., 5,412,958, Cl. 68-5.00C.

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Catallo, Frank. Apparatus for finishing a fabric web. 5,412,853, Cl. 26-18.600.

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Nakamura, Ichiro; Yamazaki, Seiji; Takahashi, Osamu; Arai, Hiroaki; and Hamaguchi, Shigeo, 5,413,865, Cl. 428-432.000.

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Heminger, David V.; Dorr, David; Berry, Michael E.; Chadwick, Dennis; Martin, Christopher C.; and Hailey, George, 5,413,441, Cl. 411-55.000.

Chaikin, Clarice M. Artificial Christmas tree. 5,413,825, Cl. 428-18.000.

Challa, Nagesh, to Nexcom Technology, Inc. Electrically erasable programmable read-only memory array. 5,414,658, Cl. 365-185.000.

Challener, William A., IV, to Minnesota Mining and Manufacturing Company. Magneto-optic recording medium having two recording layers, and drive for same. 5,414,678, Cl. 369-13.000.

Chalutz, Edo: See—  
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Chan, Edward K. C., to E-Systems, Inc. Device and method for shielding an electrically conductive cable from electromagnetic interference. 5,414,211, Cl. 174-36.000.

Chan, Gilbert Y.; and Preston, Kenneth G., to Aerojet-General Corporation. Method for the manufacture of a three-mirror optical system and the optical system resulting therefrom. 5,414,555, Cl. 359-366.000.

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Minder, Ernst; and Hofherr, Walther, 5,413,860, Cl. 428-411.100.  
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Collins, Eric H. Plastic cradle pallet for loading, storing and transporting heavy steel or other metal coils in a vertical position. 5,413,054, Cl. 108-55.300.  
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Continental White Cap, Inc.: See—  
Hekal, thab; Iler, Howard D.; Kiss, Bradley C.; and Bialka, Daniel P., 5,413,234, Cl. 215-230.000.  
Conway, David H. Airport lighting unit. 5,414,603, Cl. 362-153.100.  
Cook, Bruce R., to Exxon Research and Engineering Company. Increased production of alkyl naphthalenes from reforming. 5,414,175, Cl. 585-467.000.  
Cook, James D.; Drabowicz, Albert W.; Maurer, D. Joseph; Plagens, Mark R.; Sridhar, Uppili; and Stewart, Carl E. Offset pressure sensor. 5,412,994, Cl. 73-756.000.  
Cook, John E.; and Everingham, Gary M., to Siemens Electric Limited. Canister purge system having improved purge valve. 5,413,082, Cl. 123-520.000.  
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Costantini, Michel; and Laucher, Dominique, to Rhone-Poulenc Chimie. Hydroxylation of phenolic compounds. 5,414,153, Cl. 568-771.000.

Costantini, Michel; Manaut, Daniel; and Michelet, Daniel, to Rhone-Poulenc Chimie. Preparation of o-dihydroxylated aromatic compounds via oxidation of o-fuchsones. 5,414,155, Cl. 568-771.000.

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Couch, Richard W., Jr.; Sanders, Nicholas A.; Lu, Zhipeng; and Luo, Lifeng, to Hypertherm, Inc. Process for high quality plasma arc cutting of stainless steel and aluminum. 5,414,236, Cl. 219-121.390.

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Crain, Emmett W. Wind driven fish bait bobber and fishing reel. 5,412,898, Cl. 43-19.200.

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Cruse, Richard; Szalai, Veronika; Clark, Terence; Rohman, Stephen; and Mininni, Robert, to Enichem S.p.A. CVD of silicon-based ce-

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Cumming, William J.; Gaudiana, Russell A.; Ingwall, Richard T.; Kolb, Eric S.; Mehta, Parag G.; and Minns, Richard A., to Polaroid Corporation. Electroluminescent polymers, processes for their use, and electroluminescent devices containing these polymers. 5,414,069, Cl. 528-310.000.

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Daiel Chemical Industries, Ltd.: See—  
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Dainippon Ink and Chemicals, Inc.: See—  
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Daniel, William H., to LCD, Inc. Propulsion device having circular array of inclined airfoil elements with radially-inwardly directed vacuum-inducing surfaces. 5,413,464, Cl. 416-182.000.

Daniel, William H., to LCD, Inc. Propulsion device having circular array of inclined airfoil elements with radially-outwardly directed vacuum-inducing surfaces. 5,413,465, Cl. 416-182.000.

Daniels, Harold F.; and Williams, David M., to Fluor Corporation. Self-aligning beam joint suited for use in modular construction. 5,412,913, Cl. 52-79.130.

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Darbee, Paul V., to Universal Electronics Inc. Remote control system. 5,414,761, Cl. 379-102.000.

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Gris, Jean-Paul; and Dupraz, Jean-Pierre, 5,414,400, Cl. 336-174.000.

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Parulski, Kenneth A.; and Funston, David L., 5,414,811, Cl. 395-162.000.  
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Siriani, John F., 5,413,220, Cl. 206-395.000.  
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Filion, Scott M.; Marshall, Mary K.; and Rafferty, Scott E., to Davidson Texton Inc. Driver's side air bag cover door incorporating a horn actuator. 5,413,376, Cl. 280-728.300.

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Filippakis, John. Scrolling display sign for vehicles. 5,412,892, Cl. 40-471.000.

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Field, Thomas T.: See—  
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Filion, Scott M.; Marshall, Mary K.; and Rafferty, Scott E., to Davidson Texton Inc. Driver's side air bag cover door incorporating a horn actuator. 5,413,376, Cl. 280-728.300.

Filip, Michael J.; Karunungan, Kathy L.; Kramer, Jeffrey C.; Lee, Lucille C.; Moore, Danielle L.; Shih, Charles C.; and Sydir, Jaroslaw J., to International Business Machines Corporation. System for using object-oriented hierarchical representation to implement a configuration database for a layered computer network communications subsystem. 5,414,812, Cl. 395-200.000.

Filippakis, John. Scrolling display sign for vehicles. 5,412,892, Cl. 40-471.000.

Filippi, Aldo, to Roltra Morse S.p.A. Vehicle sun roof fastening device. 5,413,390, Cl. 292-96.000.

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Kobayashi, Yuji, 5,414,536, Cl. 358-504.000.  
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Ema, Taiji, 5,414,636, Cl. 364-488.000.  
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Ishikuri, Hiroaki; and Yamamoto, Shigenobu, 5,414,759, Cl. 379-88.000.  
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Fukuda, Haruhiko: See—  
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Oonuki, Kazuo; Hiraoka, Teruyoshi; Nagahama, Hiroshi; Fukuda, Kazuhisa; Nobumoto, Akira; Isono, Takahiro; Yamada, Atsumi; and Gofuku, Hiroki, 5,413,623, Cl. 75-508.000.  
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Fukushima, Ryosuke: See—  
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Fuller, Glen C.; and Halpin, Martin J., to Figgie International Inc. Method of electrical discharge machining for manufacture of bellville springs. 5,414,233, Cl. 219-69.170.  
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Funk, Guido: See—  
Lux, Martin; Funk, Guido; Saive, Roland; Goertz, Hans-Helmut; and Konrad, Rainer, 5,414,064, Cl. 526-215.000.  
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Furlan, Eddy, to Thomson-CSF. Electronic unit formed by two boards joined by assembling means. 5,414,593, Cl. 361-784.000.  
Furlong, Gregory R.: See—  
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tus for measuring the shape of glossy objects. 5,414,517, Cl. 356-376.000.  
Furuhata, Takashi: See—  
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Ohta, Toshihiko; Shigematsu, Takashi; Shimizu, Takeo; and Nakamura, Shiro, 5,414,786, Cl. 385-63.000.  
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Furukawa, Satoshi, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus. 5,414,500, Cl. 355-261.000.  
Furuyama, Masaru, to Yamakyu Chain Kabushiki Kaisha. Bushed chain with roller fitted on outside diameter of oil-impregnated sintered bushing. 5,412,934, Cl. 59-78.000.  
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Luria, David, 5,413,292, Cl. 244-118.100.  
Fyson, John R., to Eastman Kodak Company. Oscillating drum for an apparatus for processing photographic materials. 5,414,485, Cl. 354-328.000.  
G. D. Searle & Co.: See—  
Hanson, Gunnar J.; and Manning, Robert E., 5,413,998, Cl. 514-211.000.  
Hanson, Gunnar J.; and Baran, John S., 5,414,012, Cl. 514-416.000.  
Hanson, Gunnar J., 5,414,018, Cl. 514-618.000.  
Gaertner, Kendrick S.: See—  
Smith, Lee A., 5,412,817, Cl. 4-578.100.  
Gaetano, Ralph R., to Think, Inc. Apparatus for mounting film negatives. 5,413,665, Cl. 156-514.000.  
Gaffney, John M.: See—  
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Gagnon, Hubert: See—  
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Gagnon, Louis J.: See—  
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Gaiselmann, Thomas: See—  
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Gal, Alex: See—  
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Galbraith, Robert E.: See—  
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Tredrow, Kerry D.; Larsen, Robert E.; Rajguru, Chaitanya S.; Galindo, Cesar; Jayanifard, Jahanshir J.; and Taub, Mase J., 5,414,669, Cl. 365-226.000.  
Gallagher, John J.; and Urkowitz, Harry, to Martin Marietta Corp. Radar system with pulse compression and range sidelobe suppression preceding doppler filtering. 5,414,428, Cl. 342-132.000.  
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Gallo, Anthony A., to Dextor Corporation. Semiconductor device encapsulated with a flame retardant epoxy molding compound. 5,413,861, Cl. 428-413.000.  
Gallup, Darrell L.; and Featherstone, John L., to Union Oil Company of California. Use of added water to achieve 100% injection weight in geothermal operations. 5,413,718, Cl. 210-696.000.  
Gamand, Patrice; and Cordier, Christophe, to U.S. Philips Corporation. Microwave frequency device comprising at least a transition between a transmission line integrated on a substrate and a waveguide. 5,414,394, Cl. 333-26.000.  
Gamboa, Ruben A.: See—  
Kolton, Anthony D.; Gamboa, Ruben A.; and Chimenti, Danette S., 5,414,838, Cl. 395-600.000.  
Ganesan, Madurai G.: See—  
Sheth, Nitin V.; Valorose, Joseph J., Jr.; Ellway, Keith A.; Ganesan, Madurai G.; Mooney, Kieran G.; and Johnson, Jerry B., 5,413,777, Cl. 424-490.000.  
Gannon, Henry M. Feedback circuit for high efficiency linear DC power supply. 5,414,340, Cl. 323-266.000.  
Garcel, Nadine, legal heir: See—  
Schneider, Michel; Yan, Feng; Grenier, Pascal, deceased; Puginier, Jerome; and Barrau, Marie-Bernadette, 5,413,774, Cl. 424-9.510.  
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Garcia, David L.; Bianchi, Robert G.; and Hueston, Robert J., to Ametek Aerospace Products, Inc. System and method for ratiometrically processing sensed speed and vibration signals for a non-uniformly rotating body. 5,412,985, Cl. 73-460.000.  
Garcia, Philip, to Hewlett-Packard Company. System and method for memory management in microcomputer. 5,414,826, Cl. 395-425.000.



Gardner, Donald S., to Intel Corporation. Embedded ground plane and shielding structures using sidewall insulators in high frequency circuits having vias. 5,414,221, Cl. 174-261.000.

Gardner, William R.: See—  
Jacobs, Paul E.; Gardner, William R.; Lee, Chong U.; Gilhouse, Klein S.; Lam, S. Katherine; and Tsai, Ming-Chang, 5,414,796, Cl. 395-2.300.

Garfinkle, Moishe. Mobility-disabled portable weighing device. 5,414,225, Cl. 177-199.000.

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Gary, Richard G.: See—  
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Baukal, Charles E., Jr.; and Dalton, Augustine I., 5,413,476, Cl. 431-10.000.

Moreland, Donald P., 5,413,477, Cl. 431-9.000.

Gatchalian, Bayani V. Detachable eyeshield attachment for visor caps or the like. 5,412,812, Cl. 2-10.000.

Gatter, Raymond, to Coca-Cola Company, The; and Bosch-Siemens Hausgerate GmbH. Post-mix beverage apparatus including heat exchanger for non-carbonated water. 5,413,742, Cl. 261-140.100.

Gatley, Phillip A.; Burris, Christine; and Jensen, Wolfgang W., to ACS Communications, Inc. Articulated headset support. 5,414,769, Cl. 379-430.000.

Gaudet, James L.: See—  
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- Hirano, Chiaki: See—  
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- Hochschild, Peter H.: See—  
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- Hodge, W. Andrew, to Osteonics Corp. Prosthetic knee implant for an anterior cruciate ligament deficient total knee replacement. 5,413,604, Cl. 623-20.000.
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- Hoffman, Ernest G., to Hubbell Incorporated. Electrical connector assembly, especially for electric vehicle. 5,413,493, Cl. 439-188.000.
- Hoffman, Harrell; and Sweet, Mark D., to International Business Machines Corporation. System and method for dynamically varying between interrupt and polling to service requests of computer peripherals. 5,414,858, Cl. 395-725.000.
- Hoffman, Ned. Body gym exerciser. 5,413,548, Cl. 482-127.000.
- Hoffmann, Hans-Rainer: See—  
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- Hoffmann-La Roche Inc.: See—  
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- Hofherr, Walther: See—  
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- Hogan, Patrick M.; Alexander, Rhonda L.; Greninger, Lars; and Arrow, Lloyd J., to Texas Instruments Incorporated. Graphical display of data. 5,414,809, Cl. 395-155.000.
- Hogg, Robin I. T.; and Edwards, Geoffrey S., to Colebrand Limited; and Oxley Developments Company Limited. Personnel identification devices. 5,414,405, Cl. 340-321.000.
- Hogner, Winfried; and Piechura, Hans, to Man Gutehoffnungshutte Aktiengesellschaft. Process for cooling and purifying hot, dust-laden flue gases containing dioxins and other toxic substances. 5,413,621, Cl. 75-376.000.
- Hokari, Makoto, to NEC Corporation. Exchange for an ISDN capable of controlling an incoming call by kinds of communication. 5,414,760, Cl. 379-93.000.
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- Holland, J. Mark: See—  
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- Holloway, M. Katharine: See—  
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- Hong, Gary, to United Microelectronics Corporation. Process for high density split-gate memory cell for flash or EPROM. 5,414,287, Cl. 257-316.000.
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- Hong, Sung H., to Goldstar Co., Ltd. Apparatus and method for enhancing transient edge of video signal. 5,414,473, Cl. 348-625.000.
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- Horiuchi, Shigeaki, to Isuzu Motors, Ltd. Piston and a connecting rod apparatus. 5,413,074, Cl. 123-197.200.
- Horn, James L.; and Johnson, A. Shane, to Horn, James L. Sawless lint cleaner. 5,412,844, Cl. 19-40.000.
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Hunt, Mark A.; and Owen, Keith J., to Light & Sound Design, Ltd. Stage lighting control console including assignable macro functions. 5,414,328, Cl. 315-316.000.

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Iezzi, Rodolfo; Bartolini, Andrea; and Buonomo, Franco, to Snamprogetti S.p.A.; and Eniricerche S.p.A. Process for activating catalyst precursors for the dehydrogenation of C<sub>2</sub>-C<sub>5</sub> paraffins, and a catalytic composition activated by the process. 5,414,182, Cl. 585-661.000.

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Iida, Makoto, to Matsushita Electric Industrial Co., Ltd. Focus draw-in system for optical disc device. 5,414,682, Cl. 369-44.250.

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Inada, Hiroshi; Tanaka, So; and Iiyama, Michitomo, 5,413,982, Cl. 505-193.000.

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Ikeda Bussan Co., Ltd.: See—  
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Ikeda, Susumu: See—  
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Saisho, Shinichiro; Ikeda, Toshinobu; and Odagiri, Akira, 5,414,506, Cl. 356-128.000.

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Ikegami, Tetsuo, to Olympus Optical Co., Ltd. Apparatus with a compact configuration for supporting an optical pick up device. 5,414,680, Cl. 369-44.140.

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Ilcin, Kevin J.; Buzak, Thomas S.; and Martin, Paul C., to Tektronix, Inc. Electro-optical structure having reduced sensitivity to cross talk. 5,414,440, Cl. 345-58.000.

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Hekal, Ihab; Iler, Howard D.; Kiss, Bradley C.; and Bialka, Daniel P., 5,413,234, Cl. 215-230.000.

Iliff, Robert J.; Mitchell, James D.; Carty, Daniel T.; Latham, James R.; and Kong, Stephen B., to Clorox Company, The. Liquid/supercritical carbon dioxide/dry cleaning system. 5,412,958, Cl. 68-5.000.

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Thomas, Louis; Kenny, Daniel J.; Hasan, Syed Riaz-Ul; and Dewey, George G., 5,413,444, Cl. 411-387.000.

Imachi, Kou; Fujimasa, Iwao; and Atsumi, Kazuhiko, to Nippon Zeon Co., Ltd. Medical valve apparatus. 5,413,599, Cl. 623-2.000.

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Fujii, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.

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Imanishi, Takeshi: See—  
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Ishibashi, Tadashi; Kezuka, Hiroaki; Yoshino, Saeko; Shimizu, Norio; Tsuda, Motoyuki; and Imazeki, Shuji, 5,414,072, Cl. 530-387.900.

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ImMIX: See—  
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Humphries, Martyn; Nemcek, Jozef; Jaworzyn, Joseph F.; Cantwell, John B.; and Gerrard, John J., 5,414,060, Cl. 524-558.000.

Mann, Stephen; Barker, Roger N.; Page, Graham A.; and Corr, Stephen P., 5,413,843, Cl. 428-211.000.

IMRA America, Inc.: See—  
Fermann, Martin E.; and Harter, Donald J., 5,414,725, Cl. 372-18.000.

Ina, Katsuhiro: See—  
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Incando, Peter A. Hair weft and extension method and article. 5,413,124, Cl. 132-201.000.

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Chang, Yih F., 5,414,633, Cl. 364-474.320.



Chen, Chuen-Chyr; and Chen, Ker-Ming, 5,414,059, Cl. 525-527.000.  
 Hu, Dyi-Chung; and Jeng, en-Huang, 5,412,997, Cl. 73-827.000.  
 Wu, Jinn-Fa; and Huang, Chun-Hung, 5,413,439, Cl. 409-216.000.  
 Ing, C. Olivetti & C., S.p.A.: See—  
 Accatino, Andrea; and Arca, Angelo, 5,414,452, Cl. 347-7.000.  
 Ingendoh, Axel: See—  
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 Ingram, Galen: See—  
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 Ingwall, Richard T.: See—  
 Cumming, William J.; Gaudiana, Russell A.; Ingwall, Richard T.; Kolb, Eric S.; Mehta, Parag G.; and Minns, Richard A., 5,414,069, Cl. 528-310.000.  
 Innova Biomed, Inc.: See—  
 Schneider, Linda H.; and Murphy, Randall B., 5,414,014, Cl. 514-535.000.  
 Innovative Medical Devices (UK) Ltd.: See—  
 Williamson, Neville L., 5,413,590, Cl. 607-75.000.  
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 Haenggi, Thomas J., 5,413,575, Cl. 606-45.000.  
 Innoves, Inc.: See—  
 Beuwkes, Reinier, III; Salisbury, Thomas E.; and Gonn, Robert C., 5,413,381, Cl. 281-21.100.  
 Inokuchi, Tatsuya. Disk replication apparatus, 5,414,688, Cl. 369-84.000.  
 Inoue, Kyo: See—  
 Tachikawa, Yoshiaki; Kawachi, Masao; Takahashi, Hiroshi; and Inoue, Kyo, 5,414,548, Cl. 359-130.000.  
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 Ebashi, Iwao; Takigawa, Tetsuo; and Inoue, Masayasu, 5,414,089, Cl. 546-243.000.  
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 Inoue, Takashi: See—  
 Matsuo, Mutsumi; Yudasaka, Ichio; Kanai, Kiyohiko; Nagase, Katsumi; and Inoue, Takashi, 5,414,547, Cl. 359-67.000.  
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 Katoh, Kenji; Inoue, Tokuta; Nohira, Hidetaka; Nakanishi, Kiyoshi; Iguchi, Satoshi; Kihara, Tetsuro; and Muraki, Hideaki, 5,412,945, Cl. 60-285.000.  
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 Marecot, Patrice; Barbier, Jacques; Mabilon, Gil; Durand, Daniel; and Prigent, Michel, 5,413,984, Cl. 502-333.000.  
 Instron Corporation: See—  
 Mahoney, Richard J., III; Martin, Paulo A.; Mead, Graham E.; and Scanlon, David W., 5,413,306, Cl. 248-676.000.  
 Instrument Flight Research, Inc.: See—  
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 Morgan, Ira L.; Rice, Robert H.; Bolger, Joseph E.; and Schindler, Donald G., 5,414,648, Cl. 364-563.000.  
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 Fandrich, Mickey L.; and Jungroth, Owen W., 5,414,829, Cl. 395-425.000.  
 Gardner, Donald S., 5,414,221, Cl. 174-261.000.  
 Grochowski, Edward T., 5,414,824, Cl. 395-400.000.  
 Sandage, David A.; Stanley, James C.; Hunt, Stewart W.; and Kunz, Arland D., 5,414,848, Cl. 395-650.000.  
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 Interactive Light, Inc.: See—  
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 Intermed Corporation: See—  
 Aragon, Joel T., 5,413,529, Cl. 454-251.000.  
 Intermedics, Inc.: See—  
 Schroepel, Edward A., 5,413,592, Cl. 607-18.000.  
 International Bio-Synthetics Limited: See—  
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 International Business Machines Corporation: See—  
 Alexander, Virginia L.; Gaudet, James L.; Jordan, Lloyd E., II; and Hernandez, Raymond, 5,414,834, Cl. 395-600.000.  
 Antunes, Ernesto; Bantz, David F.; Bauchot, Frederic J.; Bello, Eliane D.; Ferraz, Marcelo; LeMaut, Francois; and da Silva Araujo Tavares, Bernardo, 5,414,731, Cl. 375-202.000.  
 Archer, Gary D.; Case, Douglas R.; and Wu, Hilda J., 5,414,842, Cl. 395-600.000.  
 Baer, William J.; and Leung, Paul C., 5,414,836, Cl. 395-575.000.  
 Banks, Jon M.; Clearman, Melvin R., Jr.; Colson, James C.; Craig, David O.; Loose, David C.; and Varan, James E., 5,413,321, Cl. 270-58.000.  
 Behm, Jason L.; Balakrishnan, Govind; and Eisenhauer, Daniel G., 5,414,845, Cl. 395-650.000.

Bertin, Claude L.; Miller, Christopher P.; and Perlman, David J., 5,414,637, Cl. 364-489.000.  
 Bingham, Ronald E.; Dockter, Michael J.; Farber, Joel F.; and Seppi, Kevin D., 5,414,841, Cl. 395-600.000.  
 Boutaghou, Zine E.; Malek, Sattar S.; and Richards, Dean A., 5,414,574, Cl. 360-97.010.  
 Brice, Frank W., Jr.; Elliott, Joseph C.; Fredericks, Kenneth J.; Galbraith, Robert E.; Halma, Marten J.; Hough, Roger E.; John, Suzanne M.; Malinowski, Paul A.; Meritt, Allan S.; Oakes, Kenneth J.; Rathjen, John C., Jr.; Sachs, Martin W.; Stucki, David E.; and Wyman, Leslie W., 5,414,851, Cl. 395-650.000.  
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 Denneau, Monty M.; Gavril, Bruce D.; Hochschild, Peter H.; and Stunkel, Craig B., 5,414,740, Cl. 375-371.000.  
 Denneau, Monty M.; Gavril, Bruce D.; Hochschild, Peter H.; and Stunkel, Craig B., 5,414,832, Cl. 395-550.000.  
 Doyle, Mary T.; and Kane, Jacqueline, 5,414,810, Cl. 395-157.000.  
 Felisberto, Cynthia N.; Milkovich, Stephen A.; and Nufer, Robert W., 5,413,842, Cl. 428-209.000.  
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 Filip, Michael J.; Karunungan, Kathy L.; Kramer, Jeffrey C.; Lee, Lucille C.; Moore, Danielle L.; Shih, Charles C.; and Sydir, Jaroslav J., 5,414,812, Cl. 395-200.000.  
 Fry, Scott M.; Jackson, Scott A.; and Ripberger, Richard A., 5,414,570, Cl. 360-48.000.  
 Gonya, Stephen G.; Lake, James K.; Long, Randy C.; and Wild, Roger N., 5,414,303, Cl. 257-772.000.  
 Gonzales, Cesar A.; Ramm, Dov; and Viscito, Eric, 5,414,469, Cl. 348-408.000.  
 Gordon, Robert D.; Sinnott, Joseph F., Jr.; and Walling, Lonnie S., 5,414,805, Cl. 395-133.000.  
 Hershey, Paul C.; Johnson, Donald B.; Le, An V.; Matyas, Stephen M.; Wacławsky, John G.; and Wilkins, John D., 5,414,833, Cl. 395-575.000.  
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 Ikeda, Yoshihiro; and Takayama, Shinji, 5,413,835, Cl. 428-141.000.  
 Kramer, Paul H.; and Tate, Kay A., 5,414,852, Cl. 395-700.000.  
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 Levenson, Marc D.; and Santini, Hugo A. E., 5,414,580, Cl. 360-123.000.  
 Pennebaker, William B., 5,414,423, Cl. 341-107.000.  
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 Vassiliadis, Stamatis; Triantafyllos, George; and Kobrosly, Walid, 5,414,797, Cl. 395-51.000.  
 Wang, Diana S., 5,414,844, Cl. 395-650.000.  
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 International Lubricants, Inc.: See—  
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 International Omni-Pak Corporation: See—  
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 International Superconductivity Technology Center: See—  
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 Inui, Yasuo; and Yagi, Nobuhito, to Kurimoto, Ltd. Compound partition diaphragm for use in a ball mill, 5,413,288, Cl. 241-72.000.  
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 LaFontaine, Roy A., 5,413,296, Cl. 248-210.000.  
 Iowa State University Research Foundation: See—  
 Lu, Tongxin; and Udpal, Satish S., 5,414,623, Cl. 364-413.210.  
 Iowa State University Research Foundation, Inc.: See—  
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 Ireland, Chris M.; Radisky, Derek C.; Barrows, Louis R.; and Kramer, Robert, to American Cyanamid Company. Antineoplastic pyrolo[4,3,2-de]quinolin-8(1H)-ones, 5,414,001, Cl. 514-287.000.  
 Irven, Neil. Edging paint roller, 5,412,832, Cl. 15-230.110.  
 Irwin, David: See—  
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 Irwin Toy Limited: See—  
 Clement, Leonard W., 5,413,199, Cl. 190-108.000.  
 Isaac, George L., to Probes Associates, Inc. Semiconductor device test probe ring apparatus and method of manufacture, 5,414,371, Cl. 324-762.000.

Isabelle, Paul: See—  
 Pernicka, Martin P.; Isabelle, Paul; and Gagnon, Hubert, 5,412,814, Cl. 2-424.000.  
 Isaka, Kazuo: See—  
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 Ishihara, Kazuya: See—  
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 Ishihara, Yoshio: See—  
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 Ishii, Akio: See—  
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 Ishii, Hiroto; Tsuzuki, Masanori; and Saito, Yoshinori, to Idemitsu Kōsan Company Limited. Process for preparing carbonyl compounds, 5,414,137, Cl. 568-360.000.  
 Ishii, Takao; Iwata, Tsunekazu; and Tajima, Yukimichi, to Nippon Telegraph and Telephone Corporation. Oxygen ion conductor and solid fuel cell, 5,413,880, Cl. 429-33.000.  
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 Ishikawa, Masakuni: See—  
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 Ishikawa, Tadashi: See—  
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 Ishikawajima-Harima Heavy Industries Co., Ltd.: See—  
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 Ishikuri, Hiroaki; and Yamamoto, Shigenobu, to Fujitsu Limited. Automatic personal search telephone system, 5,414,759, Cl. 379-88.000.  
 Ishimori, Fumitaka: See—  
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 Ishiwata, Masahiro: See—  
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 Ishizaki, Makoto: See—  
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 Isobe, Mitsuo: See—  
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 Isono, Takahiro: See—  
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 Isosaka, Akira: See—  
 Miyazaki, Kiyoshi; Wakai, Tomoyuki; Isosaka, Akira; Watanabe, Yoshiro; and Koyano, Yukio, 5,412,927, Cl. 53-552.000.  
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 Ito, Atsushi: See—  
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Ito, Daisuke: See—  
 Hara, Tsukushi; Ohkuma, Takeshi; Tsurunaga, Kazuyuki; Ito, Daisuke; and Tada, Takamitsu, 5,414,586, Cl. 361-19.000.  
 Ito, Hiroyasu, to Canon Kabushiki Kaisha. Image communicating apparatus, 5,414,525, Cl. 358-426.000.  
 Ito, Ikuro: See—  
 Sato, Toshio; Ito, Ikuro; Yamaguchi, Hiromichi; and Takeda, Kyoichi, 5,414,174, Cl. 585-467.000.  
 Ito, Munehiro, to NEC Corporation. Semiconductor memory device having address transition detector quickly enabling redundancy decoder, 5,414,659, Cl. 365-200.000.  
 Ito, Nobuyuki: See—  
 Tsuchiya, Hiroaki; Ohsawa, Keishi; Sakemi, Yuji; Waki, Kenichiro; Ito, Nobuyuki; Takano, Takehiro; and Tomikawa, Yoshiro, 5,414,497, Cl. 355-253.000.  
 Itoh, Akira: See—  
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 Itoh, Motohiko: See—  
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 ITT Corporation: See—  
 Bahler, Lawrence G.; and Higgins, Alan L., 5,414,755, Cl. 379-67.000.  
 Phillips, Earle N., 5,414,557, Cl. 359-428.000.  
 IUP Institut für Umweltpflege AG: See—  
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 Iwabuchi, Kazunori: See—  
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Kaneko, Steven T.; and Adams, Aditha M., to Microsoft Corporation. Ergonomic pointing device. 5,414,445, Cl. 345-163.000.

Kaneko, Toshimi: See—  
Hanato, Yoshio; Hori, Toshio; Tokuda, Hiromichi; and Kaneko, Toshimi, 5,414,220, Cl. 174-254.070.

Kaneyasu, Kazunari; and Nakahara, Takashi, to Tokuyama Corporation. Solid electrolyte gas-sensing device. 5,413,691, Cl. 204-424.000.

Kanezashi, Satsuki: See—  
Takeuchi, Kunihiro; Chiriku, Akihiko; Kanezashi, Satsuki; and Tanashita, Hiroto, 5,413,495, Cl. 439-223.000.

Kang, Woo J. Holder for emergency flashlight. 5,413,223, Cl. 206-573.000.

Kanmoto, Yoshiaki; Fukuda, Haruhiko; Yonenaga, Kohtaroh; and Shijo, Hiroyasu, to Ricoh Company, Ltd. Apparatus for reading image from original image on translucent film with automatic adjustment of the quantity of light from a light source. 5,414,535, Cl. 358-487.000.

Kanno, Yoshihisa; Kajimoto, Shinshi; and Jinno, Masayuki, to Naldec Corporation; and Mazda Motor Corporation. Protecting apparatus for electronic device of vehicle having solar battery and storage battery. 5,414,306, Cl. 307-87.000.

Kano, Masami: See—  
Shimizu, Yutaka; and Kano, Masami, 5,414,318, Cl. 310-239.000.

Kansai Paint Company, Limited: See—  
Sugimura, Yoh; Yabuta, Motoshi; Yukawa, Yoshiyuki; and Fujii, Yasuhiro, 5,414,055, Cl. 523-453.000.

Kaplan, Edward B. Pyramid slot machine. 5,413,342, Cl. 273-143.00B.

Kaplan, Eric B.; and Kuehn, Arthur G., to Progressive Computing, Inc. Method for transmitting data using a communication interface box. 5,414,712, Cl. 371-15.100.

Kaplan, Martin C., to Eastman Kodak Company. Light pipe spectral filter. 5,414,489, Cl. 355-67.000.

Kaplan, Ronald J.: See—  
Giles, Robert R.; Kemplin, Richard M.; and Kaplan, Ronald J., 5,413,427, Cl. 400-691.000.

Karl, Ulrich: See—  
Rendenbach-Mueller, Beatrice; Karl, Ulrich; and Weifenbach, Harald, 5,414,006, Cl. 514-363.000.

Kartler, David, to Mahoney, Thomas P.; and Holland, J. Mark. Wiping device for caulking. 5,413,258, Cl. 222-575.000.

Karunungan, Kathy L.: See—  
Filip, Michael J.; Karunungan, Kathy L.; Kramer, Jeffrey C.; Lee, Lucille C.; Moore, Danielle L.; Shih, Charles C.; and Sydir, Jaroslav J., 5,414,812, Cl. 395-200.000.

Karve, Mohan D.: See—  
Lee, James C.; and Karve, Mohan D., 5,413,795, Cl. 424-489.000.

Kasai, Kazuo: See—  
Okazaki, Sachiko; Kogoma, Masuhiro; Hirakawa, Masahiro; and Kasai, Kazuo, 5,413,769, Cl. 422-186.070.

Kashiwazaki, Tomoyuki: See—  
Shinoda, Ichiro; Kashiwazaki, Tomoyuki; Okawado, Akira; Moriya, Kazumasa; Sato, Shinichi; Itoh, Motohiko; Watanabe, Mitsuo; and Kawai, Hiroaki, 5,414,252, Cl. 235-463.000.

Kastl, Alfons: See—  
Hofmuth, Walter; Kastl, Alfons; Schausberger, Helmut; and Wimmer, Anton, 5,414,484, Cl. 354-321.000.

Kasuya, Michio: See—  
Ijuin, Kazuya; Kasuya, Michio; and Otsuki, Shinnichiro, 5,413,426, Cl. 400-621.000.

Katagiri, Kazuharu: See—  
Yamashita, Masataka; Terada, Masahiro; Mori, Shousei; and Katagiri, Kazuharu, 5,413,735, Cl. 252-299.610.

Katahira, Shinichiro: See—  
Yasue, Kenji; Tamura, Tsuneo; Katahira, Shinichiro; and Watanabe, Mioko, 5,414,042, Cl. 524-789.000.

Katakura, Koichi, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Magnetic disc drive device with hub and clasper assembly for reducing post-assembly machining. 5,414,575, Cl. 360-98.080.

Katayama, Hiroyuki: See—  
Mieda, Michinobu; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 5,414,652, Cl. 365-122.000.

Katayama, Yasunori; Morooka, Yasuo; Okada, Takashi; Nakajima, Masaaki; Hattori, Satoshi; and Shigyo, Masakane, to Hitachi, Ltd. Method and device for controlling object to be controlled using learning function. 5,414,619, Cl. 364-151.000.

Katayori, Hidenobu: See—  
Katoh, Minoru; Kawamura, Kotaro; and Katayori, Hidenobu, 5,414,463, Cl. 348-207.000.

Kato, Heizaburo, to Sankyo Seisakusho Co. Apparatus for supporting coil material supply device. 5,413,304, Cl. 248-421.000.

Kato, Noboru: See—  
Mandai, Harufumi; Kato, Noboru; and Tojyo, Atsushi, 5,414,402, Cl. 336-200.000.

Kato, Seiji: See—  
Nonaka, Yoshiya; Aoyagi, Yoshio; Abe, Hiroyuki; Hirano, Chiaki; Furukawa, Kiyoshi; Bradshaw, Alex; Kiyoura, Kazuhiro; Kato, Seiji; and Haraguchi, Koichiro, 5,414,684, Cl. 369-47.000.

Kato, Tomonori: See—  
Aoki, Seiji; Kato, Tomonori; Taniguchi, Hiroaki; Morotomi, Hidetosi; and Ono, Masami, 5,414,191, Cl. 585-820.000.

Katoh, Hideaki: See—  
Kaneko, Isamu; Katoh, Hideaki; Yokoyama, Kazuaki; and Ishikawa, Tsuyoshi, 5,414,599, Cl. 362-31.000.

Katoh, Kenji; Inoue, Tokuta; Nohira, Hidetaka; Nakanishi, Kiyoshi; Iguchi, Satoshi; Kihara, Tetsuro; and Muraki, Hideaki, to Kabushiki Kaisha Toyota Cho Kenkusho; and Toyota Jidosha Kabushiki Kai-

sha. Exhaust purification device of an internal combustion engine. 5,412,945, Cl. 60-285.000.

Katoh, Kimikazu: See—  
Azuma, Keiji; Katoh, Kimikazu; and Oguro, Ryoichi, 5,413,838, Cl. 428-194.000.

Katoh, Minoru; Kawamura, Kotaro; and Katayori, Hidenobu, to Hitachi, Ltd. Video cameras capable of switching an aspect ratio and view finders for use in the same. 5,414,463, Cl. 348-207.000.

Katoh, Motoi: See—  
Fujii, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.

Katsaros, Georges; Thomas, David G.; and Allison, Richard D., to Sherwood Medical Company. Device for sealing hemostatic incisions. 5,413,571, Cl. 606-213.000.

Katsuda, Nobuyuki; Yabushita, Shinichi; and Hashizume, Shuhei, to Sumitomo Chemical Co., Ltd. Compositions containing benzodifurone compounds and methods for coloring hydrophobic materials using the same. 5,413,613, Cl. 8-471.000.

Kauffman, James W., to Honeywell Inc. Synthetic friction algorithm for a hard control element. 5,414,620, Cl. 364-167.010.

Kaufmann, John, to Loral Aerospace Corp. Adaptive equalizer and method for operation at high symbol rates. 5,414,732, Cl. 375-232.000.

Kauphusman, James V.: See—  
Rudie, Eric N.; Neilson, Bruce H.; and Kauphusman, James V., 5,413,588, Cl. 607-101.000.

Kawachi, Masao: See—  
Tachikawa, Yoshiaki; Kawachi, Masao; Takahashi, Hiroshi; and Inoue, Kyo, 5,414,548, Cl. 359-130.000.

Kawade, Hisaaki: See—  
Takimoto, Kiyoshi; Hatanaka, Katsunori; Sakai, Kunihiro; Miyamoto, Masahiko; Kawade, Hisaaki; Sato, Yasufumi; Kishi, Etsuro; and Kawagishi, Hideyuki, 5,414,260, Cl. 250-306.000.

Kawagishi, Hideyuki; Enomoto, Takashi; and Iwamoto, Hirofumi, to Canon Kabushiki Kaisha. Liquid crystal apparatus. 5,414,542, Cl. 359-48.000.

Kawagishi, Hideyuki: See—  
Takimoto, Kiyoshi; Hatanaka, Katsunori; Sakai, Kunihiro; Miyamoto, Masahiko; Kawade, Hisaaki; Sato, Yasufumi; Kishi, Etsuro; and Kawagishi, Hideyuki, 5,414,260, Cl. 250-306.000.

Kawaguchi, Toshikazu, to Minolta Camera Kabushiki Kaisha. Image data processing apparatus in which the state of mounting in delay memory is detected. 5,414,800, Cl. 395-115.000.

Kawai, Hiroaki: See—  
Shinoda, Ichiro; Kashiwazaki, Tomoyuki; Okawado, Akira; Moriya, Kazumasa; Sato, Shinichi; Itoh, Motohiko; Watanabe, Mitsuo; and Kawai, Hiroaki, 5,414,252, Cl. 235-463.000.

Kawakami, Katsuhiko: See—  
Yasui, Toshihiko; Takimoto, Yoshio; deceased; Kawakami, Katsuhiko; Kiyonari, Toshiyuki; and Endo, Norio, 5,413,629, Cl. 106-21.00R.

Kawamatsu, Hideaki, to Sumitomo Rubber Industries Inc. Golf club shaft and its manufacturing mandrel. 5,413,338, Cl. 273-80.00B.

Kawamura, Kotaro: See—  
Katoh, Minoru; Kawamura, Kotaro; and Katayori, Hidenobu, 5,414,463, Cl. 348-207.000.

Kawamura, Satoshi: See—  
Maeda, Takeshi; Arai, Shinichi; Isaka, Kazuo; Saito, Atsushi; Mizokami, Takuya; Sugiyama, Hataka; and Kawamura, Satoshi, 5,414,689, Cl. 369-116.000.

Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyouhei, to Kotobuki Sangyo Kabushiki Kaisha. Guiding method for steel materials to be rolled and roller guide system therefor. 5,412,970, Cl. 72-250.000.

Kawamura, Yoshiro; Manabe, Isao; and Nakashima, Shingo, to Honda Giken Kogyo Kabushiki Kaisha. Method of bending metallic pipe. 5,412,973, Cl. 72-369.000.

Kawamura, Yukinori: See—  
Wada, Tatsuya; Murayama, Syouji; Kuroda, Kazuhiko; Satomura, Yukiyo; Matsuoka, Tadashi; Nonami, Mitsuharu; Matsumoto, Kozo; Kawamura, Yukinori; Matsumoto, Norikazu; Hikita, Hiroshi; and Iwata, Hideo, 5,413,018, Cl. 83-456.000.

Kawaragi, Yuuji: See—  
Sato, Keiichi; Kawaragi, Yuuji; and Higashino, Yasuko, 5,414,160, Cl. 568-883.000.

Kawasaki Steel Corporation: See—  
Manabe, Masahiko; Morita, Kazumi; Muro, Yoshinari; Kan, Takahiro; Iida, Yoshiaki; Kobayashi, Hideo; and Obara, Takashi, 5,413,640, Cl. 148-111.000.

Sato, Keiji; and Fukuda, Bunjiro, 5,413,639, Cl. 148-111.000.

Yazawa, Yoshihiro; Owada, Satoshi; Togashi, Fusao; Yoshioka, Keiichi; and Satoh, Susumu, 5,413,754, Cl. 420-41.000.

Kawashima, Haruna, to Canon Kabushiki Kaisha. Surface position detecting device. 5,414,515, Cl. 356-371.000.

Kawashimaseisakusyo Co., Ltd.: See—  
Miyazaki, Kiyoshi; Wakai, Tomoyuki; Isosaka, Akira; Watanabe, Yoshirou; and Koyano, Yukio, 5,412,927, Cl. 53-552.000.

Kawate, Shinichi: See—  
Yagi, Takayuki; Komatsu, Toshiyuki; Sato, Yasue; and Kawate, Shinichi, 5,413,664, Cl. 156-345.000.

Kayaba Kogyo Kabushiki Kaisha: See—  
Murakami, Tomoharu, 5,413,195, Cl. 188-282.000.

Kayes, Allan G., to Powermole International Ltd. Soil displacement hammer with movable head. 5,413,185, Cl. 175-296.000.

Kazakos, Ann M.: See—  
Duggan, Michael J.; Kazakos, Ann M.; and Gilmore, Daniel R., III, 5,413,807, Cl. 427-58.000.

Kazama, Toshio, to NHK Spring Co., Ltd. Coil spring-pressed needle contact probe modules with offset needles. 5,414,369, Cl. 324-758.000.

Kazami, Kazuyuki: See—  
Goto, Tetsuro; Kazami, Kazuyuki; Daitoku, Koichi; Wakabayashi, Tsutomu; Ezawa, Akira; and Tomino, Naoki, 5,414,486, Cl. 354-430.000.

Kazda, Stanislav: See—  
Fey, Peter; Dressel, Jurgen; Hanks, Rudolf; Hubsch, Walter; Kramer, Thomas; Muller, Ulrich; Muller-Gliemann, Matthias; Beuck, Martin; Bischoff, Hilmar; Wohlfel, Stefan; Denzer, Dirk; Kazda, Stanislav; Stasch, Johannes-Peter; Knorr, Andreas; and Zaiss, Siegfried, 5,414,003, Cl. 514-333.000.

Muller, Ulrich E.; Dressel, Jurgen; Fey, Peter; Hanks, Rudolf H.; Hubsch, Walter; Kramer, Thomas; Muller-Gliemann, Matthias; Beuck, Martin; Kazda, Stanislav; Knorr, Andreas; Stasch, Johannes-Peter; and Wohlfel, Stefan, 5,414,008, Cl. 514-381.000.

Kazuyuki, Tadamoto: See—  
Watabe, Shinichi; Kazuyuki, Tadamoto; and Okagawa, Hiroaki, 5,414,281, Cl. 257-95.000.

Keane, Peter J.: See—  
Munteanu, Marina A.; Keane, Peter J.; Betz, Alison; Guenin, Eric P.; and Smith, Leslie C., 5,413,723, Cl. 252-8.600.

Kegerise, Wesley R., II: See—  
Pack, Arthur V.; and Kegerise, Wesley R., II, 5,412,864, Cl. 29-825.000.

Kehne, Heinz: See—  
Willms, Lothar; Lachhein, Stephen; Schlegel, Gunter; and Kehne, Heinz, 5,414,084, Cl. 544-194.000.

Kehr, Wolfgang: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmichen, Ralph; Seidelmann, Dieter; Kehr, Wolfgang; Schneider, Herbert H.; Engelstoft, Mogens; Hansen, Bodo J.; Waetjen, Frank; and Honore, Tage, 5,414,002, Cl. 514-292.000.

Keigley, Kevin V. Rake attachment for a skid steer. 5,413,181, Cl. 172-253.000.

Keinert, Helmut: See—  
Quaas, Hans-Reiner; and Keinert, Helmut, 5,413,279, Cl. 237-12.30C.

Keller, Arnold, to Waldemar Link GmbH & Co. Knee joint endoprosthesis for replacing the articular surfaces of the tibia. 5,413,608, Cl. 623-20.000.

Keller, Jakob, to ABB Research Ltd. Combustion chamber of a gas turbine having premixing and catalytic burners. 5,412,938, Cl. 60-39.210.

Kelly, Bryan J. Adjustable multi-compartment pneumatic support apparatus. 5,412,822, Cl. 5-455.000.

Kelman, Josh; and Hames, Robert, to Davidson Texton Inc. Method of fabricating a preform. 5,413,750, Cl. 264-517.000.

Kemp, Bruce E.: See—  
Hillyard, Carmel J.; Rylatt, Dennis B.; Kemp, Bruce E.; and Bundesen, Peter G., 5,413,913, Cl. 435-7.250.

Kemplin, Richard M.: See—  
Giles, Robert R.; Kemplin, Richard M.; and Kaplan, Ronald J., 5,413,427, Cl. 400-691.000.

Kendall Company, The: See—  
Bradberry, Layton; and Pendergrass, John, 5,412,957, Cl. 66-178.00A.

Kenevan, Timothy P. Modular shipping container. 5,413,236, Cl. 220-4.280.

Kennedy, John M.: See—  
Kennedy, William R.; and Kennedy, John M., 5,412,916, Cl. 52-262.000.

Kennedy, William R.; and Kennedy, John M., to Jack Kennedy Metal Products and Buildings Inc. Structure having quick-connect components. 5,412,916, Cl. 52-262.000.

Kenney, Donald M. Low charge consumption memory. 5,414,656, Cl. 365-149.000.

Kenny, Daniel J.: See—  
Thomas, Louis; Kenny, Daniel J.; Hasan, Syed Riaz-Ul; and Dewey, George G., 5,413,444, Cl. 411-387.000.

Kenny, John D.: See—  
Lee, Robert H. J.; and Kenny, John D., 5,414,863, Cl. 395-750.000.

Kensler, Terry T.: See—  
Alexander, Robert L.; Bequette, Robert J.; Kensler, Terry T.; and Scott, Joseph A., 5,413,995, Cl. 514-110.000.

Kerby, Michael C.: See—  
Bearden, Roby, Jr.; Kerby, Michael C.; and Davis, Stephen M., 5,414,181, Cl. 585-654.000.

Kerguiduff, Marianne, to U.S. Philips Corporation. Echo canceller. 5,414,767, Cl. 379-410.000.

Kerner, James M.; McCauley, Patrick A.; McCulloch, Larry E.; and Tanner, Michael R. Thermoelectric power module. 5,413,166, Cl. 165-30.000.

Kernevez, Nelly; and Glenat, Henri, to Commissariat a L'Energie Atomique. NMR magnetometer probe having a single resonator and a single radical solution. 5,414,357, Cl. 324-301.000.

Kerr, James F., to Material Control, Inc. Dual track ladder. 5,413,191, Cl. 182-39.000.

Keshelava, Viktor V. Tubular organ prosthesis. 5,413,601, Cl. 623-12.000.

Kesling, Haven S., Jr.: See—  
Shawl, Edward T.; and Kesling, Haven S., Jr., 5,413,634, Cl. 106-696.000.

Kessels, Jozef L. W., to U.S. Philips Corporation. Arithmetic unit for multiplying long integers modulo M and R.S.A. converter provided with such multiplication device. 5,414,651, Cl. 364-746.000.

Kessler, Christoph: See—  
Eberle, Josef; Seibl, Rudolf; Kessler, Christoph; and Konig, Bernhard, 5,413,906, Cl. 435-5.000.

Ketchum, Jeffrey M., to Advanced Micro Devices, Inc. Apparatus and method for removing deposits from an APCVD system. 5,413,671, Cl. 216-37.000.

Kezuka, Hiroaki: See—  
Ishibashi, Tadashi; Kezuka, Hiroaki; Yoshino, Saeko; Shimizu, Norio; Tsuda, Motoyuki; and Imazeki, Shuji, 5,414,072, Cl. 530-387.900.

Khan, M. Amin; and Bernstein, Howard, to Alkermes Controlled Therapeutics, Inc. Controlled release ACTH containing microspheres. 5,413,797, Cl. 424-489.000.

Khandros, Igor: See—  
Grube, Gary; Khandros, Igor; and Mathieu, Gaetan, 5,414,298, Cl. 257-690.000.

Khan's Enterprise Co., Ltd.: See—  
Jean, Kuan-May, 5,413,087, Cl. 126-41.00R.

KHS Maschinen- und Anlagenbau AG: See—  
Zwilling, Heinz-Michael; Sindermann, Siegmund; and Theine, Axel, 5,413,153, Cl. 141-39.000.

Kida, Kenji: See—  
Sugiyama, Hiroyuki; and Kida, Kenji, 5,413,040, Cl. 101-230.000.

Kids Own Co. Ltd., The: See—  
Le Clerc, Joe, 5,413,228, Cl. 211-13.000.

Kiesewetter, Lothar E., to Dynamotive Corp. Clamping device for magnetostriuctive bodies. 5,414,397, Cl. 335-215.000.

Kihara, Nobuyoshi: See—  
Taki, Hideshi; Ueno, Takafumi; Tsuji, Shiro; Nikaido, Masataka; and Kihara, Nobuyoshi, 5,414,568, Cl. 360-19.100.

Kihara, Osamu: See—  
Sawase, Kensuke; and Kihara, Osamu, 5,414,533, Cl. 358-473.000.

Kihara, Tetsuro: See—  
Katoh, Kenji; Inoue, Tokuta; Nohira, Hidetaka; Nakanishi, Kiyoshi; Iguchi, Satoshi; Kihara, Tetsuro; and Muraki, Hideaki, 5,412,945, Cl. 60-285.000.

Killam, Geoffrey T.: See—  
Godolphin, William J.; Specht, Winona C.; Pires, David P.; and Killam, Geoffrey T., 5,413,246, Cl. 222-1.000.

Killick, Donald E.: See—  
Jansen, Murray L.; Killick, Donald E.; Lang, Alexander; Pullman, Royce T.; Sutton, Christopher M.; and Zwaaneveld, Cornelis H., 5,413,112, Cl. 128-726.000.

Killpatrick, Joseph E.: See—  
Berndt, Dale F.; and Killpatrick, Joseph E., 5,414,727, Cl. 372-38.000.

Kim, Bang M.: See—  
Thornton, Roy F.; Kim, Bang M.; Babb, Steven J.; and Harmon, John L., 5,413,682, Cl. 204-102.000.

Kim, Choong Y., to Hyundai Motor Co., Ltd. Roof molding assembly structure for an automobile. 5,413,398, Cl. 296-210.000.

Kim, Hak; and Han, Woo-sung, to Samsung Electronics Co., Ltd. Method of forming a pattern on a substrate having a step change in height. 5,413,898, Cl. 430-325.000.

Kim, Hoon S.; Park, Kun Y.; and Lee, Byung G., to Korea Institute of Science and Technology. Process for the preparation of 1,1,1-trifluoro-2,2-dichloroethane. 5,414,166, Cl. 570-176.000.

Kim, Jae K., to Hyundai Electronics Industries Co., Ltd. Method for forming a contact of a semiconductor device. 5,413,961, Cl. 437-195.000.

Kim, Seok T.; Kim, Young S.; and Kim, Yo J., to Samsung Electronics Co., Ltd. Method for manufacturing a semiconductor device with an epitaxial void. 5,413,947, Cl. 437-41.000.

Kim, Wan S.: See—  
Cho, Jung H.; Nam, Kie H.; and Kim, Wan S., 5,414,156, Cl. 568-781.000.

Kim, Yo J.: See—  
Kim, Seok T.; Kim, Young S.; and Kim, Yo J., 5,413,947, Cl. 437-41.000.

Kim, Young S.: See—  
Kim, Seok T.; Kim, Young S.; and Kim, Yo J., 5,413,947, Cl. 437-41.000.

Kimberly-Clark Corporation: See—  
Enloe, Kenneth M., 5,413,570, Cl. 604-385.200.

Fitting, Steven W.; Sayovitz, John J.; Edwards, Joel E.; and Suduth, Gregory T., 5,413,811, Cl. 427-176.000.

Nohr, Ronald S.; and MacDonald, John G., 5,413,655, Cl. 156-167.000.

Kimpel, Alvin A.; and Jennings, Milton E., to Warman International Ltd. Spring-assisted split seat gate valve. 5,413,140, Cl. 137-375.000.

Kimura, Hideyuki; Takahashi, Tsuyoshi; Suzuki, Tomio; Ohdaira, Toshio; Uefune, Kouki; and Nishimura, Yuji, to Hitachi, Ltd. Magnetic disk storage system. 5,414,591, Cl. 361-695.000.

Kimura, Misao: See—  
Shinkawa, Masaki; and Kimura, Misao, 5,414,436, Cl. 343-715.000.

Kimura, Toshiaki: See—  
Tani, Kazunori; and Kimura, Toshiaki, 5,412,925, Cl. 53-450.000.

Kimura, Toshio: See—  
Aoyagi, Koji; and Kimura, Toshio, 5,414,544, Cl. 359-53.000.



- Kindel, Heinrich: See—  
Barth, Peter; Hoffmann, Hans-Rainer; Muller, Walter; and Kindel, Heinrich, 5,413,567, Cl. 604-307.000.
- King, David L.; Cooper, Michael D.; and Sanderson, William A., to Catalytic, Inc. Acid catalyst and use thereof in alkylation of olefins with tertiary alkanes. 5,414,187, Cl. 585-730.000.
- King, Marilyn G.: See—  
Evans, Randall N.; Cummins, Monica S.; King, Marilyn G.; and Ferguson, Robert L., 5,413,047, Cl. 102-302.000.
- King, William E. Rail fitting for marine applications. 5,413,063, Cl. 114-221.00R.
- Kingston, Howard M., to Duquesne University of the Holy Ghost. Method of species isotope dilution mass spectrometry. 5,414,259, Cl. 250-283.000.
- Kingston, Smauel C.: See—  
Lundquist, Alan E.; Zscheile, John W., Jr.; and Kingston, Smauel C., 5,414,730, Cl. 375-208.000.
- Kinoshita, Iwao; Machii, Daisuke; Onoda, Yasuo; Takai, Haruki; Kosaka, Nobuo; Shuto, Katsuechi; Gomi, Katsushige; Morimoto, Makoto; and Ishii, Akio, to Kyowa Hakko Kogyo Co., Ltd. Triphenylmethane derivatives. 5,413,997, Cl. 514-183.000.
- Kinouchi, Shinichi: See—  
Egawa, Kunihiko; Umemura, Toshio; Kinouchi, Shinichi; Wakata, Mitsunobu; Utsunomiya, Shin; and Nozaki, Ayumi, 5,413,981, Cl. 505-121.000.
- Kira, Ikuo: See—  
Onishi, Norimasa; Shimaoka, Megumi; Kira, Ikuo; and Nakazawa, Masakazu, 5,413,921, Cl. 435-135.000.
- Kirchner, Jack R., to Du Pont de Nemours & E. I., and Company. Polyfluoro nitrogen-containing organic compounds. 5,414,111, Cl. 560-357.000.
- Kiriki, Toshihiko, to Konica Corporation. Single lens. 5,414,560, Cl. 359-654.000.
- Kirin Beer Kabushiki Kaisha: See—  
Ishizaki, Keiichirou; and Onishi, Noboru, 5,413,929, Cl. 435-240.460.
- Yasui, Toshihiko; Takimoto, Yoshio, deceased; Kawakami, Katsuhiko; Kiyonari, Toshiyuki; and Endo, Norio, 5,413,629, Cl. 106-21.00R.
- Kirk, Richard O., to Dow Chemical Company. The. Uniform distribution polycarbonate pellets. 5,414,056, Cl. 525-461.000.
- Kirkland, W. Dean: See—  
Eilenberg, Steven S.; DeFranco, Jack; Walters, Mark; and Kirkland, W. Dean, 5,414,358, Cl. 324-309.000.
- Kiser, Willie C.; Foreman, Kevin G.; and Miller, Paul J., to TRW Inc. Surge suppression device. 5,414,587, Cl. 361-118.000.
- Kishi, Etsuro: See—  
Takimoto, Kiyoshi; Hatanaka, Katsunori; Sakai, Kunthiro; Miyamoto, Masahiko; Kawade, Hisaaki; Sato, Yasufumi; Kishi, Etsuro; and Kawagishi, Hideyuki, 5,414,260, Cl. 250-306.000.
- Kishi, Hajime; Ozaki, Atsushi; and Odagiri, Nobuyuki, to Toray Industries, Inc. Prepreg and composite. 5,413,847, Cl. 428-283.000.
- Kishi, Norimasa; and Takada, Masayuki, to Nissan Motor Co., Ltd. Vehicle navigation apparatus providing simultaneous forward and rearward views. 5,414,461, Cl. 348-115.000.
- Kiss, Bradley C.: See—  
Hekal, Ihab; Iler, Howard D.; Kiss, Bradley C.; and Bialka, Daniel P., 5,413,234, Cl. 215-230.000.
- Kissinger, Robert D.; Sauby, Michael E.; Menzies, Richard G.; and Paxson, Allen J., to General Electric Company. Method for making fatigue crack growth-resistant nickel-base article. 5,413,752, Cl. 419-28.000.
- Kita, Masao: See—  
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- Kitazume, Yoshiaki: See—  
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- Kito, Masaru, to Emhart Inc. Stud welding method. 5,414,234, Cl. 219-99.000.
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- Kiyohara, Toshikazu: See—  
Yamanashi, Teruaki; Suzuki, Shinichirou; Tsujimoto, Yoshio; and Kiyohara, Toshikazu, 5,413,657, Cl. 156-235.000.
- Kiyonari, Toshiyuki: See—  
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- Kiyoura, Kazuhiro: See—  
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- Klauber, Robert D.: See—  
Vigmostad, Erik B.; and Klauber, Robert D., 5,412,999, Cl. 73-862.333.
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- Kliwer, Wayne R.: See—  
Salem, George F.; and Kliwer, Wayne R., 5,414,185, Cl. 585-721.000.
- Klimesch, Roger: See—  
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- Klonikowski, Guenter. Detachable motor vehicle hood ornament. 5,413,826, Cl. 428-31.000.
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Sanderson, John R.; Knifton, John F.; and Duranleau, Roger G., 5,414,141, Cl. 568-578.000.
- Sanderson, John R.; and Knifton, John F., 5,414,162, Cl. 568-909.800.
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- Knight, Susannah S.: See—  
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- Knoll, Mark W., to Angeion Corporation. Current truncated waveform defibrillator. 5,413,591, Cl. 607-6.000.
- Knorr, Andreas: See—  
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- Knox, Carol L., to Polymer Product Company, Inc. Intumescent non-halogenated flame retardant polystyrene composition. 5,414,031, Cl. 524-101.000.
- Knox, Richard F. Toy crane configurable into three different operating modes. 5,413,515, Cl. 446-75.000.
- Knuth, Howard D.: See—  
Cho, Frederick Y.-T.; Anderson, Michael J.; and Knuth, Howard D., 5,414,214, Cl. 174-52.300.
- Kobayashi, Hideo: See—  
Manabe, Masahiko; Morita, Kazumi; Muro, Yoshinari; Kan, Takahiro; Iida, Yoshiaki; Kobayashi, Hideo; and Obara, Takashi, 5,413,640, Cl. 148-111.000.
- Kobayashi, Isamu: See—  
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- Kobayashi, Kazuhiro; Murai, Hiroyuki; and Hayama, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Active matrix liquid crystal display device. 5,414,278, Cl. 257-72.000.
- Kobayashi, Kiyoshi: See—  
Suga, Yasushi; Kobayashi, Kiyoshi; and Sasahara, Toshimitu, 5,413,818, Cl. 427-420.000.
- Kobayashi, Mikio: See—  
Nishisu, Yoshihiro; and Kobayashi, Mikio, 5,413,736, Cl. 252-301.40R.
- Kobayashi, Naoya; Takasaki, Yoshitaka; Mizokawa, Sadao; Maruyama, Hisayuki; Mabuchi, Hiroshi; and Amada, Eiichi, to Hitachi, Ltd.; and Hitachi Cable, Ltd. Transmission system constituted of multistage reproduction nodes. 5,414,739, Cl. 375-371.000.
- Kobayashi, Shinichi: See—  
Ikezawa, Yukio; and Kobayashi, Shinichi, 5,414,505, Cl. 356-127.000.
- Kobayashi, Shunichi, to Kabushiki Kaisha Toshiba. Electronic watt-hour meter. 5,414,349, Cl. 324-142.000.
- Kobayashi, Tatsuya: See—  
Fuji, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.
- Kobayashi, Yoshinori: See—  
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- Kobayashi, Yuji, to Fuji Xerox Co., Ltd. Image reader having the ability to correct imaging performance to due field angle focus variations. 5,414,536, Cl. 358-504.000.
- Kobrosly, Walid: See—  
Vassiliadis, Stamatis; Triantafyllos, George; and Kobrosly, Walid, 5,414,797, Cl. 395-51.000.
- Koch Engineering Company, Inc.: See—  
Buchholz, Matthew; Yeoman, Neil; and Matke, Frank E., 5,413,741, Cl. 261-112.200.
- Koch, Max, to Komax Holding AG. Cable-feeding and cable-changing apparatus for a cable processing machine. 5,412,855, Cl. 29-33.00M.
- Koch, Peter: See—  
Steckelberg, Willi; Muller, Rolf; and Koch, Peter, 5,414,128, Cl. 564-406.000.
- Koch, Robert: See—  
Sue, Chen-Youn; Koch, Robert; Pace, John E.; and Prince, Gregory R., 5,414,045, Cl. 525-86.000.
- Koch, Thomas L.; Ostermayer, Frederick W., Jr.; Tennant, Donald M.; and Verdiell, Jean-Marc, to American Telephone and Telegraph Company. Grating fabrication using electron beam lithography. 5,413,884, Cl. 430-5.000.

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- Kodama, Yasumasa; and Sekine, Yoshiyuki, to Sony Corporation. Luminance signal generator with interpolation. 5,414,465, Cl. 348-236.000.
- Koenigswieser, Rudolf; and Reisenbichler, Peter, to Robert Bosch GmbH. Fuel injection system for internal combustion engines. 5,413,076, Cl. 123-446.000.
- Koga, Kunio, to Global Octanes Corporation. Method for improving conversion of isobutylene in MTBE process. 5,414,147, Cl. 568-697.000.
- Koga, Noriyuki; and Hanzawa, Hisashi, to Sony Corporation. Cassette accommodating type electronic device having a plurality of windows for identifying the amount of remaining tape and the side label of the cassette accommodated in the device. 5,414,573, Cl. 360-93.000.
- Kogoma, Masuhiro: See—  
Okazaki, Sachiko; Kogoma, Masuhiro; Hirakawa, Masahiro; and Kasai, Kazuo, 5,413,769, Cl. 422-186.070.
- Koguchi, Yuko: See—  
Yoshimura, Toshihiko; Shimizu, Tasaku; Ishikawa, Yuichi; Otaka, Masahiro; Koguchi, Yuko; Enomoto, Kunio; Hasegawa, Kunio; Hayashi, Makoto; and Takaku, Kazuo, 5,414,356, Cl. 324-239.000.
- Kohlmeier, Bruce E., to Parker-Hannifin Corporation. Alignment coupler for linear device. 5,413,031, Cl. 92-165.00R.
- Kohn, Bruce R.: See—  
Boorse, Rodney T.; Kohn, Bruce R.; and Shotwell, Kerri R., 5,414,626, Cl. 364-424.030.
- Kohno, Teruhisa: See—  
Nokubo, Seiji; Kohno, Teruhisa; and Fujimoto, Tsuyoshi, 5,413,406, Cl. 303-119.200.
- Kohno, Yoshiaki: See—  
Takaoka, Tatsuru; Yagi, Kouichi; and Kohno, Yoshiaki, 5,412,865, Cl. 29-830.000.
- Koike, Noriyuki: See—  
Tarumi, Yasuo; Koike, Noriyuki; and Takago, Toshio, 5,414,119, Cl. 562-851.000.
- Koivukangas, John, to Onesys Oy. Device for surgical procedures. 5,413,573, Cl. 606-1.000.
- Koizumi, Shinobu, to Hitachi, Ltd. Method for selectively saving/restoring first registers and bypassing second registers in register units based on individual lock/unlock status thereof. 5,414,864, Cl. 395-775.000.
- Kojima, Hisayoshi: See—  
Fuji, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.
- Kolaska, Karl-Heinz; and Voss, Gerd, to Storopack Hans Reichenecker GmbH & Co. Shaped bodies of granulated beads and method. 5,413,855, Cl. 428-320.200.
- Kolb, Eric S.: See—  
Cumming, William J.; Gaudiana, Russell A.; Ingwall, Richard T.; Kolb, Eric S.; Mehta, Parag G.; and Minns, Richard A., 5,414,069, Cl. 528-310.000.
- Kolbus GmbH & Co. KG: See—  
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- Rathert, Horst, 5,413,447, Cl. 412-19.000.
- Koller, Beverly H.: See—  
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- Kolvereid, Harald. Compression-type pipe joint using threaded clamp having longitudinally slotted inner sleeve. 5,413,388, Cl. 285-323.000.
- Koma, Yasuyuki, to Honda Giken Kogyo Kabushiki Kaisha. Knee bolster structure. 5,413,379, Cl. 280-752.000.
- Komarek, James A.; Tanner, Scott B.; Padgett, Clarence W.; and Minney, Jack L., to Creative Integrated Systems, Inc. VLSI memory with an improved sense amplifier with dummy bit lines for modeling addressable bit lines. 5,414,663, Cl. 365-210.000.
- Komatsu, Eiji, to Sony Corporation. Charge transfer device wherein the time constant between the clock means and the transfer gate electrodes are substantially equal. 5,414,467, Cl. 348-322.000.
- Komatsu, Tokuhisa: See—  
Aikawa, Noboru; Matsuo, Koji; Nishimura, Yutaka; Iwamoto, Hiroshi; and Komatsu, Tokuhisa, 5,412,867, Cl. 29-825.000.
- Komatsu, Toshiyuki: See—  
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- Komax Holding AG: See—  
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- Komiya, Kenichi: See—  
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- Komori Corporation: See—  
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- Komoto, Keiji: See—  
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- Komura, Norio; Makita, Hiroshige; Ishikawa, Tomoaki; and Miyakawa, Taro, to Honda Giken Kogyo Kabushiki Kaisha. Hydrostatic continuously variable transmission. 5,412,948, Cl. 60-468.000.
- Kondo, Kazuaki; and Imura, Masaki, to Sumitomo Rubber Industries, Ltd. Apparatus and method for forming a green tire. 5,413,653, Cl. 156-111.000.
- Kondo, Kazuhiko: See—  
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- Kondo, Seiji: See—  
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- Kong, Paul: See—  
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- Kong, Stephen B.: See—  
Iliff, Robert J.; Mitchell, James D.; Carty, Daniel T.; Latham, James R.; and Kong, Stephen B., 5,412,958, Cl. 68-5.00C.
- Konica Corporation: See—  
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- Ueda, Kiichirou, 5,414,562, Cl. 359-683.000.
- Konig, Bernhard: See—  
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- Konkel, Siegfried: See—  
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- Konoshima, Takao; Tokuda, Harukuni; Iinuma, Munekazu; and Mizuno, Mizuo, to Tsujimoto Kagaku Kogyo Co., Ltd. Anti-skin tumor promoting composition. 5,414,015, Cl. 514-456.000.
- Konrad, Rainer: See—  
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- Koong, Farn-Ping: See—  
Yao, Shin-Chuan; Wu, Jong-Fu; Cheng, Kun-Lin; Tsai, Chiu-Hsiung; Koong, Farn-Ping; Chuang, Kun-Lung; Yao, Shu-Lan; and Liu, Chin-Liu, 5,414,024, Cl. 521-114.000.
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- Koppe, Heinz; Nicolai, Norbert; and Stupp, Winfried, to Stewing GmbH & Co. KG Werk Berlin. Heat-shrinkable materials, especially for cable splices and junctions. 5,413,790, Cl. 424-411.000.
- Korber AG: See—  
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- Uhm, Sung J.; Han, Sung H.; Oh, Jun W.; Joo, Oh S.; Jung, Kwang D.; and Beak, Jung Y., 5,414,161, Cl. 568-885.000.
- Koreeda, Masato; and Houston, Todd A., to University of Michigan. Synthesis of C-glycosylated compounds with the use of a mild, iodine-catalyzed reaction. 5,414,074, Cl. 536-18.600.
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- Kosak, Matthew K.: See—  
Kosak, Kenneth M.; and Kosak, Matthew K., 5,413,924, Cl. 435-177.000.
- Kosaka, Nobuo: See—  
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- Kosal, Jeffrey A.; and Revis, Anthony, to Dow Corning Corporation. Fiber treatment compositions and methods for the preparation thereof. 5,413,724, Cl. 252-8.600.
- Koscica, Thomas E.: See—  
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- Koshi, Yutaka; Kamizawa, Koh; Kunitake, Setsu; and Suzuki, Kazuhiro, to Fuji Xerox Co., Ltd. Image encoding apparatus sensitive to tone variations. 5,414,527, Cl. 358-433.000.
- Koshida, Nobuyoshi: See—  
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- Kosinski, Sandra G.: See—  
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- Koskenmaki, David C.; and Calhoun, Clyde D., to Minnesota Mining and Manufacturing Company. Array of conductive pathways. 5,413,659, Cl. 156-229.000.
- Koss, Edward S. Remotely controlled steering apparatus for outboard motor. 5,413,062, Cl. 114-144.00A.
- Kost, Kent M.; Lindsay, Thomas J.; and Price, John F., to Boehringer Mannheim Corporation. Potentiometric biosensor and the method of its use. 5,413,690, Cl. 204-403.000.
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- Kosuge, Minoru: See—  
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- Kotagiri, Yukio: See—  
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- Kotatsu, Nobuo, to Hitachi, Ltd. System for determining and returning frequently requested information by an alternate path in a distributed database. 5,414,837, Cl. 395-600.000.
- Kotidis, Petros A.: See—  
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- Kotmel, Robert F.: See—  
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- Kotobuki & Co. Ltd.: See—  
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- Kotobuki Sangyo Kabushiki Kaisha: See—  
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- Kotzur, Frank W.; Swanson, Mark; Sutton, Kevin; Hopko, Donald J.; Rosenkranz, Thomas; and Franklin, David, to Windings, Inc. Serial accumulator system for filamentary material. 5,413,264, Cl. 226-119.000.
- Kouno, Katuyuki: See—  
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- Kouno, Tetsushi: See—  
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- Kovacs, Janos; and Kroesen, Ronald, to Analog Devices, Inc. Center frequency controlled phase locked loop system. 5,414,390, Cl. 331-2.000.
- Koval, Carl A.: See—  
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- Koyanagi, Toshiro, to Takata Corporation. Restraining protective seat for infants. 5,413,401, Cl. 297-250.100.
- Koyano, Yukio: See—  
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- Kraeft, Robert W. Apparatus and method for directing and controlling propelled balls. 5,413,085, Cl. 124-81.000.
- Kraft Foods, Inc.: See—  
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- Kragtwijk, Eric: See—  
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- Krajicek, Milan. Three-layer vascular prostheses. 5,413,597, Cl. 623-1.000.
- Kramer, Jeffrey C.: See—  
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- Kramer, Paul H.; and Tate, Kay A., to International Business Machines Corporation. Method for protecting data in a computer system. 5,414,852, Cl. 395-700.000.
- Kramer, Robert: See—  
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- Kramer, Thomas: See—  
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- Krammer, Erich: See—  
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- Krapchev, Vladimir B. Infrared laser system. 5,414,723, Cl. 372-3.000.
- Kratzert, Herbert: See—  
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- Kratzert & Schrem GmbH: See—  
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- Krause, John T.: See—  
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- Krause, Kenneth W., to Smith & Nephew Dyonics, Inc. Brushless motor. 5,414,332, Cl. 318-254.000.
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- Krieg, G.: See—  
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- Krieger, John M. Floating gun barrel mount. 5,412,895, Cl. 42-75.020.
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- Kring, Charles J., Jr.: See—  
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- Krishnamoorthy, Suban: See—  
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- Kroesen, Ronald: See—  
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- Kromminga, Gaylen; Dietrich, William J., Sr.; and Knobloch, Dean, to DMI, Inc. Improvements in frame of winged agricultural implement. 5,413,182, Cl. 172-776.000.
- Kronberg, James W., to United States of America, Energy. Digital electronic bone growth stimulator. 5,413,596, Cl. 607-51.000.
- Krongauz, Viktor; Dohm, Gregg E.; and Qureshi, Gulzar A., to Allied Tube & Conduit Corporation. Hinge connector. 5,412,843, Cl. 16-387.000.
- Krossmann, Jurgen: See—  
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- Krueger, John D.: See—  
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- Krupp Industrietechnik Gesellschaft mit beschränkter Haftung: See—  
Pausch, Konrad; and Stenvers, Karl-Heinz, 5,414,564, Cl. 359-846.000.
- Kruse, Thomas E.; and Traxler, John C., to Sunstate Mobility Corp. Personal mobility vehicle. 5,413,187, Cl. 180-65.100.
- Kubo, Masao: See—  
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- Kubota Corporation: See—  
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- Kubota, Takeshi, to Canon Kabushiki Kaisha. Image forming apparatus with circuit board cover guiding recording medium. 5,414,492, Cl. 355-200.000.
- Kubota, Yasushi; and Onishi, Shigeo, to Sharp Kabushiki Kaisha. Driving circuit of a ferroelectric memory device and a method for driving the same. 5,414,654, Cl. 365-145.000.
- Kuchelapati, Raju; Koller, Beverly H.; and Smithies, Oliver, to Cell Genesys, Inc.; and Univ. of North Carolina at Chapel Hill. Homologous recombination for universal donor cells and chimeric mammalian hosts. 5,413,923, Cl. 435-172.300.
- Kuchimachi, Kazuhiro: See—  
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- Kuchta, Richard, to Gerber Garment Technology, Inc. Cloth cutter bed slat cleaner with vacuum removal feature. 5,412,836, Cl. 15-308.000.
- Kudo, Junichi: See—  
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- Kuehn, Arthur G.: See—  
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- Kuekenhoechner, Thomas: See—  
Fischer, Rolf; Goetz, Norbert; Kuekenhoechner, Thomas; Rust, Harald; and Schnurr, Werner, 5,414,097, Cl. 549-425.000.
- Kuhar, Michael J.; Carroll, Frank I.; Boja, John W.; Lewin, Anita H.; and Abraham, Philip, to Research Triangle Institute; and United States of America, Health and Human Services. Cocaine receptor binding ligands. 5,413,779, Cl. 424-1.850.
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- Kuhn, Peter: See—  
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- Kuhnhold, Michael; Fischer, Wolfgang; and Dropezyński, Hartmut, to Jagenberg Aktiengesellschaft. Method and device for exchanging windings rolls. 5,413,656, Cl. 156-184.000.
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- Kulis, Stanley F., Jr.; and Carpenter, Richard L., to Pneumo Abex Corporation. Brake friction pad assembly. 5,413,194, Cl. 188-251.00A.
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- Kumar, Ajith K.; and Stitt, Thomas D., to General Electric Company. Pattern generation control for inverter drives. 5,414,615, Cl. 363-95.000.
- Kumar, Alok: See—  
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- Kumar, Vijay: See—  
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- Kumazawa, Satoru; Shimizu, Susumu; Enari, Hiroyuki; Ito, Atsushi; Ikeda, Susumu; Sato, Nobuo; and Saishoji, Toshihide, to Kureha Kagaku Kogyo Kabushiki Kaisha. Cyclopentanecarboxylic acid derivatives useful for producing azole compounds. 5,414,105, Cl. 560-51.000.
- Kummel, Alfred: See—  
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- Kummer, Kyle G.: See—  
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- Kumpf, Robert J.: See—  
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- Kunitake, Setsu: See—  
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- Kunkel, Steven L.; Lyle, Leon R.; and Strieter, Robert M., to University of Michigan, The Regents of the; and Mallinckrodt Medical, Inc. Labelled monocycle chemoattractant protein material and medical uses thereof. 5,413,778, Cl. 424-1.410.
- Kunzevski, Tamar: See—  
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- Kunz, Arland D.: See—  
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- Kuo, Judy C. L.: See—  
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- Kuo, Youti: See—  
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- Kuok, Henry H., to Thomson Consumer Electronics, Inc. Audio recording apparatus using an imperfect memory circuit. 5,414,758, Cl. 379-88.000.
- Kuramoto, Ryusuke, to Nakata Manufacturing Co., Ltd. Method of determining the optimum ratios of roll rotation speeds in a cold roll forming mill. 5,412,965, Cl. 72-19.000.
- Kurano, Takatoshi: See—  
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- Kuraray Co., Ltd.: See—  
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- Omatsu, Toshihiro; and Tokitoh, Yasuo, 5,414,138, Cl. 568-454.000.
- Kurata, Kazuhiko, to NEC Corporation. Coupling structure between optical semiconductor and optical waveguide, and coupling method of the same. 5,414,787, Cl. 385-92.000.
- Kureha Chemical Industry Co., Ltd.: See—  
Wakasugi, Takashi; Miyakawa, Tadashi; and Suzuki, Fukuichi, 5,414,139, Cl. 568-466.000.
- Kureha Kagaku Kogyo Kabushiki Kaisha: See—  
Kumazawa, Satoru; Shimizu, Susumu; Enari, Hiroyuki; Ito, Atsushi; Ikeda, Susumu; Sato, Nobuo; and Saishoji, Toshihide, 5,414,105, Cl. 560-51.000.
- Kurimoto, Ltd.: See—  
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- Kuriyama, Toru: See—  
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- Kuroda, Kazuhiko: See—  
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- Kuroda, Masuo; Yazaki, Fumihiko; Wakabayashi, Masashi; and Ohsaka, Naoyuki, to Yokohama Rubber Co., Ltd., The. Hose with releasable float for leak detection. 5,413,146, Cl. 138-104.000.
- Kurokawa, Toshio; Sawano, Mitsuru; Osawa, Yukio; Nakagawa, Kenichi; and Ichihashi, Mitsuoshi, to Fuji Photo Film Co., Ltd. Photosensitive material exposure apparatus. 5,414,490, Cl. 355-71.000.
- Kushida, Masaki: See—  
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- Kushino, Mitsuo: See—  
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- Kussi, Siegfried: See—  
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- Kusumoto, Satoru; and Oka, Ryoichi, to Tylan General, K.K. Throttle valve. 5,413,139, Cl. 137-341.000.
- Kutner, Barry S.; and Latowicki, Daniel A., to Flexiclav, Inc. Method and apparatus for sterilizing articles. 5,413,757, Cl. 422-21.000.
- Kutsuwada, Tatsuya: See—  
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L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Precedes Georges Claude: See—  
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Landers, Carl. Method of and apparatus for horizontal well drilling. 5,413,184, Cl. 175-62.000.

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Larson, Jay M.; and Bonesteell, David L., to Eaton Corporation. Ultra light engine valve. 5,413,073, Cl. 123-188.300.  
Larson, Tony R.; and Taylor, Raymond S., to International Business Machines Corporation. Impedance buffer for driving capacitive loads. 5,414,382, Cl. 327-561.000.  
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Laufer, Helmut, to Robert Bosch GmbH. Fuel injection pump. 5,413,080, Cl. 123-502.000.  
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Daniel, William H., 5,413,465, Cl. 416-182.000.

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Lee, David, to United Microelectronics Corporation. Twin tub CMOS process. 5,413,944, Cl. 437-34.000.  
Lee, Edward K. B., to Motorola, Inc. Method and apparatus for receiving and decoding communication signals in a CDMA receiver using partial de-correlation. 5,414,699, Cl. 370-18.000.  
Lee, George C., to Ford Motor Company. Retainer for holding relative positions of rotating members. 5,413,418, Cl. 384-620.000.  
Lee, Guo-shuh J.: See—  
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Lee, Han-Sheng; Staller, Steven E.; and Chilcott, Dan W., to Delco Electronics Corporation. Method of bonding silicon wafers at temperatures below 500 degrees centigrade for sensor applications. 5,413,955, Cl. 437-86.000.  
Lee, Heung Soon, to Goldstar Co., Ltd. Apparatus for decoding variable length codes. 5,414,468, Cl. 348-402.000.  
Lee, Hyung-seok, to Samsung Electronics Co., Ltd. Multilayered liquid crystal display with multiple black unit columns. 5,414,545, Cl. 359-53.000.  
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Lee, Nicholas A.; Meis, Michael A.; and Stone, Theodore J., to Minnesota Mining and Manufacturing Company. Actuation tool and cap for fiber optic connector. 5,414,790, Cl. 385-139.000.  
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- Mandeville, Raymond E.: See—  
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Steigerwald, Robert L.; and Park, John N., 5,414,238, Cl. 219-121.540.  
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Kawamura, Yoshiro; Manabe, Isao; and Nakashima, Shingo, 5,412,973, Cl. 72-369.000.  
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Matharu, Rajinder P. S.: See—  
Schneider, F. Howard; Muni, Indu A.; Murty, B. Ram; Pandya, Mahendra K.; and Matharu, Rajinder P. S., 5,414,005, Cl. 514-343.000.  
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Matsubara, Yoichi: See—  
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Matsushima, Keiichi, to Graphtec Corp. Tablet position digitizer. 5,414,226, Cl. 178-18.000.  
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Matsushita Electric Corporation of America: See—  
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Iitsuka, Hiroyuki, 5,414,686, Cl. 369-48.000.  
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Uemachi, Hiroshi; Sato, Yoshiko; Sotomura, Tadashi; and Takeyama, Kenichi, 5,413,882, Cl. 429-213.000.  
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- McPherson, Donald M. Laser absorbing filter glass. 5,413,971, Cl. 501-78.000.
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- Meyer, Joseph H.: See—  
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- Microlas Lasersystem GmbH: See—  
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- Micron Technology, Inc.: See—  
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- Kaneko, Steven T.; and Adams, Aditha M., 5,414,445, Cl. 345-163.000.
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- Diebold, James P.; and Scahill, John W., 5,413,227, Cl. 209-722.000.
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- Milkovich, Stephen A.: See—  
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- Miller, Christopher P.: See—  
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- Miller, Leo C. Flying toy. 5,413,354, Cl. 273-426.000.
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- Miller, Steven. Adjustable eye bolt for bicycle cantilever brakes. 5,413,193, Cl. 188-24.190.
- Milligan, Tim V., to Centuri Corporation. Recoverable aerial toy. 5,413,514, Cl. 446-36.000.
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- Millipore S. A.: See—  
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- Eian, Gilbert L., 5,414,048, Cl. 525-326.200.
- Gaul, Kimberley A., 5,413,729, Cl. 252-162.000.
- Koskenmaki, David C.; and Calhoun, Clyde D., 5,413,659, Cl. 156-229.000.
- Lee, Nicholas A.; Meis, Michael A.; and Stone, Theodore J., 5,414,790, Cl. 385-139.000.
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- Mitscher, Alfred: See—  
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- Mitsubishi Cable Industries, Ltd.: See—  
Watabe, Shinichi; Kazuyuki, Tadatomo; and Okagawa, Hiroaki, 5,414,281, Cl. 257-95.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Egawa, Kunihiko; Umemura, Toshio; Kinouchi, Shinichi; Wakata, Mitsunobu; Utsunomiya, Shin; and Nozaki, Ayumi, 5,413,981, Cl. 505-121.000.
- Hosoya, Yasuhiko, 5,412,943, Cl. 60-276.000.
- Inoue, Yasuo; Sugahara, Kazuyuki; Ipposhi, Takashi; Yamaguchi, Yasuo; and Nishimura, Tadashi, 5,413,968, Cl. 437-200.000.
- Matsumoto, Norio; and Muramatsu, Kikuo, 5,414,717, Cl. 371-32.000.
- Nakahara, Kazuhiko; and Sasaki, Yoshinobu, 5,414,387, Cl. 330-54.000.
- Ogawa, Kenji, 5,414,367, Cl. 324-663.000.
- Ogawa, Kenji; and Suzuki, Hiroyoshi, 5,414,368, Cl. 324-675.000.
- Ozeki, Yuko; and Fudeyasu, Yoshio, 5,414,672, Cl. 365-233.500.



Shimura, Teruyuki; and Yoshida, Naohito, 5,414,273, Cl. 257-17.000.  
 Tanahashi, Toru, 5,414,333, Cl. 318-268.000.  
 Tsutsumi, Seisuke; Ikawa, Yasushi; and Shima, Akira, 5,414,336, Cl. 318-560.000.  
 Tsuzuki, Munenori; Yamanaka, Hideaki; Saito, Hirotsuka; and Oshima, Kazuyoshi, 5,414,696, Cl. 370-16.000.  
 Wada, Shunichi; Nisino, Kazuhisa; and Sasaki, Yasushi, 5,414,627, Cl. 364-424.050.  
 Yamauchi, Shunji, 5,413,471, Cl. 425-129.100.  
 Mitsubishi Electronic Research Laboratories, Inc.: See—  
 Bershteyn, Mikhail, 5,414,716, Cl. 371-27.000.  
 Mitsubishi Jukogyo Kabushiki Kaisha: See—  
 Murata, Yoshinori; Goto, Yukio; Tamura, Yukio; Mouri, Ryoji; Miki, Toshio; and Ishikawa, Masaki, 5,413,475, Cl. 425-205.000.  
 Nakanishi, Teruo; Ando, Yohei; and Sakakibara, Kiyokatsu, 5,413,010, Cl. 74-5.220.  
 Mitsubishi Kasei Corporation: See—  
 Sato, Keiichi; Kawaragi, Yuuji; and Higashino, Yasuko, 5,414,160, Cl. 568-883.000.  
 Mitsubishi Materials Corporation: See—  
 Hayashi, Kunihiko; Fujino, Shuichi; Enomoto, Youichi; and Tanaka, Shoji, 5,413,988, Cl. 505-511.000.  
 Mitsubishi Rayon Co., Ltd.: See—  
 Hajikano, Akira; Hayashi, Seiji; Imai, Yoshitaka; and Aoki, Kunihiro, 5,413,858, Cl. 428-364.000.  
 Mitsubishi Belting Ltd.: See—  
 Mishima, Kyoichi, 5,413,538, Cl. 474-263.000.  
 Mitsubashi, Masami: See—  
 Foss, Richard C.; Gillingham, Peter B.; Harland, Robert; Mitsuhashi, Masami; and Wada, Atsushi, 5,414,662, Cl. 365-203.000.  
 Mitsui Petrochemical Industries, Ltd.: See—  
 Moriya, Satoru; Takahashi, Mamoru; Ishimoto, Akio; and Hirose, Toshiyuki, 5,414,044, Cl. 525-74.000.  
 Mitsumi Electric Co., Ltd.: See—  
 Watanabe, Takashi; and Saitoh, Atsushi, 5,414,389, Cl. 330-279.000.  
 Mitsuana, Seisuke; Matsuo, Naoya; Nagao, Akihito; and Sasaki, Yasunori; to Mazda Motor Corporation. Engine control system, 5,413,078, Cl. 123-492.000.  
 Mitsuhashi Denki Kabushiki Kaisha: See—  
 Kobayashi, Kazuhiro; Murai, Hiroyuki; and Hayama, Masahiro, 5,414,278, Cl. 257-72.000.  
 Mittelman, Harry. Nasal-labial implant, 5,413,600, Cl. 623-11.000.  
 Miura, Takao: See—  
 Kajita, Toru; Ota, Toshiyuki; Yumoto, Yoshiji; and Miura, Takao, 5,413,896, Cl. 430-192.000.  
 Miura, Yasushi; and Takekoshi, Nobuhiko, to Canon Kabushiki Kaisha. Image forming apparatus for forming images on both surfaces of recording material, 5,414,501, Cl. 355-271.000.  
 Miwa, Hiroyuki; Shinohara, Mamoru; Gomi, Takayuki; and Fujisawa, Tomotaka, to Sony Corporation. Semiconductor device and process for fabricating the same, 5,414,291, Cl. 257-370.000.  
 Mixon, Larry C., to United States of America. Army. Reactive armor with radar absorbing structure, 5,413,027, Cl. 89-36.170.  
 Miyahara, Yuji: See—  
 Ozawa, Satoshi; Miyahara, Yuji; Taki, Mamoru; Yamashita, Koutaro; and Watanabe, Yoshio, 5,413,685, Cl. 204-416.000.  
 Miyakawa, Tadashi: See—  
 Wakasugi, Takashi; Miyakawa, Tadashi; and Suzuki, Fukuichi, 5,414,139, Cl. 568-466.000.  
 Miyakawa, Taro: See—  
 Komura, Norio; Makita, Hiroshige; Ishikawa, Tomoaki; and Miyakawa, Taro, 5,412,948, Cl. 60-468.000.  
 Miyake, Tetsuo: See—  
 Ono, Kazuya; Miyake, Tetsuo; Osa, Mikio; Kitagawa, Katuji; and Kubo, Masao, 5,414,058, Cl. 525-523.000.  
 Miyamoto, Harukazu: See—  
 Sugiyama, Hisataka; Maeda, Takeshi; Matsumoto, Kiyoshi; Terao, Motoyasu; Okamine, Shigenori; Nishida, Tetsuya; and Miyamoto, Harukazu, 5,414,451, Cl. 347-258.000.  
 Miyamoto, Masahiko: See—  
 Takimoto, Kiyoshi; Hatanaka, Katsunori; Sakai, Kunihiro; Miyamoto, Masahiko; Kawade, Hisaaki; Sato, Yasufumi; Kishi, Etsuro; and Kawagishi, Hideyuki, 5,414,260, Cl. 250-306.000.  
 Miyasaka, Hideki: See—  
 Matsushige, Hiromi; Kosuge, Minoru; Shimura, Yasuhiro; Miyasaka, Hideki; Minoshima, Satoshi; Tachiuchi, Tsugui; Iwabuchi, Kazunori; Takashi, Terumi; and Matsunami, Naoto, 5,414,571, Cl. 360-65.000.  
 Miyata, Teijiro: See—  
 Hosono, Masakazu; Arai, Hidehiko; and Miyata, Teijiro, 5,414,204, Cl. 588-210.000.  
 Miyauchi, Fumio; and Mizuno, Shouji, to Ikeda Bussan Co., Ltd. Method of making a back-rest frame for a seat, 5,412,860, Cl. 29-527.100.  
 Miyazaki, Kiyoshi; Wakai, Tomoyuki; Isosaka, Akira; Watanabe, Yoshio; and Koyano, Yukio, to Kawashimaseisakusyo Co., Ltd. Longitudinal bag-making, filling and packaging machine, 5,412,927, Cl. 53-552.000.  
 Miyazaki, Masami; and Ando, Eiichi, to Asahi Glass Company Ltd. Low emissivity film, 5,413,864, Cl. 428-432.000.  
 Miyazaki, Toshihiko: See—  
 Shido, Shun-ichi; Miyazaki, Toshihiko; Sakai, Kunihiro; and Oguuchi, Takahiro, 5,414,690, Cl. 369-126.000.

Miyoshi, Kazunori: See—  
 Deguchi, Kimiyoshi; Somemura, Yoh; Miyoshi, Kazunori; and Matsuda, Tadahito, 5,414,746, Cl. 378-35.000.  
 Miyoshi, Motosuke: See—  
 Shimizu, Masahiro; Fukasawa, Takayuki; Yamazaki, Yuichiro; Miyoshi, Motosuke; Okano, Haruo; and Okumura, Katsuya, 5,413,663, Cl. 156-345.000.  
 Mizokami, Takuya: See—  
 Maeda, Takeshi; Arai, Shinichi; Isaka, Kazuo; Saito, Atsushi; Mizokami, Takuya; Sugiyama, Hisataka; and Kawamura, Satoshi, 5,414,689, Cl. 369-116.000.  
 Mizokawa, Sadao: See—  
 Kobayashi, Naoya; Takasaki, Yoshitaka; Mizokawa, Sadao; Maruyama, Hisayuki; Mabuchi, Hiroshi; and Amada, Eiichi, 5,414,739, Cl. 375-371.000.  
 Mizukami, Makoto, to Victor Company of Japan, Ltd. Magnetic recording medium having a glass or amorphous carbon substrate, vanadium or molybdenum precoat layer, chromium primer layer and cobalt magnetic layer, 5,413,873, Cl. 428-611.000.  
 Mizuno, Den'ichi: See—  
 Soma, Gen-ichiro; Yoshimura, Kiyoshi; Tsukioka, Daisuke; Mizuno, Den'ichi; and Oshima, Haruyuki, 5,413,993, Cl. 514-54.000.  
 Mizuno, Kazunori, to Fuji Photo Film Co., Ltd. Packaging for a photographic film cassette, 5,413,221, Cl. 206-397.000.  
 Mizuno, Mizuo: See—  
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 Mizuno, Shouji: See—  
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 Mizuno, Yasuyuki, to Riken Vinyl Industry Co., Ltd. Decorative laminated sheet having a feeling of coating and a process for producing same, 5,413,840, Cl. 428-195.000.  
 Mizushima, Ichiro: See—  
 Murakoshi, Atsushi; Mizushima, Ichiro; Watanabe, Masaharu; and Yoshiki, Masahiko, 5,413,943, Cl. 437-20.000.  
 Mlakar, Paul F., to Jaycor. Telescoping hardened aircraft unit load device, 5,413,410, Cl. 312-409.000.  
 Mobil Oil Corporation: See—  
 Bell, Weldon K.; Brown, Steven H.; Harandi, Mohsen N.; and Trewella, Jeffrey C., 5,414,146, Cl. 568-697.000.  
 Chen, Catherine S. H.; and Wentzek, Steven E., 5,414,189, Cl. 585-801.000.  
 Child, Jonathan E.; and Melli, Tomas R., 5,414,186, Cl. 585-724.000.  
 Chin, Arthur A.; Collins, Nick A.; Harandi, Mohsen N.; Thomson, Robert T.; and Ware, Robert A., 5,414,172, Cl. 585-322.000.  
 Chou, Tai-Sheng, 5,413,699, Cl. 208-113.000.  
 Fletcher, David L.; Sarli, Michael S.; and Shih, Stuart S., 5,413,697, Cl. 208-89.000.  
 Fletcher, David L.; Harandi, Mohsen N.; Sarli, Michael S.; and Shih, Stuart S., 5,413,698, Cl. 208-89.000.  
 Yan, Tsoung Y., 5,413,702, Cl. 208-97.000.  
 Mobile Oil Corporation: See—  
 Fletcher, David L.; Hilbert, Timothy L.; McGovern, Stephen J.; Sarli, Michel S.; and Shih, Stuart S., 5,413,696, Cl. 208-89.000.  
 Mobile Telecommunication Technologies: See—  
 Bhagat, Jai P.; Ackerman, David W.; Oswalt, Ernest A.; and Hays, William D., 5,414,750, Cl. 379-57.000.  
 Mochizuki, Yasumasa; Yoshino, Tomoaki; Hasegawa, Shinichi; and Sano, Masakazu, to Jatco Corporation. System and method for predicting failure in machine tool, 5,414,632, Cl. 364-474.160.  
 Mock, Elmar, to Tetra Alfa Holdings S.A. Closure unit on a container for flowable products, 5,413,238, Cl. 220-268.000.  
 Mock, Gerald L.; Benmergui, Alberto D.; and Siddiqui, Uzair, to Toro Company, The. Irrigation controller with analog data input devices, 5,414,618, Cl. 364-140.000.  
 Modiano, Alberto M.: See—  
 Smith, Henry I.; Modiano, Alberto M.; and Moon, Euclid E., 5,414,514, Cl. 356-363.000.  
 Moenclaeys, Denis, to Picanol N.V. Gripper loom rapier guide arrangement, 5,413,151, Cl. 139-449.000.  
 Mohan, Philip V., to Chrysler Corporation. Adjustable piercing probe tip, 5,414,346, Cl. 324-72.500.  
 Molex Incorporated: See—  
 Comer, Joseph D.; DeRoss, Robert; and Gierut, Frederick J., 5,412,862, Cl. 29-751.000.  
 Molins PLC: See—  
 Dawson, John; Dyett, Derek H.; Sharp, Norman L.; and Sternbridge, James R., 5,413,121, Cl. 131-84.100.  
 Mollen, Hubertus T.: See—  
 Verguld, Martinus M. F.; and Mollen, Hubertus T., 5,413,275, Cl. 228-180.210.  
 Moller International, Inc.: See—  
 Griffith, Michael J., 5,413,877, Cl. 428-698.000.  
 Moltech Invent S.A.: See—  
 de Nora, Vittorio; and Sekhar, Jainagesh A., 5,413,689, Cl. 204-279.000.  
 Monarch Marking Systems, Inc.: See—  
 Principe, Terry J.; and Schultz, Paul S., 5,413,384, Cl. 283-81.000.  
 Monbaliu, Marcel J.: See—  
 Van Rompuy, Ludo L.; Dewanckele, Jean-Marie O.; Vaes, Jos A.; and Monbaliu, Marcel J., 5,413,897, Cl. 430-230.000.  
 Monetel S.A.: See—  
 Dubois, Eric; and Nicolet, Andre, 5,413,325, Cl. 271-121.000.

Money, Julian D., to M-Pak Limited. Merchandise containers, 5,413,273, Cl. 229-128.000.  
 Mongelluzzo & Butta, Ltd.: See—  
 Mongelluzzo, Michael, 5,412,831, Cl. 15-167.100.  
 Mongelluzzo, Michael, to Mongelluzzo & Butta, Ltd. Toothbrush with replaceable brush head, 5,412,831, Cl. 15-167.100.  
 Monk, Ronald W.; Van Cleve, David P.; Crisafulli, Joseph A.; Curry, Robert J.; Carpenter, Dennis G.; Emmert, Gerald T.; Fowler, David L.; and Milani, David A., to Hughes Aircraft Company. Method and apparatus for missile interface testing, 5,414,347, Cl. 324-73.100.  
 Monsanto Europe S.A./N.V.: See—  
 De Keyser, Francois, 5,413,828, Cl. 428-36.500.  
 Montaz, Edmond, to S P I R E C-sarl-. Device for controlling temperature in a room, 5,413,530, Cl. 454-262.000.  
 Montgomery, Lawrence M., to Amber Forrest, Inc. Eggball, 5,413,332, Cl. 273-58.00R.  
 Moon, Euclid E.: See—  
 Smith, Henry I.; Modiano, Alberto M.; and Moon, Euclid E., 5,414,514, Cl. 356-363.000.  
 Moon, Kook-Jin. Inertia driven striker for a firearm, 5,412,894, Cl. 42-69.020.  
 Moon, Kyung H., to Samsung Electronics Co., Ltd. Top cover locking system of a boiling clothes washing machine, 5,412,825, Cl. 8-159.000.  
 Mooney, Charles W.: See—  
 Eaton, Eric T.; and Mooney, Charles W., 5,414,596, Cl. 361-814.000.  
 Mooney, Kieran G.: See—  
 Sheth, Nitin V.; Valorose, Joseph J., Jr.; Ellway, Keith A.; Ganesan, Madurai G.; Mooney, Kieran G.; and Johnson, Jerry B., 5,413,777, Cl. 424-490.000.  
 Moore, Anthony J.: See—  
 Cracknell, Robert B.; and Moore, Anthony J., 5,414,103, Cl. 558-90.000.  
 Moore, Brian K., to Camco International Inc. Spoolable coiled tubing completion system, 5,413,170, Cl. 166-85.000.  
 Moore Business Forms, Inc.: See—  
 Raby, James M., 5,413,532, Cl. 462-2.000.  
 Moore, Danielle L.: See—  
 Filip, Michael J.; Karunungan, Kathy L.; Kramer, Jeffrey C.; Lee, Lucille C.; Moore, Danielle L.; Shih, Charles C.; and Sydir, Jaroslaw J., 5,414,812, Cl. 395-200.000.  
 Moore, E. Frank, III. Embroidery hoop set holder and method, 5,413,057, Cl. 112-103.000.  
 Moore, Paul A.: See—  
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 Moore, Robert A.: See—  
 Buchan, William R.; Moore, Robert A.; Theodoulou, Sotos M.; and Carrish, Jeffrey J., 5,414,498, Cl. 355-256.000.  
 Moreiras, Luis; Davis, Frederick J.; and Shild, Issac, to Parker-Hannifin Corporation. Flexible hose and fitting assembly, 5,413,147, Cl. 138-109.000.  
 Moreland, Donald P., to Gas Research Institute. Staged air, low NOX burner with internal recuperative flue gas recirculation, 5,413,477, Cl. 431-9.000.  
 Moreland, Janet, to C. R. Bard, Inc. Vascular graft, 5,413,598, Cl. 623-1.000.  
 Moretto, Hans-Heinrich: See—  
 Pohmer, Klaus; Weber, Rainer; Block, Hans-Dieter; and Moretto, Hans-Heinrich, 5,414,102, Cl. 558-45.000.  
 Pohmer, Klaus; Weber, Rainer; Dorzbach-Lange, Cornelia; Haida, Reinhard; and Moretto, Hans-Heinrich, 5,414,120, Cl. 564-82.000.  
 Morgan, Bill W.; Whiteside, James A.; and Hann, Julian R., to Stark Manufacturing, Inc. System and method for controlling item selection, sequence and completeness, 5,414,634, Cl. 364-478.000.  
 Morgan, Ira L.; Rice, Robert H.; Bolger, Joseph E.; and Schindler, Donald G., to Integrated Diagnostic Measurement Corporation. Nondestructively determining the dimensional changes of an object as a function of temperature, 5,414,648, Cl. 364-563.000.  
 Morgan, James G. Utility device for a fisherman, 5,412,896, Cl. 43-4.000.  
 Mori, Junji: See—  
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 Mori, Shousei: See—  
 Yamashita, Masataka; Terada, Masahiro; Mori, Shousei; and Katagiri, Kazuharu, 5,413,735, Cl. 252-299.610.  
 Mori, Takeshi; Nakamura, Masato; and Nakayama, Eiji, to Central Glass Co., Ltd. Glass plate positioning and supplying machine, 5,413,204, Cl. 198-345.100.  
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 Mori, Yoshikuni; and Kushino, Mitsuo, to Nippon Shokubai, Co., Ltd. Toner and method for production thereof, 5,413,890, Cl. 430-110.000.  
 Moricz nee Garai, Zsuzsanna: See—  
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Morikawa, Hiroshi, to Ryobi Motor Products Corp. Speed control mechanism for a power tool, 5,414,793, Cl. 388-824.000.  
 Morikawa, Takashi: See—  
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 Morimoto, Makoto: See—  
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 Morishita, Akihiko; and Eda, Osami, to Nikon Corporation. Position measuring apparatus, 5,414,516, Cl. 356-374.000.  
 Morita, Kazumi: See—  
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 Morita, Naoyuki; and Tsugane, Hiroaki, to Seiko Epson Corporation. Semiconductor device chip with interlayer insulating film covering the scribe lines, 5,414,297, Cl. 257-620.000.  
 Morita, Shigehiro, to Kabushiki Kaisha Kawai Gakki Seisakusho. Electronic musical instrument, 5,414,209, Cl. 84-615.000.  
 Moriya, Kazumasa: See—  
 Shinoda, Ichiro; Kashiwazaki, Tomoyuki; Okawado, Akira; Moriya, Kazumasa; Sato, Shinichi; Itoh, Motohiko; Watanabe, Mitsuo; and Kawai, Hiroaki, 5,414,252, Cl. 235-463.000.  
 Moriya, Satoru; Takahashi, Mamoru; Ishimoto, Akio; and Hirose, Toshiyuki, to Mitsui Petrochemical Industries, Ltd. Polyolefin resin composition and crosslinked molded article and process for the production thereof, 5,414,044, Cl. 525-74.000.  
 Moriya, Shigeru, to Minolta Camera Kabushiki Kaisha. Image reading apparatus which detects document size, 5,414,522, Cl. 358-296.000.  
 Morizumi, Masaaki, to Fuji Photo Optical Co., Ltd. Overhead projector, 5,414,480, Cl. 353-119.000.  
 Morooka, Yasuo: See—  
 Katayama, Yasunori; Morooka, Yasuo; Okada, Takashi; Nakajima, Masaaki; Hattori, Satoshi; and Shigyo, Masakane, 5,414,619, Cl. 364-151.000.  
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 Mort, Nicholas A.: See—  
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 Morton International, Inc.: See—  
 Daines, Michael J.; and Jones, Michael D., 5,413,375, Cl. 280-728.200.  
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 Andros, Richard P., Jr., 5,414,418, Cl. 340-825.440.  
 Bienz, Richard A., 5,414,738, Cl. 375-341.000.  
 Bushman, Michael L.; and Fuchs, Kenneth C., 5,414,354, Cl. 327-184.000.  
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 Eaton, Eric T.; and Mooney, Charles W., 5,414,596, Cl. 361-814.000.  
 Edgar, Gregory A.; and Huslig, Dan, 5,414,378, Cl. 327-143.000.  
 Fette, Bruce A.; and DaBell, Steve D., 5,414,614, Cl. 363-59.000.  
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 Gladden, Michael E.; Skruhak, Robert J.; Yishay, Oded; and Hartung, Eytan, 5,414,714, Cl. 371-22.300.  
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- Pfiester, James R.; and Hayden, James D., 5,413,948, Cl. 437-41.000.
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- Motoyama, Masahiko: See—  
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- Mouk, Robert W.; and Abel, Albert E., to A.L. Sandpiper Corporation. Non-metallized and substoichiometric metallized reactions with ammonia and other weak bases in the dehalogenation of refrigerants. 5,414,200, Cl. 588-205.000.
- Moulton, Kern A.: See—  
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- Caputo, Ross A.; Jones, Jeffrey; Moulton, Kern A.; and Campbell, Bryant A., deceased, 5,413,758, Cl. 422-22.000.
- Mouri, Ryoji: See—  
Murata, Yoshinori; Goto, Yukio; Tamura, Yukio; Mouri, Ryoji; Miki, Toshio; and Ishikawa, Masaki, 5,413,475, Cl. 425-205.000.
- Movsesian, Peter. Mobile robotic arm. 5,413,454, Cl. 414-729.000.
- Moysan, Stephen R., III; and Sugg, Rolin W., to Baldwin Hardware Corporation. Article having a decorative and protective multilayer coating simulating brass. 5,413,874, Cl. 428-627.000.
- Mozar, Eric S.: See—  
Rocheleau, Paula M.; Wojciechowski, James M.; Miller, Donald E.; Mozar, Eric S.; and Alcini-Mazur, Lisa, 5,414,229, Cl. 181-150.000.
- M'raih, David: See—  
Naccache, David; and M'raih, David, 5,414,772, Cl. 380-46.000.
- MRJ, Inc.: See—  
Fawcett, Kenneth J., Jr., 5,414,771, Cl. 380-44.000.
- MTI Technology Corporation: See—  
Henson, Larry P.; Gajjar, Kumar; and Idleman, Thomas E., 5,414,818, Cl. 395-325.000.
- Mudra nee Kantor, Eva: See—  
Toth, Gyorgy; Balint, Janos; Elek nee Herczik, Klara; Moricz nee Garai, Zsuzsanna; and Mudra nee Kantor, Eva, 5,414,108, Cl. 560-104.000.
- Mueller, Herbert: See—  
Weyer, Hans-Juergen; Fischer, Rolf; Jeschek, Gerhard; and Mueller, Herbert, 5,414,143, Cl. 568-617.000.
- Mueller, Mark A.: See—  
Sheu, Yu-Hwa E.; Sanderson, John R.; Mueller, Mark A.; and Smith, William A., 5,414,145, Cl. 568-671.000.
- Mueller, Ulrich; Hoelndrich, Wolfgang; Schaefer, Hans D.; Eiden, Ulrich; and Woessner, Norbert, to BASF Aktiengesellschaft. Fixing large zeolite and zeolite-like molecular sieve crystals on moldings. 5,413,975, Cl. 502-60.000.
- Muhr, Johann, to Siemens Aktiengesellschaft. Multi-stage switching equipment. 5,414,706, Cl. 370-65.500.
- Mukai, Yasuo; Takasu, Yasuhito; and Nakayama, Masaaki, to Nippon-denso Co., Ltd. Catalytic converter deterioration detecting system for engine. 5,412,942, Cl. 60-276.000.
- Mukudai, Osamu: See—  
Matsuura, Yui; Mukudai, Osamu; Anzai, Mitsutoshi; and Watanabe, Kayoko, 5,413,891, Cl. 430-110.000.
- Matsuura, Yui; Mukudai, Osamu; Anzai, Mitsutoshi; and Watanabe, Kayoko, 5,413,892, Cl. 430-110.000.
- Mulasky, Bernard F.: See—  
Heyse, John V.; and Mulasky, Bernard F., 5,413,700, Cl. 208-134.000.
- Muller-Gliemann, Matthias: See—  
Fey, Peter; Dressel, Jurgen; Hanks, Rudolf; Hubsch, Walter; Kramer, Thomas; Muller, Ulrich; Muller-Gliemann, Matthias; Beuck, Martin; Bischoff, Hilmar; Wohlfeil, Stefan; Denzer, Dirk; Kazda, Stanislav; Stasch, Johannes-Peter; Knorr, Andreas; and Zaiss, Siegfried, 5,414,003, Cl. 514-333.000.
- Muller, Ulrich E.; Dressel, Jurgen; Fey, Peter; Hanks, Rudolf H.; Hubsch, Walter; Kramer, Thomas; Muller-Gliemann, Matthias; Beuck, Martin; Kazda, Stanislav; Knorr, Andreas; Stasch, Johannes-Peter; and Wohlfeil, Stefan, 5,414,008, Cl. 514-381.000.
- Muller, Ingo; Schneider, Norbert; and Krammer, Erich, to U.S. Philips Corporation. Toothbrush. 5,412,827, Cl. 15-22.100.
- Muller, Rolf: See—  
Steckelberg, Willi; Muller, Rolf; and Koch, Peter, 5,414,128, Cl. 564-406.000.
- Muller, Ulrich: See—  
Fey, Peter; Dressel, Jurgen; Hanks, Rudolf; Hubsch, Walter; Kramer, Thomas; Muller, Ulrich; Muller-Gliemann, Matthias; Beuck, Martin; Bischoff, Hilmar; Wohlfeil, Stefan; Denzer, Dirk; Kazda, Stanislav; Stasch, Johannes-Peter; Knorr, Andreas; and Zaiss, Siegfried, 5,414,003, Cl. 514-333.000.
- Muller, Ulrich E.; Dressel, Jurgen; Fey, Peter; Hanks, Rudolf H.; Hubsch, Walter; Kramer, Thomas; Muller-Gliemann, Matthias; Beuck, Martin; Kazda, Stanislav; Knorr, Andreas; Stasch, Johannes-Peter; and Wohlfeil, Stefan, to Bayer Aktiengesellschaft. Imidazolyl-
- substituted phenylpropionic and cinnamic acid derivatives. 5,414,008, Cl. 514-381.000.
- Muller, Walter: See—  
Barth, Peter; Hoffmann, Hans-Rainer; Muller, Walter; and Kindel, Heinrich, 5,413,567, Cl. 604-307.000.
- Mullhaupt, Joseph T.: See—  
Chao, Chien C.; Sherman, John D.; Mullhaupt, Joseph T.; and Bolinger, Cornelius M., 5,413,625, Cl. 95-103.000.
- Mulligan, Robert M.: See—  
Mallett, Joel D.; and Mulligan, Robert M., 5,412,933, Cl. 59-23.000.
- Mullner, Martin: See—  
Hackl, Kurt A.; Rossler, Markus; Mullner, Martin; and Stern, Gerhard, 5,414,083, Cl. 544-130.000.
- Multico International Pty., Limited: See—  
Hayes, Brian B.; and Hayes, Colin J., 5,413,505, Cl. 439-622.000.
- Muni, Indu A.: See—  
Schneider, F. Howard; Muni, Indu A.; Murty, B. Ram; Pandya, Mahendra K.; and Matharu, Rajinder P. S., 5,414,005, Cl. 514-343.000.
- Munn, Roger D. Electrical outlet. 5,413,501, Cl. 439-535.000.
- Munteanu, Marina A.; Keane, Peter J.; Betz, Alison; Guenin, Eric P.; and Smith, Leslie C. Use of special surfactants to control viscosity in fabric softeners. 5,413,723, Cl. 252-8.600.
- Murabayashi, Akira; Takenaka, Hideyuki; and Kai, Hiroyuki, to Shionogi & Co., Ltd. Process for producing alpha-ketoamide derivative. 5,414,122, Cl. 564-129.000.
- Murai, Hiroyuki: See—  
Kobayashi, Kazuhiro; Murai, Hiroyuki; and Hayama, Masahiro, 5,414,278, Cl. 257-72.000.
- Murakami, Tomoharu, to Kayaba Kogyo Kaishiki Kaisha. Shock absorber. 5,413,195, Cl. 188-282.000.
- Murakami, Yasuo; Sekino, Kazuo; and Mitamura, Nobuaki, to NSK Ltd. Rolling bearing. 5,413,643, Cl. 148-319.000.
- Muraki, Hideaki: See—  
Katoh, Kenji; Inoue, Tokuta; Nohira, Hidetaka; Nakanishi, Kiyoshi; Iguchi, Satoshi; Kihara, Tetsuro; and Muraki, Hideaki, 5,412,945, Cl. 60-285.000.
- Oshima, Yujiro; Muraki, Hideaki; Yokota, Koji; and Nakanishi, Kiyoshi, 5,412,946, Cl. 60-286.000.
- Murakoshi, Atsushi; Mizushima, Ichiro; Watanabe, Masaharu; and Yoshiki, Masahiko, to Kabushiki Kaisha Toshiba. Semiconductor device and method of manufacturing the same. 5,413,943, Cl. 437-20.000.
- Muramatsu, Kikuo: See—  
Matsumoto, Norio; and Muramatsu, Kikuo, 5,414,717, Cl. 371-32.000.
- Muraoka, Akemi: See—  
Takahashi, Toshiaki; Tanimoto, Yoshio; Muraoka, Akemi; and Fukushima, Tatsuo, 5,414,169, Cl. 585-241.000.
- Murase, Takao; and Nishiwaki, Motohiro, to NGK Insulators Ltd. Oxygen sensing apparatus and method using electrochemical oxygen pumping action to provide reference gas. 5,413,683, Cl. 204-183.160.
- Murata, Daisuke: See—  
Fuji, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.
- Murata, Hiroshi; and Yatsuka, Takeshi, to Toyo Boseki Kaishiki Kaisha. Magnetic recording medium having a magnetic layer comprising a specified polyurethane resin and magnetic particles. 5,413,862, Cl. 428-423.100.
- Murata, Kyohu: See—  
Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyohu, 5,412,970, Cl. 72-250.000.
- Murata Manufacturing Co., Ltd.: See—  
Hanato, Yoshio; Hori, Toshio; Tokuda, Hiromichi; and Kaneko, Toshimi, 5,414,220, Cl. 174-254.000.
- Mandai, Harufumi; Kato, Noboru; and Tojyo, Atsushi, 5,414,402, Cl. 336-200.000.
- Mashio, Tasuku, 5,414,320, Cl. 310-311.000.
- Takaoka, Tatsuru; Yagi, Kouichi; and Kohno, Yoshiaki, 5,412,865, Cl. 29-830.000.
- Murata, Shizuo: See—  
Nakayama, Minoru; Sawai, Toshiya; and Murata, Shizuo, 5,414,126, Cl. 564-322.000.
- Murata, Yoshinori; Goto, Yukio; Tamura, Yukio; Mouri, Ryoji; Miki, Toshio; and Ishikawa, Masaki, to Mitsubishi Jukogyo Kaishiki Kaisha. Serial two-stage extruder. 5,413,475, Cl. 425-205.000.
- Murayama, Syouji: See—  
Wada, Tatsuya; Murayama, Syouji; Kuroda, Kazuhiko; Satomura, Yukiyo; Matsuoka, Tadashi; Nonami, Mitsuharu; Matsumoto, Kozo; Kawamura, Yukinori; Matsumoto, Norikatsu; Hikita, Hiroshi; and Iwata, Hideo, 5,413,018, Cl. 83-456.000.
- Muro, Yoshinari: See—  
Manabe, Masahiko; Morita, Kazumi; Muro, Yoshinari; Kan, Takahiro; Iida, Yoshiaki; Kobayashi, Hideo; and Obara, Takashi, 5,413,640, Cl. 148-111.000.
- Murphy, Randall B.: See—  
Schneider, Linda H.; and Murphy, Randall B., 5,414,014, Cl. 514-535.000.
- Murray, Kenneth: See—  
Arin, Haldun; and Murray, Kenneth, 5,414,577, Cl. 360-105.000.

- Murty, B. Ram: See—  
Schneider, F. Howard; Muni, Indu A.; Murty, B. Ram; Pandya, Mahendra K.; and Matharu, Rajinder P. S., 5,414,005, Cl. 514-343.000.
- Murugaraj, Pandijan: See—  
Maier, Joachim; Rabenau, Albrecht, deceased; and Murugaraj, Pandijan, 5,413,980, Cl. 505-121.000.
- Musikant, Barry L.; Deutsch, Allan S.; and Cohen, Brett I., to Essential Dental Systems, Inc. Overdenture attachment system. 5,413,480, Cl. 433-173.000.
- Musset, Dominique: See—  
Dibie, Alain; Musset, Dominique; Prou, Philippe; and Catteau, Gilles, 5,413,586, Cl. 606-200.000.
- Muto, Takanori; and Sudou, Teruhisa, to NEC Corporation. Single transformer switching regulator. 5,414,611, Cl. 363-21.000.
- Mutoh, Nobuyoshi: See—  
Masaki, Ryoso; Mutoh, Nobuyoshi; Ohmae, Tsutomu; and Okuyama, Toshiaki, 5,414,339, Cl. 318-800.000.
- Mutterlein, Bernhard; and Vogt, Holger, to Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. Integrated power switch structure having a vertical thyristor controlled by a lateral MOS transistor. 5,413,313, Cl. 257-137.000.
- Myers, Peter J.; and Baerenwald, Philip M., to Today's Kids, Inc. Multipurpose highchair and swing with detachable seat. 5,413,399, Cl. 297-118.000.
- Myers, W. Neill; Scott, Ewell M.; Forbes, John C.; and Shadoan, Michael D., to United States of America, National Aeronautics and Space Administration. Apparatus for testing high pressure injector elements. 5,412,981, Cl. 73-119.00A.
- Naccache, David; and M'raih, David, to Gemplus Development. System for improving the digital signature algorithm. 5,414,772, Cl. 380-46.000.
- Nadella: See—  
Labedan, Jean-Denis, 5,413,417, Cl. 384-572.000.
- Nagahama, Hiroshi: See—  
Oonuki, Kazuo; Hiraoka, Teruyoshi; Nagahama, Hiroshi; Fukuda, Kazuhisa; Nobumoto, Akira; Isono, Takahiro; Yamada, Atsumi; and Gofuku, Hiroki, 5,413,623, Cl. 75-508.000.
- Nagahira, Joji: See—  
Suzuki, Koji; Ishikawa, Tadashi; Nagahira, Joji; and Motoyama, Hajime, 5,414,862, Cl. 395-750.000.
- Nagano, Masashi, to Shimano Inc. Chain shift aiding structure for bicycle sprocket. 5,413,534, Cl. 474-78.000.
- Nagao, Akihito: See—  
Mitsunaga, Seisuke; Matsuo, Naoya; Nagao, Akihito; and Sasaki, Yasunori, 5,413,078, Cl. 123-492.000.
- Nagase, Fumio: See—  
Ueki, Jiro; and Nagase, Fumio, 5,414,576, Cl. 360-104.000.
- Nagase, Katsumi: See—  
Matsuo, Mutsumi; Yudasaka, Ichiro; Kanai, Kiyohiko; Nagase, Katsumi; and Inoue, Takashi, 5,414,547, Cl. 359-67.000.
- Nagler, Werner; and Gloess, Bernhard, to Siemens Aktiengesellschaft. Method for monitoring existing telephone connections, particularly permanently switched telephone connections. 5,414,695, Cl. 570-15.000.
- Nahara, Akira: See—  
Matsubaguchi, Satoshi; and Nahara, Akira, 5,413,868, Cl. 428-457.000.
- NAI Neway, Inc.: See—  
Pierce, William C., 5,413,374, Cl. 280-713.000.
- Nakagaito, Toru: See—  
Nakanishi, Yutaka; Yamada, Toshihiko; and Nakagaito, Toru, 5,413,479, Cl. 431-304.000.
- Nakagawa, Kenichi: See—  
Kurokawa, Toshio; Sawano, Mitsuru; Osawa, Yukio; Nakagawa, Kenichi; and Ichihashi, Mitsuyoshi, 5,414,490, Cl. 355-71.000.
- Nakagome, Hideki: See—  
Obtani, Yasumi; Hatakeyama, Hideo; Kuriyama, Toru; Nakagome, Hideki; and Matsubara, Yoichi, 5,412,952, Cl. 62-6.000.
- Nakahara, Kazuhiko; and Sasaki, Yoshinobu, to Mitsubishi Denki Kabushiki Kaisha. Distributed amplifier and bidirectional amplifier. 5,414,387, Cl. 330-54.000.
- Nakahara, Takashi: See—  
Kaneyasu, Kazunari; and Nakahara, Takashi, 5,413,691, Cl. 204-424.000.
- Nakajima, Hitoshi: See—  
Yokoyama, Akinori; and Nakajima, Hitoshi, 5,413,974, Cl. 501-153.000.
- Nakajima, Masaaki: See—  
Katayama, Yasunori; Morooka, Yasuo; Okada, Takashi; Nakajima, Masaaki; Hattori, Satoshi; and Shigyo, Masakane, 5,414,619, Cl. 364-151.000.
- Nakajima, Nobuyuki; Ishikawa, Masakuni; and Saito, Susumu, to Zexel Corporation. Thrust bearing arrangement for a drive shaft of a scroll compressor. 5,413,469, Cl. 418-55.100.
- Nakajima, Takashi: See—  
Nakamura, Makoto; and Nakajima, Takashi, 5,414,305, Cl. 326-62.000.
- Nakamoto, Akira; Takada, Shiro; Hanazawa, Akiyoshi; Sakunaga, Kazunori; Mori, Takuji; Saito, Taro; and Sunahata, Mutsumi, to Kubota Corporation. Torque measuring system. 5,412,998, Cl. 73-862.335.
- Nakamura, Akihiro; and Imanishi, Takeshi, to Hitachi, Ltd.; and Hitachi System Engineering Ltd. Method and system for generating a project schedule using weighted work processes. 5,414,843, Cl. 395-600.000.
- Nakamura, Atsumu: See—  
Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyohu, 5,412,970, Cl. 72-250.000.
- Nakamura, Ichiro; Yamazaki, Seiji; Takahashi, Osamu; Arai, Hiroaki; and Hamaguchi, Shigeo, to Central Glass Company, Limited; and Nissan Motor Co., Ltd. Water-repellent metal oxide film and method of forming same on glass substrate. 5,413,865, Cl. 428-432.000.
- Nakamura, Kenji: See—  
Nishimura, Michio; Nitta, Jun; Nakamura, Kenji; Majima, Masao; and Nakata, Toru, 5,414,549, Cl. 359-160.000.
- Nakamura, Kiyoshi: See—  
Hirose, Tokuzo; and Nakamura, Kiyoshi, 5,413,058, Cl. 112-231.000.
- Nakamura, Kozo, to Kabushiki Kaisha Komatsu Seisakusho. Method for production of thin oxide superconducting film and substrate for production of the film. 5,413,986, Cl. 505-476.000.
- Nakamura, Makoto; and Nakajima, Takashi. Output circuit having capability of keeping logic state of signal sent between logic circuits. 5,414,305, Cl. 326-62.000.
- Nakamura, Masato: See—  
Mori, Takeshi; Nakamura, Masato; and Nakayama, Eiji, 5,413,204, Cl. 198-345.100.
- Nakamura, Shiro: See—  
Ohta, Toshihiko; Shigematsu, Takashi; Shimizu, Takeo; and Nakamura, Shiro, 5,414,786, Cl. 385-63.000.
- Nakanishi, Horotoshi: See—  
Tomioka, Jun; Kuwana, Koji; Nakanishi, Horotoshi; Uetani, Yasunori; and Ida, Ayako, 5,413,895, Cl. 430-191.000.
- Nakanishi, Kiyoshi: See—  
Katoh, Kenji; Inoue, Tokuta; Nohira, Hidetaka; Nakanishi, Kiyoshi; Iguchi, Satoshi; Kihara, Tetsuro; and Muraki, Hideaki, 5,412,945, Cl. 60-285.000.
- Oshima, Yujiro; Muraki, Hideaki; Yokota, Koji; and Nakanishi, Kiyoshi, 5,412,946, Cl. 60-286.000.
- Nakanishi, Teruo; Ando, Yohei; and Sakakibara, Kiyokatsu, to Mitsubishi Jukogyo Kaishiki Kaisha. Electric motor having a spherical rotor and its application apparatus. 5,413,010, Cl. 74-5.220.
- Nakanishi, Yutaka; Yamada, Toshihiko; and Nakagaito, Toru, to Toyotomi Company, Ltd. Discharge-type ignition device for oil burner. 5,413,479, Cl. 431-304.000.
- Nakano, Russell T.: See—  
Heninger, Andrew G.; and Nakano, Russell T., 5,414,854, Cl. 395-700.000.
- Nakashima, Katsuya; and Tsukazaki, Hisanobu, to Sony Corporation. Semiconductor memory device. 5,414,668, Cl. 365-225.700.
- Nakashima, Shingo: See—  
Kawamura, Yoshiro; Manabe, Isao; and Nakashima, Shingo, 5,412,973, Cl. 72-369.000.
- Nakata Manufacturing Co., Ltd.: See—  
Kuramoto, Ryusuke, 5,412,965, Cl. 72-19.000.
- Nakata, Toru: See—  
Nishimura, Michio; Nitta, Jun; Nakamura, Kenji; Majima, Masao; and Nakata, Toru, 5,414,549, Cl. 359-160.000.
- Nakayama, Eiji: See—  
Mori, Takeshi; Nakamura, Masato; and Nakayama, Eiji, 5,413,204, Cl. 198-345.100.
- Nakayama, Masaaki: See—  
Mukai, Yasuo; Takasu, Yasuhito; and Nakayama, Masaaki, 5,412,942, Cl. 60-276.000.
- Nakayama, Masaharu: See—  
Sawada, Hideo; Komoto, Keiji; Sano, Masahiro; Enokida, Yutaka; Mitani, Motohiro; Matsumoto, Takeo; Nakayama, Masaharu; and Okajima, Masato, 5,414,065, Cl. 526-279.000.
- Nakayama, Minoru; Sawai, Toshiya; and Murata, Shizuo, to Chisso Corporation. Diamino compounds and liquid crystal aligning films. 5,414,126, Cl. 564-322.000.
- Nakazato, Mitsuo: See—  
Adachi, Hiroo; and Nakazato, Mitsuo, 5,414,386, Cl. 330-51.000.
- Nakazawa, Masakazu: See—  
Onishi, Norimasa; Shimaoka, Megumi; Kira, Ikuo; and Nakazawa, Masakazu, 5,413,921, Cl. 435-135.000.
- Nalco Chemical Company: See—  
Dragisich, Vera, 5,414,112, Cl. 562-12.000.
- Nunn, Maureen B., 5,413,680, Cl. 162-274.000.
- Sivakumar, Ananthasubra; Shah, Jitendra; Rao, Narasimha M.; and Budd, Scott S., 5,413,719, Cl. 210-708.000.
- Naldec Corporation: See—  
Kanno, Yoshihisa; Kajimoto, Shinshi; and Jinno, Masayuki, 5,414,306, Cl. 307-87.000.
- Nam, Kie H.: See—  
Cho, Jung H.; Nam, Kie H.; and Kim, Wan S., 5,414,156, Cl. 568-781.000.
- Namba, Shigeaki: See—  
Nigawara, Seitsu; Namba, Shigeaki; and Fukai, Masayuki, 5,414,798, Cl. 395-75.000.
- Nanji, Amin A., to New England Deaconess Hospital Corp. Methodology employing lactobacillus GG for reduction of plasma endotoxin levels circulating in-vivo. 5,413,785, Cl. 424-93.450.
- Nappa, Mario J.; and Sievert, Allen C., to Du Pont de Nemours, E. I., and Company. Process for the manufacture of 1,1,1,3,3,3-hexafluoropropane. 5,414,165, Cl. 570-169.000.
- Naritake, Isao: See—  
Sugibayashi, Tadahiko; Naritake, Isao; and Matano, Tatsuya, 5,414,660, Cl. 365-200.000.



Nartron Corporation: See—  
Andersen, Christian J.; Gebauer, Duane W.; and Ingraham, Ronald D., 5,413,072, Cl. 123-145.00A.

Nasset, James L.: Shift control device retrofitted to inhibit a downshift to first gear in an L-position for automobile automatic transmission. 5,413,541, Cl. 477-81.000.

Nathan, Ranga: See—  
Ogawa, Yasushi; Schmidt, David K.; Armstrong, Rosa; Nathan, Ranga; Thompson, Andrea Y.; and Seyedin, Saeid M., 5,413,989, Cl. 514-12.000.

Nathan, Robert, to Alfred Karcher GmbH & Co.: Arrangement for cable tensile strain relief. 5,414,218, Cl. 174-15.100.

National Institute for Research in Inorganic Materials: See—  
Era, Koh; Suda, Yoshiyuki; Agawa, Satoshi; and Mishima, Osamu, 5,414,279, Cl. 257-76.000.

National Science Council: See—  
Lin, Jing-Chie; Wu, Jyuhn-Yih; and Lee, Sheng-Long, 5,413,617, Cl. 75-371.000.

Yang, Chin-Ping; Hsiao, Sheng-Huei; and Lin, Jiun-Hung, 5,414,070, Cl. 528-310.000.

National Semiconductor Corporation: See—  
Sauer, Don R., 5,414,388, Cl. 330-252.000.

Thomas, Michael E., 5,414,301, Cl. 257-740.000.

Nauck, George S.: Golf shot tracking and analysis system. 5,413,345, Cl. 273-185.00R.

Nauheimer, Donald J.: See—  
Schoenherr, William R.; and Nauheimer, Donald J., 5,413,449, Cl. 414-343.000.

Naumann, Fritz: See—  
Pabst, Hans G.; Grossmann, Holger; Wiedemann, Heinz; and Naumann, Fritz, 5,413,528, Cl. 454-70.000.

Nazerian, Greg; Bailey, Ronald; and Hoffa, Jack L., to Eubanks Engineering Company: Wire marking, cutting and stripping apparatus and method. 5,412,856, Cl. 29-33.00M.

NCR Corporation: See—  
Memarzadeh, Kazem; Protheroe, Robert L.; and Crooks, John F., 5,414,441, Cl. 345-87.000.

NDT Technologies, Inc.: See—  
Weischel, Herbert R., 5,414,353, Cl. 324-232.000.

NEC Corporation: See—  
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Ehara, Tatsuji, 5,414,753, Cl. 379-58.000.

Hokari, Makoto, 5,414,760, Cl. 379-93.000.

Hori, Hidetosi, 5,414,391, Cl. 331-16.000.

Ito, Munehiro, 5,414,659, Cl. 365-200.000.

Kodama, Noriaki, 5,414,665, Cl. 365-218.000.

Kurata, Kazuhiko, 5,414,787, Cl. 385-92.000.

Muto, Takamori; and Sudou, Teruhisa, 5,414,611, Cl. 363-21.000.

Ogura, Ichiro, 5,414,282, Cl. 257-187.000.

Okimura, Yasunori, 5,414,657, Cl. 365-154.000.

Ono, Takashi, 5,414,550, Cl. 359-191.000.

Oyadomari, Hajime, 5,414,816, Cl. 395-275.000.

Sugibayashi, Tadahiko; Nantake, Isao; and Matano, Tatsuya, 5,414,660, Cl. 365-200.000.

Tsuboi, Toshihide, 5,414,375, Cl. 326-30.000.

Ueda, Hiromi; Tokizawa, Ikuo; Iguchi, Kazuo; Yamashita, Haruo; Kurano, Takatoshi; and Nishihara, Motoo, 5,414,415, Cl. 340-825.020.

NEC Corporations: See—  
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NEC Research Institute, Inc.: See—  
Redmond, Ian; and Schenfeld, Eugen, 5,414,819, Cl. 395-325.000.

Neese, Edward D.; and Botsford, Matthew W., Jr., to WorldClass Industries, Inc.: Push-pull pickle line. 5,412,966, Cl. 72-37.000.

Neff, Helmut; and Beeck, Joachim, to TZN Forschungs-und Entwicklungszentrum Unterlöss GmbH: Acceleration sensor. 5,412,988, Cl. 73-517.00R.

Nehring, Vincent W., to Minnesota Mining and Manufacturing Company: Non-conductive aluminum oxide-titanium carbide (Al<sub>2</sub>O<sub>3</sub>-TiC) thin film computer head substrate, method of making same, and slider element incorporating same. 5,413,850, Cl. 428-336.000.

Neilson, Bruce H.: See—  
Rudie, Eric N.; Neilson, Bruce H.; and Kauphusman, James V., 5,413,588, Cl. 607-101.000.

Neipp, Susanne: See—  
Goppel, Thomas; and Neipp, Susanne, 5,413,481, Cl. 433-214.000.

Nelson, Constance J.: See—  
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Nelson, Stephen E.; Duxstad, David L.; and Flunker, Galen C., to Cray Research, Inc.: Method of adjusting for clock skew. 5,414,381, Cl. 327-262.000.

Nelson, Warren A.; Schaeffer, Jon C.; and Raghuraman, Srinivasan, to General Electric Company: Thermal barrier coating system for titanium aluminides. 5,413,871, Cl. 428-552.000.

Nemcek, Jozef: See—  
Humphries, Martyn; Nemcek, Jozef; Jaworzyn, Joseph F.; Cantwell, John B.; and Gerrard, John J., 5,414,060, Cl. 524-558.000.

Nemoto, Takeshi; and Nemoto, Teruko: Bellows and process for production thereof. 5,413,831, Cl. 428-43.000.

Nemoto, Teruko: See—  
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Nesvadba, Peter, to Ciba-Geigy Corporation: Phenyl phosphites for use as stabilizers for organic materials. 5,414,033, Cl. 524-117.000.

Neuroth, David H.; and Wallace, Thomson H., to Baker Hughes Incorporated: Hydrogen sulfide resistant ESP cable. 5,414,217, Cl. 174-120.00R.

Nevarez, Roberto: See—  
Bruno, Adrian A.; Schjerven, William S., Sr.; and Nevarez, Roberto, 5,413,032, Cl. 99-331.000.

New England Deaconess Hospital Corp.: See—  
Nanji, Amin A., 5,413,785, Cl. 424-93.450.

New York University: See—  
Paradis, Norman A., 5,413,558, Cl. 604-101.000.

Newell Operating Company: See—  
Ruggles, Bryan K.; and Ruggles, Cary L., 5,413,658, Cl. 156-204.000.

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News Datacom Ltd.: See—  
Handelman, Doron, 5,414,773, Cl. 380-49.000.

Nexcom Technology, Inc.: See—  
Challa, Nagesh, 5,414,658, Cl. 365-185.000.

NexGen, Inc.: See—  
McFarland, Harold L.; and Ho, Allen P., 5,414,820, Cl. 395-325.000.

Ng, Michael S.; and Wroble, Arthur J., to Cadillac Gage Textron Inc.: Weapon stabilization system. 5,413,028, Cl. 89-41.090.

NGK Insulators, Ltd.: See—  
Hirotsubi, Eiigo; and Fukuda, Naoya, 5,413,672, Cl. 216-87.000.

Murase, Takao; and Nishiwaki, Motohiro, 5,413,683, Cl. 204-183.160.

N'guyen, Christian: See—  
Bascans, Remi; Fleury, Christophe; Autechaud, Eric; and N'guyen, Christian, 5,414,718, Cl. 371-36.000.

Nguyen, Hien V.; and Vargas, Cecilia, to Chicopee: Cellulosic fiber of improved wettability. 5,413,676, Cl. 162-9.000.

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O'Donnell, Frank A.; Luo, Qiuju; and Nguyen, Kimthoa T., 5,414,426, Cl. 341-176.000.

Nguyen, Loi N.; and Lin, Yih-Shung, to SGS-Thomson Microelectronics, Inc.: Process of removing polymers in semiconductor wafers. 5,412,868, Cl. 29-852.000.

NHK Spring Co., Ltd.: See—  
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Nichols, Charles J.: See—  
Haviv, Fortuna; Fitzpatrick, Timothy D.; Swenson, Rolf E.; Nichols, Charles J.; and Mori, Nicholas A., 5,413,990, Cl. 514-15.000.

Nicholson, John R.; and Gary, Richard G., to Lever Brothers Company, Division of Conopco, Inc.: Amidoxycarboxylic acids and sulfonimine complex catalysts. 5,413,733, Cl. 252-186.420.

Nickel, Walter H.: See—  
Glancey, Timothy F.; Nickel, Walter H.; and Deceder, Jeffrey S., 5,413,328, Cl. 273-1.50A.

Nicol, Alexander C.; Marsden, Donald C.; and Souter, William A., to University of Strathclyde: Metacarpal-phalangeal (MCP) joint prosthesis. 5,413,609, Cl. 623-21.000.

Nicolai, Norbert: See—  
Koppe, Heinz; Nicolai, Norbert; and Stupp, Winfried, 5,413,790, Cl. 424-411.000.

Nicolaou, Kyriacos C.; Wrasidlo, Wolfgang A.; and Maligres, Peter E., to Scripps Research Institute: The Daunomycin derivative with reduced cytotoxicity toward normal cells. 5,413,992, Cl. 514-34.000.

Nicolet, Andre: See—  
Dubois, Eric; and Nicolet, Andre, 5,413,325, Cl. 271-121.000.

Nieder, Elmar: See—  
Engelbrecht, Eckart; and Nieder, Elmar, 5,413,607, Cl. 623-20.000.

Niederlein, Horst: See—  
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Niemann, James A.: Measurement device with common mode current cancellation. 5,414,348, Cl. 324-127.000.

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Nieuwendijk, Joris A. M.; Bax, Johannes W. T.; and De Wachter, Andre J., to U.S. Philips Corporation: Silencer arrangement for combustion engines. 5,414,230, Cl. 181-206.000.

Nigawara, Seitsu; Namba, Shigeaki; and Fukai, Masayuki, to Hitachi, Ltd.: Knowledge information generating system. 5,414,798, Cl. 395-75.000.

Nihon Kohden Corporation: See—  
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Yaguchi, Yasunori, 5,412,847, Cl. 19-295.000.

Niishiro, Mamoru: See—  
Teshima, Yasuhiro; Niishiro, Mamoru; and Matsubayashi, Michinori, 5,413,164, Cl. 165-11.100.

Nikaido, Masataka: See—  
Taki, Hideshi; Ueno, Takafumi; Tsuji, Shiro; Nikaido, Masataka; and Kihara, Nobuyoshi, 5,414,568, Cl. 360-19.100.

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Nikon Corporation: See—  
Goto, Tetsuro; Kazami, Kazuyuki; Daitoku, Koichi; Wakabayashi, Tsutomu; Ezawa, Akira; and Tomino, Naoki, 5,414,486, Cl. 354-430.000.

Iwasaki, Hiroyuki, 5,414,487, Cl. 354-432.000.

Morishita, Akihiko; and Eda, Osami, 5,414,516, Cl. 356-374.000.

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Ninomiya, Hiroshi; and Urabe, Yosuke, to Dow Corning K.K.; and Nippon Kayaku Kabushiki Kaisha: Mucoadhesive polysiloxane paste-like base and preparation. 5,413,792, Cl. 424-434.000.

Nippon Hoso Kyokai: See—  
Oba, Yoshinobu; Oshima, Hideo; and Uehara, Toshihiro, 5,414,566, Cl. 360-13.000.

Nippon Kayaku Kabushiki Kaisha: See—  
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Nippon Oil Company, Limited: See—  
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Nippon Sanso Corporation: See—  
Ohmi, Tadahiro; Ishihara, Yoshio; and Fukushima, Ryosuke, 5,414,361, Cl. 324-439.000.

Nippon Shokubai, Co., Ltd.: See—  
Mori, Yoshikuni; and Kushino, Mitsuo, 5,413,890, Cl. 430-110.000.

Nippon Steel Corporation: See—  
Anzai, Kenji, 5,414,277, Cl. 257-69.000.

Oonuki, Kazuo; Hiraoka, Teruyoshi; Nagahama, Hiroshi; Fukuda, Kazuhisa; Nobumoto, Akira; Isono, Takahiro; Yamada, Atsumi; and Gofuku, Hiroki, 5,413,623, Cl. 75-508.000.

Nippon Telegraph & Telephone: See—  
Deguchi, Kimiyoshi; Somemura, Yoh; Miyoshi, Kazunori; and Matsuda, Tadahito, 5,414,746, Cl. 378-35.000.

Nippon Telegraph and Telephone Corporation: See—  
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Tachikawa, Yoshiaki; Kawachi, Masao; Takahashi, Hiroshi; and Inoue, Kyo, 5,414,548, Cl. 359-130.000.

Ueda, Hiromi; Tokizawa, Ikuo; Iguchi, Kazuo; Yamashita, Haruo; Kurano, Takatoshi; and Nishihara, Motoo, 5,414,415, Cl. 340-825.020.

Nippon Zeon Co., Ltd.: See—  
Imachi, Kou; Fujimasa, Iwao; and Atsumi, Kazuhiko, 5,413,599, Cl. 623-2.000.

Nippondenso Co., Ltd.: See—  
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Yamakita, Hiroshi; Ina, Katsuhiko; Higuchi, Kazuhiro; Uchida, Akira; and Tsuji, Katsuhisa, 5,414,416, Cl. 340-825.000.

Nishida, Tetsuya: See—  
Sugiyama, Hisataka; Maeda, Takeshi; Matsumoto, Kiyoshi; Terao, Motoyasu; Okamine, Shigenori; Nishida, Tetsuya; and Miyamoto, Harukazu, 5,414,451, Cl. 347-258.000.

Nishiguchi, Masanori: See—  
Hashinaga, Tatsuya; and Nishiguchi, Masanori, 5,414,370, Cl. 324-760.000.

Nishiguchi, Masayuki: See—  
Muneyama, Katsumi; Kushida, Masaki; and Nishiguchi, Masayuki, 5,414,315, Cl. 310-88.000.

Nishihara, Motoo: See—  
Ueda, Hiromi; Tokizawa, Ikuo; Iguchi, Kazuo; Yamashita, Haruo; Kurano, Takatoshi; and Nishihara, Motoo, 5,414,415, Cl. 340-825.020.

Nishihara, Toshiyuki, to Sony Corporation: Semiconductor device having cladding layer and process for production of the same. 5,414,285, Cl. 257-301.000.

Nishii, Teruyuki: See—  
Watanabe, Tsunehiro; Terajima, Hisao; and Nishii, Teruyuki, 5,414,764, Cl. 379-377.000.

Nishimura, Michio; Nitta, Jun; Nakamura, Kenji; Majima, Masao; and Nakata, Toru, to Canon Kabushiki Kaisha: Semiconductor optical amplifying apparatus. 5,414,549, Cl. 359-160.000.

Nishimura, Tadashi: See—  
Inoue, Yasuo; Sugahara, Kazuyuki; Ipposhi, Takashi; Yamaguchi, Yasuo; and Nishimura, Tadashi, 5,413,968, Cl. 437-200.000.

Nishimura, Yuji: See—  
Kimura, Hideyuki; Takahashi, Tsuyoshi; Suzuki, Tomio; Ohdaira, Toshio; Uefune, Kouki; and Nishimura, Yuji, 5,414,591, Cl. 361-695.000.

Nishimura, Yutaka: See—  
Aikawa, Noboru; Matsuo, Koji; Nishimura, Yutaka; Iwamoto, Hiroshi; and Komatsu, Tokuhisa, 5,412,867, Cl. 29-825.000.

Nishisu, Yoshihiro; and Kobayashi, Mikio, to Director-General of Agency of Industrial Science & Technology: Particulate fluorescent material of (Y<sub>1-x</sub>Eu<sub>x</sub>)<sub>2</sub>O<sub>3</sub> and process of preparing same. 5,413,736, Cl. 252-301.40R.

Nishiwaki, Motohiro: See—  
Murase, Takao; and Nishiwaki, Motohiro, 5,413,683, Cl. 204-183.160.

Nisino, Kazuhisa: See—  
Wada, Shunichi; Nisino, Kazuhisa; and Sasaki, Yasushi, 5,414,627, Cl. 364-424.050.

Nissan Motor Co., Ltd.: See—  
Hattori, Akira, 5,414,625, Cl. 364-424.020.

Kishi, Norimasa; and Takada, Masayuki, 5,414,461, Cl. 348-115.000.

Nakamura, Ichiro; Yamazaki, Seiji; Takahashi, Osamu; Arai, Hiroaki; and Hamaguchi, Shigeo, 5,413,865, Cl. 428-432.000.

Nishinbo Industries, Inc.: See—  
Imashiro, Yasuo; Hasegawa, Shun; and Matsumoto, Takahiko, 5,413,853, Cl. 428-308.400.

Sato, Kazuo, 5,413,854, Cl. 428-318.400.

Nitayama, Akihiko: See—  
Ozaki, Tohru; Takato, Hiroshi; and Nitayama, Akihiko, 5,414,655, Cl. 365-149.000.

Nitta, Jun: See—  
Nishimura, Michio; Nitta, Jun; Nakamura, Kenji; Majima, Masao; and Nakata, Toru, 5,414,549, Cl. 359-160.000.

NKK Corporation: See—  
Aoki, Seiji; Kato, Tomonori; Taniguchi, Hiroaki; Morotomi, Hidetosi; and Ono, Masami, 5,414,191, Cl. 585-820.000.

Noble, Richard D.: See—  
Dubois, Mary R.; Noble, Richard D.; and Koval, Carl A., 5,414,194, Cl. 585-855.000.

Nobumoto, Akira: See—  
Oonuki, Kazuo; Hiraoka, Teruyoshi; Nagahama, Hiroshi; Fukuda, Kazuhisa; Nobumoto, Akira; Isono, Takahiro; Yamada, Atsumi; and Gofuku, Hiroki, 5,413,623, Cl. 75-508.000.

Nochebuena, Rogelio F.; and Paoli, Thomas L., to Xerox Corporation: Electroabsorptive asymmetrical fabry-perot modulator array for line printers. 5,414,553, Cl. 359-259.000.

NOF Corporation: See—  
Sawada, Hideo; Komoto, Keiji; Sano, Masahiro; Enokida, Yutaka; Mitani Motohiro; Matsumoto, Takeo; Nakayama, Masaharu; and Okajima, Masato, 5,414,065, Cl. 526-279.000.

Nohira, Hidetaka: See—  
Kato, Kenji; Inoue, Tokuta; Nohira, Hidetaka; Nakanishi, Kiyoshi; Iguchi, Satoshi; Kihara, Tetsuro; and Muraki, Hideaki, 5,412,945, Cl. 60-285.000.

Nohr, Ronald S.; and MacDonald, John G., to Kimberly-Clark Corporation: Thermoplastic compositions and nonwoven webs prepared therefrom. 5,413,655, Cl. 156-167.000.

Noiles, Douglas G.; and DeCarlo, Alfred F., Jr., to Joint Medical Products Corporation: Taper-locked acetabular socket bearing. 5,413,603, Cl. 623-18.000.

Noise Cancellation Technologies, Inc.: See—  
Scribner, Kelvin; and Hodgson, Doug, 5,414,775, Cl. 381-71.000.

Nokubo, Seiji; Kohno, Teruhisa; and Fujimoto, Tsuyoshi, to Sumitomo Electric Industries, Ltd.: Fluid pressure control device having changeover and electromagnetic valves having a common sleeve. 5,413,406, Cl. 303-119.200.

Nomura, Hironori: See—  
Igaue, Takamitsu; Nomura, Hironori; Ohnishi, Hirofumi; Matsura, Yoshinori; Sasaki, Tohru; Shimakawa, Taiji; and Yamamoto, Hiroki, 5,413,654, Cl. 156-161.000.

Nonaka, Yoshiya; Aoyagi, Yoshio; Abe, Hiroyuki; Hirano, Chiaki; Furukawa, Kiyoshi; Bradshaw, Alex; Kiyoura, Kazuhiro; Kato, Seiji; and Haraguchi, Koichiro, to Pioneer Electronic Corporation: Method and apparatus for discriminating type of disks positioned on a CD player. 5,414,684, Cl. 369-47.000.

Nonami, Mitsuharu: See—  
Wada, Tatsuya; Murayama, Syouji; Kuroda, Kazuhiko; Satomura, Yukiyo; Matsuo, Tadashi; Nonami, Mitsuharu; Matsumoto, Kozo; Kawamura, Yukinori; Matsumoto, Norikatsu; Hikita, Hiroshi; and Iwata, Hideo, 5,413,018, Cl. 83-456.000.

Norand Corporation: See—  
Durbin, Dennis A., 5,414,251, Cl. 235-462.000.

Norddeutsche Affinerie Aktiengesellschaft: See—  
Bartsch, Arno, 5,413,626, Cl. 95-219.000.

Nordischer Maschinenbau Rud. Baader GmbH & Co. KG: See—  
Braeger, Horst H.; Nuske, Klaus-Dietrich; and Wruck, Siegfert, 5,413,525, Cl. 452-165.000.

Noreve, Xavier; Terre, Michel; and Fety, Luc, to Thomson-TRT Defense: Device for the correction of images from a sensor causing a periodic noise, and implementation method. 5,414,466, Cl. 348-241.000.

Norsk Hydro a.s.: See—  
Venas, Karl; and Pedersen, Terje, 5,413,315, Cl. 266-222.000.

North Carolina State University: See—  
Tompkins, Wayne A. F.; and Tompkins, Mary B., 5,413,927, Cl. 435-239.000.

North China Research Institute of Electro-Optics: See—  
Zhou, Shouhuan; Chen, Ying-chih; Lee, Kotik K.; and Gui, Youxi, 5,414,724, Cl. 372-10.000.

Northrop Grumman Corporation: See—  
Leib, Kenneth G., 5,414,513, Cl. 356-359.000.

Norton, Douglas A.: See—  
Herman, Elvin E.; Likes, Bart E.; Norton, Douglas A.; and Smith, J. Douglas, 5,414,507, Cl. 356-345.000.

Norton, Ian T.: See—  
Baumanis, Paul J.; Norton, Ian T.; Brown, Charles R.; and Underdown, Jeffrey, 5,413,802, Cl. 426-574.000.

Norwalk Wastewater Equipment Company d/b/a NORWECO, Inc.: See—  
Graves, Jan D., 5,413,706, Cl. 210-110.000.

Noschese, Rocco J., to Burndy Corporation: Small form factor connectors with center ground plate. 5,413,491, Cl. 439-108.000.

NovAtel Communications Ltd.: See—  
Fenton, Patrick, 5,414,729, Cl. 375-209.000.

Novo Nordisk A/S: See—  
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Nowicki, Henry B.; and Oelbracht, Thomas J., to Lucas Aerospace Power Equipment Corporation. Dynamoelectric machine with brush having slanted core. 5,414,319, Cl. 310-248.000.

Nowosielski, Joseph M.: See—  
Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giao M.; and Rajagopalan, Ramamoorthy, 5,414,609, Cl. 363-17.000.

Nozaki, Ayumi: See—  
Egawa, Kunihiko; Umemura, Toshio; Kinouchi, Shinichi; Wakata, Mitsunobu; Utsunomiya, Shin; and Nozaki, Ayumi, 5,413,981, Cl. 505-121.000.

NSK Ltd.: See—  
Murakami, Yasuo; Sekino, Kazuo; and Mitamura, Nobuaki, 5,413,643, Cl. 148-319.000.

NSM Aktiengesellschaft: See—  
Menke, Wilhelm, 5,414,679, Cl. 369-36.000.  
Schulze, Ullrich; Niederlein, Horst; Kuhn, Peter; and Frank, Armin, 5,413,357, Cl. 273-436.000.

NT-T, Inc.: See—  
Kloeker, Michael F.; and Corey, David R., 5,413,504, Cl. 439-620.000.

Nufer, Robert W.: See—  
Felisberto, Cynthia N.; Milkovich, Stephen A.; and Nufer, Robert W., 5,413,842, Cl. 428-209.000.

Nunn, Maureen B., to Nalco Chemical Company. Microbiological detection method for felts using iodinitrotetrazolium. 5,413,680, Cl. 162-274.000.

Nuske, Klaus-Dietrich: See—  
Braeger, Horst H.; Nuske, Klaus-Dietrich; and Wruck, Siegbert, 5,413,525, Cl. 452-165.000.

Oakes, Kenneth J.: See—  
Brice, Frank W., Jr.; Elliott, Joseph C.; Fredericks, Kenneth J.; Galbraith, Robert E.; Halma, Marten J.; Hough, Roger E.; John, Suzanne M.; Malinowski, Paul A.; Meritt, Allan S.; Oakes, Kenneth J.; Rathjen, John C., Jr.; Sachs, Martin W.; Stucki, David E.; and Wyman, Leslie W., 5,414,851, Cl. 395-650.000.

Oakley, Clyde G.; Ranalletta, Joseph V.; Douglas, Stephen J.; and Law, Wing K., to Tetrad Corporation. Ultrasonic probe having articulated structure and rotatable transducer head. 5,413,107, Cl. 128-662.060.

Oami, Michiyoshi; and Fujisaki, Hiroo, to Hitachi, Ltd. Printer, a printer control system and method. 5,413,419, Cl. 400-61.000.

Oba, Yoshinobu; Oshima, Hideo; and Uehara, Toshihiro, to Nippon Hosokyo. Apparatus and method for generating high speed dubbing signal. 5,414,566, Cl. 360-13.000.

Obara, Michael D.: See—  
Dixon, David S.; Obara, Michael D.; Masi, James V.; and Bradley, William G., 5,413,694, Cl. 205-158.000.

Obara, Robert Z., to Cardiometrics, Inc. Rotary connector for flexible elongate member having electrical properties. 5,413,508, Cl. 439-729.000.

Obara, Takashi: See—  
Manabe, Masahiko; Morita, Kazumi; Muro, Yoshinari; Kan, Takahiro; Iida, Yoshiaki; Kobayashi, Hideo; and Obara, Takashi, 5,413,640, Cl. 148-111.000.

Obata, Hiroyuki, to Dai Nippon Printing Co., Ltd. Method for manufacturing a printing plate using a charge carrier medium and method for page make-up using a charge carrier medium. 5,414,496, Cl. 355-210.000.

Obata, Ken, to Furukawa Electric Co., Ltd., The. Transmission apparatus between rotary body and fixed body. 5,413,492, Cl. 439-164.000.

Oberster, Arthur E.: See—  
Bohm, Georg G. A.; Oberster, Arthur E.; and Yang, James H. C., 5,413,652, Cl. 156-90.000.

O'Brien, Dennis W.: See—  
Barbee, Troy W., Jr.; Johnson, Gary W.; and O'Brien, Dennis W., 5,414,588, Cl. 361-304.000.

Ocelli, Mario L., to Union Oil Company of California. Catalyst containing zeolite beta and a layered magnesium silicate. 5,413,977, Cl. 502-68.000.

Oceanfloor Limited: See—  
Cracknell, Robert B.; and Moore, Anthony J., 5,414,103, Cl. 558-90.000.

OCG Microelectronic Materials, Inc.: See—  
Sizensky, Joseph J.; Sarubbi, Thomas R.; and Toukhy, Medhat A., 5,413,894, Cl. 430-165.000.

Ocheretyansky, Vladimir: See—  
Polese, Frank J.; Giniel, Walter V.; Hermes, Terrence V.; and Ocheretyansky, Vladimir, 5,413,751, Cl. 419-23.000.

Ochiai, Shigeyoshi, to Nippon Telegraph and Telephone Corporation. Movable chair. 5,413,367, Cl. 280-250.000.

Octel Communications Corporation: See—  
Thompson, Richard L., 5,414,757, Cl. 379-88.000.

Oda, Osamu; and Amano, Toshio, to Sony Corporation. Signal receiving apparatus with automatically activated scrambled signal decoder. 5,414,456, Cl. 348-10.000.

Odabashian, Robert A., to W.R. Grace & Co.-Conn. Easy open bag. 5,413,412, Cl. 383-208.000.

Odagiri, Akira: See—  
Saisho, Shinichiro; Ikeda, Toshinobu; and Odagiri, Akira, 5,414,506, Cl. 356-128.000.

Odagiri, Nobuyuki: See—  
Kishi, Hajime; Ozaki, Atsushi; and Odagiri, Nobuyuki, 5,413,847, Cl. 428-283.000.

OddzOn Products, Inc.: See—  
Stillinger, Scott H., 5,413,331, Cl. 273-58.0BA.

O'Donnell, Frank A.; Luo, Qiuju; and Nguyen, Kimthoa T., to Universal Electronics Inc. Favorite key macro command and chained macro command in a remote control. 5,414,426, Cl. 341-176.000.

Oelbracht, Thomas J.: See—  
Nowicki, Henry B.; and Oelbracht, Thomas J., 5,414,319, Cl. 310-248.000.

Ogata, Takao: See—  
Amemiya, Koji; Suzuki, Akio; Takeuchi, Tatsuo; Fukushima, Hisashi; Hasegawa, Takashi; Moriguchi, Haruhiko; Saito, Rie; Ogata, Takao; and Sasanuma, Nobuatsu, 5,414,531, Cl. 358-465.000.

Ogawa, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for detecting alcohol concentration in a mixed fuel. 5,414,367, Cl. 324-663.000.

Ogawa, Kenji; and Suzuki, Hiroyoshi, to Mitsubishi Denki Kabushiki Kaisha. Dielectric constant detecting apparatus. 5,414,368, Cl. 324-675.000.

Ogawa, Yasushi; Schmidt, David K.; Armstrong, Rosa; Nathan, Ranga; Thompson, Andrea Y.; and Seyedin, Saeid M., to Celtrix Pharmaceuticals, Inc. Method and active compositions for inducing bone growth. 5,413,989, Cl. 514-12.000.

Ogisu, Kenji: See—  
Shimokuni, Kenji; and Ogisu, Kenji, 5,413,218, Cl. 206-387.100.

Oguchi, Takahiro: See—  
Shido, Shun-ichi; Miyazaki, Toshihiko; Sakai, Kunihiro; and Oguchi, Takahiro, 5,414,690, Cl. 369-126.000.

Ogura, Ichiro, to NEC Corporation. Semiconductor optoelectronic switch and method for driving the same. 5,414,282, Cl. 257-187.000.

Oguro, Ryoichi: See—  
Azuma, Keiji; Katoh, Kimikazu; and Oguro, Ryoichi, 5,413,838, Cl. 428-194.000.

Oh, Jun W.: See—  
Uhm, Sung J.; Han, Sung H.; Oh, Jun W.; Joo, Oh S.; Jung, Kwang D.; and Beak, Jung Y., 5,414,161, Cl. 568-885.000.

O'Hara, Bryan M., to American Cyanamid Company. DNA encoding gibbon ape leukemia virus receptor. 5,414,076, Cl. 536-23.500.

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Ohashi, Keiichi; Ohara, Yoshinobu; and Ishimori, Fumitaka, 5,414,241, Cl. 219-219.000.

Ohashi, Keiichi; Ohara, Yoshinobu; and Ishimori, Fumitaka, to Sekisui Kaseihin Kogyo Kabushiki Kaisha. Heater, a method of manufacturing the same, and an anti-condensation mirror incorporating the same. 5,414,241, Cl. 219-219.000.

Ohashi, Nobuaki: See—  
Sato, Hiroshi; and Ohashi, Nobuaki, 5,414,231, Cl. 200-1.00R.

Ohbayashi, Ken: See—  
Watanabe, Masanori; Ohbayashi, Ken; Sasaki, Kazuaki; Yamamoto, Osamu; and Matsumoto, Mitsuhiko, 5,413,956, Cl. 437-129.000.

Ohdaira, Toshio: See—  
Kimura, Hideyuki; Takahashi, Tsuyoshi; Suzuki, Tomio; Ohdaira, Toshio; Uefune, Kouki; and Nishimura, Yuji, 5,414,591, Cl. 361-695.000.

Ohishi, Yoshinori: See—  
Kamiyama, Misao; and Ohishi, Yoshinori, 5,413,377, Cl. 280-733.000.

Ohkuma, Takeshi: See—  
Hara, Tsukushi; Ohkuma, Takeshi; Tsurunaga, Kazuyuki; Ito, Daisuke; and Tada, Takamitsu, 5,414,586, Cl. 361-19.000.

Ohlendorf, Kay: See—  
Campbell, Kevin P.; Ervasti, James M.; Ohlendorf, Kay; Gaver, Mitchell G.; and Kahl, Steven D., 5,413,910, Cl. 435-721.000.

Ohmae, Hideo, to Rohm Co., Ltd. One-chip microcomputer with parallel operating load and unload data buses. 5,414,866, Cl. 395-800.000.

Ohmae, Tsutomu: See—  
Masaki, Ryoso; Mutoh, Nobuyoshi; Ohmae, Tsutomu; and Okuyama, Toshiaki, 5,414,339, Cl. 318-800.000.

Ohmi, Tadashi; Ishihara, Yoshio; and Fukushima, Ryosuke, to Horiba, Ltd.; Nippon Sanso Corporation; and Ohmi, Tadashi. Method of measuring very small quantity of impurity in gas. 5,414,361, Cl. 324-439.000.

Ohmori, Kiyoshi; Watanabe, Tetsu; Seo, Katsuhiko; and Kudo, Junichi, to Sony Corporation. Disc recording/reproducing apparatus. 5,414,687, Cl. 369-50.000.

Ohnishi, Hirofumi: See—  
Igaue, Takamitsu; Nomura, Hironori; Ohnishi, Hirofumi; Matsura, Yoshinori; Sasaki, Tohru; Shimakawa, Taiji; and Yamamoto, Hiroki, 5,413,654, Cl. 156-161.000.

Ohoka, Naoyuki: See—  
Kuroda, Masuo; Yazaki, Fumihiko; Wakabayashi, Masashi; and Ohoka, Naoyuki, 5,413,146, Cl. 138-104.000.

Ohori, Tatsuya; Hanyu, Isamu; Sugimoto, Fumitoshi; and Arimoto, Yoshihiro, to Fujitsu Limited. Composite semiconductor substrate and a fabrication process thereof. 5,413,951, Cl. 437-61.000.

Ohsawa, Keishi: See—  
Tsuchiya, Hiroaki; Ohsawa, Keishi; Sakemi, Yuji; Waki, Kenichiro; Ito, Nobuyuki; Takano, Takehiro; and Tomikawa, Yoshiro, 5,414,497, Cl. 355-253.000.

Ohta, Genichiro, to Matsushita Electric Industrial Co., Ltd. Oscilloscope with dynamic triggering determination. 5,414,635, Cl. 364-481.000.

Ohta, Kenji: See—  
Mieda, Michinobu; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 5,414,652, Cl. 365-122.000.

Ohta, Toshihiko; Shigematsu, Takashi; Shimizu, Takeo; and Nakamura, Shiro, to Furukawa Electric Co., Ltd., The. Optical waveguide

component with a molded resin portion having accurately aligned guide pin holes therein. 5,414,786, Cl. 385-63.000.

Ohta, Yoshiyuki: See—  
Kamada, Hiroshi; Shiohara, Morito; Ohta, Yoshiyuki; and Yanagishita, Hideki, 5,414,474, Cl. 348-700.000.

Ohtani, Keizo, to Yamatake-Honeywell Co., Ltd. Pressure detection gage for semiconductor pressure sensor. 5,412,993, Cl. 73-727.000.

Ohtani, Yasumi; Hatakeyama, Hideo; Kuriyama, Toru; Nakagome, Hideki; and Matsubara, Yoichi, to Kabushiki Kaisha Toshiba. Pulse tube refrigerator. 5,412,952, Cl. 62-6.000.

Oike, Toshio; and Yokota, Hiroyuki, to Yazaki Corporation. Display apparatus for vehicle. 5,414,595, Cl. 362-26.000.

OIS Optical Imaging Systems, Inc.: See—  
den Boer, Willem; and Yang, Mohshi, 5,414,283, Cl. 257-59.000.

Oka, Ryoichi: See—  
Kusumoto, Satoru; and Oka, Ryoichi, 5,413,139, Cl. 137-341.000.

Okabe, Hideaki: See—  
Suzuki, Eiji; Okabe, Hideaki; and Saito, Takanori, 5,413,794, Cl. 424-449.000.

Okada, Hidehiko: See—  
Omuro, Hideaki; Sakura, Kohei; Okada, Hidehiko; Tokuyama, Tadashi; and Oryo, Akira, 5,414,537, Cl. 358-518.000.

Okada, Shoji: See—  
Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyouhei, 5,412,970, Cl. 72-250.000.

Okada, Takashi: See—  
Katayama, Yasunori; Morooka, Yasuo; Okada, Takashi; Nakajima, Masaaki; Hattori, Satoshi; and Shigyo, Masakane, 5,414,619, Cl. 364-151.000.

Okada, Tomoyuki; Medendorp, Dale F.; and Frane, Terrie L., to Motorola Inc. Error detector circuit and method therefor. 5,414,711, Cl. 371-5.100.

Okada, Yutaka: See—  
Satake, Satoru; Okada, Yutaka; and Arijii, Shigeru, 5,413,034, Cl. 99-519.000.

Okagawa, Hiroaki: See—  
Watabe, Shinichi; Kazuyuki, Tadatomu; and Okagawa, Hiroaki, 5,414,281, Cl. 257-95.000.

Okajima, Masato: See—  
Sawada, Hideo; Komoto, Keiji; Sano, Masahiro; Enokida, Yutaka; Mitani Motohiro; Matsumoto, Takeo; Nakayama, Masaharu; and Okajima, Masato, 5,414,065, Cl. 526-279.000.

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Okamoto, Masaya, to NEC Corporations. Printing head device. 5,413,421, Cl. 400-124.150.

Okano, Haruo: See—  
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Shimizu, Masahiro; Fukasawa, Takayuki; Yamazaki, Yuichiro; Miyoshi, Motosuke; Okano, Haruo; and Okumura, Katsuya, 5,413,663, Cl. 156-345.000.

Okano, Masayuki: See—  
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Okawado, Akira: See—  
Shinoda, Ichiro; Kashiwazaki, Tomoyuki; Okawado, Akira; Moriya, Kazumasa; Sato, Shinichi; Itoh, Motohiko; Watanabe, Mitsuo; and Kawai, Hiroaki, 5,414,252, Cl. 235-463.000.

Okazaki, Haruki, to Mazda Motor Corporation. Antiskid brake system for vehicle. 5,413,405, Cl. 303-103.000.

Okazaki, Masahide; Ueyama, Kenji; and Hayashi, Takahisa, to Dainippon Screen Mfg. Co. Afocal optical system and multibeam recording apparatus comprising the same. 5,414,551, Cl. 359-205.000.

Okazaki, Sachiko; Kogoma, Masahiro; Hirakawa, Masahiro; and Kasai, Kazuo, to Sumitomo Precision Products Co., Ltd. Clad fine wire electrode-type activated species-generating apparatus. 5,413,769, Cl. 422-186.070.

Oki Electric Industry Co., Ltd.: See—  
Takahashi, Yoshinori, 5,414,269, Cl. 250-561.000.

Okimura, Yasunori, to NEC Corporation. Asynchronous static random access memory device for propagating read-out data bit through single bit line. 5,414,657, Cl. 365-154.000.

Okita, Junichi: See—  
Kameda, Osamu; Okita, Junichi; Hasetoh, Sakumi; Hirose, Ichiro; and Tanaka, Yoshimichi, 5,413,014, Cl. 74-606.00R.

Okita, Ryozo, to Sanshin Kogyo Kabushiki Kaisha. Vessel speed measuring system for the marine propulsion machine. 5,412,984, Cl. 73-182.000.

Okita, Takaaki: See—  
Okuyama, Satsuki; Okita, Takaaki; and Kamachi, Hajime, 5,414,073, Cl. 536-18.500.

Okonite Company, The: See—  
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Okumura, Katsuya: See—  
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Okuyama, Toshiaki: See—  
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O'Leary, Daniel: See—  
Rickuss, Ian; and O'Leary, Daniel, 5,412,888, Cl. 40-410.000.

Olesen, Preben H.; and Sauerberg, Per, to Novo Nordisk A/S. Azabicyclo substituted oxo- or thia-diazole compounds. 5,414,009, Cl. 514-299.000.

Oliver, Anthony D.: See—  
Paterson, Douglas F.; Meissner, Konrad; Redd, William V.; Oliver, Anthony D.; Lipford, Michael S.; Perry, Don A.; and Schoner, C. Richard, 5,413,206, Cl. 198-383.000.

Olney, Ross D.; and Reeds, John W., to Hughes Aircraft Company. Self-regulating tire pressure system and method. 5,413,159, Cl. 152-418.000.

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Lashyro, Jeffrey A.; and Olson, Allen L., 5,412,923, Cl. 53-399.000.

Olympus Optical Co., Ltd.: See—  
Ikegame, Tetsuo, 5,414,680, Cl. 369-44.140.

Tani, Naoki, 5,414,683, Cl. 36-9-47.000.

O'Mahoney, Michael A.: See—  
Crescenzi, Emil J., Jr.; Bamford, Jonathan K.; Wandinger, Titus J.; and O'Mahoney, Michael A., 5,414,313, Cl. 327-351.000.

Omatsu, Toshihiro; and Tokitoh, Yasuo, to Kuraray Company Ltd. Process for producing 2-formyl-1,4-butanediol. 5,414,138, Cl. 568-454.000.

Omura, Kengo: See—  
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Omuro, Hideaki; Sakura, Kohei; Okada, Hidehiko; Tokuyama, Tadashi; and Oryo, Akira, to Sony Corporation. Color image processing method and apparatus. 5,414,537, Cl. 358-518.000.

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Onishi, Noboru: See—  
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Onishi, Norimasa; Shimaoka, Megumi; Kira, Ikuo; and Nakazawa, Masakazu, to Ajinomoto Co., Ltd. Method of the production of (s)-gamma-halogenated-gamma-hydroxybutyric acid esters. 5,413,921, Cl. 435-135.000.

Onishi, Shigeo: See—  
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Ono, Kazuya; Miyake, Tetsuo; Osa, Mikio; Kitagawa, Katuji; and Kubo, Masao, to Somar Corporation. Powder coating composition comprising conventional epoxides with crystalline epoxides and curing agents. 5,414,058, Cl. 525-523.000.

Ono, Masami: See—  
Aoki, Seiji; Kato, Tomonori; Taniguchi, Hiroaki; Morotomi, Hidetoshi; and Ono, Masami, 5,414,191, Cl. 585-820.000.

Ono, Takashi, to NEC Corporation. Optical heterodyne detector and receiver. 5,414,550, Cl. 359-191.000.

Onoda, Yasuo: See—  
Kinoshita, Iwao; Machii, Daisuke; Onoda, Yasuo; Takai, Haruki; Kosaka, Nobuo; Shuto, Katsuichi; Gomi, Katsushige; Morimoto, Makoto; and Ishii, Akio, 5,413,997, Cl. 514-183.000.

Oonuki, Kazuo; Hiraoka, Teruyoshi; Nagahama, Hiroshi; Fukuda, Kazuhisa; Nobumoto, Akira; Isono, Takahiro; Yamada, Atsumi; and Gofuku, Hiroki, to Nippon Steel Corporation. Process and apparatus for vacuum degassing molten steel. 5,413,623, Cl. 75-508.000.

Ooyagi, Kazuhiro: See—  
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OPTi, Inc.: See—  
Lin, Fong-Lu, 5,414,827, Cl. 395-425.000.

Orange, Christian. Tight container and assembly of said container and an appropriate support. 5,413,242, Cl. 220-592.000.

Orchard-Rite Ltd., Inc.: See—  
Hill, Daryl G., 5,413,453, Cl. 414-729.000.

Orlandi, Irene, to Alfa Costruzioni Meccaniche S.p.A. Bottle-bearing plate with a centering device, in a labeling machine. 5,413,666, Cl. 156-566.000.

Oryo, Akira: See—  
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Ono, Kazuya; Miyake, Tetsuo; Osa, Mikio; Kitagawa, Katuji; and Kubo, Masao, 5,414,058, Cl. 525-523.000.

Osaki, Yoshiro, to Kabushiki Kaisha Toshiba. Data transmission control system. 5,414,697, Cl. 370-17.000.

Osann, Robert, Jr.: See—  
Verheyen, Henry T.; Kring, Charles J., Jr.; and Osann, Robert, Jr., 5,414,638, Cl. 364-489.000.

Osawa, Yukio: See—  
Kurokawa, Toshio; Sawano, Mitsuru; Osawa, Yukio; Nakagawa, Kenichi; and Ichihashi, Mitsuyoshi, 5,414,490, Cl. 355-71.000.

Osborne, William T. Oil recovery system for a vehicle maintenance facility. 5,413,716, Cl. 210-787.000.



Oscar Mayer Foods Corporation: See—  
Abler, Norman C.; Skaar, Gary R.; and Paulos, William, 5,413,526, Cl. 452-176.000.  
Oshida, Yoshitada: See—  
Terabayashi, Takao; Sato, Hidemi; Tanaka, Hideaki; and Oshida, Yoshitada, 5,414,239, Cl. 219-121.730.  
Oshima, Haruyuki: See—  
Soma, Gen-Ichiro; Yoshimura, Kiyoshi; Tsukioka, Daisuke; Mizuno, Den'ichi; and Oshima, Haruyuki, 5,413,993, Cl. 514-54.000.  
Oshima, Hideo: See—  
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Oshima, Kazuyoshi: See—  
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Oshima, Tairo; Sakashita, Hitoshi; Matsumoto, Hakuji; and Maekawa, Yoshihiko, to Toyo Boseki Kabushiki Kaisha. Thermostable DNA polymerase from *Thermus thermophilus* HB-8. 5,413,926, Cl. 435-194.000.  
Oshima, Yujiro; Muraki, Hideaki; Yokota, Koji; and Nakanishi, Kiyoshi, to Toyota Jidosha Kabushiki Kaisha; and Kabushiki Kaisha Toyota Chuo Kenkyusho. NOx decreasing apparatus for an internal combustion engine. 5,412,946, Cl. 60-286.000.  
Oshino, Genji; and Suzuki, Isamu, to Tohoku Richo Co., Ltd. Head pressing mechanism of a thermal printer. 5,414,450, Cl. 342-197.0PH.  
Oshizawa, Hidekazu; and Abe, Tatsuhiko, to Zexel Corporation. Vehicle-mounted navigation system. 5,414,630, Cl. 364-449.000.  
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Oswalt, Ernest A.: See—  
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Otaka, Masahiro: See—  
Yoshimura, Toshihiko; Shimizu, Tasuku; Ishikawa, Yuichi; Otaka, Masahiro; Koguchi, Yuko; Enomoto, Kunio; Hasegawa, Kunio; Hayashi, Makoto; and Takaku, Kazuo, 5,414,356, Cl. 324-239.000.  
Oteri Inc.: See—  
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Otruba, Svatoboj, to B&H Manufacturing Company. Universal roll-fed label cutter. 5,413,651, Cl. 156-64.000.  
Otsuki, Shinnichiro: See—  
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Oviatt, William T. Wood burning heating unit. 5,413,088, Cl. 126-77.000.  
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Czubyaty, Wolodymyr; Strand, David A.; and Wicker, Guy C., to Energy Conversion Devices, Inc. Electrically erasable memory elements having improved set resistance stability. 5,414,271, Cl. 257-3.000.  
Owada, Satoshi: See—  
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Owens, Thad T.: See—  
Hedlund, George; and Owens, Thad T., 5,413,346, Cl. 273-187.200.  
Oxley Developments Company Limited: See—  
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Oyadomari, Hajime, to NEC Corporation. Data transfer apparatus having means for controlling the difference in speed between data input/output ports and memory access. 5,414,816, Cl. 395-275.000.  
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Ozawa, Katsuji: See—  
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Ozawa, Satoshi; Miyahara, Yuji; Taku, Mamoru; Yamashita, Koutarou; and Watanabe, Yoshio, to Hitachi, Ltd. Ion-selective electrode. 5,413,685, Cl. 204-416.000.  
Ozeki, Yuko; and Fudeyasu, Yoshio, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device including address transition detector. 5,414,672, Cl. 365-233.500.

Ozmen, Suleyman M.: See—  
Abrevaya, Hayim; Ozmen, Suleyman M.; Barger, Paul T.; Gosling, Christopher D.; and Verachttert, Thomas A., 5,414,183, Cl. 585-671.000.  
Pabst, Hans G.; Grossmann, Holger; Wiedemann, Heinz; and Naumann, Fritz, to Audi AG. Air conditioning system for motor vehicles. 5,413,528, Cl. 454-70.000.  
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Pace, John E.: See—  
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Pacific Armatechnica Corporation: See—  
Feldmann, Fritz K.; Christenson, Craig; and Griffith, Paul J., 5,413,049, Cl. 102-521.000.  
Pack, Arthur V.; and Kegerise, Wesley R., II, to Okonite Company. The Method for removing outer protective layer from electrical cable. 5,412,864, Cl. 29-825.000.  
Padgett, Clarence W.: See—  
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Page, Graham A.: See—  
Mann, Stephen; Barker, Roger N.; Page, Graham A.; and Corr, Stephen P., 5,413,843, Cl. 428-211.000.  
Pagedas, Anthony C. Self locking suture lock. 5,413,585, Cl. 606-232.000.  
Pages, Irene; D'Aragona, Francesco; Sellers, James A.; and Wells, Raymond C., to Motorola, Inc. Direct wafer bonded structure method of making. 5,413,952, Cl. 437-62.000.  
Pai, Damodar M.; Yuh, Huoy-Jen; Yanus, John F.; Melnyk, Andrew R.; Mosher, Ralph A.; and Chow, Tsu-Sen, to Xerox Corporation. Transport layers containing two or more charge transporting molecules. 5,413,886, Cl. 430-58.000.  
Palacios, Paul, to Bracco International B.V. Method for making conjugate moieties capable of chelating paramagnetic metals and designed for coupling with a factor responsive to specific cellular marker sites. 5,414,114, Cl. 562-556.000.  
Palansky, Bruce J.: See—  
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Solar, Ronald J., 5,413,560, Cl. 604-164.000.  
Pandya, Mahendra K.: See—  
Schneider, F. Howard; Muni, Indu A.; Murty, B. Ram; Pandya, Mahendra K.; and Matharu, Rajinder P. S., 5,414,005, Cl. 514-343.000.  
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Paradis, Norman A., to New York University. Selective aortic perfusion system for use during CPR. 5,413,558, Cl. 604-101.000.  
Paraskevopoulos, Leo. Boat having an elevated and aft located con position. 5,413,064, Cl. 114-255.000.  
Parekh, Ebrahim M.: See—  
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Pariseau, Luc A.: See—  
Yang, Henry S.; Spinney, Barry A.; Hawe, William R.; and Pariseau, Luc A., 5,414,700, Cl. 370-24.000.  
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Henderson, Calvin W.; Lassiter, Wallace R.; and Jarvis, William R., 5,414,270, Cl. 250-572.000.

Shu, Chi-Kuen; and Lawrence, Brian M., 5,413,122, Cl. 131-274.000.

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Raby, James M., to Moore Business Forms, Inc. ID cards for impact and non-impact printers. 5,413,532, Cl. 462-2.000.

Radisky, Derek C.: See—

Ireland, Chris M.; Radisky, Derek C.; Barrows, Louis R.; and Kramer, Robert, 5,414,001, Cl. 514-287.000.

Radke, John C.; Ryan, Gregory J.; and Hershberger, Troy W., to BioResearch. Method and apparatus for diagnosing joints. 5,413,116, Cl. 128-777.000.

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Filion, Scott M.; Marshall, Mary K.; and Rafferty, Scott E., 5,413,376, Cl. 280-728.300.

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Levran, Alexander; Nowosielski, Joseph M.; Ton-That, Giau M.; and Rajagopalan, Ramamoorthy, 5,414,609, Cl. 363-17.000.

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Tedrow, Kerry D.; Larsen, Robert E.; Rajguru, Chaitanya S.; Galindo, Cesar; Jayanifard, Jahanshir J.; and Taub, Mase J., 5,414,669, Cl. 365-226.000.

Ramm, Dov: See—

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Ramm, John E., to Australian Nuclear Science & Technology Organisation. Formation of densified material. 5,414,208, Cl. 588-249.000.

Ramsey, Christopher P., to Carnaudmetalbox plc. Open-topped can body with panelled side walls. 5,413,244, Cl. 220-671.000.

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Oakley, Clyde G.; Ranalletta, Joseph V.; Douglas, Stephen J.; and Law, Wing K., 5,413,107, Cl. 128-662.060.

Rancich, Michael J.: See—

Lo Presti, Philip B.; and Rancich, Michael J., 5,413,823, Cl. 428-12.000.

Randolph, Bruce B.: See—

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Chang, Kaichiang, 5,414,433, Cl. 342-375.000.

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Tanase, Gabriel E., 5,414,352, Cl. 324-158.100.

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Reboul, Hauser G. Artificial bait with stabilizers. 5,412,899, Cl. 43-42.130.

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Burgess, Robert K.; and Redle, Thomas A., 5,413,134, Cl. 137-1.000.

Redmond, Ian; and Schenfeld, Eugen, to NEC Research Institute, Inc. Optical interconnection network. 5,414,819, Cl. 395-325.000.

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Austin, George K., Jr.; LaPlante, Pierre M.; Fisher, William F.; and Reed, Raymond G., 5,413,358, Cl. 277-12.000.

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Campbell, Paul, 5,413,186, Cl. 175-296.000.

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Haslam, Gary M.; and Van den Bout, David E., 5,414,263, Cl. 230-338.100.
- Reichen, Ronald L.; and Swenson, Phillip O., to Deere & Company. Slidable grass catcher. 5,412,931, Cl. 56-199.000.
- Reid, Dennis G.; and Clarke, Michael T., to Eaton Stamping Company. Electric motor with brush card isolated from endframe. 5,414,317, Cl. 310-239.000.
- Reid, Jack R.: See—  
Chapman, John J.; and Reid, Jack R., 5,414,142, Cl. 568-579.000.
- Reid, W. Bruce, to Hewlett-Packard Company. Slit nozzle tape for inkjet printhead. 5,414,454, Cl. 347-29.000.
- Reijnders, Jozef H., to U.S. Philips Corporation. High frequency discharge lamp operating circuit with frequency control of the ignition voltage. 5,414,327, Cl. 315-219.000.
- Reik, Wolfgang, to LuK Lamellen und Kupplungsbau GmbH. Apparatus for damping vibrations. 5,413,535, Cl. 474-94.000.
- Reisdorf, Dennis J.: See—  
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- Reisenbichler, Peter: See—  
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Feisel, Armin, 5,413,520, Cl. 451-1.000.
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- Reizer, Robert F.: See—  
Babel, Henry W.; and Reizer, Robert F., 5,413,023, Cl. 86-21.000.
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Alberni, Fred M., 5,413,462, Cl. 415-169.100.
- REM Technologies, Incorporated: See—  
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- Research Triangle Institute: See—  
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- Resource Technologies Group, Inc.: See—  
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- Reuning, Frederick K.: See—  
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Kosal, Jeffrey A.; and Revis, Anthony, 5,413,724, Cl. 252-8.600.
- Revson, Rommy H. Decorative fashion accessory. 5,413,126, Cl. 132-275.000.
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- Reynord Corporation: See—  
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- Rey, Michel, to ETA SA Fabriques d'Ebauches. Article of plastic material at least a part of the outer surface of which is decorated. 5,413,822, Cl. 428-1.000.
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- Reymond, Jacques; and Wenger, Jean L., to Bobst SA. Device for aligning box blanks for a machine processing box blanks. 5,413,327, Cl. 271-251.000.
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- Rheem Australia Limited: See—  
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- Rhein Chemie Rheinaun GmbH: See—  
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- Rhoads, W. Wistar; and Richtsmeier, Brent W., to Hewlett-Packard Company. Use of a densitometer for adaptive control of printhead-to-media distance in ink jet printers. 5,414,453, Cl. 347-8.000.
- Rhodes, Kenneth H., to Cacique, Inc. Process for making whey-derived fat substitute product and products thereof. 5,413,804, Cl. 426-583.000.
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- Costantini, Michel; Manaut, Daniel; and Michelet, Daniel, 5,414,155, Cl. 568-771.000.
- Metivier, Pascal; and Bernard, Laurent, 5,414,148, Cl. 568-706.000.
- Persello, Jacques, 5,413,844, Cl. 427-217.000.
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- Rhyme, Lee D.; and Stoy, James R., to Texaco Inc. Low-pressure-drop critical flow venturi. 5,413,145, Cl. 138-44.000.
- Riblett, Allen, to Southco, Inc. Detent hinge. 5,412,842, Cl. 16-334.000.
- Ricciardi, Susan T.: See—  
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- Riccio, Renato S. Oven with a stone covered bottom. 5,413,033, Cl. 99-339.000.
- Rice, Robert H.: See—  
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- Rich, Richard F., to Loran Cassette & Audio Products. Tape cassette with V-shaped tape build-up area for controlling misfeed tape. 5,414,581, Cl. 360-132.000.
- Richard, Michael A.; De Deken, Jacques C.; and Yee, David K., to Catalytic, Inc. Process and washed catalyst for partially hydrogenating aromatics to produce cycloolefins. 5,414,171, Cl. 585-269.000.
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- Richards, Derek, to Arjo Limited. Invalid hoist with laterally adjustable base. 5,412,820, Cl. 5-86.100.
- Richards, Justin J. C., to International Business Machines Corporation. Palette and parts view of a composite object in an object oriented computer system. 5,414,806, Cl. 395-135.000.
- Richardson, Warner G.; and Wells, Steven R., to Caterpillar Inc. Self-energizing snubber for a hydraulic motor. 5,413,030, Cl. 91-408.000.
- Richtsmeier, Brent W.: See—  
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- Rickuss, Ian; and O'Leary, Daniel, to Manthorpe Engineering Limited. Assembly for producing artificial snowfall. 5,412,888, Cl. 40-410.000.
- Ricoh Company, Ltd.: See—  
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- Fujoka, Tetsuya; and Takahashi, Hiroshi, 5,414,481, Cl. 333-122.000.
- Kadokawa, Yuichi, 5,414,720, Cl. 371-40.400.
- Kanmoto, Yoshiaki; Fukuda, Haruhiko; Yonenaga, Kohtaroh; and Shijo, Hiroyasu, 5,414,535, Cl. 358-487.000.
- Takamura, Teiji, 5,414,802, Cl. 395-119.000.
- Yahata, Masasumi, 5,414,499, Cl. 355-260.000.
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- Rider, James G.: See—  
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- Ueding, Michael; Strobel, Michael; Krieger, Albert; and Sauer, Jurgen, 5,412,845, Cl. 19-159.000.
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- Riggert, Eckhard: See—  
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- Riggs, Richard S.: See—  
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- Rigoletto, Raymond, Jr.: See—  
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- Riken Vinyl Industry Co., Ltd.: See—  
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- Rinke, Andreas: See—  
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- Ripberger, Richard A.: See—  
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- Ritter, Robert A. Method and process for rendering waste substances harmless. 5,414,206, Cl. 588-226.000.

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- Rivard, Charles-Hilaire. Apparatus for treating spinal disorder. 5,413,576, Cl. 606-61.000.
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- Roach, Jennifer A.; Toms, Douglas; Blaney, Ted L.; and Chisholm, M. Elizabeth P., to Procter & Gamble Company. The Refastenable adhesive fastening systems for individually packaged disposable absorbent articles. 5,413,568, Cl. 604-358.000.
- Robert Bosch GmbH: See—  
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- Hofmann, Karl; and Warga, Johann, 5,413,281, Cl. 239-533.400.
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- Robinson, Gordon D.: See—  
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- Rock, Moshe; and Lumb, Douglas, to Malden Mills Industries, Inc. Three-dimensional knit fabric. 5,413,837, Cl. 428-192.000.
- Rock-Tenn Company: See—  
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- Rockle, Gunter; Wernicke, Ubbjo; and Bachem, Egon, to Agfa Gevaert Aktiengesellschaft. Liquid wiper for photographic material. 5,414,483, Cl. 354-320.000.
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- Rodriguez, Nelly M.: See—  
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- Rogers, Wesley A., to Electronic Development, Inc. Apparatus and method for low cost electromagnetic field susceptibility testing. 5,414,345, Cl. 324-72.500.
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- Roginski, Amy M.: See—  
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- Ohmae, Hideo, 5,414,866, Cl. 395-800.000.
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- Clikeman, Richard R., 5,414,047, Cl. 525-298.000.
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- Larson, Gary R.; Puschak, Caren A.; Smith, Linda S.; and Wood, Kurt A., 5,414,041, Cl. 524-589.000.
- Lundquist, Eric G., 5,414,062, Cl. 526-74.000.
- Williams, Martin M.; and Trahan, Rodney J., Jr., 5,413,815, Cl. 427-289.000.
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- Rolbiecki, Timothy J.: See—  
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- Rolfs, Andreas; Liebscher, Jurgen; Unverferth, Klaus; and Faust, Gottfried, to Arzneimittelwerk Dresden GmbH. Method for producing 1-unsubstituted 3-aminopyrroles. 5,414,082, Cl. 544-60.000.
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- Rolm Systems: See—  
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- Romweber, Frank T.; and Sowa, Dennis F., to RSS, Inc. Method and apparatus for conditioning refuse. 5,412,881, Cl. 34-136.000.
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- Ross, Colby M.; Restarick, Henry L.; Echols, Ralph H., III; Thomas, Phillip T.; and Patel, Dhirajlal C., to Halliburton Company. One trip backwash/sand control system with extendable washpipe isolation. 5,413,180, Cl. 166-387.000.
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- Rostler, Peter S.: See—  
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- Rothengass, Wolfgang, to Buchta, Alfred. Liquid-filled thermostatic system. 5,413,277, Cl. 236-42.000.
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- Russell-Stanley Corporation: See—  
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- Ryobi Motor Products Corp.: See—  
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- S.S.B. Co., Ltd.: See—  
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- Saccomano, Nicholas A.; and Vinick, Fredric J., to Pfizer Inc. Calcium independent camp phosphodiesterase inhibitor antidepressant. 5,414,127, Cl. 564-344.000.
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- Sahu, Sudhari, to Magnolia Metal Corporation. Lead-free bearing bronze. 5,413,756, Cl. 420-472.000.
- Saint Just, Jacques J.: See—  
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- Saisho, Shinichi; Ikeda, Toshinobu; and Odagiri, Akira, to Shincron Co., Ltd. Method of measuring refractive index of thin film and refractive index measuring apparatus therefor. 5,414,506, Cl. 356-128.000.
- Saishoji, Toshihide: See—  
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- Saito, Atsushi: See—  
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- Saito, Hirotaka: See—  
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- Saito, Rie: See—  
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- Saito, Susumu: See—  
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- Saito, Taro: See—  
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- Saito, Toshimitsu, to Kabushiki Kaisha Toshiba. Keyboard control system and method for a computer to which a ten-key pad is connectable. 5,414,421, Cl. 341-22.000.
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- Saito, Yoshinori: See—  
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- Saitoh, Atsushi: See—  
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- Sakai, Hiroko: See—  
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- Sakakibara, Kiyokatsu: See—  
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- Saliba, George, to Quantum Corp. Rotating tape edge guide. 5,414,585, Cl. 360-130.210.
- Salisbury, Thomas E.: See—  
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- Salkeld, Richard W.; Field, Thomas T.; and Ault, Earle A., to United Technologies Corporation. Preparation of single crystal superalloys for post-casting heat treatment. 5,413,648, Cl. 148-562.000.
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- Jang, In-sik; and Yamamura, Nobuyuki, 5,414,543, Cl. 359-53.000.
- Jeong, Chang B.; and Song, Chang S., 5,414,404, Cl. 338-307.000.
- Kim, Hak; and Han, Woo-sung, 5,413,898, Cl. 430-325.000.
- Kim, Seok T.; Kim, Young S.; and Kim, Yo J., 5,413,947, Cl. 437-41.000.
- Lee, Hyung-seok, 5,414,545, Cl. 359-53.000.
- Moon, Kyung H., 5,412,825, Cl. 8-159.000.
- Park, Mun-Bae, 5,413,425, Cl. 400-240.300.
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- Sanborn, Walter J.: See—  
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- Sanchez, Jean-Yves: See—  
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- Sanders, David L.; and Rolbiecki, Timothy J., to Brunson Instrument Company. Digital optical micrometer. 5,414,646, Cl. 364-556.000.
- Sanders, Nicholas A.: See—  
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- Sanderson, William A.: See—  
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- Sankyo Seiki Mfg. Co., Ltd.: See—  
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- Santella, Michael L.; and Goodwin, Gene M., to Martin Marietta Energy Systems, Inc. Nickel aluminide alloys with improved weldability. 5,413,876, Cl. 428-680.000.
- Santini, Hugo A. E.: See—  
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- Takano, Kazuhiko, 5,413,473, Cl. 425-192.00R.
- Sara, Raymond V., to UCAR Carbon Technology Corporation. Method of forming an aluminum protective coating on a carbon-carbon composite. 5,413,816, Cl. 427-294.000.
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- Sarli, Michael S.: See—  
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- Sarubbi, Thomas R.: See—  
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- Sarwinski, Raymond E.: See—  
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- Sasaki, Kazuaki: See—  
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- Sasaki, Tadao, to Sony Corporation. Image sensor and electronic still camera with an addressable image pickup section and an analog product sum calculation section. 5,414,464, Cl. 348-222.000.
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- Sasaki, Yasushi: See—  
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- Sasanuma, Nobuatsu: See—  
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- Sato, Hidemi: See—  
Terabayashi, Takao; Sato, Hidemi; Tanaka, Hideaki; and Oshida, Yoshitada, 5,414,239, Cl. 219-121.730.
- Sato, Hiroshi; and Ohashi, Nobuaki, to Tokyo Denso Kabushiki Kaisha. Switch device. 5,414,231, Cl. 200-1.00R.



Sato, Kazuo, to Nissinbo Industries, Inc. OHP sheet for thermal transfer printer. 5,413,854, Cl. 428-318.400.

Sato, Keiichi; Kawaragi, Yuuji; and Higashino, Yasuko, to Mitsubishi Kasei Corporation. Method for dimerizing butenes, dimeric composition of butenes and method for producing alcohols by means thereof. 5,414,160, Cl. 568-883.000.

Sato, Keiji; and Fukuda, Bunjiro, to Kawasaki Steel Corporation. Method of manufacturing low-core-loss grain oriented electrical steel sheet. 5,413,639, Cl. 148-111.000.

Sato, Nobuo: See—  
Kumazawa, Satoru; Shimizu, Susumu; Enari, Hiroyuki; Ito, Atsushi; Ikeda, Susumu; Sato, Nobuo; and Saishoji, Toshihide, 5,414,105, Cl. 560-51.000.

Sato, Shinichi: See—  
Shinoda, Ichiro; Kashiwazaki, Tomoyuki; Okawado, Akira; Moriya, Kazumasa; Sato, Shinichi; Itoh, Motohiko; Watanabe, Mitsuo; and Kawai, Hiroaki, 5,414,252, Cl. 235-463.000.

Sato, Takanori: See—  
Shimizu, Toshihide; and Sato, Takanori, 5,414,061, Cl. 526-62.000.

Sato, Toshio; Ito, Ikuo; Yamaguchi, Hiromichi; and Takeda, Kyoichi, to Sumikin Chemical Co., Ltd. Side-chain alkylation method. 5,414,174, Cl. 585-467.000.

Sato, Tsuneo: See—  
Wada, Hiroshi; Kitazume, Yoshiaki; Hasegawa, Kazuko; Wakisaka, Shinji; and Sato, Tsuneo, 5,414,448, Cl. 345-194.000.

Sato, Yasue: See—  
Yagi, Takayuki; Komatsu, Toshiyuki; Sato, Yasue; and Kawate, Shinichi, 5,413,664, Cl. 156-345.000.

Sato, Yasufumi: See—  
Takimoto, Kiyoshi; Hatanaka, Katsunori; Sakai, Kunihiko; Miyamoto, Masahiko; Kawade, Hisaaki; Sato, Yasufumi; Kishi, Etsuro; and Kawagishi, Hideyuki, 5,414,260, Cl. 250-306.000.

Sato, Yasushi, to Kabushiki Kaisha Kawai Gakki Seisakusho. Multiple oscillator electronic musical instrument having a reduced number of sub-oscillators and direct-read/write of modulation control signals. 5,414,210, Cl. 84-627.000.

Sato, Yoshihiro, to Harada Kogyo Kabushiki Kaisha. Device for controlling the angle of the optical axis of a headlamp light. 5,414,335, Cl. 318-466.000.

Sato, Yoshiko: See—  
Uemachi, Hiroshi; Sato, Yoshiko; Sotomura, Tadashi; and Takeyama, Kenichi, 5,413,882, Cl. 429-213.000.

Sato, Susumu: See—  
Yazawa, Yoshihiro; Owada, Satoshi; Togashi, Fusao; Yoshioka, Keiichi; and Sato, Susumu, 5,413,754, Cl. 420-41.000.

Satomura, Yukiyoshi: See—  
Wada, Tatsuya; Murayama, Syouji; Kuroda, Kazuhiko; Satomura, Yukiyoshi; Matsuoka, Tadashi; Nonami, Mitsuharu; Matsumoto, Kozo; Kawamura, Yukinori; Matsumoto, Norikatsu; Hikita, Hiroshi; and Iwata, Hideo, 5,413,018, Cl. 83-456.000.

Sauby, Michael E.: See—  
Kissinger, Robert D.; Sauby, Michael E.; Menzies, Richard G.; and Paxson, Allen J., 5,413,752, Cl. 419-28.000.

Sauer, Don R., to National Semiconductor Corporation. Rail to rail operational amplifier input stage. 5,414,388, Cl. 330-252.000.

Sauer, Erik, to Ethicon Endo-Surgery. Flange support and display package for surgical instruments. 5,413,217, Cl. 206-363.000.

Sauer, Jürgen: See—  
Ueding, Michael; Strobel, Michael; Krieger, Albert; and Sauer, Jürgen, 5,412,845, Cl. 19-159.00R.

Sauerberg, Per: See—  
Olesen, Preben H.; and Sauerberg, Per, 5,414,009, Cl. 514-299.000.

Saunders, Cleo, executor: See—  
Saunders, William T., deceased; Dalrymple, William H.; Grubbs, Jon F.; and Johnston, William L., 5,413,645, Cl. 148-518.000.

Saunders, William T., deceased (by Saunders, Cleo, executor); Dalrymple, William H.; Grubbs, Jon F.; and Johnston, William L., to Weirton Steel Corporation. Light-cage composite-coated flat-rolled steel manufacture and product. 5,413,645, Cl. 148-518.000.

Savin, Ronald R. Stable inorganic zinc-powder rich coating composition. 5,413,628, Cl. 106-14.440.

Sawada, Hideo; Komoto, Keiji; Sano, Masahiro; Enokida, Yutaka; Mitani Motohiro; Matsumoto, Takeo; Nakayama, Masaharu; and Okajima, Masato, to NOF Corporation. Polymer comprising fluoroalkyl group, a method of preparation thereof, a surface active agent, a surface treatment agent and a coating composition. 5,414,065, Cl. 526-279.000.

Sawada, Yoshitsugu, to Yazaki Corporation. High density multi-pole connector. 5,413,507, Cl. 439-701.000.

Sawai, Toshiya: See—  
Nakayama, Minoru; Sawai, Toshiya; and Murata, Shizuo, 5,414,126, Cl. 564-322.000.

Sawano, Mitsuru: See—  
Kurokawa, Toshio; Sawano, Mitsuru; Osawa, Yukio; Nakagawa, Kenichi; and Ichihashi, Mitsuyoshi, 5,414,490, Cl. 355-71.000.

Sawase, Kensuke; and Kihara, Osamu, to Rohm Co. Ltd. Portable facsimile transmitter with automatic power switch responsive to manual operation. 5,414,533, Cl. 358-473.000.

Sayno Electric Co., Ltd.: See—  
Yamamoto, Yasuaki; Hosokawa, Hiroshi; Shinohara, Wataru; and Kiyama, Seiichi, 5,413,959, Cl. 437-174.000.

Sayovitz, John J.: See—  
Fitting, Steven W.; Sayovitz, John J.; Edwards, Joel E.; and Suduth, Gregory T., 5,413,811, Cl. 427-176.000.

Sayyadi, Babak: See—  
Geithman, Glenn A.; MacKinnon, Duncan P.; Benham, Gary D.; Sayyadi, Babak; and Yankis, Robert T., 5,414,247, Cl. 219-667.000.

Scahill, John W.: See—  
Diebold, James P.; and Scahill, John W., 5,413,227, Cl. 209-722.000.

Scanlon, David W.: See—  
Mahoney, Richard J., III; Martin, Paulo A.; Mead, Graham E.; and Scanlon, David W., 5,413,306, Cl. 248-676.000.

Scantronic Limited: See—  
Hampson, John G., 5,414,255, Cl. 250-221.000.

Schadt, Martin: See—  
Buecheker, Richard; and Schadt, Martin, 5,413,734, Cl. 252-299.600.

Schaeck, Martin: See—  
Burkard, Hermann; Leutsch, Wolfgang; Merkel, Wilfried; and Schaeck, Martin, 5,412,834, Cl. 15-250.420.

Schaefer, Hans D.: See—  
Mueller, Ulrich; Hoelderich, Wolfgang; Schaefer, Hans D.; Eiden, Ulrich; and Woessner, Norbert, 5,413,975, Cl. 502-60.000.

Schaefer, Scott. Low power memory array using selective device activation. 5,414,670, Cl. 365-230.030.

Schaeffer, Jon C.: See—  
Nelson, Warren A.; Schaeffer, Jon C.; and Raghuraman, Srinivasan, 5,413,871, Cl. 428-552.000.

Schaendl, Hartmut: See—  
Uhde, Dietmar; Lehmann, Rudiger; Gleim, Gunter; Hoch, Peter; and Schandl, Hartmut, 5,414,579, Cl. 360-107.000.

Schauberger, Helmut: See—  
Hofmuth, Walter; Kastl, Alfons; Schausberger, Helmut; and Wimmer, Anton, 5,414,484, Cl. 354-321.000.

Scheler, Siegfried; Elsaesser, Andreas; Buhr, Gerhard; Bergmann, Klaus; and Zahn, Wolfgang, to Hoechst Aktiengesellschaft. Light-sensitive mixture containing an O-naphthoquinonediazide-sulfonic acid ester and recording material produced therewith wherein the O-naphthoquinone diazides are partial esters. 5,413,899, Cl. 430-326.000.

Schenfeld, Eugen: See—  
Redmond, Ian; and Schenfeld, Eugen, 5,414,819, Cl. 395-325.000.

Scherbatskoy, Serge A. Sonic measurement while drilling. 5,414,673, Cl. 367-25.000.

Schering Aktiengesellschaft: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Kehr, Wolfgang; Schneider, Herbert H.; Engelstoft, Mogens; Hansen, Bondo J.; Waetjen, Frank; and Honore, Tage, 5,414,002, Cl. 514-292.000.

Skuballa, Werner; Buchmann, Bernd; Heindl, Josef; Frohlich, Wolfgang; Ekerdt, Roland; and Giesen, Claudia, 5,414,016, Cl. 514-460.000.

Scheyer, Dietmar. Protective cap for the end of a level having an I-shaped cross-section. 5,412,876, Cl. 33-379.000.

Schiel, Christian, to J. M. Voith GmbH. Roll press, specifically for the paper industry. 5,413,036, Cl. 100-168.000.

Schindler, Donald G.: See—  
Morgan, Ira L.; Rice, Robert H.; Bolger, Joseph E.; and Schindler, Donald G., 5,414,648, Cl. 364-563.000.

Schips AG Nachautomation: See—  
Schips, Helmut, 5,413,059, Cl. 112-308.000.

Schips, Helmut, to Schips AG Nachautomation. Device for feeding products to be sewn, in particular having edges which roll inward. 5,413,059, Cl. 112-308.000.

Schjervén, William S., Sr.: See—  
Bruno, Adrian A.; Schjervén, William S., Sr.; and Nevarez, Roberto, 5,413,032, Cl. 99-331.000.

Schlack, Richard E.; and Milne, David, to Southco, Inc. Pawl assembly. 5,413,392, Cl. 292-204.000.

Schlegel, Gene C. In-floor access pit frame and cover system. 5,412,911, Cl. 52-20.000.

Schlegel, Gunter: See—  
Willms, Lothar; Lachhein, Stephen; Schlegel, Gunter; and Kehne, Heinz, 5,414,084, Cl. 544-194.000.

Schleuter, Malte: See—  
Schmidt, Michael; and Schleuter, Malte, 5,413,099, Cl. 128-633.000.

Schlicht, Gunter. Cast convoluted piping flange. 5,413,389, Cl. 285-363.000.

Schlueter, Malte: See—  
Schmidt, Michael; and Schlueter, Malte, 5,413,102, Cl. 128-633.000.

Schlumberger Technology Corporation: See—  
D'Angelo, Ralph; Plona, Thomas; Schwartz, Lawrence M.; and Coveney, Peter, 5,412,990, Cl. 73-597.000.

Werner, Andrew T.; and Rider, James G., 5,413,048, Cl. 102-307.000.

Schmidt, David K.: See—  
Ogawa, Yasushi; Schmidt, David K.; Armstrong, Rosa; Nathan, Ranga; Thompson, Andrea Y.; and Seyedin, Saied M., 5,413,989, Cl. 514-12.000.

Schmidt, Hubertus: See—  
Thome, Roland; Schmidt, Hubertus; Feige, Reinhard; Bollmann, Ulrich; Lange, Rudiger; and Engels, Siegfried, 5,413,985, Cl. 502-355.000.

Schmidt, Joseph H., to Atlantic Richfield Company. Signal transmission through deflected well tubing. 5,413,174, Cl. 166-250.000.

Schmidt, Michael; and Schleuter, Malte, to Hewlett-Packard Company. Medical sensor. 5,413,099, Cl. 128-633.000.

Schmidt, Michael; and Schlueter, Malte, to Hewlett-Packard Company. Medical sensor. 5,413,102, Cl. 128-633.000.

Schmiechen, Ralph: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Kehr, Wolfgang; Schneider, Herbert H.; Engelstoft, Mogens; Hansen, Bondo J.; Waetjen, Frank; and Honore, Tage, 5,414,002, Cl. 514-292.000.

Schmitt, Kenneth J., to Stren Company. Backflush filter system for downhole pumps. 5,413,721, Cl. 270-747.000.

Schmitt, Reinhold: See—  
Brunner, Matthias; and Schmitt, Reinhold, 5,414,374, Cl. 324-770.000.

Schmohl, Hans; and Lorenzen, Heinrich, to Sulzer Escher Wyss AG. Turbo machine with an axial dry gas seal. 5,412,977, Cl. 73-46.000.

Schneider (Europe) A.G.: See—  
Goy, Jean-Jacques, 5,413,581, Cl. 606-194.000.

Schneider, F.; Howard, Muni, Indu A.; Murty, B. Ram; Pandya, Mahendra K.; and Matharu, Rajinder P. S., to DynaGen, Inc. Methods and articles of manufacture for the treatment of nicotine withdrawal and as an aid in smoking cessation. 5,414,005, Cl. 514-343.000.

Schneider, Herbert H.: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Kehr, Wolfgang; Schneider, Herbert H.; Engelstoft, Mogens; Hansen, Bondo J.; Waetjen, Frank; and Honore, Tage, 5,414,002, Cl. 514-292.000.

Schneider, Linda H.; and Murphy, Randall B., to Innova Biomed, Inc. Methods for efficacious removal of attached, sucking antipods from human dermis. 5,414,014, Cl. 514-535.000.

Schneider, Michel; Yan, Feng; Grenier, Pascal, deceased (by Garcel, Nadine, legal heir); Puginier, Jerome; and Barrau, Marie-Bernadette, to Bracco International B.V. Long-lasting aqueous dispersions or suspensions of pressure-resistant gas-filled microvesicles and methods for the preparation thereof. 5,413,774, Cl. 424-9.510.

Schneider, Norbert: See—  
Muller, Ingo; Schneider, Norbert; and Krammer, Erich, 5,412,827, Cl. 15-22.100.

Schnoes, Heinrich K.: See—  
DeLuca, Hector F.; Schnoes, Heinrich K.; and Perlman, Kato L., 5,414,098, Cl. 552-653.000.

Schnurr, Werner: See—  
Fischer, Rolf; Goetz, Norbert; Kuekenhoeber, Thomas; Rust, Harald; and Schnurr, Werner, 5,414,097, Cl. 549-425.000.

Schoenborn, Philippe, to LSI Logic Corporation. Shallow trench etch. 5,413,966, Cl. 437-225.000.

Schoenherr, William R.; and Nauheimer, Donald J., to Wallace Computer Services, Inc. Apparatus and method for handling business forms. 5,413,449, Cl. 414-343.000.

Schoening, Danny R.: See—  
Davidson, Robert M.; Eaton, William E.; Furlong, Gregory R.; Michelhaugh, Scott E.; Rowley, James W.; Ross, Gordon F.; Schoening, Danny R.; Tessmann, Daryl L.; and Ulz, David W., 5,414,355, Cl. 324-207.200.

Scholder, Erica J.: See—  
Hernandez, Gilberto; Scholder, Erica J.; and Thompson, Doug, 5,413,833, Cl. 428-119.000.

Scholl, Edmund; Waldert, Helmut; and Beyer, Helmut, to B. Braun Melsungen Aktiengesellschaft. Process for preparing bovine pericard materials and use thereof. 5,413,798, Cl. 424-715.000.

Schoner, C. Richard: See—  
Pateron, Douglas F.; Meissner, Konrad; Redd, William V.; Oliver, Anthony D.; Lipford, Michael S.; Perry, Don A.; and Schoner, C. Richard, 5,413,206, Cl. 198-383.000.

Schonke, Ingobert, to Deknatel Medizinische Produkte GmbH. Suture holder. 5,413,214, Cl. 206-63.300.

Schreiber, Paul T.; and Curtis, Douglas R., to Tandy Corporation. Automatic transistor checker. 5,414,373, Cl. 324-768.000.

Schrem, Kurt; Kratzert, Herbert; and Benn, Alexander, to Kratzert & Schrem GmbH. Clamping device and a clamping file equipped therewith. 5,413,430, Cl. 402-60.000.

Schroepfel, Edward A., to Intermedics, Inc. Cardiac pacemaker with automatic parameter adjustment. 5,413,592, Cl. 607-18.000.

Schropp, Isidor; Anemogiannis, Kimon; and Visintini, Giuliano, to Siemens Aktiengesellschaft. Surface-wave arrangement having a structure for preventing interfering acoustic wave components. 5,414,321, Cl. 310-313.00R.

Schubert, Karl D.; Verrier, Guy F.; and Gray, Michael, to International Business Machines Corporation. Stylus tilt detection apparatus for communication with a remote digitizing display. 5,414,227, Cl. 178-18.000.

Schuch, Wolfgang: See—  
Bridges, Ian G.; Grierson, Donald; and Schuch, Wolfgang, 5,413,937, Cl. 435-320.100.

Schueler, Robert A., to Textron Inc. Motor-powered lawn mower. 5,412,932, Cl. 56-249.000.

Schuler, Chester L., to Lex Computer and Management Corporation. Actuator having electronically controllable tactile responsiveness. 5,414,337, Cl. 318-561.000.

Schuler, Claus: See—  
Greuter, Felix; Schuler, Claus; and Strumpler, Ralf, 5,414,403, Cl. 338-22.00R.

Schulte, Gunther; and Mahnig, Fritz, to Georg Fischer Automobilguss GmbH. Roller bearing assembly. 5,414,784, Cl. 384-537.000.

Schultz, Paul S.: See—  
Principe, Terry J.; and Schultz, Paul S., 5,413,384, Cl. 283-81.000.

Schultz, Thomas J.; Kotidis, Petros A.; Woodroffe, Jaime A.; and Rostler, Peter S., to Textron Defense Systems, Division of Avco Corporation. Method and apparatus for measuring surface movement of an object using a polarizing interferometer. 5,414,510, Cl. 356-349.000.

Schulze, Dale, to Ethicon, Inc. "Omega"-shaped staple for surgical, especially endoscopic, purposes. 5,413,584, Cl. 606-219.000.

Schulze, Ullrich; Niederlein, Horst; Kuhn, Peter; and Frank, Armin, to NSM Aktiengesellschaft. Program controlled entertainment and game apparatus. 5,413,357, Cl. 273-436.000.

Schumacher, Steffen, to Robert Bosch GmbH. Electromagnetic valve with injection-molded valve-closing part. 5,414,398, Cl. 335-255.000.

Schupak, Leonard, to MedCom Electronics. Amplifier circuit. 5,414,392, Cl. 332-118.000.

Schuppe, James L.: See—  
Bernstein, Philip, Jr.; and Schuppe, James L., 5,413,638, Cl. 118-620.000.

Schwartz, Lawrence M.: See—  
D'Angelo, Ralph; Plona, Thomas; Schwartz, Lawrence M.; and Coveney, Peter, 5,412,990, Cl. 73-597.000.

Schwartz, Nira; Shahar, Arie; and Woods, Richard. Dynamic fluid level and bubble inspection for quality and process control. 5,414,778, Cl. 382-142.000.

Schwartzel, Jacques: See—  
Zarka, Albert; Detaint, Jacques; Schwartzel, Jacques; Toudic, Yves; Capelle, Bernard; Zheng, Yun L.; Philippot, Etienne; Buisson, Xavier; and Arnaud, Roger, 5,413,067, Cl. 117-54.000.

Schwarz, William M.; and Fuller, Timothy J., to Xerox Corporation. Colorant and ink compositions. 5,413,630, Cl. 106-22.00K.

Schwede, Gary W. Method and apparatus for transferring data directly between a memory device and a peripheral device in a single address cycle under the control of a processor. 5,414,815, Cl. 395-275.000.

Schwendeman, Robert J.; Jasinski, Leon; and Kuznicki, William J., to Motorola, Inc. Battery saving method for selective call receivers. 5,414,419, Cl. 340-825.440.

Scott, David N. Maple syrup dispenser. 5,413,248, Cl. 222-51.000.

Scott, Ewell M.: See—  
Myers, W. Neill; Scott, Ewell M.; Forbes, John C.; and Shadoan, Michael D., 5,412,981, Cl. 73-119.00A.

Scott, George L., III, to Energex Company, The. System and method for monitoring fracture growth during hydraulic fracture treatment. 5,413,179, Cl. 166-308.000.

Scott, Joseph A.: See—  
Alexander, Robert L.; Bequette, Robert J.; Kensler, Terry T.; and Scott, Joseph A., 5,413,995, Cl. 514-110.000.

Scott, Norman H., to UOP. Absorption and cold separation process for recovering purified hydrogen from a catalytic dehydrogenation zone effluent. 5,414,168, Cl. 585-2.000.

Scribner, Kelvin; and Hodgson, Doug, to Noise Cancellation Technologies, Inc. Noise attenuation system for vibratory feeder bowl. 5,414,775, Cl. 381-71.000.

Scripps Research Institute, The: See—  
Nicolau, Kyriacos C.; Wrasidlo, Wolfgang A.; and Maligres, Peter E., 5,413,992, Cl. 514-34.000.

Seaman, Gary W.; Mascha, Michael; and Williams, Homer F., to Ethnographics, Inc. Repetitive event analysis system. 5,414,644, Cl. 364-551.010.

Sears Roebuck & Co.: See—  
Dewire, Robert J.; and Krueger, John D., 5,413,262, Cl. 224-253.000.

Security Tag Systems, Inc.: See—  
Lian, Ming R., 5,414,412, Cl. 340-572.000.

Seeger, Horst K.; Liu, Yao-Ching; Haight, LeVoy G.; Pagan, Luis A.; Payne, Kimberly R.; and Vanderbilt, Jeffrey J., to Huntsman Polypropylene Corporation. Process for the production of polypropylene. 5,414,063, Cl. 526-88.000.

Seem, John E., to Johnson Service Company. Method and apparatus for adaptive demand limiting electric consumption through load shedding. 5,414,640, Cl. 364-493.000.

Segal, Rene. Portable bird playgym. 5,413,068, Cl. 119-26.000.

Seibl, Rudolf: See—  
Eberle, Josef; Seibl, Rudolf; Kessler, Christoph; and Konig, Bernhard, 5,413,906, Cl. 435-5.000.

Seidelmann, Dieter: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Kehr, Wolfgang; Schneider, Herbert H.; Engelstoft, Mogens; Hansen, Bondo J.; Waetjen, Frank; and Honore, Tage, 5,414,002, Cl. 514-292.000.

Seiko Epson Corporation: See—  
Fujita, Toru; Mimose, Kiyoharu; and Suzuki, Takashi, 5,414,488, Cl. 355-30.000.

Matsuo, Mutsumi; Yudasaka, Ichio; Kanai, Kiyohiko; Nagase, Katsumi; and Inoue, Takashi, 5,414,547, Cl. 359-67.000.

Morita, Naoyuki; and Tsugane, Hiroaki, 5,414,297, Cl. 257-620.000.

Seiko Instruments Co., Ltd.: See—  
Fujita, Toru; Mimose, Kiyoharu; and Suzuki, Takashi, 5,414,488, Cl. 355-30.000.

Seitz, David M.: See—  
Gimple, James J.; Hamilton, David L.; Hughey, Daniel C.; Jamison, Chris M.; and Seitz, David M., 5,413,283, Cl. 239-600.000.

Sekhar, Jainagesh A.: See—  
de Nora, Vittorio; and Sekhar, Jainagesh A., 5,413,689, Cl. 204-279.000.

Seki, Masaki; Takegahara, Takashi; and Matsunaka, Toru, to Fanuc Ltd. Method of NC data preparation for repeated patterns. 5,414,807, Cl. 395-142.000.

Sekiguchi, Masami; and Yamamoto, Toru, to Sony Corporation. Magnetic recording apparatus with selective recording of auxiliary audio signal. 5,414,569, Cl. 360-19.100.



- Sekine, Hiroshi:** See—  
Terada, Yoshihiro; Sasuga, Kazuyasu; Kouno, Katuyuki; Taniuchi, Kazumasa; Sekine, Hiroshi; and Ishiwata, Masahiro, 5,414,529, Cl. 358-448.000.
- Sekine, Yoshiyuki:** See—  
Kodama, Yasumasa; and Sekine, Yoshiyuki, 5,414,465, Cl. 348-236.000.
- Sekino, Kazuo:** See—  
Murakami, Yasuo; Sekino, Kazuo; and Mitamura, Nobuaki, 5,413,643, Cl. 548-319.000.
- Sekisui Chemical Co., Ltd.:** See—  
Suzuki, Taro; Fukuda, Mutsumi; and Yoneto, Kunio, 5,413,776, Cl. 424-448.000.
- Sekisui Kagaku Kogyo Kabushiki Kaisha:** See—  
Anraku, Hideo, 5,413,786, Cl. 514-185.000.
- Sekisui Kaseihin Kogyo Kabushiki Kaisha:** See—  
Ohashi, Keiichi; Ohara, Yoshinobu; and Ishimori, Fumitaka, 5,414,241, Cl. 219-219.000.
- Seliverstov, Lev A.:** See—  
Adasko, Vladimir I.; Vardenburg, Arnold K.; Emelyanov, Alexander L.; Seliverstov, Lev A.; Emelyanov, Viktor L.; Slonimsky, Alexander D.; Sklyarov, Nikolai A.; Tikhonov, Vladimir I.; Rogozhin, Jury F.; and Piliposian, Pogos M., 5,414,224, Cl. 174-262.000.
- Sellers, James A.:** See—  
Pages, Irene; D'Aragona, Francesco; Sellers, James A.; and Wells, Raymond C., 5,413,952, Cl. 437-62.000.
- Semiconductor Energy Laboratory Co., Ltd.:** See—  
Yamazaki, Shunpei; Mase, Akira; Hiroki, Masaaki; and Takemura, Yasuhiko, 5,414,442, Cl. 345-89.000.
- Sen, Bidyut K.:** and **Tosaya, Eric S.:** to LSI Logic Corporation. Multi-layer IC semiconductor package, 5,414,222, Cl. 174-262.000.
- Sensimetrix Corporation:** See—  
Zurek, Patrick M.; and Rabinowitz, William M., 5,413,114, Cl. 128-746.000.
- Sensordeck L.P.:** See—  
Vigmostad, Erik B.; and Klauber, Robert D., 5,412,999, Cl. 73-862.333.
- Seo, Katsuhiro:** See—  
Ohmori, Kiyoshi; Watanabe, Tetsu; Seo, Katsuhiro; and Kudo, Junichi, 5,414,687, Cl. 369-50.000.
- Seppi, Kevin D.:** See—  
Bingham, Ronald E.; Dockter, Michael J.; Farber, Joel F.; and Seppi, Kevin D., 5,414,841, Cl. 395-600.000.
- Seraji, Homayoun:** to California Institute of Technology. Method and apparatus for adaptive force and position control of manipulators, 5,414,799, Cl. 395-95.000.
- Seto, Kaoru:** See—  
Fuji, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.
- Sevrain, Christophe J. P.:** and **Beckett, Carl D.:** to Micropump Corporation. Line clamp, 5,413,566, Cl. 604-248.000.
- Sextant Avionique:** See—  
Denoize, Xavier; and Faivre, Francois, 5,414,631, Cl. 364-461.000.
- Sextant Medical Corporation:** See—  
Benaron, David A., 5,413,098, Cl. 128-633.000.
- Seyedin, Saied M.:** See—  
Ogawa, Yasushi; Schmidt, David K.; Armstrong, Rosa; Nathan, Ranga; Thompson, Andrea Y.; and Seyedin, Saied M., 5,413,989, Cl. 514-12.000.
- SGS-Thomson Microelectronics, Inc.:** See—  
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- SGS-Thomson Microelectronics S.A.:** See—  
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- Shadoan, Michael D.:** See—  
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- Shafer, Sheldon J.:** See—  
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- Shah, Jitendra:** See—  
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- Shahar, Arie:** See—  
Schwartz, Nira; Shahar, Arie; and Woods, Richard, 5,414,778, Cl. 382-142.000.
- Shanmugasundaram, Thiruvenkataswamy:** See—  
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- Shannon, Warren K.:** See—  
Gray, Roger M.; and Shannon, Warren K., 5,413,422, Cl. 400-144.200.
- Shao, Steve:** Quickly-mountable securing structure for electric heating element in a heater fan, 5,414,794, Cl. 392-365.000.
- Shapona, Mark G.:** to Ford Motor Company. Apparatus for scaleless induction heating, 5,414,246, Cl. 219-640.000.
- Sharma, Anil:** See—  
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- Sharp, James E.:** See—  
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- Sharp Kabushiki Kaisha:** See—  
Fukui, Yoshimitsu, 5,414,721, Cl. 371-67.100.
- Ihara, Makoto:** 5,414,661, Cl. 365-203.000.
- Iwaki, Tetsuo;** **Tanaka, Toshihisa;** and **Yamada, Eiji:** 5,414,719, Cl. 371-37.100.
- Kanatani, Yoshiharu;** **Fukuoka, Hirofumi;** and **Uehira, Shigeyuki:** 5,414,443, Cl. 345-95.000.
- Kubota, Yasushi;** and **Onishi, Shigeo:** 5,414,654, Cl. 365-145.000.
- Mieda, Michinobu;** **Katayama, Hiroyuki;** **Takahashi, Akira;** and **Ohta, Kenji:** 5,414,652, Cl. 365-122.000.
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- Watanabe, Masanori;** **Ohbayashi, Ken;** **Sasaki, Kazuaki;** **Yamamoto, Osamu;** and **Matsumoto, Mitsuhiro:** 5,413,956, Cl. 437-129.000.
- Yamauchi, Yoshimitsu:** 5,414,286, Cl. 257-315.000.
- Sharp Kabushiki Kaisha:** See—  
Fukamoto, Katsumi, 5,414,671, Cl. 365-228.000.
- Sharp, Norman L.:** See—  
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- Shatilov, Alexander Y.:** Aquarium surface sweep prefilter, 5,413,707, Cl. 210-169.000.
- Shaw, Edward T.;** and **Kesling, Haven S., Jr.:** to Arco Chemical Technology, L.P. Cement composition, 5,413,634, Cl. 106-696.000.
- Sheffer, Phil B.:** to Triangle Container Corporation. Plural-component one-piece shipping and retail display carton, 5,413,276, Cl. 229-120.110.
- Sheldon, Donald H., Jr.:** to Deere & Company. Vegetation cutter for a cotton harvester, 5,412,930, Cl. 56-44.000.
- Sheldrake, Gary N.:** See—  
Brown, Stephen M.; Glass, Janet C.; and Sheldrake, Gary N., 5,414,164, Cl. 570-123.000.
- Sbell Oil Company:** See—  
Drent, Eit; and Kragtswijk, Eric, 5,414,109, Cl. 560-207.000.
- Shelton, Floyd:** Fixed resilient sleeper athletic flooring system, 5,412,917, Cl. 52-403.100.
- Shen, Jun:** See—  
Goronkin, Herbert; Tehrani, Saied N.; Shen, Jun; and Zhu, Xiaodong T., 5,414,274, Cl. 257-25.000.
- Shen, Tim H. T.:** See—  
Lee, I-Shi; Shen, Tim H. T.; Huang, Stephen R. M.; and Kuo, Judy C. L., 5,414,308, Cl. 327-293.000.
- Shenoi, Noel A.:** to Worldwide Remediation, Inc. Apparatus and method for removing hydrocarbons from soils and gravel, 5,413,129, Cl. 134-65.000.
- Sherman, John D.:** See—  
Chao, Chien C.; Sherman, John D.; Mullhaupt, Joseph T.; and Bolinger, Cornelius M., 5,413,625, Cl. 95-103.000.
- Sherry, A. Dean:** See—  
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- Sherets, Charles R.:** See—  
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- Sherwin-Williams Company, The:** See—  
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- Sherwood Medical Company:** See—  
Katsaros, Georges; Thomas, David G.; and Allison, Richard D., 5,413,571, Cl. 606-213.000.
- Sheth, Nitin V.;** **Valorose, Joseph J., Jr.;** **Ellway, Keith A.;** **Ganesan, Madurai G.;** **Mooney, Kieran G.;** and **Johnson, Jerry B.:** to American Cyanamid Company. Pulsatile once-a-day delivery systems for minocycline, 5,413,777, Cl. 424-490.000.
- Sheu, Yeh-Hwa E.;** **Sanderson, John R.;** **Mueller, Mark A.;** and **Smith, William A.:** to Texaco Chemical Inc. Production of tertiary butyl alcohol from isobutane, 5,414,145, Cl. 568-671.000.
- Shiau, Shoen-Shuh:** Writing instrument with light assembly, 5,413,429, Cl. 401-195.000.
- Shido, Shun-Ichi;** **Miyazaki, Toshihiko;** **Sakai, Kunihiro;** and **Oguchi, Takahiro:** to Canon Kabushiki Kaisha. Moving apparatus, a moving method and an information detection and/or input apparatus using the same, 5,414,690, Cl. 369-126.000.
- Shields, Charles W.:** to Shields Company. Magnetic sweeper, 5,413,225, Cl. 209-614.000.
- Shields Company:** See—  
Shields, Charles W., 5,413,225, Cl. 209-614.000.
- Shigematsu, Takashi:** See—  
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- Shigyo, Masakane:** See—  
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- Shih, Charles C.:** See—  
Filip, Michael J.; Karunungan, Kathy L.; Kramer, Jeffrey C.; Lee, Lucille C.; Moore, Danielle L.; Shih, Charles C.; and Sydir, Jaroslav J., 5,414,812, Cl. 395-200.000.
- Shih, Stuart S.:** See—  
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- Fletcher, David L.;** **Sarli, Michael S.;** and **Shih, Stuart S.:** 5,413,697, Cl. 208-89.000.
- Fletcher, David L.;** **Harandi, Mohsen N.;** **Sarli, Michael S.;** and **Shih, Stuart S.:** 5,413,698, Cl. 208-89.000.
- Shiina, Michihiro:** See—  
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- Shijo, Hiroyasu:** See—  
Kanmoto, Yoshiaki; Fukuda, Haruhiko; Yonenaga, Kohtaroh; and Shijo, Hiroyasu, 5,414,535, Cl. 358-487.000.
- Shilad, Issac:** See—  
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- Shima, Akira:** See—  
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- Shimada, Kunihiro;** **Yanagisawa, Shuichi;** and **Tanaka, Satoru:** to Pioneer Electronic Corporation. Optical disk, method of manufacturing the same and method of recording the same, 5,414,691, Cl. 369-275.200.
- Shimakawa, Taiji:** See—  
Igaue, Takamitsu; Nomura, Hironori; Ohnishi, Hirofumi; Matsura, Yoshinori; Sasaki, Tohru; Shimakawa, Taiji; and Yamamoto, Hiroki, 5,413,654, Cl. 156-161.000.
- Shimano Inc.:** See—  
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- Shimaoka, Megumi:** See—  
Onishi, Norimasa; Shimaoka, Megumi; Kira, Ikuo; and Nakazawa, Masakazu, 5,413,921, Cl. 435-135.000.
- Shimizu, Hidetoshi:** to Shinano Kensi Kabushiki Kaisha. Disk player with constant angular velocity, 5,414,685, Cl. 369-48.000.
- Shimizu, Masahiro;** **Fukasawa, Takayuki;** **Yamazaki, Yuichi;** **Miyoshi, Motosuke;** **Okano, Haruo;** and **Okumura, Katsuya:** to Tokyo Electron Limited; and **Kabushiki Kaisha Toshiba.** Plasma processing apparatus, 5,413,663, Cl. 156-345.000.
- Shimizu, Norio:** See—  
Ishibashi, Tadashi; Kezuka, Hiroaki; Yoshino, Saeko; Shimizu, Norio; Tsuda, Motoyuki; and Imazeki, Shuji, 5,414,072, Cl. 530-387.900.
- Shimizu, Susumu:** See—  
Kumazawa, Satoru; Shimizu, Susumu; Enari, Hiroyuki; Ito, Atsushi; Ikeda, Susumu; Sato, Nobuo; and Saishoji, Toshihide, 5,414,105, Cl. 560-51.000.
- Shimizu, Takeo:** See—  
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- Shimizu, Tasuku:** See—  
Yoshimura, Toshihiko; Shimizu, Tasuku; Ishikawa, Yuichi; Otake, Masahiro; Koguchi, Yuko; Enomoto, Kunio; Hasegawa, Kunio; Hayashi, Makoto; and Takaku, Kazuo, 5,414,356, Cl. 324-239.000.
- Shimizu, Toshihide;** and **Sato, Takanori:** to Shin-Etsu Chemical Co., Ltd. Polymer scale preventive liquid and method of preventing polymer scale deposition, 5,414,061, Cl. 526-62.000.
- Shimizu, Yutaka;** and **Kano, Masami:** to Mitsuba Electric Manufacturing Co., Ltd. Brush device, 5,414,318, Cl. 310-239.000.
- Shimokuni, Kenji;** and **Ogisu, Kenji:** to Sony Corporation. Cassette for accommodating a recording medium, 5,413,218, Cl. 206-387.100.
- Shimosaka, Hiroyosi:** See—  
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- Shimoyoshi, Osamu:** See—  
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- Shimura, Teruyuki;** and **Yoshida, Naohito:** to Mitsubishi Denki Kabushiki Kaisha. Heterojunction bipolar transistor, 5,414,273, Cl. 257-17.000.
- Shimura, Yasuhiro:** See—  
Matsushige, Hiromi; Kosuge, Minoru; Shimura, Yasuhiro; Miyasaka, Hideki; Minoshima, Satoshi; Tachiuchi, Tsuguji; Iwabuchi, Kazunori; Takashi, Terumi; and Matsunami, Naoto, 5,414,571, Cl. 360-65.000.
- Shin-Etsu Chemical Co., Ltd.:** See—  
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- Tarumi, Yasuo;** **Koike, Noriyuki;** and **Takago, Toshio:** 5,414,119, Cl. 562-851.000.
- Shin-Etsu Handotai Company, Ltd.:** See—  
Terashima, Seiichi; and Kita, Masao, 5,413,521, Cl. 451-1.000.
- Shin, Yun-seung;** and **Chang, Sung-nam:** to Samsung Electronics Co., Ltd. Semiconductor device with a multilayered contact structure having a boro-phosphate silicate glass planarizing layer, 5,414,302, Cl. 257-752.000.
- Shinano Kensi Kabushiki Kaisha:** See—  
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- Shincron Co., Ltd.:** See—  
Saisho, Shinichiro; Ikeda, Toshiobu; and Odagiri, Akira, 5,414,506, Cl. 356-128.000.
- Shinkawa, Keiro:** See—  
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- Shinkawa, Masaki;** and **Kimura, Misao:** to Harada Kogyo Kabushiki Kaisha. Electric extensible car antenna, 5,414,436, Cl. 343-715.000.
- Shinoaki, Sakura;** and **Enomoto, Junichi:** to Tokyo Gas Co., Ltd. Method and apparatus for determining elementary circuits and initial values of flows in a pipe network, 5,414,641, Cl. 364-510.000.
- Shinoda, Ichiro;** **Kashiwazaki, Tomoyuki;** **Okawado, Akira;** **Moriya, Kazumasa;** **Sato, Shinichi;** **Itoh, Motohiko;** **Watanabe, Mitsuo;** and **Kawai, Hiroaki:** to Fujitsu Limited. High speed scan bar code reader which can read more than one type of bar code, 5,414,252, Cl. 235-463.000.
- Shinoda, Sumio:** to Daicel Chemical Industries, Ltd. Ru-Sn heteropolynuclear complex and process for producing acetic acid or methyl acetate by using the same, 5,414,110, Cl. 560-238.000.
- Shinohara, Mamoru:** See—  
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- Shinohara, Wataru:** See—  
Yamamoto, Yasuaki; Hosokawa, Hiroshi; Shinohara, Wataru; and Kiyama, Seiichi, 5,413,959, Cl. 437-174.000.
- Shiobara, Yasuhisa:** to Kabushiki Kaisha Toshiba. Direct transfer from a receive buffer to a host in a token-passing type network data transmission system, 5,414,813, Cl. 395-200.000.
- Shiohara, Morito:** See—  
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- Shionogi & Co., Ltd.:** See—  
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- Shippen, Norris:** See—  
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- Shippers Paper Products Company:** See—  
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- Van Erden, Donald L.:** 5,413,824, Cl. 428-12.000.
- Shirai, Shoji:** See—  
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- Shiraishi, Tohru:** See—  
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- Shiraiwa, Yoshinori:** See—  
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- Shobatake, Yasuro:** See—  
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- Shoei Kako Kabushiki Kaisha:** See—  
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- Shogren, William G.:** See—  
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- Shorey, James L.:** to DAX Industries, Inc. Electric throttle and motor control circuitry, 5,414,792, Cl. 388-811.000.
- Short Brothers PLC:** See—  
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- Shotwell, Kerri R.:** See—  
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- Shtayer, Ronen;** **Eliyahu, Roni;** and **Livay, Aviel:** to Motorola, Inc. Method and data structure for performing address compression in an asynchronous transfer mode (ATM) system, 5,414,701, Cl. 370-58.200.
- Shu, Chi-Kuen;** and **Lawrence, Brian M.:** to R. J. Reynolds Tobacco Company. Method of providing flavorful and aromatic compounds, 5,413,122, Cl. 131-274.000.
- Shuchart, Chris E.:** See—  
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- Shulman, Jan E.:** See—  
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- Shuto, Katsuichi:** See—  
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- Siddiqui, Uzair:** See—  
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- Siecor Corporation:** See—  
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- Siegel, Robert P.;** **Kuo, Youti;** and **Hanzlik, Edward C.:** to Xerox Corporation. Predictive decurler apparatus and method, 5,414,503, Cl. 355-309.000.
- Siemens Aktiengesellschaft:** See—  
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- Brunner, Matthias;** and **Schmitt, Reinhold:** 5,414,374, Cl. 324-770.000.
- Michel, Peter;** and **Kummel, Alfred:** 5,414,316, Cl. 310-90.000.
- Muhr, Johann:** 5,414,706, Cl. 370-65.500.
- Nagler, Werner;** and **Gloess, Bernhard:** 5,414,695, Cl. 370-15.000.
- Schropp, Isidor;** **Anemogiannis, Kimon;** and **Visintini, Giuliano:** 5,414,321, Cl. 310-313.00R.
- Siemens Automotive L.P.:** See—  
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- Hornby, Michael J.;** and **Robinson, Barry S.:** 5,413,077, Cl. 123-457.000.
- Siemens Electric Limited:** See—  
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- Siemens Elema AB:** See—  
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- Siemens Energy & Automation, Inc.:** See—  
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Silver, Jules; and Ziegler, Louis C. Predetermined dosage hypodermic syringe system. 5,413,564, Cl. 604-232.000.  
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Simonsen, Lars: See—  
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Simpson, Randall L.; and Pruneda, Cesar O., to University of California, The Regents of the, Method for fabricating non-detonable explosive simulants. 5,413,812, Cl. 427-212.000.  
Sims, Travis M., Jr., to Lectrosionics, Inc. Adaptive proportional gain audio mixing system. 5,414,776, Cl. 381-119.000.  
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Siranni, John F., to Eastman Kodak Company. Energy attenuating support plates for protecting objects thereon. 5,413,220, Cl. 206-395.000.  
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Stupp, Winfried: See—  
Koppe, Heinz; Nicolai, Norbert; and Stupp, Winfried, 5,413,790, Cl. 424-411.000.

Stutz, William H., Jr., to Pacesetter, Inc. Lead retention and seal for implantable medical device. 5,413,595, Cl. 607-637.000.

Suda, Yoshiyuki: See—  
Era, Koh; Suda, Yoshiyuki; Agawa, Satoshi; and Mishima, Osamu, 5,414,279, Cl. 257-76.000.

Sudduth, Gregory T.: See—  
Fitting, Steven W.; Sayovitz, John J.; Edwards, Joel E.; and Sudduth, Gregory T., 5,413,811, Cl. 427-176.000.

Sudou, Teruhisa: See—  
Muto, Takanori; and Sudou, Teruhisa, 5,414,611, Cl. 363-21.000.

Sue, Chen-Youn; Koch, Robert; Pace, John E.; and Prince, Gregory R., to General Electric Company. Grafting, phase-inversion and cross-linking controlled multi-stage bulk process for making ABS graft copolymers. 5,414,045, Cl. 525-86.000.

Suga, Yasushi; Kobayashi, Kiyoshi; and Sasahara, Toshimitu, to Fuji Photo Film Co., Ltd. Curtain coating method and apparatus utilizing checking plate for controlling liquid flow. 5,413,818, Cl. 427-420.000.

Sugahara, Kazuyuki: See—  
Inoue, Yasuo; Sugahara, Kazuyuki; Ipposhi, Takashi; Yamaguchi, Yasuo; and Nishimura, Tadashi, 5,413,968, Cl. 437-200.000.

Sugawa, Shigetoshi; and Gofuku, Ichichiro, to Canon Kabushiki Kaisha. Photoelectric converting device and image processing apparatus utilizing the same. 5,414,275, Cl. 257-53.000.

Sugg, Rolin W.: See—  
Moysan, Stephen R., III; and Sugg, Rolin W., 5,413,874, Cl. 428-627.000.

Sugibayashi, Tadahiko; Naritake, Isao; and Matano, Tatsuya, to NEC Corporation. Double word line type dynamic RAM having redundant sub-array of cells. 5,414,660, Cl. 365-200.000.

Sugimoto, Fumitoshi: See—  
Ohori, Tatsuya; Hanyu, Isamu; Sugimoto, Fumitoshi; and Arimoto, Yoshihiro, 5,413,951, Cl. 437-61.000.

Sugimoto, Takatoshi; Yoshimura, Hideaki; and Suzuki, Masayuki, to Sony Corporation. Automatic testing method and testing apparatus for devices. 5,414,639, Cl. 364-489.000.

Sugimura, Yoh; Yabuta, Motoshi; Yukawa, Yoshiyuki; and Fujii, Yasuhiro, to Kansai Paint Company, Limited. Coating resin compositions. 5,414,055, Cl. 523-453.000.

Sugiura, Keiichi, to Nihon Kohden Corporation. Pulse oximeter probe. 5,413,101, Cl. 128-633.000.

Sugiyama, Hiroyuki; and Kida, Kenji, to Komori Corporation. Sheet reversing apparatus for sheet-fed rotary press with reversing mechanism. 5,413,040, Cl. 101-230.000.

Sugiyama, Hisataka; Maeda, Takeshi; Matsumoto, Kiyoshi; Terao, Motoyasu; Okamine, Shigenori; Nishida, Tetsuya; and Miyamoto, Harukazu, to Hitachi, Ltd. Three-dimensional recording and reproducing apparatus. 5,414,451, Cl. 547-258.000.

Sugiyama, Hista: See—  
Maeda, Takeshi; Arai, Shinichi; Isaka, Kazuo; Saito, Atsushi; Mizokami, Takuya; Sugiyama, Hista; and Kawamura, Satoshi, 5,414,689, Cl. 369-116.000.

Sullivan, Mark T.; and Mansfield, Joseph A. Tilting kinematic mount. 5,414,565, Cl. 359-872.000.

Sulouff, Robert E., Jr.: See—  
Bergstrom, John S.; and Sulouff, Robert E., Jr., 5,412,987, Cl. 73-517.00R.

Sulzer Escher Wyss AG: See—  
Schmohl, Hans; and Lorenzen, Heinrich, 5,412,977, Cl. 73-46.000.

Sumikin Chemical Co., Ltd.: See—  
Sato, Toshio; Ito, Ikuo; Yamaguchi, Hiromichi; and Takeda, Kyoichi, 5,414,174, Cl. 585-467.000.

Sumitomo Bakelite Company Limited: See—  
Azuma, Keiji; Katoh, Kimikazu; and Oguro, Ryoichi, 5,413,838, Cl. 428-194.000.

Sumitomo Chemical Co., Ltd.: See—  
Katsuda, Nobuyuki; Yabushita, Shinichi; and Hashizume, Shuhei, 5,413,613, Cl. 8-471.000.

Kotani, Kozo; and Sakaya, Taiichi, 5,414,030, Cl. 524-99.000.

Tomioka, Jun; Kuwana, Koji; Nakanishi, Horotoshi; Uetani, Yasunori; and Ida, Ayako, 5,413,895, Cl. 430-191.000.

Sumitomo Electric Industries, Ltd.: See—  
Hashinaga, Tatsuya; and Nishiguchi, Masanori, 5,414,370, Cl. 324-760.000.

Inada, Hiroshi; Tanaka, So; and Iiyama, Michitomo, 5,413,982, Cl. 505-193.000.

Nokubo, Seiji; Kohno, Teruhisa; and Fujimoto, Tsuyoshi, 5,413,406, Cl. 303-119.200.

Yoshino, Masato, 5,414,628, Cl. 364-426.020.

Sumitomo Metal Ceramics Inc.: See—  
Tozawa, Yoji; Hashimoto, Shizuki; and Yamamoto, Tetsuya, 5,414,300, Cl. 257-704.000.

Sumitomo Precision Products Co., Ltd.: See—  
Okazaki, Sachiko; Kogoma, Masahiro; Hirakawa, Masahiro; and Kasai, Kazuo, 5,413,769, Cl. 422-186.070.

Sumitomo Rubber Industries Inc.: See—  
Kawamatsu, Hideaki, 5,413,338, Cl. 273-80.00B.

Sumitomo Rubber Industries, Ltd.: See—  
Iwanaga, Takeshi, 5,413,336, Cl. 273-77.00A.

Kondo, Kazuaki; and Iimura, Masaaki, 5,413,653, Cl. 156-111.000.

Sumitomo Wiring Systems, Ltd.: See—  
Fudoo, Eiji; Yamada, Takayuki; and Saka, Yuuji, 5,412,861, Cl. 29-564.200.

Tanaka, Tsutomu, 5,413,500, Cl. 439-521.000.

Sun Company, Inc. (R&M): See—  
Durante, Vincent A.; Walker, Darrell W.; Gussow, Steven M.; Lyons, James E.; and Hayes, Robert C., 5,414,157, Cl. 568-840.000.

Sun, Deh-Chuan; and Stark, Casper F., to Howmedica Inc. Non-oxidizing polymeric medical implant. 5,414,049, Cl. 525-333.700.

Sun, Mei H., to Luxtron Corporation. Measuring system employing a luminescent sensor and methods of designing the system. 5,414,266, Cl. 250-459.100.

Sunahata, Mutsumi: See—  
Nakamoto, Akira; Takada, Shiro; Hanazawa, Akiyoshi; Sakunaga, Kazunori; Mori, Takuji; Saito, Taro; and Sunahata, Mutsumi, 5,412,998, Cl. 73-862.335.

Sundberg, Jack G.: See—  
Bennett, George L.; and Sundberg, Jack G., 5,413,466, Cl. 417-69.000.

Sung, Gilbert: See—  
Lin, Tien-Ler; Wan, Ray L.; Hsiao, Ling-Wen; and Sung, Gilbert, 5,414,664, Cl. 365-218.000.

Sunnybrook Health Science Centre: See—  
Lockwood, Geoff R.; Turnbull, Daniel H.; and Foster, F. Stuart, 5,412,854, Cl. 29-25.350.

Sunstate Mobility Corp.: See—  
Krusse, Thomas E.; and Traxler, John C., 5,413,187, Cl. 180-65.100.

Suski, Edward D.; Silva, David J.; and Miner, Glenn G., to AST Research, Inc. Solder pad for printed circuit boards. 5,414,223, Cl. 174-262.000.

Susnitzky, David W.: See—  
Hwang, Chinmau J.; Beaman, Donald R.; and Susnitzky, David W., 5,413,972, Cl. 501-98.000.

Suspa Compant Aktiengesellschaft: See—  
Bauer, Hans J., 5,413,414, Cl. 384-276.000.

Sutton, Christopher M.: See—  
Jansen, Murray L.; Killick, Donald E.; Lang, Alexander; Pullman, Royce T.; Sutton, Christopher M.; and Zwaaneveld, Cornelis H., 5,413,112, Cl. 128-726.000.

Sutton, Kevin: See—  
Kotzur, Frank W.; Swanson, Mark; Sutton, Kevin; Hopko, Donald J.; Rosenkranz, Thomas; and Franklin, David, 5,413,264, Cl. 226-119.000.

Suyama, Tomio: See—  
Maruyama, Fumio; and Suyama, Tomio, 5,413,130, Cl. 134-95.300.

Suzuki, Akio: See—  
Amemiya, Koji; Suzuki, Akio; Takeuchi, Tatsuo; Fukushima, Hisashi; Hasegawa, Takashi; Moriguchi, Haruhiko; Saito, Rie; Ogata, Takao; and Sasanuma, Nobutsu, 5,414,531, Cl. 358-465.000.

Suzuki, Akira, to Hitachi, Ltd. Oil-free type screw compressor device. 5,413,467, Cl. 417-203.000.

Suzuki, Eiji; Okabe, Hideaki; and Saito, Takanori, to Lintec Corporation. Percutaneous absorption promoter, a tape plaster and a method of promoting percutaneous absorption. 5,413,794, Cl. 424-449.000.

Suzuki, Eiji, to Fujitsu Limited. Data communication system with channel switches. 5,414,414, Cl. 340-825.010.

Suzuki, Fukuichi: See—  
Wakasugi, Takashi; Miyakawa, Tadashi; and Suzuki, Fukuichi, 5,414,139, Cl. 568-466.000.

Suzuki, Hiroyoshi: See—  
Ogawa, Kenji; and Suzuki, Hiroyoshi, 5,414,368, Cl. 324-675.000.

Suzuki, Isamu: See—  
Oshino, Genzi; and Suzuki, Isamu, 5,414,450, Cl. 342-197.0PH.

Suzuki Kabushiki Kaisha: See—  
Hirata, Chiaki, 5,413,200, Cl. 192-40.000.

Suzuki, Katsuhiko; Hayashi, Katsuhiko; and Itoh, Akira, to Toyota Jidosha Kabushiki Kaisha. Device for determining deterioration of a catalytic converter for an engine. 5,412,941, Cl. 60-276.000.

Suzuki, Kazuhiro: See—  
Koshi, Yutaka; Kamizawa, Koh; Kunitake, Setsu; and Suzuki, Kazuhiro, 5,414,527, Cl. 358-433.000.

Suzuki, Koji; Ishikawa, Tadashi; Nagahira, Joji; and Motoyama, Hajime, to Canon Kabushiki Kaisha. Apparatus for controlling a power source. 5,414,862, Cl. 395-750.000.

Suzuki, Masayuki: See—  
Sugimoto, Takatoshi; Yoshimura, Hideaki; and Suzuki, Masayuki, 5,414,639, Cl. 364-489.000.

Suzuki Motor Corporation: See—  
Wada, Shunichi; Nisino, Kazuhisa; and Sasaki, Yasushi, 5,414,627, Cl. 364-424.050.

Suzuki, Seiichi: See—  
Ellisman, Mark H.; Fan, Gary G. Y.; Price, Jeff; and Suzuki, Seiichi, 5,414,261, Cl. 250-311.000.

Suzuki, Shinichiro: See—  
Yamanashi, Teruaki; Suzuki, Shinichiro; Tsujimoto, Yoshio; and Kiyohara, Toshikazu, 5,413,657, Cl. 156-235.000.

Suzuki, Takashi: See—  
Fujita, Toru; Mimose, Kiyoharu; and Suzuki, Takashi, 5,414,488, Cl. 355-30.000.

Suzuki, Takaya: See—  
Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyouhei, 5,412,970, Cl. 72-250.000.

Suzuki, Taro; Fukuda, Mutsumi; and Yoneto, Kunio, to Sekisui Chemical Co., Ltd. Pharmaceutical preparation for percutaneous absorption. 5,413,776, Cl. 424-448.000.

Suzuki, Tomio: See—  
Kimura, Hideyuki; Takahashi, Tsuyoshi; Suzuki, Tomio; Ohdaira, Toshio; Uefune, Kouki; and Nishimura, Yuji, 5,414,591, Cl. 361-695.000.

Suzuki, Yoshinori: See—  
Sakakibara, Yasuhiro; Kobayashi, Isamu; and Suzuki, Yoshinori, 5,414,825, Cl. 395-400.000.

Sverdrup, Edward F.: See—  
Peterson, Steven H.; Lahoda, Edward J.; Grant, David C.; Sverdrup, Edward F.; Congedo, Thomas V.; Bartko, John; Witkowski, Robert E.; Wolfe, Arthur L.; Partlow, William D.; and Skriba, Michael C., 5,414,195, Cl. 588-1.000.

Swan, Dale G.; and Hastings, Charles A., to BSI Corporation. Restrained multifunctional reagent for surface modification. 5,414,075, Cl. 568-333.000.

Swanson, Mark: See—  
Kotzur, Frank W.; Swanson, Mark; Sutton, Kevin; Hopko, Donald J.; Rosenkranz, Thomas; and Franklin, David, 5,413,264, Cl. 226-119.000.

Swars, Helmut: See—  
Breuer, Hans-Jürgen; Bruck, Rolf; and Swars, Helmut, 5,413,767, Cl. 422-174.000.

Swartz, Jerome; and Metlitsky, Boris, to Symbol Technologies, Inc. Method and apparatus for reading two-dimensional bar code employing bit-mapped imaging. 5,414,250, Cl. 235-462.000.

Swarup, Vijay; Geiger, Albert J.; Drake, Evelyn N.; Peiffer, Dennis G.; and Gorbaty, Martin L., to Exxon Research & Engineering Co.



Sustained release agricultural substrate coated with a blend of EPDM and asphalt. 5,413,856, Cl. 428-334.000.

Swauger, Jonathan L. Stabilizing fitting for an intravenous catheter or syringe. 5,413,562, Cl. 604-179.000.

Sweet, Mark D.: See—  
Hoffman, Harrell; and Sweet, Mark D., 5,414,858, Cl. 395-725.000.

Swenson, Phillip O.: See—  
Reichen, Ronald L.; and Swenson, Phillip O., 5,412,931, Cl. 56-199.000.

Swenson, Rolf E.: See—  
Haviv, Fortuna; Fitzpatrick, Timothy D.; Swenson, Rolf E.; Nichols, Charles J.; and Mort, Nicholas A., 5,413,990, Cl. 514-15.000.

Swetye, William J.: See—  
Woodall, Richard P.; Swetye, William J.; Faison, Brian R.; and Your, Robert E., 5,413,459, Cl. 415-104.000.

Swift, Joseph A.; Wallace, Stanley J.; and Peck, Wilbur M., to Xerox Corporation. Electrostaticographic reproducing machine resistive carbon fiber wire. 5,414,216, Cl. 174-124.00R.

Switky, Andrew, to Aptix Corporation. Integrated socket and IC package assembly. 5,413,489, Cl. 439-71.000.

Sydir, Jaroslaw J.: See—  
Filip, Michael J.; Karunungan, Kathy L.; Kramer, Jeffrey C.; Lee, Lucille C.; Moore, Danielle L.; Shih, Charles C.; and Sydir, Jaroslaw J., 5,414,812, Cl. 395-200.000.

Sykes, Melvin C.: See—  
Wakeley, Lillian D.; Tom, Judy C.; Sykes, Melvin C.; Brabston, William N.; and Malone, Philip G., 5,414,197, Cl. 588-3.000.

Sylla, Salime: See—  
Armand, Michel; Sanchez, Jean-Yves; and Sylla, Salime, 5,414,117, Cl. 562-828.000.

Sylvester, Keith V.: See—  
Huse, William D.; Sorge, Anthony M., and Sylvester, Keith V., 5,413,708, Cl. 210-198.200.

Symbol Technologies, Inc.: See—  
Swartz, Jerome; and Metlitsky, Boris, 5,414,250, Cl. 235-462.000.

Syntex (U.S.A.) Inc.: See—  
Fu, Cheng-Chyi R.; and Lidgate, Deborah M., 5,414,011, Cl. 514-413.000.

Synthesis Research, Inc.: See—  
Waschura, Thomas E.; and Waschura, James R., 5,414,713, Cl. 371-20.400.

Szalai, Veronika: See—  
Cruse, Richard; Szalai, Veronika; Clark, Terence; Rohman, Stephen; and Mininni, Robert, 5,413,813, Cl. 427-237.000.

Szarka, Laszlo J.: See—  
Patel, Ramesh N.; McNamee, Clyde G.; and Szarka, Laszlo J., 5,413,935, Cl. 435-280.000.

T. H. Creears Corporation: See—  
Webb, Robert M.; and Webb, Thomas M., 5,413,709, Cl. 210-255.000.

Tachikawa, Yoshiaki; Kawachi, Masao; Takahashi, Hiroshi; and Inoue, Kyo, to Nippon Telegraph and Telephone Corporation. Arrayed-wave guide grating multi/multiplexer with loop-back optical paths. 5,414,548, Cl. 359-130.000.

Tachiuchi, Tsuguji: See—  
Matsushige, Hiromi; Kosuge, Minoru; Shimura, Yasuhiro; Miyasaka, Hideki; Minoshima, Satoshi; Tachiuchi, Tsuguji; Iwabuchi, Kazunori; Takashi, Terumi; and Matsunami, Naoto, 5,414,571, Cl. 360-65.000.

Tada, Hideki: See—  
Fuji, Haruo; Kobayashi, Tatsuya; Imai, Nobuhiro; Kojima, Hisayoshi; Umezawa, Masao; Tada, Hideki; Ito, Akira; Seto, Kaoru; Katoh, Motoi; and Murata, Daisuke, 5,414,493, Cl. 355-200.000.

Tada, Takamitsu: See—  
Hara, Tsukushi; Ohkuma, Takeshi; Tsurunaga, Kazuyuki; Ito, Daisuke; and Tada, Takamitsu, 5,414,586, Cl. 361-19.000.

Taiwan Semiconductor Manufacturing Company: See—  
Lin, Chung-An; Lin, Ting-Hwang; and Chao, Ying-Chen, 5,413,940, Cl. 437-7.000.

Tajali, Oholam R., to Square D Company. Meter socket assembly and distribution board. 5,414,590, Cl. 361-669.000.

Tajima, Yukimichi: See—  
Ishii, Takao; Iwata, Tsunekazu; and Tajima, Yukimichi, 5,413,880, Cl. 429-33.000.

Takada, Masayuki: See—  
Kishi, Norimasa; and Takada, Masayuki, 5,414,461, Cl. 348-115.000.

Takada, Shiro: See—  
Nakamoto, Akira; Takada, Shiro; Hanazawa, Akiyoshi; Sakunaga, Kazunori; Mori, Takuji; Saito, Taro; and Sunahata, Mutsumi, 5,412,998, Cl. 73-862.335.

Takago, Toshio: See—  
Tarumi, Yasuo; Koike, Noriyuki; and Takago, Toshio, 5,414,119, Cl. 562-851.000.

Takahashi, Akira: See—  
Mieda, Michinobu; Katayama, Hiroyuki; Takahashi, Akira; and Ohta, Kenji, 5,414,652, Cl. 365-122.000.

Takahashi, Hiroaki: See—  
Azuma, Nobuo; Furuhashi, Takashi; and Takahashi, Hiroaki, 5,414,523, Cl. 358-341.000.

Takahashi, Hiroshi: See—  
Fujioka, Tetsuya; and Takahashi, Hiroshi, 5,414,481, Cl. 353-122.000.

Tachikawa, Yoshiaki; Kawachi, Masao; Takahashi, Hiroshi; and Inoue, Kyo, 5,414,548, Cl. 359-130.000.

Takahashi, Kazuaki: See—  
Hasegawa, Makoto; Takahashi, Kazuaki; Mimura, Masahiro; Watanabe, Kazunori; Yokozaki, Katsushi; and Harada, Hiroyuki, 5,414,736, Cl. 375-334.000.

Takahashi, Koji: See—  
Kadowaki, Shuichi; and Takahashi, Koji, 5,414,457, Cl. 348-14.000.

Takahashi, Mamoru: See—  
Moriya, Satoru; Takahashi, Mamoru; Ishimoto, Akio; and Hirose, Toshiyuki, 5,414,044, Cl. 525-74.000.

Takahashi, Osamu: See—  
Nakamura, Ichiro; Yamazaki, Seiji; Takahashi, Osamu; Arai, Hiroaki; and Hamaguchi, Shigeo, 5,413,865, Cl. 428-432.000.

Takahashi, Satoshi; and Kambara, Hideki, to Hitachi, Ltd. Optical cell and optical detection systems light absorption. 5,414,508, Cl. 356-246.000.

Takahashi, Toshiaki; Tanimoto, Yoshio; Muraoka, Akemi; and Fukushima, Tatsuo, to Mazda Motor Corporation. Method of obtaining hydrocarbon oil from waste plastic material or waste rubber material and apparatus for carrying out the method. 5,414,169, Cl. 585-241.000.

Takahashi, Tsuyoshi: See—  
Kimura, Hideyuki; Takahashi, Tsuyoshi; Suzuki, Tomio; Ohdaira, Toshio; Uefune, Kouki; and Nishimura, Yuji, 5,414,591, Cl. 361-695.000.

Takahashi, Yoshinori, to Oki Electric Industry Co., Ltd. Circuit for detecting a paper at a desired position along a paper feed path with a one shot multivibrator actuating circuit. 5,414,269, Cl. 250-561.000.

Takai, Haruki: See—  
Kinoshita, Iwao; Machii, Daisuke; Onoda, Yasuo; Takai, Haruki; Kosaka, Nobuo; Shuto, Katsuchi; Gomi, Katsushige; Morimoto, Makoto; and Ishii, Akio, 5,413,997, Cl. 514-183.000.

Takaku, Kazuo: See—  
Yoshimura, Toshihiko; Shimizu, Tasuku; Ishikawa, Yuichi; Otake, Masahiro; Koguchi, Yuko; Enomoto, Kunio; Hasegawa, Kunio; Hayashi, Makoto; and Takaku, Kazuo, 5,414,356, Cl. 324-239.000.

Takami, Akihiko; Watanabe, Yasuo; Iwakini, Hideharu; and Takemoto, Takashi, to Mazda Motor Corporation. Exhaust gas purification catalyst. 5,413,976, Cl. 502-66.000.

Takamura, Teiji, to Ricoh Company, Ltd. Three-dimensional geometry processing system. 5,414,802, Cl. 395-119.000.

Takano, Kazuhiko, to Sanyo Electric Co., Ltd. Mechanism for mounting and dismounting mixer in an automatic noodle making machine. 5,413,473, Cl. 425-192.00R.

Takano, Takehiro: See—  
Tsuchiya, Hiroaki; Ohsawa, Keishi; Sakemi, Yuji; Waki, Kenichiro; Ito, Nobuyuki; Takano, Takehiro; and Tomikawa, Yoshiro, 5,414,497, Cl. 355-253.000.

Takaoka, Tatsuru; Yagi, Kouichi; and Kohno, Yoshiaki, to Murata Manufacturing Co., Ltd. Method of manufacturing multilayer electronic component. 5,412,865, Cl. 29-830.000.

Takasaka, Yoshitaka: See—  
Kobayashi, Naoya; Takasaki, Yoshitaka; Mizokawa, Sadao; Maruyama, Hisayuki; Mabuchi, Hiroshi; and Amada, Eiichi, 5,414,739, Cl. 375-371.000.

Takashi, Terumi: See—  
Matsushige, Hiromi; Kosuge, Minoru; Shimura, Yasuhiro; Miyasaka, Hideki; Minoshima, Satoshi; Tachiuchi, Tsuguji; Iwabuchi, Kazunori; Takashi, Terumi; and Matsunami, Naoto, 5,414,571, Cl. 360-65.000.

Takasu, Yasuhito: See—  
Mukai, Yasuo; Takasu, Yasuhito; and Nakayama, Masaaki, 5,412,942, Cl. 60-276.000.

Takata Corporation: See—  
Kamiyama, Misao; and Ohishi, Yoshinori, 5,413,377, Cl. 280-733.000.

Koyanagi, Toshiro, 5,413,401, Cl. 297-250.100.

Takato, Hiroshi: See—  
Ozaki, Tohru; Takato, Hiroshi; and Nitayama, Akihiko, 5,414,655, Cl. 365-149.000.

Takayama, Ryoichi: See—  
Fuji, Satoru; Takayama, Ryoichi; Tomita, Yoshihiro; Okano, Masayuki; and Torii, Hideo, 5,413,667, Cl. 216-20.000.

Takayama, Seiji: See—  
Yamada, Yasuhiro; Sakuda, Shohei; and Takayama, Seiji, 5,413,991, Cl. 514-27.000.

Takayama, Shinji: See—  
Ikeda, Yoshihiro; and Takayama, Shinji, 5,413,835, Cl. 428-141.000.

Takeda, Kyoichi: See—  
Sato, Toshio; Ito, Ikuo; Yamaguchi, Hiromichi; and Takeda, Kyoichi, 5,414,174, Cl. 585-467.000.

Takegahara, Takashi: See—  
Seki, Masaki; Takegahara, Takashi; and Matsunaka, Toru, 5,414,807, Cl. 395-142.000.

Takekoshi, Nobuhiko: See—  
Miura, Yasushi; and Takekoshi, Nobuhiko, 5,414,501, Cl. 355-271.000.

Takemoto, Takashi: See—  
Takami, Akihiko; Watanabe, Yasuo; Iwakini, Hideharu; and Takemoto, Takashi, 5,413,976, Cl. 502-66.000.

Takemura, Yasuhiko: See—  
Yamazaki, Shunpei; Mase, Akira; Hiroki, Masaaki; and Takemura, Yasuhiko, 5,414,442, Cl. 345-89.000.

Takenaka, Hideyuki: See—  
Murabayashi, Akira; Takenaka, Hideyuki; and Kai, Hiroyuki, 5,414,122, Cl. 564-129.000.

Takeuchi, Kunihiko; Chiriku, Akihiko; Kanezashi, Satsuki; and Tanishita, Hiroto, to Yazaki Corporation. Female terminal. 5,413,495, Cl. 439-223.000.

Takeuchi, Tatsuo: See—  
Amemiya, Koji; Suzuki, Akio; Takeuchi, Tatsuo; Fukushima, Hisashi; Hasegawa, Takashi; Moriguchi, Haruhiko; Saito, Rie; Ogata, Takao; and Sasanuma, Nobuatsu, 5,414,531, Cl. 358-465.000.

Takeuchi, Toshifumi: See—  
Amada, Nobutaka; Takeuchi, Toshifumi; Abeta, Akira; Arai, Takao; and Usuda, Kouji, 5,414,567, Cl. 360-19.100.

Takeyama, Kenichi: See—  
Uemachi, Hiroshi; Sato, Yoshiko; Sotomura, Tadashi; and Takeyama, Kenichi, 5,413,882, Cl. 429-213.000.

Uemachi, Hiroshi; Sotomura, Tadashi; Takeyama, Kenichi; and Koshida, Nobuyoshi, 5,413,883, Cl. 429-213.000.

Taki, Hideshi; Ueno, Takafumi; Tsuji, Shiro; Nikaido, Masataka; and Kihara, Nobuyoshi, to Matsushita Electric Industrial Co., Ltd. Variable speed digital signal reproducing apparatus. 5,414,568, Cl. 360-19.100.

Taki, Mamoru: See—  
Ozawa, Satoshi; Miyahara, Yuji; Taki, Mamoru; Yamashita, Koutarou; and Watanabe, Yoshio, 5,413,685, Cl. 204-416.000.

Tagigawa, Tetsuo: See—  
Ebashi, Iwao; Tagigawa, Tetsuo; and Inoue, Masayasu, 5,414,089, Cl. 546-243.000.

Takimoto, Kazumi, Takeshi Takimoto, executors: See—  
Yasui, Toshihiko; Takimoto, Yoshio, deceased; Kawakami, Katsuhiko; Kiyonari, Toshiyuki; and Endo, Norio, 5,413,629, Cl. 106-21.00R.

Takimoto, Kiyoshi; Hatanaka, Katsunori; Sakai, Kunihiko; Miyamoto, Masahiko; Kawade, Hisaaki; Sato, Yasufumi; Kishi, Etsuro; and Kawagishi, Hideyuki, to Canon Kabushiki Kaisha. Scanning probe microscope and method of observing samples by using the same. 5,414,260, Cl. 250-306.000.

Takimoto, Yoshio, deceased: See—  
Yasui, Toshihiko; Takimoto, Yoshio, deceased; Kawakami, Katsuhiko; Kiyonari, Toshiyuki; and Endo, Norio, 5,413,629, Cl. 106-21.00R.

Taligent, Inc.: See—  
Heninger, Andrew G.; and Nakano, Russell T., 5,414,854, Cl. 395-700.000.

Tamaru, Hideshi; Togawa, Kazuo; Sakano, Akio; and Yoshida, Kimiyoshi, to Sony Corporation. Touch panel apparatus. 5,414,413, Cl. 345-175.000.

Tamil, Lakshman S.; and Jordan, Arthur K., to United States of America, America; and Board of Regents, University of Texas. Optical logic gates with high extinction ratio using inverse scattering technique and method using same. 5,414,789, Cl. 385-122.000.

Tammera, Robert F.; and Dallara, Robert J. Filterless drain separator. 5,413,705, Cl. 210-94.000.

Tamor, Michael A.: See—  
Aslam, Mohammad; and Tamor, Michael A., 5,413,668, Cl. 216-2.000.

Tamura, Tsuneo: See—  
Yasue, Kenji; Tamura, Tsuneo; Katahira, Shinichiro; and Watanabe, Mioko, 5,414,042, Cl. 524-789.000.

Tamura, Yukio: See—  
Murata, Yoshinori; Goto, Yukio; Tamura, Yukio; Mouri, Ryoji; Miki, Toshio; and Ishikawa, Masaki, 5,413,475, Cl. 425-205.000.

Tan, Haw-Chan; Ma, Frank C.; and Chen, Vincent S., to Genrife Company Limited. IC card with generally efficient circumferential shielding. 5,413,490, Cl. 439-76.000.

Tanabe Seiyaku Co., Ltd.: See—  
Horikawa, Hiroshi; Kondo, Kazuhiko; and Iwasaki, Tameo, 5,414,081, Cl. 540-302.000.

Tanahashi, Toru, to Mitsubishi Denki Kabushiki Kaisha. Speed control apparatus for elevators using variable voltage and variable frequency control. 5,414,333, Cl. 318-268.000.

Tanaka, Akihiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Electromagnetic objective lens driving apparatus of optical data recording and reproducing apparatus. 5,414,563, Cl. 359-814.000.

Tanaka, Hideaki: See—  
Terabayashi, Takao; Sato, Hidemi; Tanaka, Hideaki; and Oshida, Yoshitada, 5,414,239, Cl. 219-121.730.

Tanaka, Kenichi: See—  
Onishi, Shigeo; Ishihara, Kazuya; Tanaka, Kenichi; and Sakiyama, Keizo, 5,414,653, Cl. 365-145.000.

Tanaka, Satoru: See—  
Shimada, Kunihiko; Yanagisawa, Shuichi; and Tanaka, Satoru, 5,414,691, Cl. 369-275.200.

Tanaka, Shoji: See—  
Hayashi, Kunihiko; Fujino, Shuichi; Enomoto, Youichi; and Tanaka, Shoji, 5,413,988, Cl. 505-511.000.

Tanaka, So: See—  
Inada, Hiroshi; Tanaka, So; and Iiyama, Michitomo, 5,413,982, Cl. 505-193.000.

Tanaka, Tadashi; Sakamoto, Masaaki; Yamamoto, Koichi; and Higuchi, Tsukimitsu, to Daido Metal Company Ltd. Copper alloy sliding bearing with high-strength back metal. 5,413,875, Cl. 428-645.000.

Tanaka, Toshihisa: See—  
Iwaki, Tetsuo; Tanaka, Toshihisa; and Yamada, Eiji, 5,414,719, Cl. 371-37.100.

Tanaka, Tsutomu, to Sumitomo Wiring Systems, Ltd. Terminal cap and cap attachment structure. 5,413,500, Cl. 439-521.000.

Tanaka, Yoshimichi: See—  
Kameda, Osamu; Okita, Junichi; Hasetoh, Sakumi; Hirose, Ichiro; and Tanaka, Yoshimichi, 5,413,014, Cl. 74-606.00R.

Tanase, Gabriel E., to Raytheon Company. Parametric test circuit with plural range resistors. 5,414,352, Cl. 324-158.100.

Tandberg Data Storage A/S: See—  
Lian, Ragnar; and Simonsen, Lars, 5,414,578, Cl. 360-106.000.

Tandy Corporation: See—  
Schreiber, Paul T.; and Curtis, Douglas R., 5,414,373, Cl. 324-768.000.

Staudacher, Daniel W.; and Mimick, Frank P., 5,414,859, Cl. 395-725.000.

Tang, Thuy N.: See—  
Buhl, Steven N.; Bhayani, Bhaskar; Yu, Chi-Sou; and Tang, Thuy N., 5,413,732, Cl. 252-182.110.

Tani, Kazunori; and Kimura, Toshiaki, to Y.A.C. Corporation. Method and apparatus for inserting a core packaging layer into a clean environment. 5,412,925, Cl. 53-450.000.

Tani, Naoki, to Olympus Optical Co., Ltd. Optical head using image sensor of XY address type in photo detector. 5,414,683, Cl. 36-9-47.000.

Taniguchi, Hiroaki: See—  
Aoki, Seiji; Kato, Tomonori; Taniguchi, Hiroaki; Morotomi, Hidetosi; and Ono, Masami, 5,414,191, Cl. 585-820.000.

Taniguchi, Hiroshi: See—  
Tsujihara, Susumu; Isobe, Mitsuo; Shimosaka, Hiroyoshi; and Taniguchi, Hiroshi, 5,414,330, Cl. 315-371.000.

Tanimoto, Yoshio: See—  
Takahashi, Toshiaki; Tanimoto, Yoshio; Muraoka, Akemi; and Fukushima, Tatsuo, 5,414,169, Cl. 585-241.000.

Tanis, Dale R., to Case Corporation. Rotor assembly for a combine. 5,413,531, Cl. 460-72.000.

Tanishita, Hiroto: See—  
Takeuchi, Kunihiko; Chiriku, Akihiko; Kanezashi, Satsuki; and Tanishita, Hiroto, 5,413,495, Cl. 439-223.000.

Taniuchi, Fujio, to Shoei Kako Kabushiki Kaisha. Helmet for riding vehicle. 5,412,810, Cl. 2-424.000.

Taniuchi, Kazuman: See—  
Terada, Yoshihiro; Sasuga, Kazuyasu; Kouno, Katuyuki; Taniuchi, Kazuman; Sekine, Hiroshi; and Ishiwata, Masahiro, 5,414,529, Cl. 358-448.000.

Tanner, Michael R.: See—  
Kerner, James M.; McCauley, Patrick A.; McCulloch, Larry E.; and Tanner, Michael R., 5,413,166, Cl. 165-30.000.

Tanner, Scott B.: See—  
Komarek, James A.; Tanner, Scott B.; Padgett, Clarence W.; and Minney, Jack L., 5,414,663, Cl. 365-210.000.

Tao Medical Electronics Co., Ltd.: See—  
Tsujino, Yukio; Morikawa, Takashi; and Hamaguchi, Yukio, 5,413,938, Cl. 436-63.000.

Tap Pharmaceuticals Inc.: See—  
Haviv, Fortuna; Fitzpatrick, Timothy D.; Swenson, Rolf E.; Nichols, Charles J.; and Mort, Nicholas A., 5,413,990, Cl. 514-15.000.

Tarozzi, Richard A.: See—  
Dietterich, Charles W.; and Tarozzi, Richard A., 5,413,472, Cl. 425-183.000.

Tarumi, Yasuo; Koike, Noriyuki; and Takago, Toshio, to Shin Etsu Chemical Co., Ltd. Hexafluoropropylene oxide compounds and a method of making same. 5,414,119, Cl. 562-851.000.

Tate, Kay A.: See—  
Kramer, Paul H.; and Tate, Kay A., 5,414,852, Cl. 395-700.000.

Taub, Mase J.: See—  
Tedrow, Kerry D.; Larsen, Robert E.; Rajguru, Chaitanya S.; Galindo, Cesar; Jayanifard, Jahanshir J.; and Taub, Mase J., 5,414,669, Cl. 365-226.000.

Taurus Impressions, Inc.: See—  
Gray, Roger M.; and Shannon, Warren K., 5,413,422, Cl. 400-144.200.

Taylor, Dorothy I.: See—  
Taylor, Thomas E.; Guymon, Bruce R.; Taylor, Dorothy I.; and Guymon, Helen E., 5,413,350, Cl. 273-271.000.

Taylor, George T.: See—  
Laurash, David F.; and Taylor, George T., 5,413,383, Cl. 283-79.000.

Taylor, John C., to Strix Limited. Cordless electrical appliances. 5,413,510, Cl. 439-886.000.

Taylor, Michael A.; and Bapat, Ajay V., to BASF Corporation. Removal of organic volatiles from polymer solutions and dispersions. 5,414,193, Cl. 585-833.000.

Taylor, Raymond S.: See—  
Larson, Tony R.; and Taylor, Raymond S., 5,414,382, Cl. 327-561.000.

Taylor, Ronald K.; and Anderson, Donald L., to Jervis B. Webb Company. Early bag storage system. 5,413,205, Cl. 198-358.000.

Taylor, Thomas E.; Guymon, Bruce R.; Taylor, Dorothy I.; and Guymon, Helen E. Illuminated game board with light directing transparent lens. 5,413,350, Cl. 273-271.000.

Taylor, William S. Apparatus and method for dissolving and dispensing soluble compounds. 5,413,280, Cl. 239-10.000.

TEAC Corporation: See—  
Ueki, Jiro; and Nagase, Fumio, 5,414,576, Cl. 360-104.000.

Teague, Stephen V.: See—  
Raabe, Otto G.; and Teague, Stephen V., 5,412,975, Cl. 73-28.004.

Technology Finance Corporation (Proprietary) Limited: See—  
Tom Du Toit, Guillaume, 5,413,579, Cl. 606-87.000.



Tedrow, Kerry D.; Larsen, Robert E.; Rajguru, Chaitanya S.; Galindo, Cesar; Jayanifard, Jahanshir J.; and Taub, Mase J., to Intel Corporation. Method and apparatus for programming and erasing flash EEPROM memory arrays utilizing a charge pump circuit. 5,414,669, Cl. 365-226.000.

Teenes AS. See—  
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Teeters, Susan M.: See—  
Watson, Michael D.; Cottom, William P.; Teeters, Susan M.; Heroux, Charles H.; and Duryee, Terrance D., 5,414,039, Cl. 524-502.000.

Tehrani, Saied N.: See—  
Goronkin, Herbert; Tehrani, Saied N.; Shen, Jun; and Zhu, Xiaodong T., 5,414,274, Cl. 257-25.000.

Tektronix, Inc.: See—  
Ilcisin, Kevin J.; Buzak, Thomas S.; and Martin, Paul C., 5,414,440, Cl. 345-58.000.

Telefonaktiebolaget L M Ericsson: See—  
Jonsson, Bjorn E. R., 5,414,752, Cl. 379-58.000.

Telsnig, Adolf. Chopping device, particularly for house and garden wastes. 5,413,287, Cl. 241-46.170.

Temple University - Of the Commonwealth System of Higher Education: See—  
Fasshi, Alireza D., 5,412,979, Cl. 73-53.010.

Templeton, James H.: See—  
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Tennant, Donald M.: See—  
Koch, Thomas L.; Ostermayer, Frederick W., Jr.; Tennant, Donald M.; and Verdiell, Jean-Marc, 5,413,884, Cl. 430-5.000.

Tennenbaum, Michael: See—  
Cherkez, Stephen; Lerman, Ori; Tennenbaum, Michael; Avner, Hasalia; and Kunyevski, Tamar, 5,414,129, Cl. 564-425.000.

Terabayashi, Takao; Sato, Hidemi; Tanaka, Hideaki; and Oshida, Yoshitada, to Hitachi, Ltd. Optical apparatus for laser machining. 5,414,239, Cl. 219-121.730.

Terada, Masahiro: See—  
Yamashita, Masataka; Terada, Masahiro; Mori, Shousei; and Katagiri, Kazuharu, 5,413,735, Cl. 252-299.610.

Terada, Yoshihiro; Sasuga, Kazuyasu; Kouno, Katuyuki; Tanuchi, Kazumasa; Sekine, Hiroshi; and Ishiwata, Masahiro, to Fuji Xerox Co., Ltd. Image combining in image processing apparatus. 5,414,529, Cl. 358-448.000.

Terajima, Hisao: See—  
Watanabe, Tsunehiro; Terajima, Hisao; and Nishii, Teruyuki, 5,414,764, Cl. 379-377.000.

Teramoto, Takafumi: See—  
Mamiya, Kiyotaka; Shiraishi, Tohru; Yokomizo, Katuhiro; and Teramoto, Takafumi, 5,413,075, Cl. 123-431.000.

Terao, Motoyasu: See—  
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Terashima, Seuch; and Kita, Masao, to Shin-Etsu Handotai Company, Ltd. Inner diameter saw slicing machine. 5,413,521, Cl. 451-1.000.

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Noreve, Xavier; Terre, Michel; and Fety, Luc, 5,414,466, Cl. 348-241.000.

Tescos Corporation: See—  
Arstein, Dale C.; and Rensberger, Lee R., 5,413,311, Cl. 251-331.000.

Teshima, Yasuhiro; Niishiro, Mamoru; and Matsubayashi, Michunori, to Fujitsu Limited. Heating furnace in combination with electronic circuit modules. 5,413,164, Cl. 165-11.100.

Tessera, Inc.: See—  
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Tessmann, Daryl L.: See—  
Davidson, Robert M.; Eaton, William E.; Furlong, Gregory R.; Michelhaugh, Scott E.; Rowley, James W.; Roas, Gordon F.; Schoening, Danny R.; Tessmann, Daryl L.; and Ulz, David W., 5,414,355, Cl. 324-207.200.

Testo GmbH & Co.: See—  
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Tetra Alfa Holdings S.A.: See—  
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Tetrad Corporation: See—  
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Tettenhorst, William C.: See—  
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Texaco Chemical Inc.: See—  
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Sanderson, John R.; and Knifton, John F., 5,414,162, Cl. 568-909.800.

Sanderson, John R.; Knifton, John F.; and Marquis, Edward T., 5,414,163, Cl. 568-909.800.

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Texaco Inc.: See—  
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Webster, George H., Jr.; and Carrillo, Donald E., 5,413,717, Cl. 210-631.000.

Texas Instruments Incorporated: See—  
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Beringhouse, Steven; Rolph, W. Donald, III; Mandeville, Raymond E.; Hartauer, Siegfert; and Vilimek, Vaclav F., 5,412,986, Cl. 73-517.00R.

Fattaruso, John W., 5,414,310, Cl. 327-62.000.

Harris, Charles K.; Borchard, Joseph F.; Clunn, Robert H.; Maunder, James R.; and Marrable, Walter E., 5,414,458, Cl. 348-92.000.

Hogan, Patrick M.; Alexander, Rhonda L.; Greninger, Lars; and Arrow, Lloyd J., 5,414,809, Cl. 395-155.000.

Hossain, Sylvia, 5,413,678, Cl. 156-657.100.

Izzi, Louis J.; and Downing, Richard E., 5,414,447, Cl. 345-190.000.

Matthews, Mark; and Weidman, Michael R., 5,413,226, Cl. 209-668.000.

Matthews, Mark D.; and Langley, Johnny, 5,413,285, Cl. 241-5.000.

Russell, Ernest J., 5,413,970, Cl. 437-208.000.

Textest AG: See—  
Vogt, Horst, 5,412,976, Cl. 73-38.000.

Textron Defense Systems, Division of Avco Corporation: See—  
Schultz, Thomas J.; Kotidis, Petros A.; Woodroffe, Jaime A.; and Rostler, Peter S., 5,414,510, Cl. 356-349.000.

Textron Inc.: See—  
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Theeuwes, Felix: See—  
Wong, Patrick S. L.; Theeuwes, Felix; Barclay, Brian L.; and Dealey, Michael H., 5,413,572, Cl. 604-892.100.

Theine, Axel: See—  
Zwilling, Heinz-Michael; Sindermann, Siegmund; and Theine, Axel, 5,413,153, Cl. 141-39.000.

Theodoulou, Sotos M.: See—  
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Therasse, Yves; and Guebels, Pierre-Paul F. M. M., to Alcatel N.V. Resequencing device for a node of a cell switching system. 5,414,705, Cl. 370-60.100.

Think, Inc.: See—  
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Thiokol Corporation: See—  
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Thomas, David G.: See—  
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Thomas De La Rue & Company Limited: See—  
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Thomas, J. Donaldson: See—  
Sobczak, Brian R.; Lucca, Frank J.; Thomas, J. Donaldson; Adams, Craig F.; and Gladden, Ernest L., 5,413,046, Cl. 102-275.700.

Thomas J. Lupton Co., Division of Conopco, Inc.: See—  
Baumanis, Paul J.; Norton, Ian T.; Brown, Charles R.; and Underdown, Jeffrey, 5,413,802, Cl. 426-574.000.

Thomas, Louis; Kenny, Daniel J.; Hasan, Syed Riaz-Ul; and Dewey, George G., to Illinois Tool Works Inc. Self-drilling fastener. 5,413,444, Cl. 411-387.000.

Thomas, Michael E., to National Semiconductor Corporation. High temperature interconnect system for an integrated circuit. 5,414,301, Cl. 257-740.000.

Thomas, Phillip T.: See—  
Roas, Colby M.; Restarick, Henry L.; Echols, Ralph H., III; Thomas, Phillip T.; and Patel, Dhirajlal C., 5,413,180, Cl. 166-387.000.

Thomas, Stephen P.: See—  
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Thome, Roland; Schmidt, Hubertus; Feige, Reinhard; Bollmann, Ulrich; Lange, Rudiger; and Engels, Siegfried, to Vereinigte Aluminium-Werke A.G.; and Leuna-Werke AG. Partially crystalline, transitional aluminum oxides, methods for their synthesis and use for obtaining molded articles, which consist essentially of gamma Al<sub>2</sub>O<sub>3</sub>. 5,413,985, Cl. 502-355.000.

Thompson, Andrea Y.: See—  
Ogawa, Yasushi; Schmidt, David K.; Armstrong, Rosa; Nathan, Ranga; Thompson, Andrea Y.; and Seyedin, Saied M., 5,413,989, Cl. 514-12.000.

Thompson, Doug: See—  
Hernandez, Gilberto; Scholder, Erica J.; and Thompson, Doug, 5,413,833, Cl. 428-119.000.

Thompson, Joseph F., to Baxter International Inc. Surgical drapes for covering appendages. 5,413,118, Cl. 128-853.000.

Thompson, Mark A.: See—  
Ezzet, Ali S.; Bassett, Carol E.; Brown, Mark L.; Thompson, Mark A.; and Archuleta, Richard M., 5,414,817, Cl. 395-275.000.

Thompson, Ray, to Cliff Electronic Components Limited. Electrical connector assembly. 5,413,506, Cl. 439-660.000.

Thompson, Richard L., to Octel Communications Corporation. Voice mail system for news bulletins. 5,414,757, Cl. 379-88.000.

Thompson, Robert A. Safety locking devices for PVC ball valves. 5,412,962, Cl. 70-178.000.

Thompson, Tok. Retracting guitar pick holder. 5,413,020, Cl. 84-329.000.

Thomson Consumer Electronics, Inc.: See—  
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Kuok, Henry H., 5,414,758, Cl. 379-88.000.

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Thomson-TRT Defense: See—  
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Thurber, Charles R., Jr., to Maxim Integrated Products. High swing interface stage. 5,414,314, Cl. 327-427.000.

Tibbets, Gary G.; Gorkiewicz, Daniel W.; and Alig, Robert L., to General Motors Corporation. Method for forming carbon filters. 5,413,773, Cl. 423-447.300.

Tidwell, Joe, to Concrete Company, The. Precast manhole invert forming. 5,413,307, Cl. 249-11.000.

Tiepel, Alain: See—  
d'Agostino, Guy; Brocard, Jean-Marie; Hebert, Pierre G. J.; Liotte, Franck; Lorne, Eric C.; Maillard, Claude; and Tiepel, Alain, 5,413,143, Cl. 137-625.110.

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Adasko, Vladimir I.; Vardenburg, Arnold K.; Emelyanov, Alexander L.; Seliverstov, Lev A.; Emelyanov, Viktor L.; Slonimsky, Alexander D.; Sklyarov, Nikolai A.; Tikhonov, Vladimir I.; Rogozhin, Jury F.; and Piliposian, Pogos M., 5,414,224, Cl. 174-262.000.

Timmins, Lawrence J. Shipping rack for vehicle sliding door upper trim frames. 5,413,216, Cl. 206-335.000.

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Tino, Joseph A.; Bisacchi, Gregory S.; and Ahmad, Saleem, to Bristol-Myers Squibb Co. Antiviral pyrimidin substituted tetrahydropyrans. 5,414,000, Cl. 514-261.000.

Tino, Joseph A.; Bisacchi, Gregory S.; and Ahmad, Saleem, to Bristol-Myers Squibb Co. Antiviral tetrahydropyrans. 5,414,096, Cl. 549-417.000.

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Basile, Peter A.; Brown, Scott C.; Snyder, Fred E.; and Tirrell, Joseph V., 5,413,216, Cl. 604-218.000.

Tischler, Siegfried E., to Saktibuan, P. T. Limbahsari, a part interest. Method for treating soil contaminated with hydrocarbons. 5,414,205, Cl. 588-214.000.

Tobita, Tomoyuki; Sase, Akira; Yamamoto, Yoshimi; and Aoki, Kenichi, to Hitachi, Ltd. Differential pressure sensor capable of removing influence of static pressure and a method of assembling the same. 5,412,992, Cl. 73-721.000.

Today's Kids, Inc.: See—  
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Togashi, Fusao: See—  
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Tohoku Richo Co., Ltd.: See—  
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Tokyo Denso Kabushiki Kaisha: See—  
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Tokyo Electron Limited: See—  
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Tokyo Gas Co., Ltd.: See—  
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Tokyo Kikai Seisakusho, Ltd.: See—  
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Tokyo Tsuki Co., Ltd.: See—  
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Tolino, Ralph W.: See—  
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Tollum, Ronald E., to Wangtek, Inc. Selective data synchronizer. 5,414,722, Cl. 371-69.100.

Tom Du Toit, Guillaume, to Technology Finance Corporation (Proprietary) Limited. Surgical saw guide and drill guide. 5,413,579, Cl. 606-87.000.

Tom, Judy C.: See—  
Wakeley, Lillian D.; Tom, Judy C.; Sykes, Melvin C.; Brabston, William N.; and Malone, Philip G., 5,414,197, Cl. 588-3.000.

Tomikawa, Yoshiro: See—  
Tsuchiya, Hiroaki; Ohsawa, Keishi; Sakemi, Yuji; Waki, Kenichiro; Ito, Nobuyuki; Takano, Takehiro; and Tomikawa, Yoshiro, 5,414,497, Cl. 355-253.000.

Tomino, Naoki: See—  
Goto, Tetsuro; Kazami, Kazuyuki; Daitoku, Koichi; Wakabayashi, Tsutomu; Ezawa, Akira; and Tomino, Naoki, 5,414,486, Cl. 354-430.000.

Tomioaka, Jun; Kuwana, Koji; Nakanishi, Horotoshi; Uetani, Yasunori; and Ida, Ayako, to Sumitomo Chemical Company, Limited. Positive resist composition comprising a quinone diazide sulfonic acid ester, a novolak resin and a polyphenol compound. 5,413,895, Cl. 430-191.000.

Tomita, Yoshihiro: See—  
Fujii, Satoru; Takayama, Ryoichi; Tomita, Yoshihiro; Okano, Masayuki; and Torii, Hideo, 5,413,667, Cl. 216-20.000.

Tomlinson, Leroy O.; and Smith, Raub W., to General Electric Co. Steam cycle for combined cycle with steam cooled gas turbine. 5,412,937, Cl. 60-39.020.

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Tompkins, Mary B.: See—  
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Tompkins, Michael E.: See—  
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Torii, Hideo: See—  
Fujii, Satoru; Takayama, Ryoichi; Tomita, Yoshihiro; Okano, Masayuki; and Torii, Hideo, 5,413,667, Cl. 216-20.000.

Torisawa, Nobuyuki; and Soga, Norikazu, to Fuji Photo Film Co., Ltd. Sheet feeding device. 5,413,322, Cl. 271-9.000.

Toro Company, The: See—  
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Toronto Hospital, The: See—  
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Toth, Gyorgy; Balint, Janos; Elek, nee Herczik, Klara; Moricz, nee Garai, Zsuzsanna; and Mudra, nee Kantor, Eva, to Biogal Gyogyszer-gyar. Process for the preparation of carboxylic acids and derivatives of them. 5,414,108, Cl. 560-104.000.

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Townsend, Irving. Frame with clip type yarn holder. 5,413,150, Cl. 139-34.000.

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 Toyota Jidosha Kabushiki Kaisha: See—  
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 Oshima, Yujiro; Muraki, Hideaki; Yokota, Koji; and Nakanishi, Kiyoshi, 5,412,946, Cl. 60-286.000.  
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 Toyotomi Company, Ltd.: See—  
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 Trainor, Diane A.: See—  
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 Trent, Billy E. Latch mechanism for tractor hitches, farm gates or the like, 5,413,369, Cl. 280-477.000.  
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 Trimble, Alan M. Ski binding block, 5,413,371, Cl. 280-602.000.  
 Tripp, Benjamin A. I-beam structure, 5,412,921, Cl. 52-729.000.  
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 Trudeau, Leon B. Concrete pile cutter, 5,413,086, Cl. 125-23.010.  
 Trueman, Constance C. Hand splint and exerciser, 5,413,554, Cl. 602-21.000.  
 Trustee of Boston University: See—  
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 Trzyna, William A.; and Walding, Carl E., to Zenith Electronics Corp. Method of operating a low standby power system for a television receiver, 5,414,475, Cl. 348-730.000.  
 Tsai, A-Po. Driving mechanism for moving table, 5,413,523, Cl. 451-364.000.  
 Tsai, Chiu-Hsiung: See—  
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 Tsai, Ming-Chang: See—  
 Jacobs, Paul E.; Gardner, William R.; Lee, Chong U.; Gilhousen, Klein S.; Lam, S. Katherine; and Tsai, Ming-Chang, 5,414,796, Cl. 395-2.300.  
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 Roth, John R.; Tsai, Peter P.; Liu, Chaoyu; Laroussi, Mounir; and Spence, Paul D., 5,414,324, Cl. 315-111.210.  
 Tse, Edison; and Zhu, Min, to Expert Edge Corp. Generation and simulation of knowledge bases with marking of node being simulated, 5,414,649, Cl. 364-578.000.  
 Tseng, Chuen-Ing J.: See—  
 Eastman, David W.; Iandoli, Kenneth J.; and Tseng, Chuen-Ing J., 5,413,722, Cl. 210-755.000.  
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 Tsubaki, Katsuhisa: See—  
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 Tsuboi, Toshihide, to NEC Corporation. CMOS output circuit with open drain transistor, 5,414,375, Cl. 326-30.000.  
 Tsuchiya, Hiroaki; Ohsawa, Keishi; Sakemi, Yuji; Waki, Kenichiro; Ito, Nobuyuki; Takano, Takehiro; and Tomikawa, Yoshiro, to Canon Kabushiki Kaisha. Powder conveying device, 5,414,497, Cl. 355-253.000.  
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 Yamanashi, Teruaki; Suzuki, Shinichiro; Tsujimoto, Yoshio; and Kiyohara, Toshikazu, 5,413,657, Cl. 156-235.000.  
 Tsujino, Yukio; Morikawa, Takashi; and Hamaguchi, Yukio, to Tao Medical Electronics Co., Ltd. Reagent for measuring immature leukocytes, 5,413,938, Cl. 436-63.000.  
 Tsukada, Harumichi; Akimoto, Etsuji; and Tsumura, Masahiro, to Daicel Chemical Industries, Ltd. Optical information recording medium, 5,413,893, Cl. 430-152.000.  
 Tsukakoshi, Toshiharu, to Hitachi, Ltd. Design method and apparatus of computer program for business processing, 5,414,847, Cl. 395-650.000.  
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 Tuckey, Charles H., to Walbro Corporation. Pulse damper, 5,413,468, Cl. 417-540.000.  
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 Turner, William J.; and Homer, David A., to Gersan Establishment. Controlling a feed of objects, 5,413,210, Cl. 198-642.000.  
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 Uchida, Go; Shirai, Shoji; and Misono, Masayoshi, to Hitachi, Ltd. In-line type electron gun assembly including electrode units having electron beam passage holes of different sizes for forming an electrostatic lens, 5,414,323, Cl. 313-414.000.

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 Ueda, Hiromi; Tokizawa, Ikuro; Iguchi, Kazuo; Yamashita, Haruo; Kurano, Takatoshi; and Nishihara, Motoo, to Nippon Telegraph and Telephone Corp.; Fujitsu Limited; and NEC Corporation. Cross-connect apparatus capable of avoiding a superfluous detour route therein, 5,414,415, Cl. 340-825.020.  
 Ueda, Kiichiro, to Konica Corporation. Zoom lens, 5,414,562, Cl. 359-683.000.  
 Ueding, Michael; Strobel, Michael; Krieger, Albert; and Sauer, Jurgen, to Rieter Ingolstadt Spinnereimaschinenbau AG. Process and device for the jiggling of a flat can, 5,412,845, Cl. 19-159.000.  
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 Uhde, Dietmar; Lehmann, Rudiger; Gleim, Gunter; Hoch, Peter; and Schandl, Hartmut, to Deutsche Thomson-Brandt GmbH. Head cylinder for a recorder, 5,414,579, Cl. 360-107.000.  
 Uhm, Sung J.; Han, Sung H.; Oh, Jun W.; Joo, Oh S.; Jung, Kwang D.; and Beak, Jung Y., to Korea Institute of Science and Technology. Process for the preparation of ethanol from methanol, 5,414,161, Cl. 568-885.000.  
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Mason, Charles D.; and Vanderkooi, Nicolas, Jr., 5,414,051, Cl. 525-432.000.

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Veatch, John W. Method and apparatus for generating a comprehensive survey map, 5,414,462, Cl. 348-135.000.

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Disco, Thomas A.; and Parish, Charles R., Jr., 5,413,330, Cl. 273-33.000.

Venas, Karl; and Pedersen, Terje, to Norsk Hydro a.s. Injection equipment, 5,413,315, Cl. 266-222.000.

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Vernon, Curtis. Gauge assembly for handlebar attachment, 5,413,007, Cl. 73-866.300.

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Vick, Gerald L., to Rockwell International Corporation. Dual optical amplifier ring laser gyroscope with reduced phase locking, 5,414,511, Cl. 356-350.000.

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Bindon, Edward W., 5,414,534, Cl. 358-483.000.

Vidrio Plano De Mexico, S.A.: See—  
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Saccomano, Nicholas A.; and Vinick, Fredric J., 5,414,127, Cl. 564-344.000.

Viratec Thin Films, Inc.: See—  
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Volk, Victor C.; and Rumburg, James L., to Carnier Corporation. Parts cleaning apparatus, 5,413,619, Cl. 55-327.000.

Volkman, Curtis L.; and Parker, Theodore L., to Essex Specialty Products, Inc.; and Dow Chemical Company, The. Thermosettable, thermosettable adhesives prepared from epoxy resins and polyesters and/or polycarbonates, 5,414,053, Cl. 525-438.000.

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Von Duprin, Inc.: See—  
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Steffens, Charles E., Jr.; Vos, Thomas H.; Gentry, Scott B.; Mazur, Joseph F.; and Blackburn, Brian K., 5,413,378, Cl. 280-735.000.

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W.R. Grace & Co.-Conn.: See—  
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Wada, Tatsuya; Murayama, Syouji; Kuroda, Kazuhiko; Satomura, Yukiyo; Matsuoka, Tadashi; Nonami, Mitsuharu; Matsumoto, Kozo; Kawamura, Yukinori; Matsumoto, Norikatsu; Hikita, Hiroshi; and Iwata, Hideo, to Fuji Electric Co., Ltd. Piezo-electric actuator operated press, 5,413,018, Cl. 83-456.000.

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Wakabayashi, Masashi: See—  
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Womack, Robert E., to Downhole Systems, Inc. Latching and sealing assembly. 5,413,171, Cl. 166-98.000.

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Weathers, Pamela J.; Cheatham, Ronald D.; and DiIorio, Alexander, 5,413,928, Cl. 435-240.400.

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Neesse, Edward D.; and Botsford, Matthew W., Jr., 5,412,966, Cl. 72-37.000.

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Grant, Ralph M.; and Wright, Forrest, 5,414,512, Cl. 356-35.500.

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Ng, Michael S.; and Wroble, Arthur J., 5,413,028, Cl. 89-41.090.

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Braeger, Horst H.; Nuske, Klaus-Dietrich; and Wruck, Siegfried, 5,413,525, Cl. 452-165.000.

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Archer, Gary D.; Case, Douglas R.; and Wu, Hilda J., 5,414,842, Cl. 395-600.000.

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Lin, Jing-Chie; Wu, Jyuhn-Yih; and Lee, Sheng-Long, 5,413,617, Cl. 75-371.000.

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Wu, Otto. Hair dryer handle structure. 5,412,879, Cl. 34-97.000.

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Wu, Yeong-Wei A., to Hughes Aircraft Company. Cryogenic cooling system with active vibration control. 5,412,951, Cl. 62-6.000.

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Berger, Scott A.; Wuchter, Richard B.; and Stefanelli, Pietro A., 5,414,202, Cl. 588-206.000.

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Wulf, Elmer B.; and Wulf, Mark E., 5,412,883, Cl. 36-50.500.

Wylie, Calvin R., to Beutler Heating and Air Conditioning, Inc. Temperature control system for multi-story building. 5,413,165, Cl. 165-22.000.

Wyman, Leslie W.: See—  
Brice, Frank W., Jr.; Elliott, Joseph C.; Fredericks, Kenneth J.; Galbraith, Robert E.; Halma, Marten J.; Hough, Roger E.; John, Suzanne M.; Malinowski, Paul A.; Meritt, Allan S.; Oakes, Kenneth J.; Rathjen, John C., Jr.; Sachs, Martin W.; Stucki, David E.; and Wyman, Leslie W., 5,414,851, Cl. 395-650.000.

Wyner, Jay S., to Wyner, Jay S. Method for long range preservation treatment by liquid-air injection of infrastructure monuments and other porous and embedded steel structures. 5,413,808, Cl. 427-140.000.

Xerox Corporation: See—  
Aikens, Andrew J.; Ebner, Fritz F.; and Chapuran, Ronald F., 5,414,494, Cl. 355-202.000.

Bov, Raphael F., Jr.; and Diaz, Jose R., 5,414,783, Cl. 382-320.000.

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Eschbach, Reiner, 5,414,538, Cl. 358-522.000.

Girmay, K. Girmay, 5,414,284, Cl. 257-80.000.

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Mastalski, Henry T., 5,413,810, Cl. 427-171.000.

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Pai, Damodar M.; Yuh, Huo-Yen; Yanus, John F.; Melnyk, Andrew R.; Mosher, Ralph A.; and Chow, Tsu-Sen, 5,413,886, Cl. 430-58.000.

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Schwarz, William M.; and Fuller, Timothy J., 5,413,630, Cl. 106-22.000.

Siegel, Robert P.; Kuo, Youti; and Hanzlik, Edward C., 5,414,503, Cl. 355-309.000.

Spitz, A. Lawrence; and Wilcox, Lynn D., 5,414,781, Cl. 382-296.000.

Swift, Joseph A.; Wallace, Stanley J.; and Peck, Wilbur M., 5,414,216, Cl. 174-124.000.

Wong, Chee-Chiu J.; and Sanborn, Walter J., 5,413,536, Cl. 474-101.000.

Xilinx, Inc.: See—  
Freidin, Philip M., 5,414,377, Cl. 326-41.000.

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Litvak, Herbert E.; Leach, Steven C.; and Rodgers, Edward G., 5,414,504, Cl. 356-72.000.

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Williams, William B., III; Reisdorf, Dennis J.; and Donofrio, William T., 5,413,092, Cl. 128-4.000.

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Yabushita, Shinichi: See—  
Katsuda, Nobuyuki; Yabushita, Shinichi; and Hashizume, Shuhei, 5,413,613, Cl. 8-471.000.

Yabuta, Motoshi: See—  
Sugimura, Yoh; Yabuta, Motoshi; Yukawa, Yoshiyuki; and Fujii, Yasuhiro, 5,414,055, Cl. 523-453.000.

Yaeger, Stephen A.: See—  
Salsburg, Fredric; Roberts, William E.; Yaeger, Stephen A.; and Overbeck, Robert B., 5,413,450, Cl. 414-495.000.

Yagi, Kouichi: See—  
Takaoka, Tatsuru; Yagi, Kouichi; and Kohno, Yoshiaki, 5,412,865, Cl. 29-830.000.

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Inui, Yasuo; and Yagi, Nobuhito, 5,413,288, Cl. 241-72.000.

Yagi, Takayuki; Komatsu, Toshiyuki; Sato, Yasue; and Kawate, Shinichi, to Canon Kabushiki Kaisha. Apparatus for preparing a semiconductor device, photo treatment apparatus, pattern forming apparatus and fabrication apparatus. 5,413,664, Cl. 156-345.000.

Yaguchi, Yasunori, to Nihonboshiyohin Laboratory Co., Ltd. Loose-boss top roller. 5,412,847, Cl. 19-295.000.



Yahata, Masasumi, to Ricoh Company, Ltd. Developing device for image forming apparatus having improved air/toner filtering. 5,414,499, Cl. 355-260.000.

Yamada, Akihiro, to Sony Corporation. Portable telephone apparatus responsive to control signals obtained through a connector and through a wired telephone line for a mending the operational program. 5,414,751, Cl. 379-58.000.

Yamada, Atsumi: See—  
Oonuki, Kazuo; Hiraoka, Teruyoshi; Nagahama, Hiroshi; Fukuda, Kazuhisa, Nobumoto, Akira, Isono, Takahiro; Yamada, Atsumi; and Gofuku, Hiroki, 5,413,623, Cl. 75-508.000.

Yamada, Eiji: See—  
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Yamada, Takayuki: See—  
Fudoo, Eiji; Yamada, Takayuki; and Saka, Yuuji, 5,412,861, Cl. 29-564.200.

Yamada, Toshihiko: See—  
Nakanishi, Yutaka; Yamada, Toshihiko; and Nakagaito, Toru, 5,413,479, Cl. 431-304.000.

Yamada, Yasuhiro; Sakuda, Shohei; and Takayama, Seiji, to Ajinomoto Co., Inc. Allosamidin compounds. 5,413,991, Cl. 514-27.000.

Yamagata, Shigeo, to Canon Kabushiki Kaisha. Having head shift control means with selectable head shift rates and head control possibilities. 5,414,572, Cl. 360-75.000.

Yamaguchi, Hiromichi: See—  
Sato, Toshio; Ito, Ikuo; Yamaguchi, Hiromichi; and Takeda, Kyochi, 5,414,174, Cl. 585-467.000.

Yamaguchi, Yasuo: See—  
Inoue, Yasuo; Sugahara, Kazuyuki; Ipposhi, Takashi; Yamaguchi, Yasuo; and Nishimura, Tadashi, 5,413,968, Cl. 437-200.000.

Yamaguchi, Yoshiaki: See—  
Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyouhei, 5,412,970, Cl. 72-250.000.

Yamakita, Hiroshi; Ina, Katsuhiro; Higuchi, Kazuhiro; Uchida, Akira; and Tsuji, Katsuhisa, to Nippondenso Co., Ltd. Temperature dependent control module cluster unit for motor vehicle. 5,414,416, Cl. 340-825.000.

Yamakyu Chain Kabushiki Kaisha: See—  
Furuyama, Masaru, 5,412,934, Cl. 59-78.000.

Yamamoto, Fujio, to Hitachi, Ltd. Evaluating method of data division patterns and a program execution time for a distributed memory parallel computer system, and parallel program producing method using such an evaluating method. 5,414,849, Cl. 395-650.000.

Yamamoto, Hiroki: See—  
Igaue, Takamitsu; Nomura, Hironori; Ohnishi, Hirofumi; Matsura, Yoshinori; Sasaki, Tohru; Shimakawa, Taiji; and Yamamoto, Hiroki, 5,413,654, Cl. 156-161.000.

Yamamoto, Koichi: See—  
Tanaka, Tadashi; Sakamoto, Masaaki; Yamamoto, Koichi; and Higuchi, Tsukimitsu, 5,413,875, Cl. 428-645.000.

Yamamoto, Masamitsu, to Uni-Charm Co., Ltd. Sanitary napkin. 5,413,569, Cl. 604-385.200.

Yamamoto, Osamu: See—  
Watanabe, Masanori; Ohbayashi, Ken; Sasaki, Kazuaki; Yamamoto, Osamu; and Matsumoto, Mitsuhiro, 5,413,956, Cl. 437-129.000.

Yamamoto, Shigenobu: See—  
Ishikuri, Hiroaki; and Yamamoto, Shigenobu, 5,414,759, Cl. 379-88.000.

Yamamoto, Tetsuya: See—  
Tozawa, Yoji; Hashimoto, Shizuki; and Yamamoto, Tetsuya, 5,414,300, Cl. 257-704.000.

Yamamoto, Toru: See—  
Sekiguchi, Masami; and Yamamoto, Toru, 5,414,569, Cl. 360-19.100.

Yamamoto, Yasuaki; Hosokawa, Hiroshi; Shinohara, Wataru; and Kiyama, Seichi, to Sayno Electric Co., Ltd. Method of modifying transparent conductive oxide film including method of manufacturing photo voltaic device. 5,413,959, Cl. 437-174.000.

Yamamoto, Yoshimi: See—  
Tobita, Tomoyuki; Sase, Akira; Yamamoto, Yoshimi; and Aoki, Kenichi, 5,412,992, Cl. 73-721.000.

Yamamura, Nobuyuki: See—  
Jang, In-sik; and Yamamura, Nobuyuki, 5,414,543, Cl. 359-53.000.

Yamanaka, Hideaki: See—  
Tsuzuki, Munenori; Yamanaka, Hideaki; Saito, Hirotaka; and Oshima, Kazuyoshi, 5,414,696, Cl. 370-16.000.

Yamanashi, Teruaki; Suzuki, Shinichiro; Tsujimoto, Yoshio; and Kiyohara, Toshikazu, to Nippon Oil Company, Limited. Method of making compensator for liquid crystal display. 5,413,657, Cl. 156-235.000.

Yamashita, Haruo: See—  
Ueda, Hiromi; Tokizawa, Ikuo; Iguchi, Kazuo; Yamashita, Haruo; Kurano, Takatoshi; and Nishihara, Motoo, 5,414,415, Cl. 340-825.020.

Yamashita, Izumi: See—  
Watanabe, Tomonari; Yamashita, Izumi; Chono, Masazumi; and Kouno, Tetsushi, 5,414,144, Cl. 568-670.000.

Yamashita, Kazuhiko, to Matsushita Electric Industrial Co., Ltd. Hand-written character input device. 5,414,228, Cl. 178-18.000.

Yamashita, Koutaro: See—  
Ozawa, Satoshi; Miyahara, Yuji; Taki, Mamoru; Yamashita, Koutaro; and Watanabe, Yoshio, 5,413,685, Cl. 204-416.000.

Yamashita, Masataka; Terada, Masahiro; Mori, Shouser; and Katagiri, Kazuharu, to Canon Kabushiki Kaisha. Liquid crystal composition,

liquid crystal device using the liquid crystal composition, and display method and apparatus using the liquid crystal composition and device. 5,413,735, Cl. 252-299.610.

Yamatake-Honeywell Co., Ltd.: See—  
Ohtani, Keizo, 5,412,993, Cl. 73-727.000.

Yamauchi, Shunji, to Mitsubishi Denki Kabushiki Kaisha. Resin-sealing apparatus including a gas spring. 5,413,471, Cl. 425-129.100.

Yamauchi, Yoshimitsu, to Sharp Kabushiki Kaisha. Nonvolatile memory, method of fabricating the same, and method of reading information from the same. 5,414,286, Cl. 257-315.000.

Yamazaki, Seiji: See—  
Nakamura, Ichiro; Yamazaki, Seiji; Takahashi, Osamu; Arai, Hiroaki; and Hamaguchi, Shigeo, 5,413,865, Cl. 428-432.000.

Yamazaki, Shunpei; Mase, Akira; Hiroki, Masaaki; and Takemura, Yasuhiko, to Semiconductor Energy Laboratory Co., Ltd. Electro-optical device and method of driving the same. 5,414,442, Cl. 345-89.000.

Yamazaki, Yuichiro: See—  
Shimizu, Masahiro; Fukasawa, Takayuki; Yamazaki, Yuichiro; Miyoshi, Motosuke; Okano, Haruo; and Okumura, Katsuya, 5,413,663, Cl. 156-345.000.

Yan, Feng: See—  
Schneider, Michel; Yan, Feng; Grenier, Pascal, deceased; Puginier, Jerome; and Barrau, Marie-Bernadette, 5,413,774, Cl. 424-9.510.

Yan, Tsoung Y., to Mobil Oil Corporation. High severity visbreaking of residual oil. 5,413,702, Cl. 208-97.000.

Yanagisawa, Shuichi: See—  
Shimada, Kunihiko; Yanagisawa, Shuichi; and Tanaka, Satoru, 5,414,691, Cl. 369-275.200.

Yanagishita, Hideki: See—  
Kamada, Hiroshi; Shiohara, Morito; Ohta, Yoshiyuki; and Yanagishita, Hideki, 5,414,474, Cl. 348-700.000.

Yang, Chin-Ping; Hsiao, Sheng-Huei; and Lin, Jiun-Hung, to National Science Council. Poly(amide-ether-imide)s. 5,414,070, Cl. 528-310.000.

Yang, Heechung: See—  
Amkraut, Alfred A.; and Yang, Heechung, 5,413,796, Cl. 424-489.000.

Yang, Henry S.; Spinney, Barry A.; Hawe, William R.; and Pariseau, Luc A., to Digital Equipment Corp. Negotiation protocol for establishment of full duplex communication on a token ring network. 5,414,700, Cl. 370-24.000.

Yang, I-Min. Caster for baggage. 5,412,838, Cl. 16-26.000.

Yang, James H. C.: See—  
Bohm, Georg G. A.; Oberster, Arthur E.; and Yang, James H. C., 5,413,652, Cl. 156-90.000.

Yang, Min-Tzong: See—  
Chen, Anchor; Yang, Min-Tzong; Hsue, Chen-Chiu; and Hong, Gary, 5,413,950, Cl. 437-52.000.

Yang, Mohshi: See—  
den Boer, Willem; and Yang, Mohshi, 5,414,283, Cl. 257-59.000.

Yang, Tai-Her. Sequential on-off type serial lamp set constructed by varied thermo delay time constant. 5,414,326, Cl. 315-185.00R.

Yang, Weikang: See—  
Kumagai, Ryohet; and Yang, Weikang, 5,414,666, Cl. 365-222.000.

Yang, Yu-Chung; Ciarletta, Agnes B.; Ricciardi, Susan T.; and Clark, Steven C., to Genetics Institute, Inc. Human cytokine IL-9. 5,414,071, Cl. 530-351.000.

Yankis, Robert T.: See—  
Geithman, Glenn A.; MacKinnon, Duncan P.; Benham, Gary D.; Sayyadi, Babak; and Yankis, Robert T., 5,414,247, Cl. 219-667.000.

Yanus, John F.: See—  
Pai, Damodar M.; Yuh, Huoy-Jen; Yanus, John F.; Melnyk, Andrew R.; Mosher, Ralph A.; and Chow, Tsu-Sen, 5,413,886, Cl. 430-58.000.

Yao, Shin-Chuan; Wu, Jong-Fu; Cheng, Kun-Lin; Tsai, Chiu-Hsiung; Koong, Farn-Ping; Chuang, Kun-Lung; Yao, Shu-Lan; and Liu, Chun-Liu, to China Textile Institute. Water-permeable and fire-resistant product and a preparing method thereof. 5,414,024, Cl. 521-114.000.

Yao, Shu-Lan: See—  
Yao, Shin-Chuan; Wu, Jong-Fu; Cheng, Kun-Lin; Tsai, Chiu-Hsiung; Koong, Farn-Ping; Chuang, Kun-Lung; Yao, Shu-Lan; and Liu, Chun-Liu, 5,414,024, Cl. 521-114.000.

Yarkoni, Eran; and Sakran, Nabeel, to Intel Corporation. Apparatus for configuring relative position of a cache memory in a cache memory array. 5,414,828, Cl. 395-425.000.

Yasue, Kenji; Tamura, Tsuneo; Katahira, Shinichiro; and Watanabe, Mioko, to Unitika Ltd. Reinforced polyamide resin composition and process for producing the same. 5,414,042, Cl. 524-789.000.

Yasui, Toshihiko; Takimoto, Yoshio, deceased (by Takimoto, Kazumi, Takeshi Takimoto, executors); Kawakami, Katsuhiko; Kiyonari, Toshiyuki; and Endo, Norio, to Dainippon Ink and Chemicals, Inc.; and Kirin/Beer Kabushiki Kaisha. Laser marking and printing ink therefor. 5,413,629, Cl. 106-21.00R.

Yatake, Satoru: See—  
Amano, Koshi; and Yatake, Satoru, 5,414,589, Cl. 361-306.300.

Yatsuka, Takeshi: See—  
Murata, Hiroshi; and Yatsuka, Takeshi, 5,413,862, Cl. 428-423.100.

Yazaki Corporation: See—  
Oike, Toshio; and Yokota, Hiroyuki, 5,414,595, Cl. 362-26.000.

Sawada, Yoshitsugu, 5,413,507, Cl. 439-701.000.

Takeuchi, Kunihiko; Chiriku, Akihiko; Kanezashi, Satsuki; and Tanishita, Hiroto, 5,413,495, Cl. 439-223.000.

Yazaki, Fumihiko: See—  
Kuroda, Masuo; Yazaki, Fumihiko; Wakabayashi, Masashi; and Ohoka, Naoyuki, 5,413,146, Cl. 138-104.000.

Yazawa, Yoshihiro; Owada, Satoshi; Togashi, Fusao; Yoshioka, Keiichi; and Satoh, Susumu, to Kawasaki Steel Corporation. Ferritic stainless steel exhibiting excellent atmospheric corrosion resistance and crevice corrosion resistance. 5,413,754, Cl. 420-41.000.

Yazeejian, Diran, to Chrysler Corporation. Method and apparatus for the evaluation of reflective surfaces. 5,414,518, Cl. 356-376.000.

Yeda Research and Development Co. Ltd.: See—  
Cahen, David; Jakubowicz, Abram; Dagan, Geula; and Gartsman, Konstantin, 5,413,942, Cl. 437-16.000.

Yee, David K.: See—  
Richard, Michael A.; De Deken, Jacques C.; and Yee, David K., 5,414,171, Cl. 585-269.000.

Yee, Shoon Y. Anti-theft device for a motor vehicle. 5,412,964, Cl. 70-261.000.

Yeh, Hsi-Shou. Easy-open can end. 5,413,241, Cl. 220-269.000.

Yen, Po-Wen; Chung, Army; and Liaw, Her-Song, to United Microelectronics Corporation. Method for depositing an insulating inter-layer in a semiconductor metallurgy system. 5,413,963, Cl. 437-195.000.

Yeoman, Neil: See—  
Buchholz, Matthew; Yeoman, Neil; and Matke, Frank E., 5,413,741, Cl. 261-112.200.

Yerman, Alexander J.: See—  
Roshen, Waseem A.; and Yerman, Alexander J., 5,414,401, Cl. 336-178.000.

Yeung, B. W. Anissa: See—  
Sacrificante, Guerino G.; and Yeung, B. W. Anissa, 5,413,889, Cl. 430-106.000.

Yienn Lih Enterprise Co., Ltd.: See—  
Wu, Hua-Te, 5,413,261, Cl. 224-148.000.

Yishay, Oded: See—  
Gladden, Michael E.; Skrhak, Robert J.; Yishay, Oded; and Hartung, Eytan, 5,414,714, Cl. 371-22.300.

Yokohama Rubber Co., Ltd.: See—  
Kuroda, Masuo; Yazaki, Fumihiko; Wakabayashi, Masashi; and Ohoka, Naoyuki, 5,413,146, Cl. 138-104.000.

Yokomizo, Katuhiko: See—  
Mamiya, Kiyotaka; Shiraiishi, Tohru; Yokomizo, Katuhiko; and Teramoto, Takafumi, 5,413,075, Cl. 123-431.000.

Yokota, Hiroyuki: See—  
Oike, Toshio; and Yokota, Hiroyuki, 5,414,595, Cl. 362-26.000.

Yokota, Koji: See—  
Oshima, Yujiro; Muraki, Hideaki; Yokota, Koji; and Nakanishi, Kiyoshi, 5,412,946, Cl. 60-286.000.

Yokota, Masayuki, to Canon Kabushiki Kaisha. Multiprocessor shared resource management system implemented as a virtual task in one of the processors. 5,414,856, Cl. 395-725.000.

Yokota, Minoru, to Fuji Photo Film Co., Ltd. Silver halide photographic material and a manufacturing method therefor. 5,413,900, Cl. 430-495.000.

Yokoyama, Akinori; and Nakajima, Hitoshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Aluminum-containing oxide and process for producing aluminum-containing oxide. 5,413,974, Cl. 501-153.000.

Yokoyama, Kazuaki: See—  
Kaneko, Isamu; Katoh, Hideaki; Yokoyama, Kazuaki; and Ishikawa, Tsuyoshi, 5,414,599, Cl. 362-31.000.

Yokozaki, Katsushi: See—  
Hasegawa, Makoto; Takahashi, Kazuaki; Mimura, Masahiro; Watanabe, Kazunori; Yokozaki, Katsushi; and Harada, Hiroyuki, 5,414,736, Cl. 375-334.000.

Yonenaga, Kohtaroh: See—  
Kanmoto, Yoshiaki; Fukuda, Haruhiko; Yonenaga, Kohtaroh; and Shijo, Hiroyasu, 5,414,535, Cl. 358-487.000.

Yoneto, Kunio: See—  
Suzuki, Taro; Fukuda, Mutsumi; and Yoneto, Kunio, 5,413,776, Cl. 424-448.000.

Yoshida, Kimiyoshi: See—  
Tamaru, Hideshi; Togawa, Kazuo; Sakano, Akio; and Yoshida, Kimiyoshi, 5,414,413, Cl. 345-175.000.

Yoshida Kogyo K.K.: See—  
Fudaki, Tsutomu, 5,412,849, Cl. 24-388.000.

Yoshida, Masanori, to Kabushiki Kaisha Nikko. Method of taking out viscera of fish and apparatus thereof. 5,413,524, Cl. 452-110.000.

Yoshida, Naohito: See—  
Shimura, Teruyuki; and Yoshida, Naohito, 5,414,273, Cl. 257-17.000.

Yoshiki, Masahiko: See—  
Murakoshi, Atsushi; Mizushima, Ichiro; Watanabe, Masaharu; and Yoshiki, Masahiko, 5,413,943, Cl. 437-20.000.

Yoshimura, Hideaki: See—  
Sugimoto, Takatoshi; Yoshimura, Hideaki; and Suzuki, Masayuki, 5,414,639, Cl. 364-489.000.

Yoshimura, Kiyoshi: See—  
Soma, Gen-Ichiro; Yoshimura, Kiyoshi; Tsukioka, Daisuke; Mizuno, Den'Ichi; and Oshima, Haruyuki, 5,413,993, Cl. 514-54.000.

Yoshimura, Toshihiko; Shimizu, Tasaku; Ishikawa, Yuichi; Otaka, Masahiro; Koguchi, Yuko; Enomoto, Kunio; Hasegawa, Kunio; Hayashi, Makoto; and Takaku, Kazuo, to Hitachi, Ltd. Fluxmeter including squid and pickup coil with flux guiding core and method for sensing degree of deterioration of an object. 5,414,356, Cl. 324-239.000.

Yoshino, Masato, to Sumitomo Electric Industries, Ltd. Estimated vehicle speed calculation apparatus. 5,414,628, Cl. 364-426.020.

Yoshino, Saeko: See—  
Ishibashi, Tadashi; Kezuka, Hiroaki; Yoshino, Saeko; Shimizu, Norio; Tsuda, Motoyuki; and Imazeki, Shuji, 5,414,072, Cl. 530-387.900.

Yoshino, Tomoaki: See—  
Mochizuki, Yasumasa; Yoshino, Tomoaki; Hasegawa, Shinichi; and Sano, Masakazu, 5,414,632, Cl. 364-474.160.

Yoshioka, Keiichi: See—  
Yazawa, Yoshihiro; Owada, Satoshi; Togashi, Fusao; Yoshioka, Keiichi; and Satoh, Susumu, 5,413,754, Cl. 420-41.000.

Yoshizawa, Sadao: See—  
Kawamura, Tadashi; Yamaguchi, Yoshiaki; Yoshizawa, Sadao; Okada, Shoji; Endo, Makoto; Kutsuwada, Tatsuya; Nakamura, Atsumu; Manabe, Akira; Suzuki, Takaya; and Murata, Kyouhei, 5,412,970, Cl. 72-250.000.

Yosizato, Akihiko; and Furubeppu, Satoshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Diaminoureia compound and process for production thereof and high heat resistant polyurethaneurea and process for production thereof. 5,414,118, Cl. 564-51.000.

You, Shy-Loong. Screen for a projector. 5,414,558, Cl. 359-451.000.

Young Industries, Inc.: See—  
Mitchell, Andrew; and Ingram, Galen, 5,413,256, Cl. 222-368.000.

Young, Kenneth C., Jr.: See—  
Johnston, Cesar A.; Smith, David J.; and Young, Kenneth C., Jr., 5,414,707, Cl. 370-79.000.

Young, Michael S., to Square D Company. Circuit breaker enclosure gas venting system. 5,414,584, Cl. 361-115.000.

Young, Paul E.; Clendenen, Rex E., Jr.; Delbosque, Juan; Smith, Roy; Miller, Gary L.; and Lewis, Brian S., to General Motors Corporation. Vehicle headlamp adjuster with pivoting housing. 5,414,602, Cl. 362-66.000.

Young, Wayne P.: See—  
Green, David T.; Bolanos, Henry; Mastri, Dominick L.; McGarry, Richard A.; and Young, Wayne P., 5,413,272, Cl. 227-175.000.

Your, Robert E.: See—  
Woodall, Richard P.; Swetey, William J.; Faison, Brian R.; and Your, Robert E., 5,413,459, Cl. 415-104.000.

Yourd, Raymond A.: See—  
Jonsson, Erik H.; Archey, Rick L.; Kumpf, Robert J.; Meltzer, Aaron D.; Pielartzik, Harald; and Yourd, Raymond A., 5,414,054, Cl. 525-439.000.

Yu, Brian: See—  
Wu, William B.; and Yu, Brian, 5,413,044, Cl. 101-420.000.

Yu, Chi-Sou: See—  
Buhl, Steven N.; Bhayani, Bhaskar; Yu, Chi-Sou; and Tang, Thuy N., 5,413,732, Cl. 252-182.110.

Yu, Chiao-Mei. Easy opening case. 5,413,219, Cl. 206-387.100.

Yu, Wang-I. Enhanced electrical connector. 5,413,496, Cl. 439-326.000.

Yudasaka, Ichio: See—  
Matsuo, Mutsumi; Yudasaka, Ichio; Kanai, Kiyohiko; Nagase, Katsumi; and Inoue, Takashi, 5,414,547, Cl. 359-67.000.

Yuh, Huoy-Jen: See—  
Pai, Damodar M.; Yuh, Huoy-Jen; Yanus, John F.; Melnyk, Andrew R.; Mosher, Ralph A.; and Chow, Tsu-Sen, 5,413,886, Cl. 430-58.000.

Yukawa, Yoshiyuki: See—  
Sugimura, Yoh; Yabuta, Motoshi; Yukawa, Yoshiyuki; and Fujii, Yasuhiro, 5,414,055, Cl. 523-453.000.

Yumoto, Hideki, to Matsushita Electric Corporation of America. Circuit and method for controlling an audio system. 5,414,774, Cl. 381-1.000.

Yumoto, Yoshiji: See—  
Kajita, Toru; Ota, Toshiyuki; Yumoto, Yoshiji; and Miura, Takao, 5,413,896, Cl. 430-192.000.

Zahedi, Amir. Device for removing a bone cement tube. 5,413,578, Cl. 606-86.000.

Zahn, Wolfgang: See—  
Scheler, Siegfried; Elsaesser, Andreas; Buhr, Gerhard; Bergmann, Klaus; and Zahn, Wolfgang, 5,413,899, Cl. 430-326.000.

Zahr, George E., to Du Pont de Nemours & E. I., and Company. Method for dispersion spinning of sheathed rod-in-tube superconducting composites. 5,413,753, Cl. 419-36.000.

Zaiss, Siegfried: See—  
Fey, Peter; Dressel, Jurgen; Hanko, Rudolf; Hubsch, Walter; Kramer, Thomas; Muller, Ulrich; Muller-Gliemann, Matthias; Beuck, Martin; Bischoff, Hilmar; Wohlfel, Stefan; Denzer, Dirk; Kazda, Stanislaw; Stasch, Johannes-Peter; Knorr, Andreas; and Zaiss, Siegfried, 5,414,003, Cl. 514-333.000.

Zambo, George, to HACA Spare Parts Technology Inc. Tie rod assembly for sand molding machine. 5,413,013, Cl. 74-587.000.

Zanzig, Jerald G.: See—  
Flerchinger, Gary G.; and Zanzig, Jerald G., 5,413,402, Cl. 298-23.00M.

Zarka, Albert; Detaint, Jacques; Schwartzel, Jacques; Toudic, Yves; Capelle, Bernard; Zheng, Yun L.; Philippot, Etienne; Buisson, Xavier; and Arnaud, Roger, to France Telecom & Centre National de la Recherche Scientifique (CNRS). Method of obtaining a crystal by crystal growth in the liquid phase from a seed. 5,413,067, Cl. 117-54.000.

Zehavi, Ephraim, to Qualcomm Incorporated. Method and apparatus for bifurcating signal transmission over in-phase and quadrature phase spread spectrum communication channels. 5,414,728, Cl. 375-200.000.

Zehner, William J., to United States of America, Navy. Sonar array with reduced grating lobes. 5,414,676, Cl. 367-103.000.  
 Zellweger Uster AG: See—  
 Josa, Rolf; and Wampfler, Hans, 5,414,520, Cl. 356-430.000.  
 Zemach, Shalom; and Farin, Yitzhak, to Mefalim Ymiem Vashkoht Ltd. Sea cage fish farming system. 5,412,903, Cl. 43-102.000.  
 Zeneca Inc.: See—  
 Stein, Mark M.; and Trainor, Diane A., 5,414,132, Cl. 564-503.000.  
 Zeneca Limited: See—  
 Bridges, Ian G.; Grierson, Donald; and Schuch, Wolfgang, 5,413,937, Cl. 435-320.100.  
 Zeneca Limited Imperial Chemical House: See—  
 Brown, Stephen M.; Glass, Janet C.; and Sheldrake, Gary N., 5,414,164, Cl. 570-123.000.  
 Zenith Electronics Corp.: See—  
 Trzyna, William A.; and Walding, Carl E., 5,414,475, Cl. 348-730.000.  
 Zentmyer, John. Automotive vehicle differential assembly. 5,413,015, Cl. 74-650.000.  
 Zexel Corporation: See—  
 Nakajima, Nobuyuki; Ishikawa, Masakuni; and Saito, Susumu, 5,413,469, Cl. 418-55.100.  
 Oshikawa, Hidekazu; and Abe, Tatsuhiro, 5,414,630, Cl. 364-449.000.  
 Zhang, Ying-Zhi: See—  
 Brodman, Bruce W.; Sharma, Anil; Shanmugasundaram, Thiruvengataswamy; and Zhang, Ying-Zhi, 5,414,198, Cl. 588-202.000.  
 Zheng, Yun L.: See—  
 Zarka, Albert; Detaint, Jacques; Schwartzel, Jacquie; Toudic, Yves; Capelle, Bernard; Zheng, Yun L.; Philippot, Etienne; Buisson, Xavier; and Arnaud, Roger, 5,413,067, Cl. 117-54.000.  
 Zhou, Shouhuan; Chen, Ying-chih; Lee, Kotik K.; and Gui, Youxi, to North China Research Institute of Electro-Optics; and Quantum Electronics Technology, Inc. Monolithic self Q-switched laser. 5,414,724, Cl. 372-10.000.  
 Zhou, Zhen-Hong: See—  
 Aydil, Eray S.; Gottscho, Richard A.; and Zhou, Zhen-Hong, 5,413,954, Cl. 437-81.000.  
 Zhu, Min: See—  
 Tse, Edison; and Zhu, Min, 5,414,649, Cl. 364-578.000.

Zhu, Xiaodong T.: See—  
 Goronkin, Herbert; Tehrani, Saied N.; Shen, Jun; and Zhu, Xiaodong T., 5,414,274, Cl. 257-25.000.  
 Ziebarth, Michael S.; Hager, Michael J.; Beeckman, Jean W.; and Plecha, Stanislaw, to W. R. Grace & Co.-Conn. SOX/NOX sorbent and process of use. 5,413,771, Cl. 423-239.100.  
 Ziegler, Louis C.: See—  
 Silver, Jules; and Ziegler, Louis C., 5,413,564, Cl. 604-232.000.  
 Zileh, Harald: See—  
 Von Der Saal, Wolfgang; Zileh, Harald; and Bohm, Erwin, 5,414,088, Cl. 546-158.000.  
 Zimmerman, G. Stanley, Jr.: See—  
 Austin, Jared A.; and Zimmerman, G. Stanley, Jr., 5,413,849, Cl. 428-293.000.  
 Zippe, Bernd H.; Weis, Erich; and Leichtsenschlag, Hilmar, to Zippe, GmbH & Co. Method and heat-exchanger for preheating broken glass and glass-batching melt-goods or similar bulk goods using a heating gas. 5,412,882, Cl. 34-521.000.  
 Zippe, GmbH & Co.: See—  
 Zippe, Bernd H.; Weis, Erich; and Leichtsenschlag, Hilmar, 5,412,882, Cl. 34-521.000.  
 Zirngiebl, Eberhard: See—  
 Jentsch, Joerg-Dietrich; Klausener, Alexander; Landscheidt, Heinz; Wolters, Erich; and Zirngiebl, Eberhard, 5,414,104, Cl. 558-277.000.  
 Zscheile, John W., Jr.: See—  
 Lundquist, Alan E.; Zscheile, John W., Jr.; and Kingston, Smauel C., 5,414,730, Cl. 375-208.000.  
 Zuberbuhler, H. Richard; Burchell, James R.; and Sorosky, David F. Shelf allocation and management system. 5,413,229, Cl. 211-59.300.  
 Zur, Oded Y.: See—  
 Gurner, Asaf; and Zur, Oded Y., 5,414,256, Cl. 250-221.000.  
 Zurek, Patrick M.; and Rabinowitz, William M., to Sensimetrics Corporation. System for testing adequacy of human hearing. 5,413,114, Cl. 128-746.000.  
 Zwaaneveld, Cornelis H.: See—  
 Jansen, Murray L.; Killick, Donald E.; Lang, Alexander; Pullman, Royce T.; Sutton, Christopher M.; and Zwaaneveld, Cornelis H., 5,413,112, Cl. 128-726.000.  
 Zwilling, Heinz-Michael; Sindermann, Siegmund; and Theine, Axel, to KHS Maschinen- und Anlagenbau AG. Container filling machine for filling open-top containers, and a filler valve therefor. 5,413,153, Cl. 141-39.000.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF MAY, 1995

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arkwright, Incorporated: See—  
 Gager, Morgan E.; Atherton, David; and Gadodia, Surendra K., Re. 34,933, Cl. 428-246.000.  
 Atherton, David: See—  
 Gager, Morgan E.; Atherton, David; and Gadodia, Surendra K., Re. 34,933, Cl. 428-246.000.  
 Bio Medic Data Systems, Inc.: See—  
 Campbell, Neil E.; and Park, Chinsoo, Re. 34,936, Cl. 606-117.000.  
 Bourbon, Andre: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.  
 Campbell, Neil E.; and Park, Chinsoo, to Bio Medic Data Systems, Inc. Animal marker implanting system. Re. 34,936, Cl. 606-117.000.  
 Chekroun, Isaac: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.  
 Duchon, Douglas J., to Logitech S.A. Cursor positioning device operable over various degrees of elevation. Re. 34,931, Cl. 250-221.000.  
 Elmjet Limited: See—  
 Gray, Colin, Re. 34,932, Cl. 347-74.000.  
 Gadodia, Surendra K.: See—  
 Gager, Morgan E.; Atherton, David; and Gadodia, Surendra K., Re. 34,933, Cl. 428-246.000.  
 Gager, Morgan E.; Atherton, David; and Gadodia, Surendra K., to Arkwright, Incorporated. Printing film. Re. 34,933, Cl. 428-246.000.  
 Gerin, Bernard: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.  
 Graux, Jean-Baptiste: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.  
 Gray, Colin, to Elmjet Limited. Continuous ink jet printing device. Re. 34,932, Cl. 347-74.000.  
 Kristen, Hanns J., to Tilia, Inc. Plastic bag for vacuum sealing. Re. 34,929, Cl. 206-524.800.  
 Kusz, Maximilian, to Owens Illinois Closure Inc. Child resistant reminder closure. Re. 34,930, Cl. 215-220.000.  
 Logitech S.A.: See—  
 Duchon, Douglas J., Re. 34,931, Cl. 250-221.000.  
 Mazur, Richard A.: See—  
 Raterman, Donald E.; Mazur, Richard A.; and Primdahl, Richard D., Re. 34,934, Cl. 453-10.000.  
 Owens Illinois Closure Inc.: See—  
 Kusz, Maximilian, Re. 34,930, Cl. 215-220.000.  
 Park, Chinsoo: See—  
 Campbell, Neil E.; and Park, Chinsoo, Re. 34,936, Cl. 606-117.000.  
 Primdahl, Richard D.: See—  
 Raterman, Donald E.; Mazur, Richard A.; and Primdahl, Richard D., Re. 34,934, Cl. 453-10.000.  
 Raterman, Donald E.; Mazur, Richard A.; and Primdahl, Richard D. Coin sorter with counter and brake mechanism. Re. 34,934, Cl. 453-10.000.  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, to Synthelabo. Method for preparing (+)-(2S,3S)-3-hydroxy-2-(4-methoxyphenyl)-2,3-dihydro-5H-1,5-benzothiazepine-4-one and chlorinated derivatives thereof. Re. 34,935, Cl. 540-491.000.  
 Synthelabo: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.  
 Tilia, Inc.: See—  
 Kristen, Hanns J., Re. 34,929, Cl. 206-524.800.  
 Ugolini, Antonio: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.  
 Wick, Alexander: See—  
 Rossey, Guy; Chekroun, Isaac; Ugolini, Antonio; Wick, Alexander; Gerin, Bernard; Bourbon, Andre; and Graux, Jean-Baptiste, Re. 34,935, Cl. 540-491.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

Atlantic Thermoplastics Co., Inc.: See—  
 Sullivan, James B.; and Fox, Richard B., B1 4,910,886, Cl. 36-44.000.  
 Bell, John; and Keopfggen, William, to Ekstrom Industries, Inc., Watt-hour meter socket adapter. B1 1,034,531, 5-9-95, Cl. 439-135.000.  
 Bertsch, Ludo: See—  
 Dodds, David E.; and Bertsch, Ludo, B1 4,677,646, Cl. 375-36.000.  
 Bosyj, Nick M.; Leonatti, John A.; Weber, Vincent L.; and Wagner, Gregory P., to Hoover Company, The. Wet and dry vacuum cleaner. B1 4,831,685, 5-9-95, Cl. 15-344.000.  
 Cornwell, Tomy W.: See—  
 Niswander, Robert L.; and Cornwell, Tomy W., B1 4,564,313, Cl. 405-125.000.  
 Davila, Dan I.; Midkiff, John A.; and Ekanayake, Dulip, to Siecor Corporation. Communication outlet. B1 4,976,510, 5-9-95, Cl. 385-135.000.  
 Dengler, William R.; and Shaver, William M., to Dynatec International Limited. Method of breaking a full face of rock for constructing shafts and tunnels. B1 5,232,268, 5-9-95, Cl. 299-13.000.  
 Dodds, David E.; and Bertsch, Ludo, to Saskatchewan Economic Development Corporation. Dataset powered by control and data signals from data terminal. B1 4,677,646, 5-9-95, Cl. 375-36.000.  
 Dynatec International Limited: See—  
 Dengler, William R.; and Shaver, William M., B1 5,232,268, Cl. 299-13.000.  
 Ekanayake, Dulip: See—  
 Davila, Dan I.; Midkiff, John A.; and Ekanayake, Dulip, B1 4,976,510, Cl. 385-135.000.  
 Ekstrom Industries, Inc.: See—  
 Bell, John; and Keopfggen, William, B1 1,034,531, Cl. 439-135.000.  
 Fox, Richard B.: See—  
 Sullivan, James B.; and Fox, Richard B., B1 4,910,886, Cl. 36-44.000.  
 Funatsu, Chuhei; and Hirata, Toshikiyo, to Toyo Tsushinki K.K. Collision avoidance system for aircraft. B1 1,032,368, 5-9-95, Cl. 342-32.000.  
 Gregory, Peter; and Kenyon, Ronald W., to Zeneca Limited. Azo dyes suitable for ink jet printing. B1 5,268,459, 5-9-95, Cl. 534-758.000.  
 Hirata, Toshikiyo: See—  
 Funatsu, Chuhei; and Hirata, Toshikiyo, B1 1,032,368, Cl. 342-32.000.  
 Hoover Company, The: See—  
 Bosyj, Nick M.; Leonatti, John A.; Weber, Vincent L.; and Wagner, Gregory P., B1 4,831,685, Cl. 15-344.000.  
 Hyway Concrete Products Co.: See—  
 Niswander, Robert L.; and Cornwell, Tomy W., B1 4,564,313, Cl. 405-125.000.  
 James, Gregory S. System and method for protecting plants from freeze damage. B1 4,763,440, 5-9-95, Cl. 47-2.000.  
 Kanebo, Ltd.: See—  
 Matsui, Masaao; Naito, Hiroshi; and Okamoto, Kazuo, B1 4,457,973, Cl. 428-372.000.  
 Kanebo Synthetic Fibers Ltd.: See—  
 Matsui, Masaao; Naito, Hiroshi; and Okamoto, Kazuo, B1 4,457,973, Cl. 428-372.000.  
 Kenyon, Ronald W.: See—  
 Gregory, Peter; and Kenyon, Ronald W., B1 5,268,459, Cl. 534-758.000.  
 Keopfggen, William: See—  
 Bell, John; and Keopfggen, William, B1 1,034,531, Cl. 439-135.000.



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# CLASSIFICATION OF PATENTS

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69	5,412,812	810	5,412,878	39.33	5,412,939	335	5,413,012	CLASS 112		275	5,413,125
424	5,412,813	97	5,412,879	274	5,412,940	587	5,413,013	103	5,413,057	321	5,413,126
	5,412,814	104	5,412,928	276	5,412,941	606 R	5,413,014	231	5,413,058		5,413,127
		136	5,412,881	281	5,412,942	650	5,413,015	308	5,413,059	CLASS 134	
239	5,412,815	521	5,412,882	285	5,412,944	CLASS 75		CLASS 114		1.2	5,413,670
578.1	5,412,817	44	5,412,886	286	5,412,945	371	5,413,617	102	5,413,060	56 R	5,413,128
623	5,412,816	50.5	5,412,883	454	5,412,946	376	5,413,621	105	5,413,061	65	5,413,129
642	5,412,818	CLASS 36		468	5,412,947	446	5,413,622	144 A	5,413,062	95.3	5,413,130
661	5,412,819	CLASS 37		739	5,412,948	508	5,413,623	221 R	5,413,063	104.4	5,413,131
		342	5,412,884	CLASS 62		711	5,413,624	255	5,413,064	133	5,413,132
86.1	5,412,820	451	5,412,885	6	5,412,950	CLASS 76		256	5,413,065	138	5,413,133
455	5,412,821	CLASS 40		25	5,412,951	108.1	5,413,016	354	5,413,066	CLASS 137	
601	5,412,822	119	5,412,886	36	5,412,952	CLASS 83		CLASS 117		1	5,413,134
632	5,412,823	152.2	5,412,887	85	5,412,953	152	5,413,017	54	5,413,067	15	5,413,135
	5,412,824	410	5,412,888	CLASS 63		456	5,413,018	CLASS 118		68.1	5,413,136
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1.7	5,412,826	69.02	5,412,894	CLASS 68		615	5,414,209	52.2	5,413,069	515.5	5,413,142
22.1	5,412,827	75.02	5,412,895	5 C	5,412,958	627	5,414,210	247	5,413,070	625.11	5,413,143
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230.11	5,412,832	42.19	5,412,900	178	5,412,962	36.08	5,413,026	197.2	5,413,074	118.1	5,413,148
250.34	5,412,833	42.22	5,412,901	209	5,412,963	36.17	5,413,027	431	5,413,075	123	5,413,149
250.42	5,412,834	44.87	5,412,902	261	5,412,964	41.09	5,413,028	446	5,413,076	CLASS 139	
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308	5,412,836	132.1	5,412,904	27	5,413,616	CLASS 91		492	5,413,078	449	5,413,151
344	B1 4,831,685	CLASS 44		19	5,412,965	408	5,413,030	502	5,413,079	CLASS 141	
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238	5,412,840	2	B1 4,763,440	239	5,412,969	103	5,413,625	32	5,413,083	114	5,413,155
249	5,412,841	30	5,412,905	250	5,412,970	219	5,413,626	44.5	5,413,084	165	5,413,156
334	5,412,842	72	5,412,906	326	5,412,971	235	5,413,627	81	5,413,085	314	5,413,157
387	5,412,843	85	5,412,907	333	5,412,972	CLASS 99		CLASS 125		72	5,413,158
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159 R	5,412,845	505	5,412,909	CLASS 73		519	5,413,034	77	5,413,088	224	5,413,640
288	5,412,846	CLASS 52		28.04	5,412,975	CLASS 100		246	5,413,090	239	5,413,641
295	5,412,847	20	5,412,911	38	5,412,976	168	5,413,036	598	5,413,091	319	5,413,642
99	5,412,848	36.5	5,412,912	46	5,412,977	CLASS 101		CLASS 128		420	5,413,643
388	5,412,849	79.13	5,412,913	49.2	5,412,978	9	5,413,037	4	5,413,092	518	5,413,644
616	5,412,850	126.6	5,412,914	53.01	5,412,979	178	5,413,038	200.24	5,413,093	539	5,413,645
709	5,412,851	105	5,412,915	105	5,412,980	225	5,413,039	200.26	5,413,094	562	5,413,646
713.6	5,412,852	119 A	5,412,916	170.05	5,412,981	230	5,413,040	205.24	5,413,095	564	5,413,647
		262	5,412,917	170.12	5,412,982	348	5,413,041	206.17	5,413,096	690	5,413,648
18.6	5,412,853	403.1	5,412,918	170.18	5,412,983	415.1	5,413,042	633	5,413,097	CLASS 152	
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33 M	5,412,855	729	5,412,921	517 R	5,412,986	201	5,413,045	41 R	5,413,087	64	5,413,651
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160.6	5,412,857	CLASS 53		597	5,412,988	302	5,413,047	639	5,413,103	111	5,413,653
450	5,412,858	399	5,412,923	663	5,412,989	307	5,413,048	660.05	5,413,104	161	5,413,654
527.1	5,412,860	412	5,412,924	721	5,412,990	457	5,413,050	660.07	5,413,105	167	5,413,655
564.2	5,412,861	450	5,412,925	727	5,412,991	521	5,413,049	662.06	5,413,106	184	5,413,656
751	5,412,862	552	5,412,926	756	5,412,993	CLASS 106		665	5,413,107	204	5,413,657
799	5,412,863	756	5,412,994	808	5,412,994	14.44	5,413,628	696	5,413,108	229	5,413,658
825	5,412,864	CLASS 55		827	5,412,995	21 R	5,413,629	724	5,413,109	235	5,413,659
	5,412,865	327	5,413,619	830	5,412,997	22 K	5,413,630	726	5,413,110	243	5,413,660
830	5,412,866	CLASS 56		862.333	5,412,998	156	5,413,631	734	5,413,111	263	5,413,661
848	5,412,867	15.4	5,412,929	862.335	5,412,999	493	5,413,632	746	5,413,112	345	5,413,662
852	5,412,868	44	5,412,930	863.03	5,412,998	672	5,413,633	763	5,413,113	514	5,413,663
890.032	5,412,869	199	5,412,931	863.41	5,413,000	696	5,413,634	777	5,413,114	515	5,413,664
895.32	5,412,870	249	5,412,932	863.83	5,413,001	792	5,413,635	830	5,413,115	566	5,413,665
		CLASS 59		864.18	5,413,006	CLASS 108		853	5,413,116	515	5,413,666
2	5,412,871	23	5,412,933	864.23	5,413,007	6	5,413,051	858	5,413,117	643.1	5,413,667
50	5,412,872	78	5,412,934	866.3	5,413,007	44	5,413,052	877	5,413,118	657.1	5,413,668
355	5,412,873	80	5,412,935	CLASS 74		55.3	5,413,053	88.1	5,413,119	47.3	5,413,669
		CLASS 60		5.22	5,413,010	56.1	5,413,054	274	5,413,120	CLASS 159	
374	5,412,875	39.02	5,412,936	18	5,413,008	56.3	5,413,055	73	5,413,121	CLASS 160	
379	5,412,876	63	5,412,937	63	5,413,009	CLASS 111		73	5,413,122	7	5,413,161
503	5,412,880					130	5,413,055				



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177	5,413,162	CLASS 200	640	5,414,246	421	5,413,304	222	5,413,315	CLASS 296
CLASS 162	1 R	5,414,231	667	5,414,247	460	5,413,305	CLASS 267	136	5,413,396
5	5,413,675	CLASS 203	730	5,414,248	676	5,413,306	64-24	5,413,316	146-15
9	5,413,676	CLASS 204	89 2	5,413,236	11	5,413,307	134	5,413,317	210
42	5,413,677	CLASS 205	254	5,413,237	CLASS 249	140	5,413,318	CLASS 297	118
274	5,413,680	CLASS 206	268	5,413,238	CLASS 250	140.12	5,413,319	154	5,413,399
11.1	5,413,164	102	5,413,682	269	5,413,239	140.13	5,413,320	250.1	5,413,401
22	5,413,165	183.16	5,413,683	279	5,413,240	58	5,413,321	CLASS 298	23 M
30	5,413,166	192.13	5,413,684	280	5,413,241	747	5,413,322	CLASS 299	13
86	5,413,167	192.14	5,413,687	281	5,413,242	9	5,413,323	BI 5,232,268	CLASS 300
95	5,413,168	279	5,413,689	282	5,413,243	121	5,413,324	92	5,413,404
153	5,413,169	299 R	5,413,688	283	5,413,244	149	5,413,325	103	5,413,405
85	5,413,170	403	5,413,690	284	5,413,245	251	5,413,326	119.2	5,413,406
98	5,413,171	416	5,413,691	285	5,413,246	1	5,413,327	CLASS 301	56
153	5,413,172	424	5,413,692	286	5,413,247	32 B	5,413,328	CLASS 302	51
212	5,413,173	434	5,413,693	287	5,413,248	58 BA	5,413,329	CLASS 303	10.1
250	5,413,174	158	5,413,694	288	5,413,249	58 R	5,413,330	CLASS 304	87
252	5,413,175	318	5,413,695	289	5,413,250	61 R	5,413,331	CLASS 305	88
277	5,413,176	CLASS 206	105	5,413,251	61 R	5,413,332	5,413,333	CLASS 306	90
294	5,413,177	63.3	5,413,252	61 R	5,413,252	73 L	5,413,334	CLASS 307	239
300	5,413,178	308.1	5,413,253	61 R	5,413,253	77 A	5,413,335	CLASS 308	248
308	5,413,179	335	5,413,254	61 R	5,413,254	77 A	5,413,336	CLASS 309	311
387	5,413,180	363	5,413,255	61 R	5,413,255	77 A	5,413,337	CLASS 310	313 R
253	5,413,181	387.1	5,413,256	61 R	5,413,256	80 B	5,413,338	CLASS 311	366
776	5,413,182	524.8	5,413,257	61 R	5,413,257	81 C	5,413,339	CLASS 312	263
15.1	5,414,218	573	5,413,258	61 R	5,413,258	127 B	5,413,340	CLASS 313	230 I
36	5,414,211	600	5,413,259	61 R	5,413,259	138 R	5,413,341	CLASS 314	409
52.3	5,414,212	28	5,413,260	61 R	5,413,260	143 B	5,413,342	CLASS 315	414
113 R	5,414,213	89	5,413,261	61 R	5,413,261	176 B	5,413,343	CLASS 316	111.21
120 R	5,414,214	96.5	5,413,262	61 R	5,413,262	176 E	5,413,344	CLASS 317	158
124 R	5,414,215	119	5,413,263	61 R	5,413,263	185 R	5,413,345	CLASS 318	185 R
250	5,414,216	97	5,413,264	61 R	5,413,264	187.2	5,413,346	CLASS 319	316
254	5,414,217	113	5,413,265	61 R	5,413,265	200 A	5,413,347	CLASS 320	368.23
261	5,414,218	134	5,413,266	61 R	5,413,266	208	5,413,348	CLASS 321	371
262	5,414,219	189	5,413,267	61 R	5,413,267	245	5,413,349	CLASS 322	254
53	5,413,183	207	5,413,268	61 R	5,413,268	271	5,413,350	CLASS 323	268
62	5,413,184	567	5,413,269	61 R	5,413,269	274	5,413,351	CLASS 324	288
296	5,413,185	614	5,413,270	61 R	5,413,270	287	5,413,352	CLASS 325	66
CLASS 175	5,413,186	668	5,413,271	61 R	5,413,271	292	5,413,353	CLASS 326	72
53	5,413,187	722	5,413,272	61 R	5,413,272	400	5,413,354	CLASS 327	72.5
62	5,413,188	94	5,413,273	61 R	5,413,273	426	5,413,355	CLASS 328	73.1
296	5,413,189	110	5,413,274	61 R	5,413,274	429	5,413,356	CLASS 329	142
199	5,414,225	169	5,413,275	61 R	5,413,275	436	5,413,357	CLASS 330	143
18	5,414,226	198.2	5,413,276	61 R	5,413,276	12	5,413,358	CLASS 331	158
5,414,227	205	5,413,277	5,413,277	61 R	5,413,277	180	5,413,359	CLASS 332	188
5,414,228	208	5,413,278	5,413,278	61 R	5,413,278	7	5,413,360	CLASS 333	207.2
5,414,229	215	5,413,279	5,413,279	61 R	5,413,279	11.2	5,413,361	CLASS 334	232
5,414,230	225	5,413,280	5,413,280	61 R	5,413,280	11.2	5,413,362	CLASS 335	239
5,414,231	254	5,413,281	5,413,281	61 R	5,413,281	14.1	5,413,363	CLASS 336	251
5,414,232	274	5,413,282	5,413,282	61 R	5,413,282	32.7	5,413,364	CLASS 337	255
5,414,233	300	5,413,283	5,413,283	61 R	5,413,283	96.1	5,413,365	CLASS 338	301
5,414,234	450	5,413,284	5,413,284	61 R	5,413,284	250.1	5,413,366	CLASS 339	174
5,414,235	617	5,413,285	5,413,285	61 R	5,413,285	277	5,413,367	CLASS 340	178
5,413,187	631	5,413,286	5,413,286	61 R	5,413,286	477	5,413,368	CLASS 341	200
5,413,188	696	5,413,287	5,413,287	61 R	5,413,287	490.1	5,413,369	CLASS 342	22 R
5,413,190	708	5,413,288	5,413,288	61 R	5,413,288	602	5,413,370	CLASS 343	307
5,413,191	725	5,413,289	5,413,289	61 R	5,413,289	618	5,413,371	CLASS 344	321
5,413,192	755	5,413,290	5,413,290	61 R	5,413,290	620	5,413,372	CLASS 345	388.1
5,413,193	787	5,413,291	5,413,291	61 R	5,413,291	713	5,413,373	CLASS 346	475
5,413,194	803	5,413,292	5,413,292	61 R	5,413,292	728.2	5,413,374	CLASS 347	525
5,413,195	100	5,413,293	5,413,293	61 R	5,413,293	728.3	5,413,375	CLASS 348	541
5,413,196	106	5,413,294	5,413,294	61 R	5,413,294	733	5,413,376	CLASS 349	551
5,413,197	187	5,413,295	5,413,295	61 R	5,413,295	735	5,413,377	CLASS 350	568
5,413,198	24.19	5,413,296	5,413,296	61 R	5,413,296	752	5,413,378	CLASS 351	572
5,413,199	251 A	5,413,297	5,413,297	61 R	5,413,297	844	5,413,379	CLASS 352	825.02
5,413,200	282	5,413,298	5,413,298	61 R	5,413,298	5,414,295	5,413,380	CLASS 353	825.25
5,413,201	299	5,413,299	5,413,299	61 R	5,413,299	5,414,296	5,413,381	CLASS 354	825.44
5,413,202	353	5,413,300	5,413,300	61 R	5,413,300	5,414,297	5,413,382	CLASS 355	20
5,413,203	345.1	5,413,301	5,413,301	61 R	5,413,301	5,414,298	5,413,383	CLASS 356	22
5,413,204	358	5,413,302	5,413,302	61 R	5,413,302	5,414,299	5,413,384	CLASS 357	67
5,413,205	383	5,413,303	5,413,303	61 R	5,413,303	5,414,300	5,413,385	CLASS 358	107
5,413,206	457	5,413,304	5,413,304	61 R	5,413,304	5,414,301	5,413,386	CLASS 359	143
5,413,207	497	5,413,305	5,413,305	61 R	5,413,305	5,414,302	5,413,387	CLASS 360	176
5,413,208	500	5,413,306	5,413,306	61 R	5,413,306	5,414,303	5,413,388	CLASS 361	32
5,413,209	642	5,413,307	5,413,307	61 R	5,413,307	5,414,304	5,413,389	CLASS 362	35.5
5,413,210	690.2	5,413,308	5,413,308	61 R	5,413,308	5,414,305	5,413,390	CLASS 363	153.1
5,413,211	718	5,413,309	5,413,309	61 R	5,413,309	5,414,306	5,413,391	CLASS 364	217
5,413,212	778	5,413,310	5,413,310	61 R	5,413,310	5,414,307	5,413,392	CLASS 365	246
5,413,213		5,413,311	5,413,311	61 R	5,413,311	5,414,308	5,413,393	CLASS 366	345
		5,413,312	5,413,312	61 R	5,413,312	5,414,309	5,413,394	CLASS 367	349
		5,413,313	5,413,313	61 R	5,413,313	5,414,310	5,413,395	CLASS 368	350
		5,413,314	5,413,314	61 R	5,413,314	5,414,311	5,413,396	CLASS 369	351
		5,413,315	5,413,315	61 R	5,413,315	5,414,312	5,413,397	CLASS 370	352
		5,413,316	5,413,316	61 R	5,413,316	5,414,313	5,413,398	CLASS 371	353
		5,413,317	5,413,317	61 R	5,413,317	5,414,314	5,413,399	CLASS 372	354
		5,413,318	5,413,318	61 R	5,413,318	5,414,315	5,413,400	CLASS 373	355
		5,413,319	5,413,319	61 R	5,413,319	5,414,316	5,413,401	CLASS 374	356
		5,413,320	5,413,320	61 R	5,413,320	5,414,317	5,413,402	CLASS 375	357
		5,413,321	5,413,321	61 R	5,413,321	5,414,318	5,413,403	CLASS 376	358
		5,413,322	5,413,322	61 R	5,413,322	5,414,319	5,413,404	CLASS 377	359
		5,413,323	5,413,323	61 R	5,413,323	5,414,320	5,413,405	CLASS 378	360
		5,413,324	5,413,324	61 R	5,413,324	5,414,321	5,413,406	CLASS 379	361
		5,413,325	5,413,325	61 R	5,413,325	5,414,322	5,413,407	CLASS 380	362
		5,413,326	5,413,326	61 R	5,413,326	5,414,323	5,413,408	CLASS 381	363
		5,413,327	5,413,327	61 R	5,413,327	5,414,324	5,413,409	CLASS 382	364
		5,413,328	5,413,328	61 R	5,413,328	5,414,325	5,413,410	CLASS 383	365
		5,413,329	5,413,329	61 R	5,413,329	5,414,326	5,413,411	CLASS 384	366
		5,413,330	5,413,330	61 R	5,413,330	5,414,327	5,413,412	CLASS 385	367
		5,413,331	5,413,331	61 R	5,413,331	5,414,328	5,413,413	CLASS 386	368
		5,413,332	5,413,332	61 R	5,413,332	5,414,329	5,413,414	CLASS 387	369
		5,413,333	5,413,333	61 R	5,413,333	5,414,330	5,413,415	CLASS 388	370
		5,413,334	5,413,334	61 R	5,413,334	5,414,331	5,413,416	CLASS 389	371
		5,413,335	5,413,335	61 R	5,413,335	5,414,332	5,413,417	CLASS 390	372
		5,413,336	5,413,336	61 R	5,413,336	5,414,333	5,413,418	CLASS 391	373
		5,413,337	5,413,337	61 R	5,413,337	5,414,334	5,413,419	CLASS 392	374
		5,413,338	5,413,338	61 R	5,413,338	5,414,335	5,413,420	CLASS 393	375
		5,413,339	5,413,339	61 R	5,413,339	5,414,336	5,413,421	CLASS 394	376
		5,413,340</							

## CLASSIFICATION OF PATENTS

366	5,413,442	241	5,413,800	192	5,413,896		5,413,494	511	5,413,988	18 6	5,414,074
383	5,413,443	420	5,413,801	230	5,413,897	223	5,413,495			23 5	5,414,076
387	5,413,444	574	5,413,802	325	5,413,898	326		CLASS 514		24 3	5,414,077
400	5,413,445	583	5,413,804	326	5,413,899	328	5,413,497	12	5,413,989	26 71	5,414,078
	CLASS 412	598	5,413,803	495	5,413,900	346	5,413,498	15	5,413,990	56	5,414,079
17	5,413,446	620	5,413,805	502	5,413,901	500	5,413,499	27	5,413,991		
19	5,413,447			503	5,413,902	521	5,413,500	34	5,413,992		CLASS 540
	CLASS 414	9	5,413,806	523	5,413,903	535	5,413,501	54	5,413,993	145	5,414,080
338	5,413,448	58	5,413,807	569	5,413,904	551	5,413,502	102	5,413,994	302	5,414,081
343	5,413,449	140	5,413,808	600	5,413,905	578	5,413,503	110	5,413,995	491	Re 34,935
495	5,413,450		5,413,809		CLASS 431	622	5,413,504	169	5,413,996		CLASS 544
528	5,413,451	171	5,413,810	9	5,413,477	660	5,413,505	183	5,413,997		
695.5	5,413,452	176	5,413,811	10	5,413,476	701	5,413,507	211	5,413,998	60	5,414,082
729	5,413,453	212	5,413,812	265	5,413,478	729	5,413,508	231.5	5,413,999	130	5,414,083
	5,413,454	217	5,413,844	304	5,413,479	851	5,413,509	261	5,414,000	194	5,414,084
793.2	5,413,455	237	5,413,813		CLASS 433	886	5,413,510	287	5,414,001	300	5,414,085
	CLASS 415	262	5,413,814					292	5,414,002	315	5,414,086
		289	5,413,815	173	5,413,480		CLASS 440		5,414,009	404	5,414,087
	5,413,456	294	5,413,816	214	5,413,481			299	5,414,010		CLASS 546
55.6	5,413,457	306	5,413,817		CLASS 434	74	5,413,512	316	5,414,003	158	5,414,088
104	5,413,459	420	5,413,818				CLASS 445	339	5,414,004	243	5,414,089
115	5,413,458	427	5,413,819	11	5,413,482			343	5,414,005		CLASS 548
169.1	5,413,462	527	5,413,820		5,413,483	24	5,413,513	363	5,414,006		
206	5,413,460	576	5,413,821	128	5,413,484		CLASS 446	365	5,414,007	142	5,414,090
	CLASS 416		CLASS 428	254	5,413,485	36	5,413,514	381	5,414,008	214	5,414,091
1	5,413,461	1	5,413,822	317	5,413,486	75	5,413,515	413	5,414,011		CLASS 549
95	5,413,463	12	5,413,823	432	5,413,488	301	5,413,516	416	5,414,012		
182	5,413,464		5,413,824		CLASS 435	354	5,413,517	423	5,414,013	27	5,414,092
	5,413,465		5,413,825	5	5,413,906	454	5,413,518	456	5,414,016	214	5,414,093
	CLASS 417	18	5,413,826	6	5,413,907	487	5,413,519	460	5,414,017	236	5,414,094
69	5,413,466	31	5,413,827		5,413,908		CLASS 451	512	5,414,017	254	5,414,095
203	5,413,467	35.7	5,413,828		5,413,909			538	5,414,018	417	5,414,096
540	5,413,468	36.5	5,413,829	7.1	5,413,911	1	5,413,520	729	5,414,019	425	5,414,097
	CLASS 418	40	5,413,830	7.22	5,413,912		5,413,521				CLASS 552
		43	5,413,831	7.25	5,413,913	21	5,413,522		CLASS 521	653	5,414,098
55.1	5,413,469	92	5,413,832	23	5,413,914	38	5,413,523	32	5,414,020		CLASS 554
171	5,413,470	119	5,413,833	25	5,413,915	364		48	5,414,021		
	CLASS 419	121	5,413,834	29	5,413,916		CLASS 452	88	5,414,022	69	5,414,099
23	5,413,751	141	5,413,835	69.1	5,413,917	110	5,413,524	114	5,414,023	191	5,414,100
28	5,413,752	188	5,413,836	70.3	5,413,919	165	5,413,525		CLASS 522		CLASS 556
36	5,413,753	192	5,413,837	71.2	5,413,920	176	5,413,526		5,414,024	136	5,414,101
	CLASS 420	194	5,413,838		5,413,921		CLASS 453	46	5,414,025		CLASS 558
41	5,413,754	195	5,413,839	135	5,413,922			112	5,414,027	45	5,414,102
416	5,413,755		5,413,840	158	5,413,923	10	Re 34,934	453		90	5,414,103
472	5,413,756	209	5,413,841	172.3	5,413,924		CLASS 454		5,414,055	277	5,414,104
	CLASS 422	211	5,413,842	177	5,413,925	57	5,413,527	30	5,414,028	51	5,414,105
21	5,413,757	209	5,413,843	189	5,413,926	70	5,413,528	60	5,414,029	78	5,414,106
22	5,413,758	215	5,413,845	194	5,413,927	251	5,413,529	99	5,414,030	79	5,414,107
22	5,413,758	229	5,413,846	239	5,413,927	262	5,413,530	101	5,414,031	104	5,414,108
23	5,413,759	246	Re 34,933	240.4	5,413,928		CLASS 460	115	5,414,032	207	5,414,109
24	5,413,760	283	5,413,847	240.46	5,413,929	72	5,413,531	117	5,414,033	238	5,414,110
56	5,413,761	293	5,413,848	240.49	5,413,930		CLASS 462	120	5,414,034	357	5,414,111
70	5,413,762	305.5	5,413,848	252.1	5,413,931			181	5,414,035		CLASS 562
80	5,413,762	308.4	5,413,853	253.3	5,413,932	2	5,413,532	394	5,414,036	12	5,414,112
82.09	5,413,763	318	5,413,854	262	5,413,933			502	5,414,037	413	5,414,113
168	5,413,764	320.2	5,413,855	280	5,413,935		CLASS 473	558	5,414,060	556	5,414,114
173	5,413,765	334	5,413,856	299	5,413,936			576	5,414,061	591	5,414,115
174	5,413,766	336	5,413,850	312	5,413,934	55	5,413,533	789	5,414,041	606	5,414,116
186.07	5,413,767		BI 4,225,647	320.1	5,413,937		CLASS 474		5,414,042	828	5,414,117
186.3	5,413,769	357	5,413,857	721	5,413,910	78	5,413,534	64	5,414,043	851	5,414,119
225	5,413,768	361	5,413,851		CLASS 436	94	5,413,535		5,414,044		CLASS 564
	5,413,770	364	5,413,852			101	5,413,536		5,414,045	51	5,414,118
	CLASS 423		5,413,858	63	5,413,938	154	5,413,537		5,414,046	86	5,414,120
239.1	5,413,771	172	BI 4,457,973	518	5,413,939	164	BI 4,889,321		5,414,047	129	5,414,121
446	5,413,772	408	5,413,859		CLASS 437	263	5,413,538		5,414,048	275	5,414,123
447.2	5,413,773	411.1	5,413,860				CLASS 475		5,414,049	282	5,414,124
447.3	5,413,773	413	5,413,861	7	5,413,940	63	5,413,539		5,414,050	305	5,414,125
		423.1	5,413,862	16	5,413,941		CLASS 477		5,414,051	322	5,414,126
	CLASS 424	428	5,413,863	20	5,413,942				5,414,052	344	5,414,127
1 41	5,413,778	432	5,413,864	34	5,413,943				5,414,053	406	5,414,128
1 85	5,413,779		5,413,865	40	5,413,944	43	5,413,540		5,414,054	418	5,414,130
9 51	5,413,774	447	5,413,867	35	5,413,945		5,413,541		5,414,055	425	5,414,129
78.02	5,413,775	457	5,413,868		5,413,946	81	5,413,542		5,414,056	440	5,414,132
78.03	5,413,780	469.2	5,413,869	41	5,413,947		CLASS 482		5,414,057	503	5,414,133
93 45	5,413,781	502	5,413,870	44	5,413,948				5,414,058		
93 45	5,413,782	553	5,413,871	52	5,413,949				5,414,059		
93 5	5,413,783	601	5,413,872	61	5,413,950	49	5,413,543				
93 51	5,413,784	627	5,413,873	62	5,413,951	68	5,413,544				
115.1	5,413,785	611	5,413,874	69	5,413,952	71	5,413,545				
409	5,413,786	645	5,413,875	62	5,413,953	99	5,413,546				
	5,413,787	680	5,413,876	81	5,413,954	121	5,413,547				
	5,413,788	698	5,413,877	86	5,413,955	127	5,413,548				
	5,413,789			129	5,413,956		CLASS 501				
411	5,413,790		CLASS 429	161	5,413,957						
422	5,413,791	16	5,413,878	173	5,413,958	78	5,413,971				
434	5,413,792	30	5,413,879	174	5,413,959	98	5,413,972				
436	5,413,793	33	5,413,880	195	5,413,961	120	5,413,973				
448	5,413,796	105	5,413,881		5,413,962	153	5,413,974				
449	5,413,794	213	5,413,882		5,413,963		CLASS 502				
489	5,413,795		5,413,883	200	5,413,968	60	5,413,975		CLASS 528		
	5,413,796				5,413,969	66	5,413,976		5,414,066	456	5,414,138
	5,413,797		CLASS 430	208	5,413,970	68	5,413,977		5,414,067	490	5,414,140
490	5,413,777	5	5,413,884	209	5,413,964	80	5,413,978		5,414,068	579	5,414,142
715	5,413,798	28	5,413,885	219	5,413,965	107	5,413,979		5,414,069	617	5,414,143
	CLASS 425	58	5,413,886	225	5,413,966	333	5,413,984		5,414,070	670	5,414,144
			5,413,887	235	5,413,967	355	5,413,985			671	5,414,145
129.1	5,413,471	106	5,413,888		CLASS 439		CLASS 505				
183	5,413,472		5,413,889								
192 R	5,413,473	110	5,413,890	71	5,413,489	121	5,413,980				
205	5,413,475		5,413,891	76	5,413,490		5,413,981		CLASS 534		
311	5,413,487		5,413,892	108	5,413,491	193	5,413,982		BI 5,268,459	727	5,414,151
	CLASS 426	152	5,413,893	135	BI Re 34,531	211	5,413,983				
3	5,413,799	165	5,413,894	164	5,413,492	476	5,413,986		CLASS 536		
		191	5,413,895	188	5,413,493	492	5,413,987				
								18.5	5,414,073	7	

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771	5,414,153	467	5,414,174		5,414,196						31	5,413,594
	5,414,155		5,414,175	3	5,414,197						52	5,413,596
781	5,414,156	500	5,414,176	202	5,414,198	4	5,413,552	1	5,413,573		75	5,413,590
840	5,414,157	512	5,414,177	204	5,414,199	21	5,413,553	4	5,413,555		100	5,413,587
851	5,414,158	513	5,414,178	205	5,414,200		5,413,554	33	5,413,574		101	5,413,588
864	5,414,159	519	5,414,179	206	5,414,201			45	5,413,575		637	5,413,595
883	5,414,160	525	5,414,180		5,414,202			61	5,413,576			
885	5,414,161	654	5,414,181	207	5,414,203	22	5,413,556	69	5,413,577			CLASS 623
909.8	5,414,162	661	5,414,182	210	5,414,204	96	5,413,557	86	5,413,578	1		5,413,597
	5,414,163	678	5,414,183	214	5,414,205	101	5,413,558	87	5,413,579			5,413,598
		701	5,414,184	216	5,414,206	102	5,413,559	117	Re.34,936	2		5,413,599
CLASS 570		721	5,414,185	226	5,414,207	164	5,413,560	170	5,413,580		2	5,413,600
123	5,414,164	724	5,414,186		5,414,208	167	5,413,561	194	5,413,581	11		5,413,601
169	5,414,165	730	5,414,187	249		179	5,413,562	200	5,413,582	12		5,413,602
176	5,414,166	800	5,414,188			218	5,413,563	202	5,413,583	17		5,413,603
177	5,414,167	801	5,414,189			219	5,413,564	206	5,413,584	18		5,413,604
		802	5,414,190	47	5,414,683	232	5,413,565	213	5,413,571	20		5,413,605
CLASS 585		820	5,414,191			247	5,413,566	219	5,413,584			5,413,606
2	5,414,168	825	5,414,192			248	5,413,567	232	5,413,585			5,413,607
241	5,414,169	833	5,414,193	18	5,413,549	307	5,413,568					5,413,608
264	5,414,170	855	5,414,194			358	5,413,569					5,413,609
269	5,414,171					385.2	5,413,570	6	5,413,591	21		5,413,610
322	5,414,172	CLASS 588	5,414,195	2	5,413,550		5,413,571	18	5,413,592	23		5,413,611
357	5,414,173	1	5,414,196	46	5,413,551	892.1	5,413,572	27	5,413,593	25		5,413,612

## CLASSIFICATION OF DESIGNS

D1—	101	358,018	466	358,048	433	358,092	D14—	162	358,131	53	358,169	133	358,208			
D2—	607	358,019		358,067	434	358,094		100	358,132	55	358,170	146	358,209			
	777	358,020	467	358,068	456	358,095			358,133	60	358,171		358,210			
	970	358,021	475	358,049		358,096			358,134	69	358,172	155	358,211			
D3—	6	358,022	480	358,078	527	358,097			358,135	82	358,173	156	358,212			
	217	358,023	491	358,069	529	358,098		106	358,136		358,174	162	358,213			
	233	358,024	499	358,050	549	358,099			358,137	11	358,175	175	358,214			
	264	358,025	516	358,051	28	358,100		109	358,138	21	358,176	190	358,215			
		358,026	519	358,052	32	358,101			358,139	42	358,177	206	358,216			
		358,027	531	358,070	39	358,102			358,140	D21—	145	358,178	215	358,217		
		358,028	585	358,053	65	358,103			358,141	163	358,179	223	358,218			
		358,029	597	358,054		358,104		114	358,142	188	358,180	224	358,219			
	284	358,030	629	358,079	81	358,105			358,143	191	358,181	D25—	51	358,220		
	318	358,031	632	358,055	103	358,106			358,144		358,182	D26—	11	358,221		
D4—	104	358,032	302	358,056	104	358,107		115	358,145	195	358,183		23	358,222		
	114	358,206	332	358,057	106	358,108		116	358,146	200	358,184		37	358,223		
		358,033	334	358,059		358,109		137	358,147	211	358,185		46	358,224		
	138	358,034	350	358,061	110	358,110		138	358,148	214	358,186		63	358,225		
D5—	53	358,035	360	358,062	113	358,111			358,149	217	358,187		71	358,226		
D6—	300	358,037	509	358,080	24	358,112		205	358,150	220	358,188	D27—	162	358,227		
	317	358,036	605	358,071	87	358,114			358,151	234	358,189			358,228		
	333	358,058	621	358,072	144	358,115		218	358,152	242	358,190			358,229		
	334	358,038	672	358,074	164	358,113		245	358,153	253	358,191	D28—	49	358,230		
		358,060	690	358,073	202	358,116		253	358,154	255	358,192		82	358,231		
		358,077	19	358,081	218	358,117		257	358,155	D22—	126	358,193	D29—	106	358,232	
	349	358,039	51	358,075	D12—	91	358,118	D15—	5	358,156	D23—	202	358,194	D30—	133	358,233
	366	358,063	70	358,082		160	358,119		25	358,157		213	358,195	D32—	1	358,234
		358,064	331	358,076		180	358,120	D16—	22	358,158		225	358,197			358,235
		358,065	370	358,083		300	358,121		312	358,159		226	358,196			358,236
	373	358,040	373	358,084		310	358,122		326	358,160			358,198		22	358,241
	379	358,041	382	358,085		408	358,123	D17—	13	358,161		238	358,199		32	358,242
		358,042	300	358,086		423	358,124	D18—	4	358,162		252	358,200		37	358,243
	380	358,043	311	358,087		425	358,125		43	358,163		260	358,201		43	358,244
	381	358,044	341	358,088			358,126			358,164		263	358,202		44	358,244
	387	358,045	347	358,089			358,127		56	358,165		309	358,203		46	358,237
	437	358,046	420	358,090			358,128	D19—	26	358,166		314	358,204		50	358,238
	445	358,047	429	358,091	104	358,130		48	358,167		393	358,205	D34—	1	358,239	
	449	358,066	430	358,093	154	358,129			358,168		125	358,207	D24—	7	358,240	

## CLASSIFICATION OF PLANTS

P —	41.1 43.1	9,128 9,129	48 56	9,130 9,131	57	9,132	87.12	9,134	87.4	9,133	90	9,135
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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

### PATENTS

01 :	5,412,981 5,413,027 5,413,192 5,413,780 5,413,825 5,413,866 5,414,152 5,414,733 5,413,020 5,412,887 5,412,939 5,413,026 5,413,174 5,413,333 5,413,624 5,413,936 5,413,952 5,413,965 5,414,214 5,414,274 5,414,347 5,414,372 5,414,382 5,414,432 5,414,570 5,414,614 5,414,626 5,414,738 5,414,744 5,412,898 5,413,088 5,413,366 5,413,464 5,413,465 5,413,619 5,414,362 5,414,634 Re.34,929 5,412,819 5,412,824 5,412,851 5,412,856 5,412,866 5,412,905 5,412,908 5,412,951 5,412,958 5,412,959 5,412,972 5,412,975 5,412,980 5,413,000 5,413,007	5,413,015 5,413,019 5,413,023 5,413,025 5,413,044 5,413,049 5,413,065 5,413,070 5,413,090 5,413,096 5,413,098 5,413,105 5,413,117 5,413,124 5,413,141 5,413,150 5,413,152 5,413,159 5,413,165 5,413,166 5,413,172 5,413,208 5,413,225 5,413,236 5,413,240 5,413,245 5,413,282 5,413,293 5,413,331 5,413,341 5,413,346 5,413,352 5,413,363 5,413,371 5,413,389 5,413,391 5,413,427 5,413,437 5,413,454 5,413,489 5,413,490 5,413,497 5,413,508 5,413,543 5,413,548 5,413,556 5,413,557 5,413,559 5,413,560 5,413,562 5,413,572 5,413,575 5,413,594	5,413,595 5,413,600 5,413,606 5,413,614 5,413,615 5,413,622 5,413,628 5,413,651 5,413,686 5,413,695 5,413,700 5,413,708 5,413,709 5,413,716 5,413,718 5,413,732 5,413,751 5,413,759 5,413,760 5,413,768 5,413,772 5,413,791 5,413,796 5,413,804 5,413,806 5,413,812 5,413,859 5,413,877 5,413,903 5,413,933 5,413,939 5,413,954 5,413,964 5,413,966 5,413,969 5,413,971 5,413,977 5,413,989 5,413,992 5,414,007 5,414,011 5,414,077 5,414,085 5,414,171 5,414,187 5,414,188 5,414,192 5,414,221 5,414,222 5,414,223 5,414,258 5,414,261 5,414,262	5,414,264 5,414,266 5,414,267 5,414,276 5,414,280 5,414,292 5,414,294 5,414,299 5,414,301 5,414,312 5,414,313 5,414,314 5,414,342 5,414,352 5,414,358 5,414,364 5,414,371 5,414,377 5,414,388 5,414,392 5,414,399 5,414,411 5,414,425 5,414,437 5,414,453 5,414,454 5,414,479 5,414,504 5,414,507 5,414,521 5,414,546 5,414,552 5,414,553 5,414,555 5,414,565 5,414,577 5,414,580 5,414,586 5,414,597 5,414,600 5,414,609 5,414,618 5,414,618 5,414,630 5,414,638 5,414,643 5,414,644 5,414,649 5,414,658 5,414,663 5,414,664 5,414,669 5,414,693 5,414,694	5,414,708 5,414,713 5,414,716 5,414,722 5,414,728 5,414,732 5,414,741 5,414,748 5,414,755 5,414,757 5,414,761 5,414,769 5,414,778 5,414,780 5,414,781 5,414,791 5,414,796 5,414,799 5,414,803 5,414,804 5,414,805 5,414,812 5,414,815 5,414,817 5,414,818 5,414,820 5,414,824 5,414,826 5,414,827 5,414,829 5,414,831 5,414,836 5,414,841 5,414,842 5,414,850 5,414,854 5,414,863 5,414,865 5,412,897 5,412,982 5,412,991 5,412,991 5,413,107 5,413,131 5,414,638 5,413,206 5,413,227 5,414,644 5,413,294 5,413,353 5,413,394 5,413,499 5,413,514 5,413,582 5,413,914	5,413,916 5,413,987 5,414,194 5,414,219 5,414,340 5,414,861 5,412,836 5,412,872 5,412,922 5,412,990 5,413,037 5,413,046 5,413,212 5,413,234 5,413,268 5,413,272 5,413,326 5,413,440 5,413,456 5,413,458 5,413,466 5,413,486 5,413,491 5,413,493 5,413,564 5,413,603 5,413,612 5,413,648 5,413,687 5,413,687 5,413,694 5,413,711 5,413,757 5,413,923 5,414,028 5,414,094 5,414,127 5,414,213 5,414,353 5,414,393 5,414,449 5,412,816 5,412,842 5,413,274 5,413,827 5,413,863 5,414,004 5,414,027 5,414,050 5,414,111 5,414,115 5,414,132 5,414,140 5,414,165	09 :	10 :
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11 :	5,414,211	5,414,018	5,414,476	28 :	5,414,857	5,413,266	5,413,217
12 :	5,412,813	5,414,095	5,414,498		5,413,351	5,413,302	5,413,224
	5,412,829	5,414,112	5,414,502		5,413,340	5,413,233	5,413,233
	5,412,830	5,414,113	5,414,514		5,414,197	5,413,348	5,413,260
	5,412,880	5,414,168	5,414,585		5,414,750	5,413,356	5,413,283
	5,412,884	5,414,183	5,414,617	29 :	5,412,812	5,413,372	5,413,308
	5,412,890	5,414,354	5,414,700		5,413,132	5,413,379	5,413,379
	5,412,892	5,414,355	5,414,704		5,413,547	5,413,397	5,413,383
	5,412,913	5,414,475	5,413,448		5,413,739	5,413,448	5,413,384
	5,412,956	5,414,477	5,414,723		5,413,830	5,413,450	5,413,403
	5,413,061	5,414,711	4,910,886	31 :	5,413,155	5,413,460	5,413,442
	5,413,066	5,414,712	5,412,833		5,413,580	5,413,463	5,413,459
	5,413,068	5,414,774	5,412,871		5,413,693	5,413,480	5,413,568
	5,413,069	5,414,838	5,412,877	32 :	5,413,113	5,413,488	5,413,642
	5,413,128	5,412,961	5,413,008		5,413,258	5,413,509	5,413,644
	5,413,162	5,413,115	5,413,012		5,413,332	5,413,532	5,413,647
	5,413,187	5,413,181	5,413,028	33 :	5,412,985	5,413,536	5,413,652
	5,413,328	5,413,316	5,413,062		5,413,042	5,413,558	5,413,706
	5,413,329	5,413,319	5,413,072		5,413,376	5,413,625	5,413,725
	5,413,344	5,413,344	5,413,073		5,413,750	5,413,738	5,413,738
	5,413,345	5,413,743	5,413,084		5,414,236	5,413,674	5,413,752
	5,413,349	5,413,920	5,413,094		5,414,332	5,413,677	5,413,761
	5,413,400	5,413,995	5,413,137		5,414,524	5,413,682	5,413,816
	5,413,424	5,414,057	5,413,169		5,414,583	5,413,707	5,413,841
	5,413,485	5,414,124	5,413,190		5,414,624	5,413,723	5,413,871
	5,413,503	5,414,149	5,413,191		5,414,839	5,413,777	5,413,918
	5,413,604	5,414,329	5,413,216		5,414,840	5,413,807	5,414,034
	5,413,870	5,414,439	5,413,257	34 :	Re. 34,936	5,413,808	5,414,099
	5,413,879	5,414,602	5,413,286		5,412,835	5,413,810	5,414,185
	5,413,978	5,412,929	5,413,317		5,412,918	5,413,817	5,414,200
	5,413,996	5,412,930	5,413,361		5,413,054	5,413,848	5,414,201
	5,414,365	5,412,999	5,413,374		5,413,142	5,413,861	5,414,319
	5,414,406	5,413,452	5,413,378		5,413,253	5,413,886	5,414,325
	5,414,412	5,413,487	5,413,387		5,413,305	5,413,904	5,414,348
	5,414,418	5,413,821	5,413,407		5,413,342	5,413,905	5,414,441
	5,414,419	5,413,910	5,413,418		5,413,380	5,413,932	5,414,510
	5,414,426	5,413,937	5,413,431		5,413,393	5,414,014	5,414,582
	5,414,459	5,414,079	5,413,438		5,413,549	5,414,021	5,414,584
	5,414,596	5,414,251	5,413,457		5,413,563	5,414,022	5,414,601
	5,414,598	5,414,511	5,413,468		5,413,636	5,414,046	5,414,622
	5,414,620	5,414,622	5,413,539		5,413,676	5,414,066	5,414,762
	5,414,676	5,413,550	5,413,587		5,413,692	5,414,076	5,414,762
	5,414,699	5,413,741	5,413,668		5,413,696	5,414,090	4,831,685
	5,414,756	5,414,646	5,413,724		5,413,697	5,414,134	5,413,120
	5,414,860	5,412,839	5,413,773		5,413,698	5,414,151	5,413,172
	4,763,440	5,412,859	5,413,778		5,413,699	5,414,216	5,413,178
13 :	5,412,902	5,412,896	5,413,781		5,413,705	5,414,233	5,413,211
	5,412,996	5,413,004	5,413,805		5,413,722	5,414,238	5,413,237
	5,413,111	5,413,184	5,413,814		5,413,733	5,414,250	5,413,441
	5,413,307	5,413,364	5,413,955		5,413,755	5,414,298	5,414,039
	5,413,330	5,413,972	5,413,809		5,413,813	5,414,303	5,414,178
	5,413,553	5,413,537	5,414,010		5,413,852	5,414,401	5,414,179
	5,413,577	5,412,899	5,414,023		5,413,884	5,414,423	5,414,180
	5,413,655	5,413,154	5,414,037		5,413,885	5,414,438	5,414,184
	5,413,811	5,413,713	5,414,053		5,413,885	5,414,460	5,414,217
	5,413,832	5,414,040	5,414,074		5,413,935	5,414,469	5,412,873
	5,413,931	5,414,175	5,414,080		5,413,983	5,414,489	5,412,878
	5,414,078	5,414,181	5,414,130		5,414,000	5,414,491	5,412,907
	5,414,385	5,413,119	5,414,173		5,414,013	5,414,494	5,413,350
16 :	5,414,395	5,413,083	5,414,229		5,414,017	5,414,495	5,413,358
	5,413,335	5,413,110	5,414,246		5,414,036	5,414,495	5,413,358
	5,413,941	5,413,125	5,414,271		5,414,049	5,414,509	5,413,341
	5,414,376	5,413,343	5,414,283		5,414,051	5,414,513	5,413,341
	5,414,670	5,413,354	5,414,296		5,414,096	5,414,538	5,414,245
	Re. 34,934	5,413,392	5,414,346		5,414,146	5,414,613	5,414,268
17 :	5,412,828	5,413,561	5,414,420		5,414,172	5,414,642	5,414,296
	5,412,843	5,413,679	5,414,330		5,414,186	5,414,740	5,414,440
	5,412,862	5,413,771	5,414,366		5,414,189	5,414,758	5,414,690
	5,412,881	5,413,779	5,414,446		5,414,265	5,414,779	5,414,848
	5,412,885	5,413,919	5,414,512		5,414,307	5,414,783	5,412,911
	5,412,886	5,414,100	5,414,518		5,414,322	5,414,797	5,412,966
	5,412,906	5,414,227	5,414,597		5,414,428	5,414,811	5,412,979
	5,412,916	5,414,431	5,414,647		5,414,444	5,414,832	5,413,095
	5,412,919	5,414,621	5,414,725		5,414,540	5,414,845	5,413,149
	5,412,920	5,414,675	5,414,735		5,414,541	5,414,851	5,413,168
	5,412,955	5,414,775	1,034,531		5,414,594	4,225,647	5,413,229
	5,412,994	5,414,782	Re. 34,931	37 :	5,414,707	5,412,817	5,413,256
	5,413,005	5,412,986	5,412,915		5,414,788	5,412,891	5,413,276
	5,413,030	5,412,995	5,412,923		5,414,819	5,412,912	5,413,297
	5,413,032	5,413,060	5,413,157	35 :	5,413,179	5,413,320	5,413,320
	5,413,056	5,413,114	5,413,231		5,414,587	5,413,122	5,413,385
	5,413,118	5,413,136	5,413,267		5,414,776	5,413,135	5,413,432
	5,413,182	5,413,306	5,413,309	36 :	5,412,831	5,413,720	5,413,443
	5,413,262	5,413,381	5,413,311		5,412,852	5,413,815	5,413,472
	5,413,278	5,413,382	5,413,339		5,412,853	5,413,927	5,413,476
	5,413,416	5,413,512	5,413,494		5,412,857	5,413,960	5,413,477
	5,413,444	5,413,598	5,413,565		5,412,864	5,414,106	5,413,504
	5,413,449	5,413,649	5,413,588		5,412,875	5,414,107	5,413,533
	5,413,498	5,413,740	5,413,591		5,412,894	5,414,142	5,413,574
	5,413,531	5,413,785	5,413,593		5,412,924	5,414,263	5,413,634
	5,413,638	5,413,797	5,413,659		5,412,928	5,414,270	5,413,635
	5,413,680	5,413,837	5,413,688		5,412,936	5,414,607	5,413,660
	5,413,701	5,413,881	5,413,729		5,412,937	5,414,801	5,413,665
	5,413,704	5,413,894	5,413,749		5,412,960	4,976,510	5,413,670
	5,413,714	5,413,928	5,413,850	38 :	5,412,964	5,413,198	5,413,702
	5,413,715	5,414,005	5,413,851	39 :	5,413,009	5,413,703	5,413,703
	5,413,719	5,414,069	5,413,011		5,412,830	5,413,710	5,413,710
	5,413,758	5,414,071	5,414,075		5,413,021	5,412,874	5,413,731
	5,413,799	5,414,091	5,414,574		5,413,035	5,412,901	5,413,753
	5,413,801	5,414,337	5,414,592		5,413,108	5,412,963	5,413,782
	5,413,823	5,414,390	5,414,604		5,413,126	5,412,978	5,413,834
	5,413,824	5,414,409	5,414,678		5,413,161	5,412,989	5,413,842
	5,413,911	5,414,433	5,414,727		5,413,220	5,413,013	5,413,867
	5,413,990	5,414,434	5,414,790		5,413,239	5,413,031	5,413,874
	5,413,998	5,414,435	5,414,821		5,413,248	5,413,147	5,413,999
	5,414,012	5,414,455	5,414,852		5,413,264	5,413,189	5,414,025

	5,414,031	5,413,501	5,413,170	5,414,170	5,413,924	5,414,445
	5,414,035	5,413,596	5,413,171	5,414,253	5,414,001	5,414,526
	5,414,041	5,413,675	5,413,173	5,414,254	5,414,123	5,413,645
	5,414,047	5,413,849	5,413,176	5,414,288	5,414,730	5,413,775
	5,414,054	5,413,857	5,413,177	5,414,289	5,412,821	5,413,783
	5,414,062	5,413,930	5,413,180	5,414,310	5,413,089	5,413,878
	5,414,067	5,413,973	5,413,226	5,414,341	5,414,637	5,413,915
	5,414,068	5,414,199	5,413,280	5,414,373	5,414,656	5,414,045
	5,414,135	5,414,237	5,413,285	5,414,378	5,412,900	5,412,893
	5,414,136	5,414,677	5,413,321	5,414,380	5,412,962	5,412,895
	5,414,157	5,414,793	5,413,399	5,414,408	5,412,987	5,412,917
	5,414,177	5,412,904	5,413,422	5,414,422	5,413,053	5,412,931
47	5,414,195	5,413,024	5,413,552	5,414,424	5,413,077	5,412,932
	5,414,198	5,413,092	5,413,592	5,414,447	5,413,186	5,413,052
	5,414,202	5,413,197	5,413,611	5,414,458	5,413,194	5,413,116
	5,414,225	5,413,222	5,413,662	5,414,648	5,413,369	5,413,140
	5,414,240	5,413,312	5,413,671	5,414,673	5,413,726	5,413,215
	5,414,259	5,413,402	5,413,678	5,414,674	5,414,154	5,413,243
	5,414,284	5,413,681	5,413,717	5,414,714	5,414,462	5,413,337
	5,414,311	5,413,795	5,413,721	5,414,745	5,414,534	5,413,408
	5,414,343	5,413,876	5,413,763	5,414,754	5,414,557	5,413,515
	5,414,356	5,413,909	5,413,784	5,414,765	5,414,771	5,413,519
	5,414,581	5,414,193	5,413,833	5,414,768	5,414,814	5,413,526
	5,414,615	5,414,203	5,413,917	5,414,789	5,414,833	5,413,570
	5,414,742	5,414,248	5,413,948	5,414,792	5,412,938	5,413,585
	5,414,747	5,414,324	5,413,970	5,414,808	5,413,063	5,413,756
	5,414,785	5,414,590	5,414,056	5,414,809	5,413,368	5,414,019
44	Re,34,933	5,412,844	5,414,063	5,414,834	5,413,453	5,414,098
	5,412,848	5,412,868	5,414,087	5,414,844	5,413,462	5,414,381
	5,412,933	5,412,883	5,414,121	5,414,858	5,413,529	5,414,640
	5,412,950	5,412,910	5,414,125	5,414,859	5,413,566	5,413,047
	5,413,544	5,412,944	5,414,141	5,412,914	5,413,912	5,413,055
45	5,412,957	5,413,033	5,414,147	5,413,133	5,414,242	5,413,134
	5,413,254	5,413,048	5,414,150	5,413,251	5,414,247	5,413,158
	5,413,412	5,413,129	5,414,162	5,413,375	5,414,344	5,413,347
	5,413,483	5,413,145	5,414,163	5,413,658	5,414,407	5,413,555



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